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**An investigation of labour ward care to inform the  
design of a computerised decision support system for the  
management of childbirth**

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Plymouth Perinatal Research Group  
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in collaboration with  
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## Abstract

### **Maureen Harris. An investigation of labour ward care to inform the design of a computerised decision support system for the management of childbirth**

Patient monitoring is a complex task, particularly during childbirth, where assessment of the baby's condition is inferred from the continuous electronic recording of the baby's heart rate pattern and maternal uterine contractions (CTG). Computerised decision support has long been advocated, as difficulties in the interpretation of the CTG have led to failure to intervene and unnecessary intervention. The problem is large, for obstetric litigation now accounts for 80% of the UK National Health Service litigation bill. The Plymouth Perinatal Research Group has developed a computerised decision support system for patient monitoring during childbirth and the UK Medical Research Council has agreed to fund a multicentre randomised trial.

The work of this thesis was an investigation of the labour ward care system to inform the human-centred design of the decision support system for patient monitoring in childbirth, prior to the clinical trial. It was recognised that many decision support systems have failed to gain clinical acceptance, as conventional design models were inadequate. Lack of attention to the organisational context of the care system and the process of the direct patient care led to the design of inflexible 'expert' systems, which constrained working practices.

A pilot ethnographic study of an existing decision support system, used for the analysis of umbilical cord blood samples, was undertaken to clarify the research approach required for the main study. It was found that barriers to effective use within the wider work system included inadequate implementation and lack of organisational support. A case study approach produced a more comprehensive account of the context and process of the use of the computer system. The main study combined qualitative with quantitative techniques to investigate the system of care in childbirth, both outside and within the delivery room, to provide a unique, holistic perspective.

The organisational context of the labour ward was investigated by direct observation of clinicians over the course of their work for 220 hours. Observations were documented and transcribed to computer text files. Patterns of actions and events were coded using ATLAS(ti) data analysis software. The codes were counted and tabulated to model the main features of this labour ward care system, which was expressed in the form of a rich picture diagram. These findings were confirmed by a limited study of five other UK labour wards. The core qualitative categories, derived from the observation data, found a complex and problematic relationship between communication, decision making and accountability. Decisions were often made outside the delivery room and were subject to misinterpretation and bias. The organisational hierarchy made it difficult for junior staff to question clinical management decisions. A system of tacit practice, external demands upon clinicians and transient allocation of junior midwives to labour ward militated against teamwork. This increased the vulnerability of the care of mothers to error.

The process of direct patient care, within the individual delivery room, of 20 mothers in labour was captured in a novel audio-video observation study. The 111 hours of first stage labour and 12 hours of second stage labour were recorded and digitised to computer files. Recurrent actions and patterns of behaviour were coded both quantitatively and qualitatively using ATLAS(ti) data analysis software. Midwives left the room on average every 15 minutes to be absent for 27% of the first stage of labour. Record keeping occurred on average every 10 minutes and accounted for 19% of midwives' time. Midwives had little time to talk with mothers and only sat down at the bedside for 15% of the time. Psychosocial support was not given priority. Parents were generally excluded from communication between clinicians yet 108 clinicians took part in the care of the 20 women. Pressures from medicolegal directives and task-orientated imperatives overshadowed meaningful interaction with parents and caused spurious care priorities.

This work has revealed the need for a critical reassessment of the type of support that is required for monitoring situations in all areas of medicine. A range of functions, such as shared information displays and models, have been suggested to augment roles and relationships between clinicians and parents to support patient-centred care. The present work has revealed that a combination of computer-based technology and changes to working practice can support the parents, their individual carers and their various roles. In this way the system of care can be more aligned to the objective of a safe and emotionally satisfying birth experience for parents and staff. A further programme of research is required to follow-up the existing studies, develop these new forms of interaction between technology and clinicians, and evaluate their effectiveness. The research methods employed in the present work will provide a more comprehensive evaluation of the decision support system in the forthcoming multicentre trial. The methods of investigation have also been shown to be of relevance to patient safety research, service delivery and training.

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## Glossary of terms and abbreviations

A:	Anaesthetist
Algicon	Medication for relief of indigestion
Apgar score	A score of the physical condition of the baby at birth
AM:	Attendant midwife [primary carer]
Apyrexial	An absence of fever
APH	Antepartum haemorrhage
ARM	Artificial rupture of membranes [amniotomy]
Augmentin	An antibiotic
AuxN	Auxiliary nurse
BBA	Abbreviation for born before arrival at hospital
BS	Bedside
Bishop score	A score of the condition of the cervix
BP	Blood pressure
B.P.M.	Beats per minute
Bradycardia (fetal)	A baseline fetal heart rate of less than 110 b.p.m
Breech	The fetal buttocks lie in the lower pole of the uterus
C:	Researcher's transcription comment
Caput Succedaneum	Localised swelling in the fetal scalp as a result of pressure of the cervix
CCT	Controlled cord traction; a technique of delivering the placenta by traction
Cephalic	Pertaining to the head
Cervix	The neck of the womb
Cholestasis	Interruption in the flow of bile through any part of the biliary system
Clonus	Rapid alternating involuntary contraction and relaxation of skeletal muscle
CM:	Core midwife
Cms	Centimetres
Codine	An analgesic
Com. Midwife	Community midwife
CON:	Consultant
Crohn's disease	Inflammatory bowel disease
Crowning	The widest transverse diameter is born
DVT	Deep vein thrombosis [blood clot in the vein]
Dexamethazone	A steroid
D/W	An abbreviation for discussed with
Dysuria	Pain on passing urine
EBL	Estimated blood loss
Ectopic heartbeat	An impulse that originates in the heart at a site other than the sinus node
Effacement	Taking up of the cervical canal into the lower segment of the uterus
Entonox	A mechanical system for delivering nitrous oxide and oxygen; 'gas and air'
ELS	Early labour suite
Episiotomy	An incision through the perineum
Erb's palsy	Paralysis caused by injury to the brachial plexus
Fentanyl	An opioid anaesthetic
Fetal movements	Movement of the baby used as a guide of fetal wellbeing
FBS	Abbreviation for fetal blood sample
FH	Fetal heart
FHHR	Fetal heart heard and regular
First stage of labour	From the onset of labour to full dilation of the cervix
FSE	Fetal scalp electrode; applied to the fetal scalp to record the fetal heart rate
FD	Full dilation of the cervix (10cm)
Fully	An informal abbreviation for full dilation of the cervix
Fundus	The upper rounded part of the uterus
Gas and air	An informal term for a gaseous mixture of nitrous oxide and oxygen
Gastroschisis	Incomplete closure of the abdominal wall [a congenital defect]
Glycosuria	Sugar in the urine
Gravida	A woman who is pregnant
Haemolytic Streptococcus	A bacteria which can cause infection in mother or baby
Hb	Haemoglobin
Hartmann's solution	Fluid given by intravenous infusion
Hydralazine	A drug used to control blood pressure [Hydralazine hydrochloride]
Hypotension	Low blood pressure
Hypertension	High blood pressure
IOL	Induction of labour
IUGR	Intrauterine growth retardation; fetal growth falls below predicted value
IPPV	Intermittent positive pressure ventilation [artificial assistance of breathing]

IVI	Intravenous infusion [drip]
Konakion	A vitamin K injection given to prevent bleeding in the baby
Labetalol	A drug given to control blood pressure [Labetalol hydrochloride]
Laparotomy	Exploratory abdominal surgery
Lie	The relationship of the long axis of the baby to the long axis of the uterus
Marcaïn	An anaesthetic drug
Maxalon	An anti-emetic [sickness] drug
MC:	Midwife coordinator
MedSt:	Medical student
Methyldopa	A drug given to control blood pressure
MLC	Abbreviation for midwife led care
mls	Millilitres
MU	International milliunits
Mucaine	Medication for relief of indigestion
Multigravida	A pregnant women who has previously had one or more pregnancies
MultiP	An informal term for a pregnant woman who has given birth
Moulding	Overlap of the bones of the fetal skull
NBFD	Neville Barnes Forceps Delivery
NBS	Non bedside
NICU	Neonatal Intensive Care Unit
Nifedipine	A drug used to control blood pressure
N/K	Not know
O:	Observer
O/A	On admission
Occiput	An area of the fetal skull used to define the position of the baby
O/P	On palpation
Oligohydramnios	An abnormally small amount or absence of amniotic fluid [liquor]
OR:	Outside the delivery room
P:	Partner
Paed	Paediatrician
Papilloedema	Swelling of the optic disc
Para	Informal term for parity
Parity	Number of live births for an individual woman
Paracetamol	A mild analgesic
Perineum	The tissue between the vaginal and the anal canal
Pethidine	A narcotic used for pain relief in labour
PPH	Postpartum haemorrhage
Presentation	The part of the fetus lying in the lower part of the womb
Primigravida	A women pregnant for the first time
Prostin pessary	A pessary containing a hormone [used to induce labour]
Proteinuria	Protein in the urine
PV	Per vaginum
REG:	Registrar
Ritodrine	A drug used to relax the uterine muscles [ritodrine hydrochloride]
ROL	Right occipito lateral; position of baby's head in relation to maternal pelvis
ROM	Rupture of membranes
Second stage of labour	From full dilation of cervix to delivery of the baby
SG:	Staff Grade doctor
Shoulder dystocia	Inability to deliver the fetal shoulders, without the aid of specific manoeuvres
SO:	Significant other – companion other than partner
SRM	Spontaneous rupture of membranes
Station	Relationship of the presenting part to landmarks on the pelvis [ischial spines]
StM:	Student midwife
SVD	Spontaneous vertex delivery [normal birth]
Symphysis	A cartilaginous joint which unites adjacent bony surfaces
Syntocinon	A hormone used to stimulate contractions
Syntometrine	A drug given by injection at time of birth to reduce maternal haemorrhage
Tachycardia (fetal)	A fetal heart rate of greater than 159 b.p.m.
TCW	Transitional Care Ward [for babies with extra needs]
TENS	Transcutaneous electric nerve stimulation [for pain relief]
Thyroxine	A hormone for treatment of a thyroid disorder
VE	Vaginal examination [an internal examination]
Venflon	Commercial name for an intravenous cannula
Vertex	An area of the baby's head defined by specific landmarks
Waterlow assessment	A scoring system to assess the risk of development of pressure sores

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### Publications arising from the work;

Relevant scientific seminars and conferences were regularly attended at which work was often presented; external institutions were visited for consultation purposes and several papers published.

### Refereed journal papers

Harris M, Keith R.D.F, Garibaldi J, Beckley S. & Greene K.R. (1995) Umbilical cord blood gas analysis at time of delivery. *Midwifery* 12 (3): 146-150.

Harris M, Jagodzinski A.P. & Greene K.R. (2001) Roles for decision support systems: case studies in maternity care. *Artificial Intelligence and Society* 15 (1): 1-10.

### Refereed conference presentations and published conference papers

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Harris M. & Greene K.R. (2002) New directions for decision support systems – support of care and caring. *Advances in Clinical Knowledge Management Five*. Cancer Research UK. Lincoln's Inn Fields, London, 22<sup>nd</sup> April. 21-22.

#### **Other presentations**

Harris M. (1995) Assessment of current methods of fetal monitoring: The midwife's perspective. *Fourth International Symposium on Perinatal Asphyxia*. Plymouth Postgraduate Medical School, University of Plymouth, 8-9<sup>th</sup> September.

Harris M, Keith R.D.F. & Greene K.R. (1995) An overview of decision support systems in healthcare. *NHS Executive. Regional Seminar for Research Fellows and Students. Crossways*, Exeter, 11-12<sup>th</sup> December.

Harris M, & Greene K.R. (1996) Clinicians' views and experiences of a knowledge-based computer system. *NHS Executive. Regional Seminar for Research Fellows and Students. Crossways*, Exeter, 9-10<sup>th</sup> December.

#### **Presentations, invited**

Harris M. (1996) Intelligent decision support systems in maternity care. *The British Computer Society Annual Conference of the Nurse Specialist Group*. University of Sheffield, 19<sup>th</sup> September.

Harris M. (2000) Communication across labour ward: A qualitative analysis of work activity in a safety-critical system. *Northern Perinatal Mortality Survey Annual Study Day*. Regional Maternity Survey Office, Freeman Hospital, Postgraduate Centre, Newcastle upon Tyne, 15<sup>th</sup> September.

Harris M. (2000) Interactive decision support systems. Supporting work activity in safety critical clinical systems. *Annual Conference for Supervisors of Midwives*. South East Region Consortium of Local Supervising Authorities. Mander Hall, Hamilton House, London, 1<sup>st</sup> November.

Harris M. & Greene K.R. (2002) Observational study of care on delivery suite. *Northern Intrapartum Care Conference*. Civic Centre, Newcastle upon Tyne, 1<sup>st</sup> February.

Harris M. (2002) Context and process - quantitative and qualitative research around interpretation of the cardiotocogram: Computer assisted learning; Computerised decision support; the system of care. *Research Seminar*. Institute of Health Studies, Bournemouth University, 11<sup>th</sup> April.

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Signed Maureen Harris  
Date 13/12/2002

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## Chapter 1

### Introduction

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*This chapter introduces the research topic and its significance. The importance of the work is underscored by the widespread incidence of adverse medical events. The nature of the clinical setting is briefly described. Background information on electronic fetal monitoring, the specific area of application for the decision support system, is provided. The prototype computerised decision support system for patient monitoring in labour is described. The chapter concludes with a summary of the structure of the thesis.*

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## **Health Technology Assessment**

Health technology is a broad church of innovative equipment, tools and human services. Many healthcare interventions are complex packages of related 'elements' rather than a single intervention such as a drug (Campbell et al., 2000). Quantitative evaluation methods, mainly based on pharmaceutical models, focus on cost-benefits and clinical outcome and therefore provide little insight into health technology development or the deployment process. Consequently, promising interventions can be prematurely abandoned or encounter repeated failure (Heathfield 1998), as opportunities to understand the nature of health technology development and deployment are currently under-exploited.

It is now recognised that greater attention to the development (preclinical) phase of health technology is needed (Murphy et al., 1998; Campbell et al., 2000). A range of methods are required to assess the possible scope of a given intervention (for example, individual patient; the health professional), how it will be delivered (for example, service modification), what aspects might be effective or ineffective and how they affect outcome. Qualitative (naturalistic) research in particular, is considered appropriate for situations where the context and process of health technology development is to be investigated and can shed light on which aspects of the intervention might be successful or problematic.

The Government's patient safety programme, '*Building a Safer NHS for Patients*' (Department of Health 2001), identified computer systems as 'cross-cutting' technology with potential to reduce the occurrence of medical errors. However, many computer systems have failed to achieve their objectives due to overemphasis of the technology and disregard of the social and organisational context of work systems (Beynon-Davies 1999). It is therefore important that further research is undertaken in this field. The present work seeks to address this in the care of women in labour.

This thesis is concerned with clinical work systems and computer systems. In particular, it is concerned with how a better understanding of the labour ward care system and the practical care of mothers, can inform the further development of a computerised decision support system (DSS) for patient monitoring during childbirth. The importance of the research is underscored by the widespread incidence of adverse medical events and the potential of computer systems to reduce the occurrence of medical errors.

It is necessary first to orientate the reader, albeit briefly, to some of the wider issues of political, legal and consumer pressures, and ongoing organisational change, as it was against this background that the research reported in this thesis was conducted. A simplistic account of an 'ideal model of childbirth' and the 'intervention cascade' is provided in appendix 1 (page 269-271) for readers who are unfamiliar with the care of mothers in labour.

## **1.1 Medical errors and clinical systems**

Adverse events, such as those in cardiac surgery and cancer treatment (Berwick 2001), shake public confidence and pose a considerable financial threat to the National Health Service (NHS). In the United Kingdom (UK), settlement for clinical negligence is currently around £400 million a year (Department of Health 2000). On a wider scale, in the United States of America (USA), the number of preventable patient deaths has been estimated at 100,000 per annum (Brennan et al., 1991). This toll makes medical errors the eighth most common cause of death (Baker et al., 1992). This is clearly an important and long-standing problem.

The Department of Health publication, *'An Organisation with a Memory'*, on learning from adverse events, has drawn on experiences from other safety critical industries (Department of Health 2000). Evidence from the aviation industry, considered as relevant to healthcare, was used to illustrate the nature of failure and efforts to address human error in this setting. Such countermeasures have included strict pilot selection procedures, ongoing training, accreditation and the assistance of computerised support systems to aid complex decision making. However, limitations on flying hours, strict communication protocols and backup systems have also improved safety. There has also been a significant contribution from psychological and sociological studies of the cockpit and cabin crew



work system, leading to changes in work practice to promote teamwork and a safety culture (Helmreich 2000). Few such organisational strategies exist in the healthcare setting.

Investigations of medical error have tended to focus on individuals and punitive countermeasures. This culture of blame assumes the unit of causation for human errors is the individual:

“performing a discrete task alone and without external aids.”

(Engstrom 1991, p. 266)

Yet clinicians are only part of a much wider social and purposive work system. James Reason (1990) compared failures in a system with pathogens in the body ready to strike when conditions are right. However, as highlighted by Engstrom (1991):

“The focus shifts from individual operators and equipment components to entire organisations and systems of production. The notion of resident pathogen is only an analogy borrowed from medicine. It is not yet a conceptual tool suited for the analysis of latent failures.”

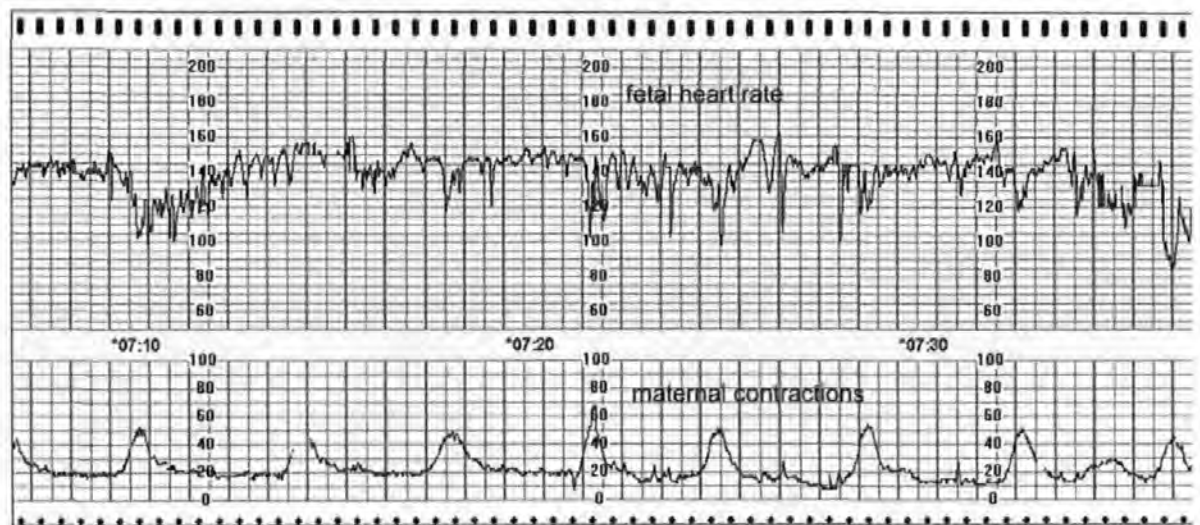
(Engstrom 1991, p. 265)

An examination of the labour ward system of care is particularly pertinent, for in the UK, claims for damaged babies account for 80% of the NHS litigation bill, currently running at £2.6 billion (Clinical Negligence Scheme for Trusts - CNST 2002), and a target of a 25% reduction in the number of instances of negligent harm by 2005 has been set (Department of Health 2000). This assumes that adequate methods are available for the analysis of errors and for the design of countermeasures.

### **1.1.1 The labour ward: a high-consequence clinical work system**

Failure in a high-consequence clinical system can result in an increased risk of harm, or actual harm, to people within the system (McCarthy et al., 1997). The Confidential Enquiry into Stillbirths and Deaths in Infancy has highlighted the vulnerability of labour wards (CESDI 1997). Nearly 75% of deaths of healthy babies during birth were avoidable and two thirds of intrapartum and early neonatal deaths were attributed to asphyxia (oxygen lack with tissue damage). Most errors were related to interpretation of electronic fetal monitoring traces. Effective monitoring of the fetus in labour depends on clinical staff having the skills to interpret the recording of the fetal heart rate and maternal uterine contractions (the cardiotocogram or CTG – figure 1.0). Difficulties in interpretation of the cardiotocogram have resulted in unnecessary intervention and importantly a failure to

intervene when necessary. Many of these latter cases subsequently become the focus of litigation (Johanson, Newburn & Macfarlane 2002).



**Figure 1.0:** The cardiotocogram

The most frequent criticisms from the Confidential Enquiries have related to delays in recognising or responding to CTG abnormalities (frequently over several hours), failure to appreciate the urgency or severity of the situation by the obstetric team and lack of senior accountability (CESDI 1997-2000).

The caesarean section rate has risen steadily over the years and now accounts for one in four births in the UK (Thomas & Paranjothy 2001). The reasons for this are not clear but fear of litigation contributes to defensive practice, with decisions based on perceived safety from legal recourse rather than potential for good patient outcome. Mothers too may request intervention due to fear of labour or loss of confidence in the system of care.

### **1.1.2 Intrapartum fetal monitoring: background**

Continuous electronic fetal monitoring by a recording of the CTG began in the late 1960s (Beard et al., 1971). However, there was little evaluation of the technology before its widespread use. Interpretation of the CTG was assumed to be easy and consequently its implementation lacked formal training programmes. Electronic fetal monitoring was often used as a tool of convenience in under-staffed maternity units. In many labour wards its routine use, rather than selective application for high-risk pregnancies, created a schism between midwives and doctors. Electronic fetal monitoring continues to be subject to criticism and controversy. Saling (1994) highlighted the historical perspectives entrenched in current practice:

“From several points of view, it would not be realistic to replace a highly efficient modern apparatus by a midwife... The midwife is more expensive and she has her human weaknesses and does not always keep to the fixed intervals as we know from many years of observations and routine.”

(Saling 1994, p. 4)

There was clearly a failure to appreciate that midwives and doctors were the monitors and the machine was only a recorder. There is now increased awareness that CTG interpretation is a difficult task, which requires considerable expertise and experience. These skills are difficult to establish and maintain with rapid staff turnover and they are not available 24 hours a day for all deliveries. It is usually the most junior member of staff, with the patient, who first has to recognise an abnormality to know that a more experienced further opinion is required. The problem is large, for at least 50% of mothers are monitored by the CTG in the UK (Audit Commission 1997). However, fetal monitoring by intermittent auscultation (listening to the baby's heart rate at regular intervals using a stethoscope or ultrasound device) is also unreliable. A study in Oxford of 64 cases of significant birth asphyxia found that 59% were monitored continuously but 41% had intermittent auscultation. In both groups significant abnormalities were either acted on too late or missed altogether (Murphy et al., 1990). These data, like the CESDI enquiry, found that significant asphyxial events go unrecognised by clinicians. It is, therefore, hardly surprising that obstetricians become the focus of litigation, or that the inexperienced resort to the use of defensive caesarean section, or that patients increasingly demand elective caesarean section. Left unchecked, the situation can only get worse with a shortage of trained midwives, working time directives and the decreased experience of junior doctors.

### **1.1.3 The organisational and social context of the labour ward**

The labour ward is a complex and dynamic system of care, which deals with an emotionally significant and critical life event. It involves a wide range of staff with varying levels of skills, experience and expertise. The environment is probably a unique care setting. It comprises a number of individual delivery rooms, where the majority of care is conducted in private (the microenvironment). Therefore, unlike general hospital wards or intensive care units, opportunities for mutual monitoring or crosschecking of the mother's and baby's condition by other members of staff are limited. In addition, the care of the individual mother takes place within the wider context of the labour ward system of care. This includes people in their various roles and with different responsibilities, such as permanent labour ward staff, staff on rotation from other areas of the maternity unit or



community, the division of labour and structures for the coordination of care (the macroenvironment).

The labour ward environment can be stressful, with underlying tensions within and between professional groups and parents (Carlisle et al., 1994; Chamberlain & Patel 1995). Pressures of time, inappropriate skills mix and inadequate staffing levels impact on safety and quality of care (Mackin & Sinclair 1998; Ness 1998). Attempts to improve continuity of care and job satisfaction have led to initiatives, such as team midwifery (Flint 1988; Department of Health 1993). However, the safety of these initiatives has been questioned due to low levels of permanent labour ward staff and deployment of staff ill-prepared to work in a generic capacity (Ness 1998).

The working party report, '*A Blue Print for the Future*' (Royal College of Obstetricians & Gynaecologists 2000), recommended a review and improvement of the organisation of labour wards. The report focused on changes in the infrastructure of medical teams and midwifery roles, the number of consultant labour ward sessions, minimum numbers of midwives and access to senior staff. It was estimated that it would take 10 to 15 years to provide adequate labour ward services.

Labour wards today can sometime seem to be under siege. Widespread shortages of midwives and medical staff, lack of experienced clinicians, escalating caesarean section rates and pressures to reduce the number of adverse obstetric events all add to the stress of the work environment. This in turn can impact on performance. As highlighted by Oakley (1992):

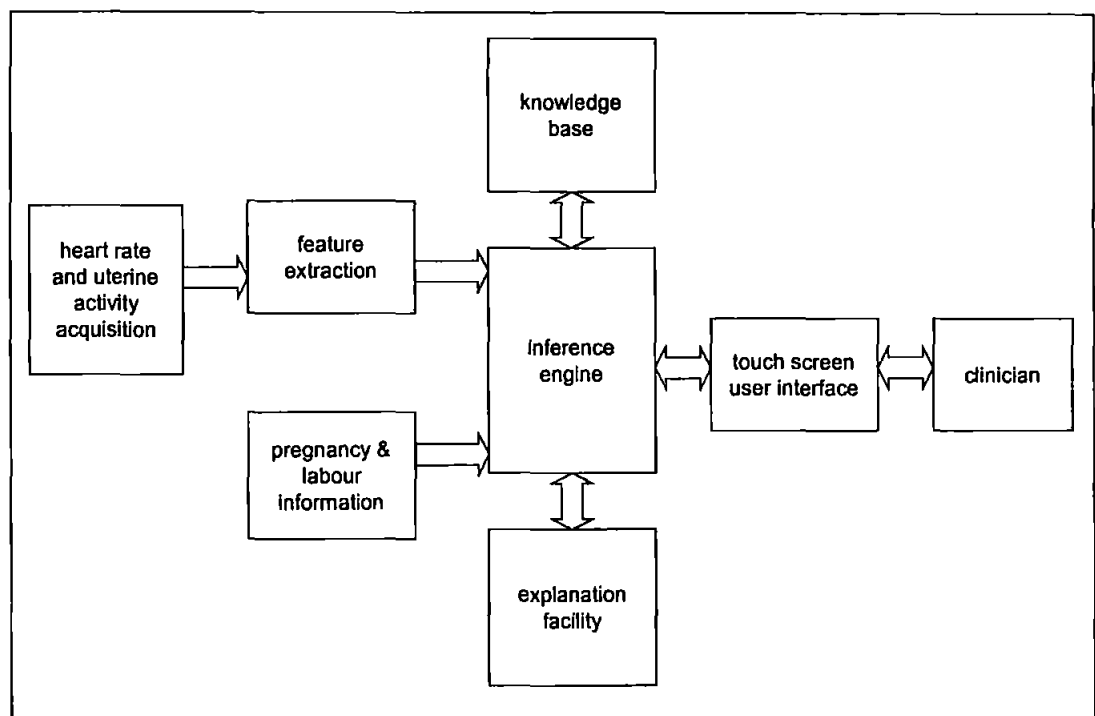
"It is a well known observation that institutional structures and systems can often be subversive of the goals they were set up to meet."

(Oakley 1992, p. 186)

## **1.2 Computerised decision support for patient monitoring in childbirth**

A major activity of the Perinatal Research Group at Derriford Hospital, Plymouth has been the development of computerised decision support systems (DSS). It has been the objective of the group to apply computer technology to improve the quality of care for mothers and babies in labour. Over the past 12 years the Perinatal Research Group has developed a

computerised decision support system for patient monitoring in labour using the CTG (Keith et al., 1994a; Keith et al., 1994b; Keith et al., 1995). The decision support system extracts the important features from the baby's heart rate pattern and the mother's contraction pattern, and pregnancy and labour information. The inference engine matches the information with the knowledge base, which has been developed from the combined knowledge of several expert obstetricians. The explanation facility allows the system to demonstrate the reasoning for a particular recommendation. The basic architecture of this decision support system is show in figure 1.1



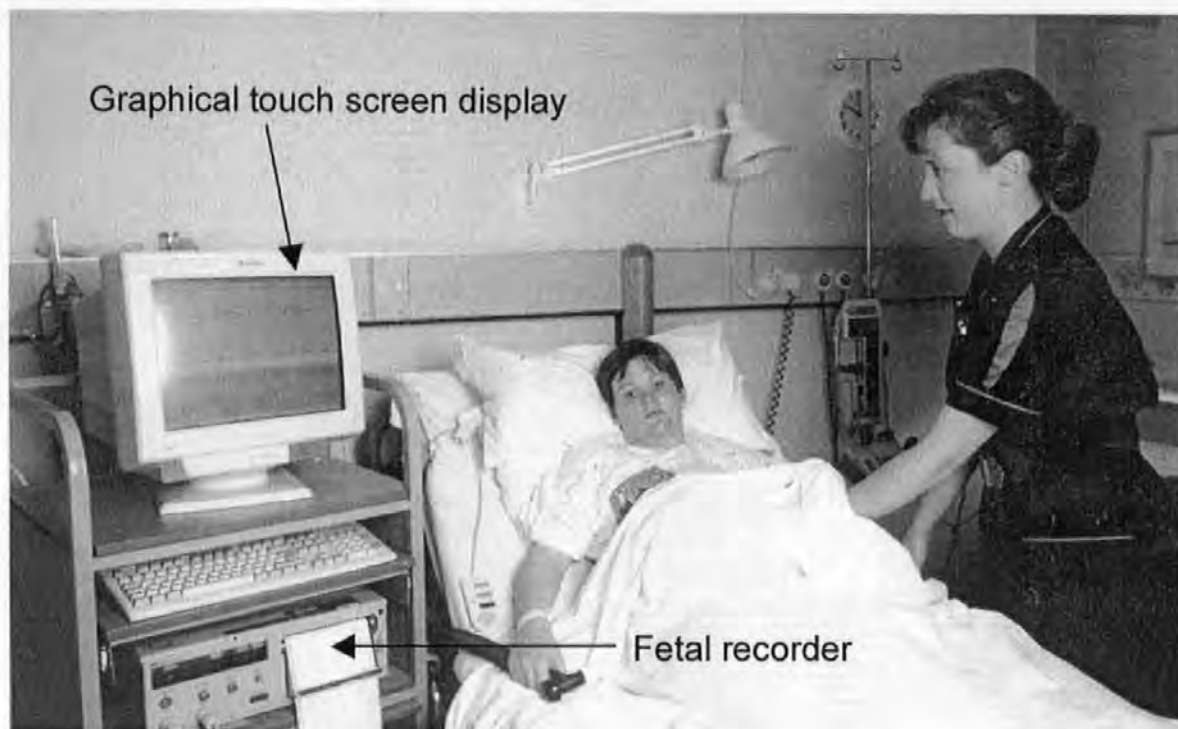
**Figure 1.1:** Architecture of the decision support system for patient monitoring in childbirth

Preliminary work compared the computer system's performance on a database of 50 cases with the performance of 17 expert clinicians around the UK. The system was found to be low interventionist and as good as the experts at identifying cases where intervention was required (Keith et al., 1995). Further development and validation compared the system's performance with three obstetric experts on a database of 500 cases weighted to poor perinatal outcome (Skinner et al., 1998). The off-line performance of the system was then compared with clinical practice on 900 serially collected cases (Harris & Greene 2000).

These extensive off-line validation studies have shown that the system attained the performance of an expert obstetrician in interpretation of the CTG and performed considerably better than clinical practice. It reliably recognised the abnormal, and was not

over-interventionist. On this data it seems reasonable to expect that the clinical use of this decision support system could improve perinatal mortality and morbidity.

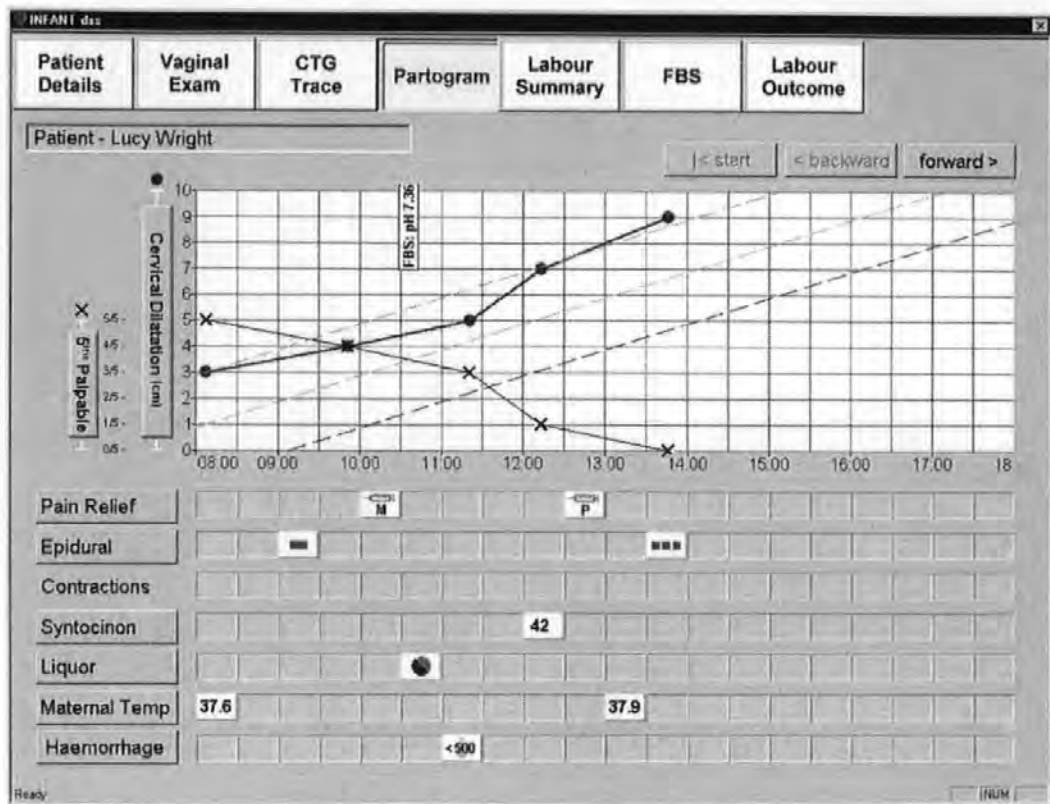
The prototype system consisted of a personal computer, to run the decision support software, connected to a conventional fetal recorder. Figure 1.2 shows a prototype computer system and the graphical touch screen interface.



**Figure 1.2:** The prototype decision support system with graphical touch screen display

The computer system automatically collected and archived the CTG from the conventional fetal recorder. The decision support system displayed the CTG data on the computer screen and extracted the important features of baseline heart rate, heart rate variability, accelerations, type and timing of decelerations, the quality of the signal and the contraction pattern.

Clinical information (previous pregnancy information, current antenatal risk factors, vaginal examination data, fetal blood sample results etc.) was entered by the clinician via the graphical touch screen interface. The information was displayed on a computer screen that was similar to the mothers' paper record, called a partogram, which graphically represents progress of labour (figure 1.3).

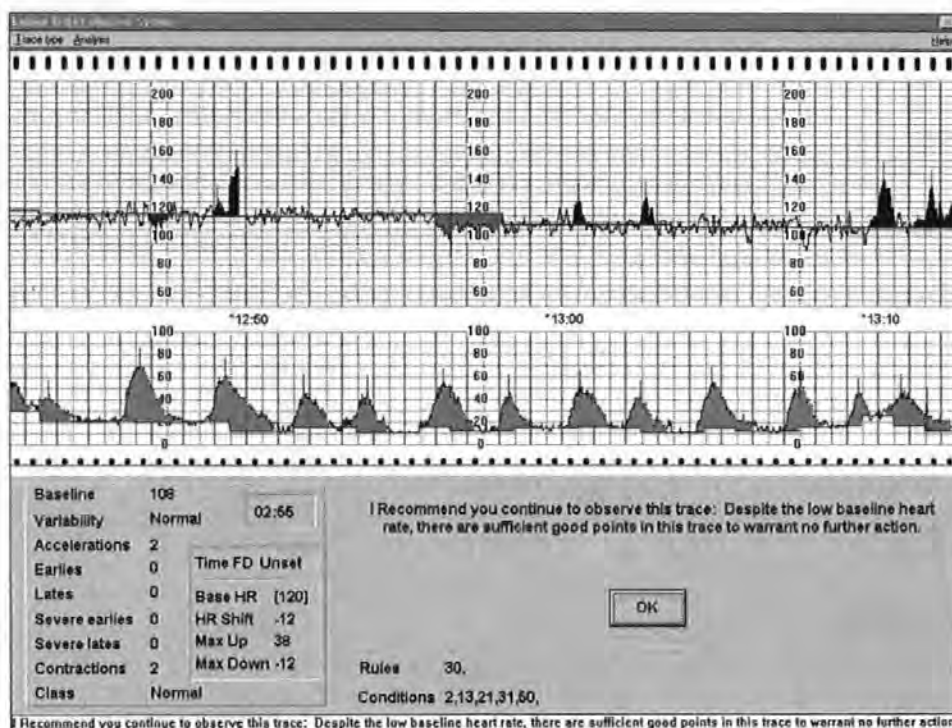


**Figure 1.3:** Computer display of the partogram showing labour progress and events

Significant clinical information and events that occurred during labour were represented visually to provide 'at a glance' information. The system could make enquiries of the clinician via the graphical user interface to prompt entry of data that it expected to have (for example, regular vaginal examinations).

These data were then analysed by the computer system in the context of the clinical information of the specific patient (stage of labour, rate of labour progress, fetal blood sample pH etc.). The system's assessment was presented as interpretations and recommendations to the clinician. The clinician could review the system's analysis using the explanation facility.

Figure 1.4 shows an example of a prototype output screen for the decision support system's analysis of the CTG. In this case the computer system highlighted reassuring features, such as accelerations (an abrupt transient rise in the heart rate) of a CTG trace with a low fetal heart rate baseline.



**Figure 1.4:** Decision support system prototype output screen showing the baseline heart rate, accelerations and maternal contractions

The interface between the computer system and user was vitally important to enable effective communication and satisfactory interaction. This was an iterative design process, which involved laboratory-based user evaluations and small-scale field studies of various prototype screen displays and forms of interaction (Harris, Keith & Greene 1997).

A real-time, large-scale user evaluation was conducted on the labour ward and demonstrated that the limited prototype computer system (without decision support output) was easy to learn and easy to use (Harris, Jagodzinski & Greene 2001). This was assessed by structured questionnaires and a clinical user preference study, which gave the choice of using the computer system or the current electronic fetal monitor. Midwives reported sharing the computer screens with doctors and core clinicians were generally dissatisfied when the computer system was withdrawn. It was also found that mothers appreciated the additional information provided and used this as a means of dialogue and to plan their analgesia.

The subject of this thesis is an investigation of the labour ward system of care. This was particularly important, as the design of previous decision support systems have been informed by conventional quantitative methods of requirements analysis, which were

insensitive to the social and organisational context of the work setting. Consequently, many computer systems were designed without an adequate understanding of the flexible and responsive nature of work and this sometimes constrained the way that work was actually accomplished (Greatbatch et al., 1993; Button & Harper 1996; Berg 1997a). For example, the use of a computer system during doctor-patient consultations undermined the doctors' ability to pay attention to and coordinate their discussion with patients (Greatbatch et al., 1993).

The importance of greater attention to the preclinical phase of decision support system design has been emphasised by Heathfield and Wyatt (1993):

“Failure to recognise the natural philosophy of a problem and a preoccupation with computer-related artefacts causes tunnel vision in terms of what can and cannot be accomplished. In such circumstances the solution may be forced into a structure dictated by the artefact, inhibiting the invention of new and more appropriate solutions.”

(Heathfield & Wyatt 1993, p. 4)

Therefore a detailed understanding of the care system is required to inform the design of computer systems (Murphy et al., 1998). This thesis addresses this well-known generic problem: the design of decision support systems to support human activity in clinical work settings. In particular, it is concerned with how a better understanding of the labour ward system of care and the practical accomplishment of the care of mothers, can inform the further development of a decision support system for patient monitoring in labour.

### **1.3 Computerised decision support systems**

A wide range of clinical computerised decision support systems have been designed to reduce the incidence of errors in many areas of medicine. There have been various definitions of decision support systems, which encompassed a broad range of support. For example:

“Active knowledge system, which uses two or more items of patient data to generate case specific advice.”

(Wyatt & Spiegelhalter 1991, p. 3)

“Any software designed to directly aid clinical decision making in which characteristics of individual patients are matched to a computerised knowledge base for the purposes of generating patient-specific assessments or recommendations that are presented to clinicians for consideration.”

(Hunt et al., 1998, p.p. 1330-1331)



A systematic review of 68 controlled trials of decision support systems found improvement in doctors' performance (for example, tighter control of blood pressure, maintenance of therapeutic range, adherence to standards) in 44/65 of the trials (Hunt et al., 1998). Patient outcome was assessed in 14/68 studies, of which, six found improvement (better weight control, improved emotional wellbeing, decreased urinary incontinence). Most of the computer systems reviewed provided reminders or alerts for clinicians. There were five diagnostic aid (not defined) trials included in the review. It is not clear how many systems were subsequently decommissioned and how many remain in routine clinical use. Computer-based reminders, alerts (for example, medication conflicts), checklists and guidelines have been shown to improve individual performance. Their effect on patient outcome is less clear (Wyatt 2000).

Two commercial medical computerised decision support systems, Quick Medical Reference (University of Pittsburgh and Camdat, San Bruno, California) and ILIAD (Applied Medical Informatics, Salt Lake City, Utah), were evaluated in a study of 216 North American clinicians on a range of off-line clinical scenarios. Quick Medical Reference improved clinicians' diagnostic accuracy by 8% compared to a 4% improvement with ILIAD. Inexperienced clinicians showed the largest improvement (Friedman 1999). Most off-line studies have demonstrated proof of principle. However, decision support systems have often encountered problems in clinical settings and so their potential has yet to be fully realised.

## **1.4 Aim and objectives**

The aim of the research is to inform human-centred design of the computerised decision support system for patient monitoring in labour. This was achieved by:

- Description and analysis of the labour ward care system.
- Development of a human-centred design framework

Specifically the research questions were:

- How is labour ward work activity currently coordinated?
- What are the generic structures and mechanisms that enable and constrain the care of mothers in childbirth?
- What options are there for support of the current system of care?
- How does investigation of the above three research questions inform human-centred design of computer-based support for care in childbirth?

## 1.5 The research process

Research, like many other aspects of life, does not always go according to plan. One encounters blind alleys, false leads and disappointments from which experience is gained and thinking matures. When the researcher first embarked on this work, her initial focus and thinking was based on individual users of the decision support system, the user interface and methods of quantitative evaluation. While work at this level produced some useful information, the scope was narrow. A small pilot study of an existing decision support system, which employed a qualitative research approach, changed the researcher's thinking from a focus on individuals to examining the wider social and organisational context of the labour ward. Consequently, the latter part of the thesis provides a detailed description of the labour ward care system and the actual care of mothers. It therefore places the 'presumed problem' of deficiencies and vagaries of individual interpretation of the CTG in a much broader context. This forms the basis for advice on the development of more appropriate technical and organisational support.

## 1.6 Structure of the thesis

The work is presented in the following chapters:

**Chapter 1** introduces the research topic and its significance. The importance of the work is underscored by the widespread incidence of adverse medical events. The nature of the clinical setting is briefly described. Background information on electronic fetal monitoring, the specific area of application for the decision support system is provided, and the prototype computerised decision support system for patient monitoring in labour is described.

**Chapter 2** reviews issues of user acceptability of decision support systems in clinical work settings and general issues of computer system design. The traditional design model for decision support systems is reviewed. It is argued that the narrow, mechanistic design model fails to take account of the social and organisational context of work systems. The focus on tasks and technology contributes to the design of decision support systems that often fail to achieve their operational objectives. The chapter concludes by addressing the consequences of the traditional simplistic design model and issues of human-centred design for decision support systems.



**Chapter 3** reviews the main theories selected for this study as an aid to the understanding and analysis of the labour ward care system. Phenomenology, ethnomethodology, situated action, distributed cognition and activity theory shaped the analytical framework and choice of research methods. Interpretive views of the context of cognition, as social and distributed throughout work systems, are reviewed. The chapter concludes with a discussion on the utility of interpretive theories for the analysis of work activity.

**Chapter 4** introduces a pilot study that was initially undertaken in order to clarify the research approach required to inform the further development of the patient monitoring decision support system. An ethnographic case study was employed to investigate the routine use of an existing decision support system, Expert DataCare, for the analysis of blood samples taken from the baby's umbilical cord at the time of birth. The study highlighted that the design of computer systems is a process, which requires a greater understanding of the use of the computer system in the context of the wider work system. This pilot work informed the selection of the research methods, the research design and the data collection techniques for the main study.

**Chapter 5** reports the research methods used during the main investigation. The diversity of methods reflects both the complexities of the problem and the limitations imposed if a laboratory-based or quantitative research method had been adopted. The research approach was iterative and each study influenced, shaped and informed the subsequent investigation. The chapter concludes with a discussion of the chosen research methods.

**Chapter 6** reports a case study of the labour ward care system (the macroenvironment). Observational data were collected by 'shadowing' individual members of the medical and midwifery staff through their work shifts and by documenting their actions and interactions. The data were analysed quantitatively and qualitatively and a rich picture diagram was developed as a model for the main structures and processes of the labour ward care system. These findings were compared with five other labour wards in the UK to produce a generic rich picture diagram of the labour ward system of care. The case study highlighted complex and problematic relationships between communication, decisionmaking and accountability. The chapter concludes with a discussion of the implications of the findings for the system of care.

**Chapter 7** reports an audio-video observational study undertaken to characterise the care of mothers within the individual delivery room (the microenvironment). Recurrent actions and care procedures were quantified and described. Data were analysed qualitatively and quantitatively to describe how care was accomplished. The study identified features within the care system that enabled and constrained the care of mothers. The supportive role of the midwife was found to be undermined by the present care system and birth partners, despite being marginalized, were used to supplement midwives' care. The interaction of medicolegal, technocentric and psychosocial frames and their imbalance, has shed light on their intended and unintended consequences and the possible causes of competing goals and spurious care priorities, which were observed. This pointed the way to the development of new forms of interaction for the decision support system, orientated to support of the care system and patient-centred care.

**Chapter 8** reflects on the investigations undertaken to consider the implications for the further development of the decision support system. The rich account of the care system reveals the need for a new model of decision support. It is clear that a range of functions, such as shared information displays, functional diagrams and models, are required to augment roles and relationships to support shared understanding and to promote patient-centred care. The investigations have also identified issues relevant to service delivery and organisation, which indicate the need for changes to the current care system so that it is aligned with its core purpose. It is proposed that a holistic approach is required, so that the performance of all the people in the system, clinicians and parents, would be augmented and complemented by innovative, supportive technology. The chapter concludes with a discussion of the utility of a broader framework of analysis.

**Chapter 9** presents a summary of the findings and the overall conclusions. The present work developed a programme of research to investigate the labour ward care system; suggested alternative roles for the decision support system, based on a human-centred design framework; demonstrated the value of qualitative methods for the analysis of the care system; examined the implications of the findings for redesign of the care system. The chapter concludes with a discussion of a number of areas for future research which include the role of non-professional (doula) support; the role of birth partners; development of training material and individual performance feedback loops; patient safety research; methods for the evaluation of emergency labour ward drills and team training.

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## Chapter 2

# Decision support systems: issues of design and use in clinical practice

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*This chapter reviews issues of user acceptability of decision support systems in clinical work settings and general issues of computer system design. The traditional decision support system design model is reviewed. It is argued that the narrow, mechanistic design model failed to take account of the social and organisational context of work systems. The focus on tasks and technology contributed to the design of decision support systems that often failed to achieve their operational objectives. The chapter concludes by addressing the consequences of the traditional simplistic design model and issues of human-centred design for decision support systems.*

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**“Their heads were all reclined either to the right, or to the left. One of their eyes turned inward, and the other directly to the Zenith.”**

Jonathon Swift - Gulliver's Travels

## **2.1 Introduction**

Gulliver's description of the Lilliputians symbolised their obsession with mathematical problems and astronomy to the exclusion of other human and practical considerations. Preoccupation with the power of technology has often overshadowed concern for human issues. This chapter provides a critique of the traditional approaches to the design of decision support systems, their assumptions and their consequences. Inherent in much of the reductionist, cognitive design models is the stripping of context and a focus on simplistic models of individual cognition rather than collective work practice. This is not to say that such models have no value, but that complementary methods are also required to take account of other human and practical considerations.

## **2.2 Issues arising with clinical use of decision support systems**

It is well known that previous decision support systems have experienced problems of user acceptability in real, clinically based work settings (Wyatt & Emerson 1990; Berg 1997a). This is an important issue, as a decision support system will only be useful in improving clinical care if it is used by clinicians. It is now realised that decision support systems are complex interventions. Often it is not possible to predict the full extent of the intervention and which aspects of the intervention could be effective or problematic for individual clinicians, clinical care teams, the individual patient and the work system. Their evaluation

is complex because both the design of a decision support system and the method of implementation can impact on user acceptance. The prevailing method of evaluation, the randomised trial, has tended to focus on the outcome of care, rather than the process of care. This has shed little light on the design of health technology or the process of deployment.

### **2.2.1 Mismatch between cognitive models and human performance**

Early decision support systems were mostly based on models of human cognition prevailing in the 1970's, such as the information processing metaphor of Newell and Simon (1972). These models essentially reduced human problem solving to the rules and limitations of finite state machines (Hollnagel 1995), so that *both* human and computer interaction were characterised as information processing machines. Such didactic and inflexible computer systems have been recognised as ineffective in real working environments. The deficiency of symbiosis between human and computer system can be viewed not as a fault of the technology, but of inappropriate expectations of its roles in interaction with the realities of clinical care, as opposed to laboratory studies. Of particular relevance to the present work are the following characteristics described by Zsombok (1997):

- Multiple players: the decision making process is distributed across many individuals so the team is a necessary unit of analysis.
- Problems are ill-structured, not artificial well-structured problems.
- Shifting, ill-defined or competing goals, not clear stated goals.
- A context of organisational goals and norms in addition to the visible task goals.
- Time stress.
- Action / feedback loops, not one-time decisions.

### **2.2.2 Reliability and fallibility**

The limitations of early decision support systems have overshadowed potential advantages such as rapid analysis of complex information, consistent advice, and initiation of early action. Computer systems are unaffected by fatigue, distractions or interruption and so seem to offer an attractive means of support. For example, the decision support system for patient monitoring in childbirth has demonstrated a performance level as good as obstetric experts and better than clinical practice on a database of 1,400 cases. It is therefore understandable that the healthcare setting would wish to harness such power.

Many decision support systems have been developed for complex problems that were incompletely understood and had no single answer (Hollnagel 1989; Berg 1997a). The uncertainty associated with data inputs and outputs have been difficult to represent to users. In addition, the knowledge base, derived from fallible human experts, has raised concerns of reliability and validity (Hollnagel 1989). However, it is important to remember that expert clinicians do not make decisions with 100% certainty and perfect outcome. Therefore, it seems unlikely that a decision support system derived from expert knowledge would have 'perfect' sensitivity and specificity. When a new intervention is evaluated, it is compared with a standard treatment to determine if it is more or less effective. There is no expectation that a new intervention will be 100% effective. Importantly, if judged in the same way as a clinician, that is, were the recommendations of the computerised decision support system in accord with a responsible body of medical opinion (the Bolam principle of negligence) then a reasonable standard of care has been provided (Braahms & Wyatt 1989).

Validation is critically important for the development of any decision support system, but particularly so for systems used in medicine. Inadequate evaluation of decision support systems has contributed to subsequent distrust and scepticism. Many benefits may arise from a Hawthorne effect, or from a checklist effect which draws attention to abnormal or missing data. The final and most influential off-line test of MYCIN, a decision support system for the diagnosis of bacterial infections, consisted of only 10 clinical cases, all of which had meningitis (Lipscombe 1989). Most reported studies to-date have been of systems for calculating drug dosage or drug interactions, for information management in preventative care or for establishing treatment guidelines. Few of these assessed the effect on patient outcomes (Hunt et al., 1998).

Until recently, there was little regulation of the quality and safety of software programs (Rigby et al., 2001). For example, errors in a reference database for calculation of Down's syndrome screening led to false negative reports (Cavallie 1996) and an error in software calculating risk of Down's syndrome led to falsely low calculation of risk for 150 women in Sheffield, England (Wilkinson 2000). Computer systems can induce as well as reduce errors and latent failures in computer systems may be just as difficult to detect as those embedded in work systems.



### **2.2.3 Assumed roles for clinical decision support systems**

Wyatt and Emerson (1990) suggested the aim of many decision support systems was to embody knowledge so that senior doctors need not interact with junior doctors. It was assumed the computer system would guide the less experienced to improved performance. However, over-constraint of novices may impede their development (Benner 1982). Berg (1997b) suggested that nurses' responsibilities could be enhanced through the delegation of activities traditionally undertaken by doctors. A cynical view might be that this would free doctors to do more 'interesting' and 'important' activities. Clearly, there is potential for decision support systems to impact on the roles and relationships of healthcare professionals.

Changes of professional boundaries highlight issues of accountability, particularly in a highly charged medicolegal environment. The regulatory body for Nursing and Midwifery in the United Kingdom (UKCC) view decision support systems as tools to ensure that all possible options have been considered (personal correspondence). Responsibility for compliance with the advice remains with the user. This may contradict the function of the computer system, as the end-users' ability to determine the validity of the advice may be limited (Hollnagel 1989).

It has often been assumed that decision support systems promoted learning (Hayes-Roth, Waterman & Lenat 1983) but their educational role remains unclear (Lipscombe 1989). It was thought that the user would learn from a display of the rules and conditions, which led to the generated advice. Developers of MYCIN (Shortliffe 1984), a decision support system for the diagnosis of bacterial infections, found their system was unsuitable for teaching students, as important knowledge was implicit in the structure and ordering of its rules and conditions (Lipscombe 1989). The role of decision support systems as an educational tool for trained clinicians has not been investigated. Many 'decision aids' support the limitations of human memory, rather than diagnostic or problem solving skills.

DeDombal (1984) suggested that for a system to be accepted users must perceive the need for assistance and the system must fulfil that need. This may not be recognised, as some individuals, especially the inexperienced, tend to be overconfident and consider their decisions to be better than they actually are (Kleinmuntz 1992). Users may reject a system for reasons other than performance. Previous decision support systems have been rejected when they imposed a significant change in practice (Wyatt & Emerson 1990). Often there

was a mismatch between the user's expectations of the system and what could be achieved. If the system's boundaries of knowledge are unclear, the user's expectations may not match the system's capabilities.

The ethics of computerised decision support have also been a source of debate. There is the view that human judgement is unsystematic, intuitive and often unreliable and conversely the view that systematic and explicit processes associated with knowledge-based systems are dehumanising (Dowie & Elstein 1991). However, little concern has been shown for the consequences of those affected by decisions. The contribution of patients in the decision making process has received little attention, particularly in maternity care where patients' choice of intervention and clinicians' unnecessary intervention is the cause of much tension and debate.

#### **2.2.4 Inadequate understanding of the clinical problem**

Some decision support systems were developed before the problem they were designed to address was fully defined or even understood. Examples of this can be found in Berg's (1997a) account of the development of ACORN (Admit to Coronary Care OR Not), a decision support system for the assessment of patients admitted to a UK Accident and Emergency department with chest pain. Originally, the designers set out to develop a computer system to reduce the number of unnecessary tests performed on patients with chest pain. When it was found this was not actually a problem in their department, the goal shifted to reduction of unnecessary admission to coronary care units (CCU), a well-described problem in the USA. The designers found this was also not a problem in their department. On the contrary, patients with serious conditions were often not admitted to CCU, while others waited an excessive amount of time to see a doctor. It was only after a number of iterations that the problem of whether to admit to CCU or not was uncovered as *the* 'suitable' application area for the decision support system.

#### **2.2.5 Localisation to development site**

The legacy of over-enthusiastic proponents of early decision support systems is one of unrealistic and unmet expectations. Many years of experience show the design process is long and complex. Early systems had many technical limitations. Computers were large, expensive, slow and required specialist operators so transfer into general use was extremely difficult. Developments in affordable and robust computing technology resolved

many technical limitations and practical problems, but many remain. One suggested solution for remaining technical problems is the electronic patient record and the grafting of knowledge-based systems onto existing information systems (Lilford 1990). Fully integrated electronic patient records are rare and frequently associated with implementation difficulties and problems of user acceptance (Berg 1998). Furthermore, there are essential differences between information and knowledge-based systems. Information systems gather mainly quantitative data, with little user feedback. In contrast, diagnostic support systems deal with incomplete information, which is associated with uncertainty and risk (Stephanou & Sage 1987).

Berg (1997a) described localisation as a dialectic relationship between a development site and iterative adjustments to a decision support system's scope and rationale so it can operate in a real-life setting. Berg pointed out that this did not mean to say that all decision support systems suffer from localisation but the particular systems he investigated, in those particular circumstances, could not work to their full potential. The work of Wyatt and Berg highlighted that greater attention to preclinical development and the actual clinical setting was needed. ACORN in particular was not designed to help nurses do their work, but to help them do someone else's work. In addition, clinical decision making was often viewed as an individual event rather than a social process. This assumption shaped the design of computer systems that provided didactic advice to individual clinicians and reduced their role to data input.

#### **2.2.5.1 Constraints on the extent of decision support**

The frank account of Heathfield and Wyatt (1993) and Berg's (1997a) critique of decision support systems, provide illustrative examples of how technology and practice adapted when the decision support system ACORN was introduced into a clinical setting. The developers found nurses often made a decision before using the computer. The system was too complicated and recommended actions that nurses were not authorised to take. In addition, lack of resources often precluded compliance with recommendations. Consequently, the system's output was reduced from 13 to three advice options to fit the nurses' triage model and practice was altered to authorise nurses to take medical decisions.

The iterative adjustment to the computer system, to meet organisational imperatives, conformed the system more to the conventions of the local site (localisation in space). This led to a reduction in the extent of the system in terms of the original objectives

(localisation in scope). To implement the computer in the clinical setting the scope of the system, the aspiration of designers and the expectations of the users were all diminished.

#### **2.2.5.2 Limitations of statistical and clinical data**

The earliest, most rigorously tested and most enduring decision support system was developed by DeDombal and co-workers (1972), for the diagnosis of acute abdominal pain. The system used Bayes' Theorem to calculate the conditional probability of a diagnosis based on the presence of specific symptoms of patients admitted to the Accident and Emergency department. Issues of localisation were highlighted when the system was implemented in surgical wards, as patient characteristics were different to those admitted to Accident and Emergency department. Regional variation in disease probabilities was also found and the system had to be readjusted to accommodate those differences. These issues were intertwined with an inevitable move from precision because of differences in disease distributions and the interpretive nature of medical data (localisation in rationale). Sociological studies of cognition have drawn attention to a more fundamental issue. Data input and output are not just information to be processed. The application of knowledge incorporates interpretive skills, which define the situated meaning of that knowledge (Garfinkel 1967; Suchman 1987; Berg 1997a). This will be discussed further in chapter 3, section 3.3.

## **2.3 Human factors**

Human factors research has long recognised the need to consider the psychological, social and technical factors, which are intertwined with individual performance. Human factors is defined as the study of the interrelationships between humans, the tools they use and the environment in which they live and work (Weinger 1998).

### **2.3.1 Effect of cognitive paradigms on the study of human factors**

Early computer systems were mainly developed under the earlier paradigm of individual performance, often according to early cognitive models of human problem solving proposed by workers such as Newell and Simon (1972). For example, the Goals, Operations, Methods and Selection (GOMS) model for human information processing attempted to predict human behaviour at the computer interface (Card, Moran & Newell 1983), and is typical of models that treat human cognition as a model of machine processing. The user's goal is to achieve a particular state. Goals correspond to the

intention of the user to perform a task, a subtask, or physical operation. Operations characterise basic physical actions and cognitive operations. A user's knowledge is organised into methods to generate sequences of operations that achieve specific goals. Selection rules are the specific conditions where it is appropriate to execute a method. Models such as GOMS were a significant attempt to place human-computer interaction and design on a more theoretical basis. However, such models were derived from the error free performance of text editing experts. Thus the scope was narrow and did not account for learning, skills acquisition or errors.

### **2.3.2 Collective work practice**

Team performance has been the focus of research, particularly in commercial, industrial and military sectors. Teams comprise interdependent individuals with different roles, responsibilities and knowledge (Cannon-Bowers, Salas & Converse 1993). Effective teams share common features such as mutual monitoring and feedback, awareness of team members' roles, responsiveness to change in task or team, effective communication, and shared understanding of the team's situation and course of action. A better understanding of how teams work together has emerged from observation of their performance in high fidelity simulations and studies of real-life settings. For example, the concept of situational mental models (the common blackboard that team members share) and mutual mental models (knowledge of the roles and responsibilities of team members) provide an explanatory framework for the analysis of team interactions. It is thought that situational mental models aid the ability of a team to form more accurate assessments and therefore to plan more effectively (Zsombok 1997b).

The factors that contribute to team effectiveness and the role of technological support are not well understood. However, concepts such as situational mental models indicate that technology could play a part in the support of teamwork through the development of external representations to aid the formation of shared mental models. The shift in focus from the study of individuals, usually under laboratory conditions, to naturalistic study of teams in real work settings, has so far had little impact on the design of decision support systems. However, there is some evidence to suggest that information systems, which display all available information to team members, can improve problem analysis, level of participation, confidence, satisfaction, quality of decisions, and reduce the dominance of groups by an individual (Pinsonneault & Kramer 1990). This should give a new sense of

direction to the design of decision support systems. A combination of technological support could aid the development of mutual mental models and establish norms of performance with consequent improvements in communication and teamwork.

### **2.3.3 Human-centred design**

Early approaches to incorporate human factors in system design were often inadequate. For example, automation of the work of coal miners initially caused suboptimisation of the entire work system (Tryst & Bamforth 1951). This observation led to the sociotechnical movement, which sought to balance the social and technical aspects of work systems to achieve a better working relationship (Rogers 1997). However, its impact has been mainly in the reorganisation of work around technology with little direct contribution to the design of technology (Clegg 1994).

Attempts to redress the balance have led to the emergence of human-centred design, which seeks to place users at the centre of the design process. This approach is guided by four main principles (HUSAT 1988):

- Computer systems exist for human purposes.
- Computer systems should be judged by the criteria of those who use them.
- Design teams must involve users in all stages of the system's life-cycle.
- Computer design must take account of user characteristics.

Methods and tools for human-centred design have been slow to evolve. For example, attempts to involve users have not been without difficulty, as it is not clear at what point in the design process users should be involved or how they can contribute. End-users are often too busy to participate in the design and evaluation process. Those who do participate are often well motivated and co-operative. Users recruited as part of a design team are often senior, articulate members of staff. Designers frequently encounter difficulty in acquiring clear information about users and their tasks. Many users have difficulty in identifying their needs and while they understand their own work they are sometimes unaware of the wider aspects of the work system (Hughes et al., 1993). In addition, there is evidence to suggest that in practice some people cannot articulate their actions but act correctly, while others articulate clearly what should be done but do not actually do it (Broadbent 1990). Issues of how to best involve users in design, identify user requirements, or bridge the 'evaluation gulf' have yet to be resolved.



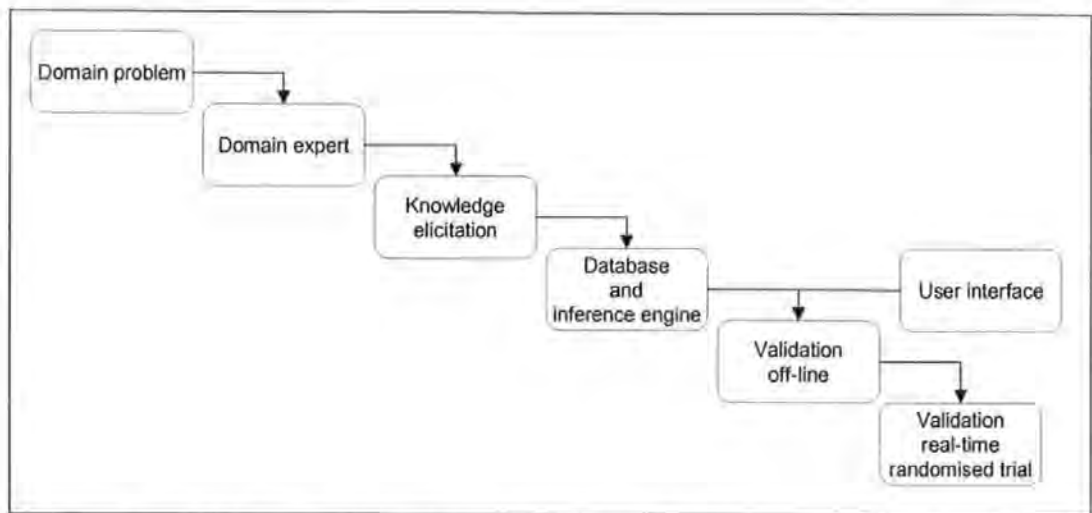
### **2.3.4 Ethnography**

The study of human computer interaction (HCI) had been dominated by quantitative research methods, but the artificial and unrepresentative nature of many studies limited their application (Carroll 1997). Numerous complex processes occurred during a task, any one of which could affect performance, so it was difficult to generalise research findings to other tasks or systems (Monk & Wright 1991). More recently, a number of workers dissatisfied with the limitations of quantitative research methods, have turned to qualitative research methods, in particular fieldwork studies termed ethnography, to inform computer system design (Hughes et al., 1993). Ethnography is a qualitative research method where the researcher enters the work setting to observe the social and organisational interaction of participants (Mays & Pope 1995). The research approach is compatible with human-centred design as there is a commitment to a faithful description of the work context. Ethnographic research is discussed more fully in section 4.4. Ethnographic studies often provide insight into the tacit and hidden aspects of work practice and may have an additional role as a vehicle to 'champion' and articulate the needs of users (Hughes et al., 1993; Rogers 1997). Qualitative research adds richness and depth of understanding, but it does have some practical problems. The duration of studies can be prolonged and the amount of data can be overwhelming and difficult to analyse. There is now a growing body of qualitative studies of work practice in a wide range of settings. These will be discussed more fully in the following chapter.

## **2.4 The legacy of technology-centred decision support system design**

Decision support systems first emerged at a time when medical hierarchy was rigid, medical advice didactic and rarely questioned, the patient was a passive recipient, and litigation was rare. These historical contingents led to the design of computer systems that provided a "unique single moment intervention" (Berg 1997a, p. 323) and an image of "lordly expert systems dispensing advice to human minions" (Lipscombe 1989, p. 186).

Traditional design models have focused on expert clinicians, knowledge elicitation and the technology. The attention given to 'decision making' as the critical moment, has overshadowed the roles of the various people involved in patient care and their interaction with each other and the patient. Consequently the social and organisational context of the system of care has often received little attention (figure 2.0).



**Figure 2.0:** Traditional simplistic decision support system design model

Few attempts have been made to respecify the design of decision support systems to avoid separating technical from social issues and individuals from their collective work practice.

## 2.5 A human-centred approach to decision support system design

Health care professionals receive considerable training and education, but this does not ensure that they will consistently make correct decisions or avoid adverse events. The roots of human error are often embedded in the wider work system and the contributing factors are often multiple. In light of increasing health service constraints, it is unlikely that human expertise will become more widely available in the future. In fact, reductions in doctors' working hours and the increasing use of defensive practice may further slow the development of expertise. It is against this background that the design of decision support systems needs to be re-evaluated. Designers need to comprehend these issues and develop a better understanding of the care system and how it can be supported.

The design of decision support systems has remained rooted in technically centred, authoritative models rather than real-life settings. Lack of adequate theoretical frameworks has contributed to adherence to a design model that viewed individuals as operating in isolation, unsupported and without resources. A task technology model has been found to produce rigid and inflexible computer systems, which have often failed to achieve their objectives (Blackler & Brown 1986).

The review of the literature highlighted the unifying themes of the importance of the social and organisational context of work activity. This has been distinctly lacking in the design of decision support systems. There is a clear need for a programme of work to inform the further development of the decision support system for patient monitoring based on the study of the actual work settings.

The problems that clinicians and patients face today have changed with the evolution of new working practices. Clinical care is fundamentally social and modern healthcare should place patients at the centre of decisions about their care. What has been missing from the design of decision support systems is the clear articulation of a programme of research to explore those relationships. An investigation of the actual care system can provide a better understanding of what can be practically accomplished, inform the design of new and more appropriate technological support and the development of new ways of caring for mothers and their babies.

## **2.6 Summary**

Early decision support systems were impractical, over ambitious and attempted to supplant rather than support clinicians. The focus on individual cognitive models engendered the image of a lone, office-based clinician consulting a 'Greek Oracle' system. Design models focused almost exclusively on individual tasks and technology. Designers often failed to take account of the social and organisational context of work systems.

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## Chapter 3

### Understanding work activity: theoretical frameworks

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*This chapter reviews the main theories that have influenced this work. Phenomenology, ethnomethodology, situated action, distributed cognition and activity theory were considered the most salient aids to inform the analysis of the labour ward system of care. The main theories, which shaped the research approach, are reviewed and their roles in understanding work practice are discussed. The various theoretical views are synthesised to provide a broader framework to inform human-centred design.*

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**“He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may be cast.”**

Leonardo da Vinci, 1452-1519

### **3.1 Introduction**

The previous chapter argued that the predominance of rational, objective views, which shaped the design of clinical decision support systems, contributed to their lack of acceptance. The limitations of quantitative evaluation methods alone have been highlighted by Kraemer and King (1990):

“These explanatory perspectives have considerable power, and have yielded useful results. However, they do not explain the variance observed in the patterns and processes of adoption and routinization of information technology in various tasks, or the differences in successful use of the technology across organisations.”

(Kraemer and King 1990, p. p. 582-583)

This chapter examines the main interpretive theories, which influenced the researcher and choice of research methods. The theoretical frameworks reviewed in this chapter were considered the most salient aids for the description, analysis and understanding of work activity.

### **3.2 Phenomenology: philosophy and inquiry**

The roots of phenomenology are complex, with different branches and abstract concepts. The philosopher Martin Heidegger rejected the rationalistic stance of the ‘mind-body’ split (Heidegger 1996). Phenomenology views the objective world and the subjective mental world of an individual as inseparable. The work of Heidegger is not easy to understand, perhaps due to preconceived notions of the world; however, metaphors such as ‘breaking down’ and ‘thrownness’ illuminate the potential for describing phenomena of interest.

Heidegger's metaphor of 'breaking down' suggests that objects and properties arise only in the event of malfunctions when they become 'present-to-hand'. For example to a person using a hammer, the hammer does not exist, it is part of the background of 'readiness-to-hand' and only presents itself as a hammer when there is some kind of breaking down. When the hammer hits the user's thumb instead of the nail its 'hammeriness' emerges.

The act of chairing a meeting is often used as an illustrative example of 'thrownness'. The chairperson cannot avoid acting, and is thrown into the action. Even doing nothing constitutes an action. The effects of action cannot be predicted, so the chairperson deals with an emergent, unfolding situation, without a stable representation. The chairperson is in the situation and so cannot step back and reflect to decide the best course of action. The chairperson may produce a retrospective account of significant patterns and events. This, however, was not the representation the chairperson had during the meeting.

The work of Winograd and Flores (1986), on understanding computers and cognition, was heavily influenced by Heidegger's *ontological* quest. They state:

"Our larger goal is to clarify the background of understanding in which discourse about computers and technology takes place, and to grasp its broader implications. Ultimately we are seeking a better understanding of what it means to be human."

(Winograd and Flores 1986, p. 13)

However, Raeithal (1992) suggested that this philosophical foundation, while helpful, had shortcomings as a 'new foundation' for computer design as it reduced the concept of communication to verbal and written language only.

### **3.3 Ethnomethodology**

Ethnomethodology is the study of the way people make sense of their social world. It differs from other social theories, which assume the social world is orderly (Garfinkel 1967). Ethnomethodologists argue that people organise their impressions and experience into a coherent pattern to create social order in their mind. They reflect on their behaviour and give an *account* to make it understandable to themselves and others. This provides the subsequent rationality for actions and shows their social competence (Collins 1997).

Garfinkel (1967) was critical of sociological descriptions of 'work' based upon theories of social structure, as they paid no attention to the detail of, and shed little light on, how work was accomplished as real-time phenomena. For example, in attempting to exhaustively and



explicitly stipulate every rule for coding data in a sociological study and failing to do so, Garfinkel drew attention to the situated and responsive nature of the work of coders. Formal accounts laid down in the coders' manual omitted the variety of practices coders used to decide the coding rules.

Ethnomethodological investigations are guided by a conceptual framework broadly consisting of the notions of indexicality, reflexivity and sequentiality. *Indexicality* of practice postulates that abstract rules fail to cover all eventualities. People make sense of a remark, sign or action by reference to the context in which it occurs and they index it to particular circumstances. More detailed specification does not help because the gap is embedded in the nature of linguistic meaning (Collins 1997). Furthermore, everyday activity would be disrupted if people had to precisely define the meaning of the terms they used. *Reflexivity* postulates that there is no time out from a situation and people respond reflexively. Social actions are part of the context at hand and sense making is accomplished through the practical actions of participants. This is the same as Heidegger's metaphor of 'thrownness' where actions are in response to an unfolding situation. *Sequentiality* postulates that the emergent and sequential organisation of interaction is linked to the context in which it occurs. Attention to visual conduct, the use of tools, forms of bodily conduct, and the sequential organisation of interaction, can reveal how activities are accomplished. Ethnomethodological investigations, therefore, focus on what people do rather than what people think they do.

Ethnomethodological critiques of technology have focused designers' attention on everyday work practice. Button and Harper (1996) argued that formal job descriptions and user narratives, treated as literal descriptions of work, were insufficient to inform the design of computer systems, and that analytic explication of the actual 'lived' work was also required. However, there has also been some criticism of the reluctance of ethnomethodologists to suggest design recommendations and the generation of extensive descriptive accounts that designers (and others) find difficult to comprehend. Rogers (1997) was critical of ethnomethodologists' brief and sometimes banal recommendations such as, support tools should take up a minimum amount of time. This extreme stance may be appropriate for anthropology but it is hardly appropriate for system design and an 'applied' version of ethnomethodology may be more appropriate for the investigation and analysis of actual work practice.

### 3.3.1 Situated action

The work of Suchman (1987) drew attention to the problem of human-machine communication, which emerged from an ethnomethodologically informed investigation of paired users of a 'smart' photocopy machine. The photocopy machine offered a number of 'accounts' of its own state, but it was incapable of monitoring how the user interpreted those representations. The observation of users revealed real-time contingencies, that is to say situated action, changed the use of the technology. In particular, the study demonstrated that in dealing with emergent and unfolding situations, action is flexible. Consequently, plans are viewed as an artefact of *reasoning about* action, not a *generative mechanism* of action. Plans, therefore, become resources for work rather than determining its course. Situated action and ethnomethodology have drawn attention to the deep-rooted problem that the use of formal knowledge (plans, rules, categories, codes) requires the application of interpretive skills. People learn how to apply this knowledge in a variety of ways. In this view, cognition is a social action and context an essential resource.

### 3.4 Frame analysis

Silverman (1993) suggested that when researchers observe an interaction within their own culture it might, at first, seem obvious and unremarkable. The work of Goffman (1974) on the study of every day interaction provides a way of asking questions about seemingly obvious situations through frame analysis. Goffman observed everyday interactions and proposed that there were rules of relevance and irrelevance, which constituted frames that people used to define settings and to make sense of scenes.

Goffman considered that asking what frames were or were not in use could lead to questioning the observed interactions. For example, an observational study of the care of terminally ill patients explored how staff used four different frames; practical, medical, lay and psychological (Peräkylä 1989). The frames were used by carers to define themselves and their patients, and served different functions, for example, resolution of identity conflict and discussion of activities. In questioning what frames were used for the care of mothers, and their intended and unintended consequences, the actions and interactions of clinicians and parents in the delivery room could be better understood.

### **3.5 Distributed cognition**

Distributed cognition is a theoretical and methodological approach to the study of cognition in real-life settings. Cognitive activities are viewed as the propagation of representational state across media (Hutchins 1995). Media refers to both internal (individual's memory, mental models) and external representations (maps, charts, diagrams). Representation refers to the transformation of resources and knowledge when performing an activity.

The distributed cognition framework is composed of distributed structures, which form a functional system. For example, the role of instruments, displays, manuals, charts and the interactions of individuals with each other and their use of artefacts. Hutchins (1990) developed the distributed cognition framework from observation of how the navigation of a ship was practically accomplished. The analysis focused on the distributed activities of the people involved and the way information was represented and transmitted through and across various media. For example, the activity of taking a bearing on a ship involved the coordination of events and media that were socially, technically and temporally distributed. The framework proposed that a system perspective could be achieved through the explication of how those various structures were coordinated in the actual work setting.

The distributed cognition framework can be applied to an individual or groups and the tools they use, to describe the cognitive system and its properties by reference to the processes that transform the system. It maps the functional system, and the propagation and transmission of knowledge. The description of the mundane aspects of actions can uncover subtle changes in actions, which are important for the collaboration of activity. Distributed cognition has also been applied in a hospital setting where researchers mapped the use of a paper-based artefact, called a radiology request form, to describe its representation and transformation across various departments (Symon, Long & Ellis 1996). It was found that the interactive and iterative nature of the use of the paper-based form supported effective work practice and that a formalised computer-based record could constrain the effective operation of the functional system. Distributed cognition theory highlights the social and environmental aspects of cognition, where knowledge is distributed between people in their roles and in the physical artefacts they use.

### **3.6 Soft systems methodology**

Soft systems methodology (SSM) is rooted in phenomenology but in the tradition of Husserl's *epistemological* stance rather than Heidegger's ontological stance. Soft systems methodology acts as an *epistemological* device where conceptual models of different human activity systems, or holons, are developed to represent the various views of the core purpose of the activity system. A root definition of the core purpose of the system is developed and serves as a vehicle for organisational learning and change (Checkland 1981). This approach seeks to understand the situation in which a perceived problem is thought to lie, not on finding a solution to a specific problem.

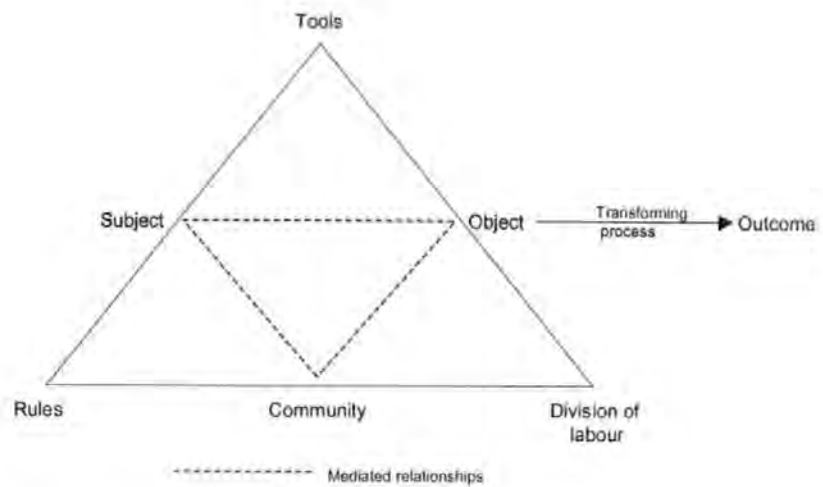
Rich picture diagrams, that is, representations of the various groups, their relationships with each other and the context of the work setting, are developed as a means of understanding the problem at a deeper and more complete level. The rich picture can be applied to the initial stages of data analysis to help develop a representation of relevant issues, and an understanding of the views of people within each domain. The rich picture serves as a useful representation of the system, issues and relationships and can be a useful aid for the organisation and discussion of issues, and to identify areas where further information is required.

### **3.7 Activity theory: developmental work**

Activity theory is rooted in the tradition of Russian psychology and the work of Vygotsky (1978) and Leontev (1978) and focuses on *the relationship between people and technology*. Activity theory consists of a general framework, which is not strictly speaking a 'theory' or a research design. Activity theory proposes that understanding human activity requires insight of the role of artefacts (tools) and their integration into social practice (Nardi 1996).

An activity system is the amalgamation of technology, social factors, individual views, experiences and action within a community of practice (Carroll 1997). The unit of analysis is not the individual or the environment, but the relationship between individuals, communities, technologies and actions (Nardi 1996). A minimal meaningful context for individual actions is called an activity, represented by an 'activity triangle' as shown in figure 3.0 (Engestrom 1991).





**Figure 3.0:** Conceptual diagram of an activity system

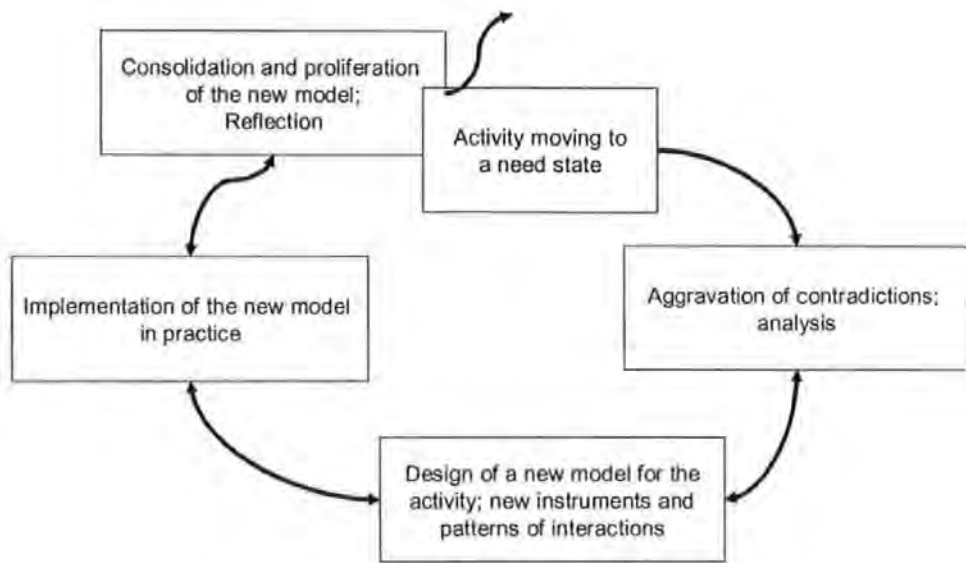
The outer layer of the 'activity triangle' represents the context of actions directed at an object. An object can be a material item or an abstract concept, which is manipulated and transformed into an outcome (Kuutti 1996). The transformation of the object into an outcome motivates the existence of an activity. The subject refers to an individual or group.

The inner triangle represents relationships within the activity system, which are mediated by rules, tools and division of labour:

- Subject and community is mediated by rules (methods, laws, implicit rules).
- Subject and object is mediated by tools (instruments, signs, procedures, machines).
- Object and community is mediated by division of labour (forms of work organisation; tasks divided horizontally between the community; vertical division of power and status).

Activity theory considers that internal activities cannot be understood if they are analysed separately from external activities. Internalisation is the transformation of external activities into internal ones. This enables people to try potential interactions in their minds without performing the actual manipulation with real objects (for example, mental simulations, imaginings, considering alternative plans). Externalisation is often necessary when an internalised action needs to be 'repaired', or when collaboration between others requires their activities to be performed externally in order to be coordinated. The underlying mechanism is the development of 'functional organs'. The combination of human abilities with the capacities of tools can improve existing functions or enable the development of new functions.

Activity theorists recognise the responsive and changing nature of activity systems and that human activity is mediated and transformed by the tools people create. Developmental work is an expansion of activity theory proposed by Engestrom, who suggests that the evolution and change of activity systems is in response to the contradictions that exist in a work system. This is considered to be the major driving force for change and learning through an expansive cycle of development as illustrated in figures 3.1 (Engestrom 1991, p. 271). This expansive cycle shows the flux of work systems, as over time the work system will again move to a need state.



**Figure 3.1:** The expansive cycle of development

Activity theory has been applied in the study of computer system design in a wide range of settings (Bødker 1991; Nardi 1996; Husa & Engestrom 2000). For example, Engestrom examined the work activity of a health centre in Finland and found the organisational, bureaucratic structure promoted a narrow, biomedical care model, which shaped the design of the computerised patient records. Consequently, the classification of patients was inflexible, consultation time constrained, and arbitrary allocation of patients led to fragmentation of care, inflexible division of labour and excessive consultations by patients.

A new model for the activity system was developed with the subject as a multidisciplinary team rather than individual practitioners. The computer system was redesigned to include comprehensive models of dimensions of care, which gradually eliminated the inflexible classification of patients. The new division of labour allowed a more flexible allocation of



time and improved continuity of care. The new work system was associated with a 37% reduction in patient consultations and increased patient and staff satisfaction.

The importance of context and process was a recurrent theme of the main interpretive theories reviewed. Activity theory, situated action and distributed cognition have become popular theoretical frameworks in the field of system design. Table 3.0 provides an outline of their main features.

**Table 3.0:** Comparison of activity theory, situated action and distributed cognition

	<b>Activity Theory</b>	<b>Situated Action</b>	<b>Distributed Cognition</b>
<b>Context</b>	Activity system	Defined by researcher	Functional system
<b>Unit of analysis</b>	An activity consists of subject, object, action and operation.	Emergent and contingent human activity.	Individuals and the artefacts they use.
<b>Focus</b>	Internal and external context. Mediation.	Situated action.	Propagation of knowledge between individuals and tools.
<b>Level of analysis</b>	Object-goal.	Fine grain; minutely observed action in real settings and situations.	Object-goal.
<b>Structure</b>	Activity is shaped by an object and held by the subject. Activities are distinguished from one another by virtue of their differing objects.	One activity cannot be distinguished from another by reference to an object (motive). Goals not considered conditions for action; retrospective, reflexive and rationalised representation.	System-goal. Abstract concept that does not involve individual consciousness.
<b>Persistent structures</b>	Artefacts, institutions.	Durable structures are not considered central.	Considers the role of artefacts to be crucial.
<b>Relationships</b>	Computers and people do not share the same ontological space.	Creative nature of humans, responsive nature of situated activity.	People and artefacts are 'agents' of the system. People viewed in control of the tools they use.

### 3.8 Discussion of the utility of the theoretical frameworks

Theories can both reveal and conceal. On the one hand they facilitate communication, understanding and development within a community of practice. On the other hand, they can confine thinking to a narrow perspective, close off opportunities to other possibilities and impede communication with those who hold different theoretical views (Walsham 1993).

The utility of interpretive theories can be viewed as follows:

- A resource for empirical study of social action and interaction.
- A guide for understanding the organisation of work.
- Providing a broader framework of analysis.
- Providing alternative views.

### **3.8.1 Empirical studies of social action and interaction**

Empirical studies informed by interpretive theories have drawn attention to the taken-for-granted aspects of social action and interaction. In particular, ethnographic work practice studies informed by ethnomethodology focus on the 'methodological resources' that people use in the production of in-situ social action and activity (talk, bodily orientation, artefacts, the environment). For example, studies of the work activity of air traffic controllers found the way individual work was performed made it available to others, without the need for explicit and direct communication. The flight strips, which contain the details of the flight plan, flight progress and position, were displayed and updated in a way that made information about the state of the work system available in a simple and straightforward manner (Hughes et al., 1993). Such studies have provided designers with a deeper understanding of the characteristics of work and have acted as a resource for designers to consider what kind of technological support the work system required.

### **3.8.2 Understanding the organisation of work**

There is now a growing corpus of studies of the organisation of work, which have been informed by interpretive theories. Heath and Luff's (1996) investigation of work practice in the London Underground Line Control Room demonstrated that informal work practice, such as overhearing of conversations and flexible division of labour, were important for the coordination of work and management of unexpected events. Thus, ethnographic studies can shed light on subtle reasons for the lack of acceptance of some computer systems. Computer systems can constrain the way work is accomplished when their design formalises the structure and ordering of work practice. This can remove the unofficial and responsive features of work, which are important for and integral to the efficient operation of work systems (Greatbatch et al., 1993; Button & Harper 1996). Attention to contradictions and tension in the actual work setting can uncover the nature of problems in the social and technical environment. This can form the basis for redesign of work systems and technical support (Engestrom 1991).

### 3.8.3 A broader framework of analysis

This section links the various theoretical views to provide a broader framework to inform the analysis of the labour ward care system. A worldview is neither right nor wrong. Clegg (1994) suggested that its usefulness could best be gauged through what it reveals and what is learned from its use or modification. No one theory is powerful enough to capture all salient features of work systems. It may, therefore, be the case that the labour ward care system and implications for the further development of the decision support system for patient monitoring can be better understood if the analysis is in relation to a broader framework (table 3.1).

**Table 3.1:** Synthesis of a broader framework of analysis

Key components of interpretive theories	Analytical framework	
<b>Mediation</b>	Functionality of DSS	Activity theory
<b>Representation and transformation</b>	Cognitive tools	Distributed cognition Situated action
<b>Emergent and responsive practice</b>	Boundaries of DSS	Ethnomethodology
<b>Ontology</b>	Role of DSS, division of labour	Phenomenology Soft Systems Methodology
<b>Epistemology</b>	Core purpose	

### 3.8.4 Providing alternative views

The theories in this review have provided insight into deep-rooted issues and acted as a device to see, from a number of perspectives, a complex work system in context. Phenomenology opened the mind to consider the properties of a complex system from a number of perspectives, in particular to the occurrence and nature of 'breakdowns' where the underlying properties of a system may be revealed. Often there is little conscious awareness of taken-for-granted activity until failures, breakdowns or disturbances occur.

Interpretive theories also offered alternative views to traditional cognitive models. Many assumptions have been made about the needs of clinicians and the type of support they require. Typically, their needs were perceived in terms of 'decision support' based on information processing. Ethnomethodology and situated action critiques of rules and plans underscored that following a plan or rule involves more than can be formally specified. Ethnomethodology and situated action were considered relevant for understanding how people make sense of and order their taken-for-granted activities.

Frame analysis provided a way to examine seemingly obvious interactions and aided the analysis of observations by asking questions about what frames were in operation and the consequences of their use.

Distributed cognition served as a reminder that various roles and artefacts serve as cognitive tools within a system. This drew attention to how these may be supported or altered by the decision support system. Subtle features within a work system may not be readily apparent and their importance to the work system may be unrecognised.

Soft systems methodology was seen as relevant because within the labour ward there are different groups (human activity systems) who work together presumably towards a common goal (a root definition). Rich picture diagrams proved an invaluable tool for making sense of a complex care system.

The activity theory development model was included as it focused on contradictions, which are present in all work systems. Activity theory provided a conceptual framework for organising data about a complex care system. In addition, the notion of mediation served as a powerful reminder that, for people, the *object* is not the operation of a computer system, but a purpose beyond that.

This work has drawn on sociological methods and sociological theories, however it was not a sociological study. The prototypical anthropological ethnography aims to understand the culture of a society or group and can span several years. In dealing with concerns of how systems (clinical and computer) can be better designed, there are pragmatic and theoretical reasons for 'applied' ethnography, which has been described by Ball and Ormerod (2000) as a radial category. Such investigations exhibit some aspects of prototypical ethnography. This approach is entirely consistent with the aims of human-centred design, where the research approach needs to align with the development cycle.

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## Chapter 4

# **Pilot study of Expert DataCare - a clinical decision support system in routine use**

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*This chapter introduces a pilot study that was initially undertaken in order to clarify the research approach required to inform the further development of the decision support system for patient monitoring in childbirth. An ethnographic case study was employed to investigate the use of an existing decision support system, Expert DataCare, for the analysis of blood samples taken from the baby's umbilical cord at time of birth. It was found that barriers to the effective use of Expert DataCare originated from the wider work system, including inadequate implementation and lack of organisational support, rather than direct interaction with the computer system. The study highlighted that the design of computer systems is a process, which requires greater understanding of the wider context of the work system. The pilot work informed main research design and data collection techniques.*

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## **4.1 Introduction**

The previous chapters of this thesis have developed an argument that a wider perspective of work activity was required to inform human-centred design of clinical decision support systems. The unifying theme of the theoretical perspectives reviewed in the previous chapter was the importance of context. This posed a challenge for the investigation of work activity in context while also avoiding oversimplification. The researcher's initial intention was to visit other hospitals where decision support systems were in routine clinical use, to see at first hand the influence of work context and the strategies adopted to study this. However, the systems identified from the literature were either limited prototypes or had been decommissioned.

## **4.2 Pilot study**

An existing decision support system (Expert DataCare) had been developed by the Perinatal Research Group for the interpretation of umbilical cord blood acid-base at the time of birth (Westgate et al., 1994). Clinicians drove the development of this system and end users had been involved in the design process. The system had been in routine use in the development site for three years and was also installed in 29 Maternity Units in the U.K. Different approaches and work arrangements had been adopted by a number of labour wards to implement the computer system. It was therefore decided to undertake a preliminary investigation of this system. Expert DataCare addressed a different and less complicated problem than the decision support system for patient monitoring however, it was routinely used in the same domain and by the same target user group.



The aims of the pilot study were to:

- Clarify the research approach required for the main investigation.
- Describe the process of change to the work activity system that had occurred with the introduction of DataCare.
- Identify factors that supported and impaired the use of the computer system.
- Describe the perceived consequences of this technology and if / how it was integrated into the work system.

### **4.3 Decision support for cord blood acid-base analysis: Expert DataCare**

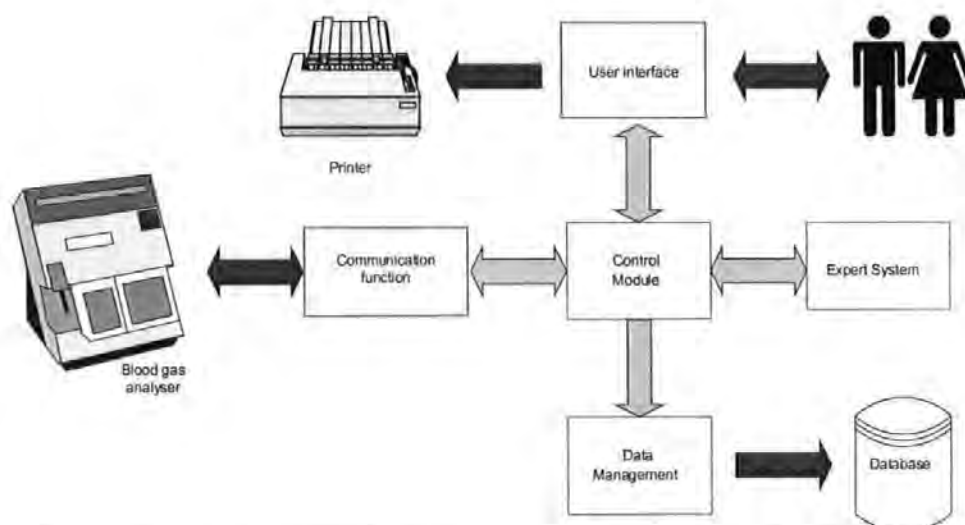
Methods of assessing the condition of the baby at time of delivery have been mainly visual and subjective. Additional objective information can be obtained at birth from blood samples of the umbilical cord artery *and* vein. Blood samples analysed with a blood gas analyser provide information that reflects the oxygenation of the baby during labour. It is now recommended that this should be undertaken routinely (Royal College of Obstetricians & Gynaecologists 1993). However, retrospective analysis of a clinical trial in Plymouth (Westgate et al., 1994) in which cord blood analysis was performed highlighted a number of problems. Approximately 25% of samples contained errors (for example, taking two samples from the same vessel), which prevented accurate interpretation. Clinical staff had neither the time nor expertise to validate and interpret the results.

Expert DataCare was developed in close collaboration with several clinicians experienced in the interpretation of perinatal acid-base data and end-users of the system. The decision support system, interfaced to the blood gas analyser, was developed to check results of umbilical cord blood acid-base analysis for errors and to provide an interpretation of the results for clinicians. This enabled clinicians to appreciate the importance of sampling both the artery and vein and gave an opportunity to repeat the attempt. The aims of the system were to improve the quality of data collected, clarify the importance of the procedure and ease the introduction of routine cord blood analysis into clinical practice.

#### **4.3.1 Operation of Expert DataCare**

The user selected the type of sample (paired, single, fetal blood sample or other), entered the mother's details and hospital identification number, and was then prompted to place the first sample into the analyser. The results from the analysis were transmitted to the

computer and immediately passed to the knowledge-base module for preliminary error checking. If an error was detected, the user was presented with immediate feedback and given the choice of retrying the sample, ignoring the error, or abandoning the current measurement. The user was prompted again if a second sample was required; once sampling was completed the results were again submitted for the second stage of error checking and interpretation. The results and a brief form of the interpretation were presented on the computer screen. Every sample was written to a raw 'master samples' database and then to a specific database when processed. The results were printed to multiple adhesive labels which were placed in both the mother's and infant's records to save time and transcription errors. Figure 4.0 shows a conceptual diagram of Expert DataCare.



**Figure 4.0:** Conceptual block diagram of the architecture of Expert DataCare

## 4.4 Methods

An ethnographic research approach was initially chosen to investigate the routine use of the decision support system, Expert DataCare, in a clinical work setting. Ethnography is a broad term for a range of qualitative methods, which have the following features in common:

- There is no attempt to control or manipulate the settings or subjects.
- The investigation takes place in the actual work setting.
- The collection and analysis of data that cannot be easily quantified.
- The interpretation of data relates to the social world and behaviour of the people within it.
- The research process is iterative.
- There is not usually a prior hypothesis; however theory may emerge from the data.

#### **4.4.1 Research design: case study**

The research design eventually chosen was a case study, as this was considered useful for the study of a complex work system in context (Yin 1994; Keen & Packwood 1995). This section provides details of case study research, the strengths and weaknesses of the approach and the choice of data collection techniques.

Case studies have been found to be helpful in understanding complex phenomenon in context (Yin 1994). A great strength of the case study approach is its flexibility. The use of multiple data sources allows investigation of a wider range of issues, which can aid the explanatory scope of the study and strengthen the comprehensiveness of the investigation. A case study does not rely on just one method or theoretical stance and it is considered:

“a strategy to be preferred when circumstances and research problems are appropriate rather than an ideological commitment to be followed whatever the circumstances.”

(Platt 1992, p. 46)

Case studies have been subject to some criticism. This has been due in part to a failure to fully describe the methods used and a failure to present the reasoning behind data analysis and conclusions. Walsham (1993) considers that validity and generalisability, from an interpretivist perspective, depends on:

“the plausibility and cogency of the logical reasoning used in describing the results from the case and drawing conclusions from them.”

(Walsham 1993, p. 15)

Case studies are not ‘representative sampling units’ in a statistical sense. The generalisation in case study research is analytical, where previously developed theory is used to compare the findings from the investigation (Yin 1994).

A case study is considered appropriate for the empirical investigation of contemporary phenomena in context, particularly when the boundaries between phenomena and context are not clear. A case study is relevant for situations where contextual conditions are an important part of the investigation (Yin 1994). The linkage to, and shedding light on, the interaction of context with the phenomena of interest provides greater explanatory power.

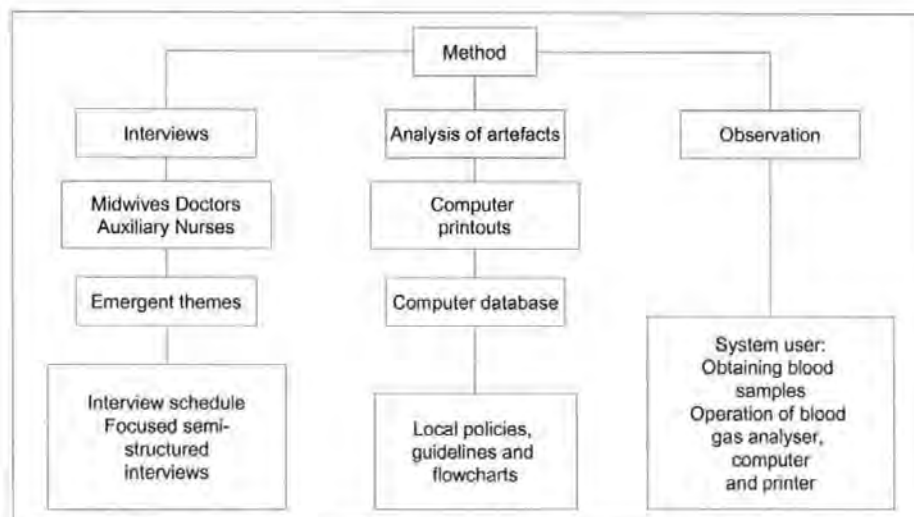
#### **4.4.2 The research sites**

Two sites were selected for study: the development site (Unit A) was selected as the system had been in routine use for three years and a comparison site in Unit B with two

years experience using the system. The choice of study site was determined by the different work approach adopted by each unit, ease of access and location.

### 4.4.3 Data collection

The use of a number of appropriate and relevant sources of data strengthened the study design. Combining evidence gathered by different sources and methods provided a more comprehensive account of the context and use of the computer system. The data collection strategy included a number of sources as shown in figure 4.1.



**Figure 4.1:** Pilot study data collection strategy

#### 4.4.3.1 Interviews

The study used unstructured interviews of doctors, midwives and care assistants, as the initial data collection method. Nineteen participants agreed to take part in the study. The aim of the interviews was to elicit information to uncover the informant's views and perceptions surrounding the use of Expert DataCare. Unstructured interviews allowed for great flexibility, but at the expense of being more time consuming and difficult to analyse. Initial interviews began with informal questions and answers, but over time tended to become more focused and structured as particular issues emerged through the process of data collection. A list of topics to cover during the interview was developed to act as a prompt for the researcher. To facilitate the telling of the informant's own interpretation, the research encouraged free flowing conversation. Conversations were tape-recorded, transcribed and analysed in detail. Each line of transcript was coded to enable identification of the source and sequence of material. A master copy of each transcript was retained and photocopies of transcripts used for data analysis.



#### **4.4.3.2 Observation**

Informal observation provided useful additional information. In the development site the degree of involvement included both complete observer and participant observer. In the comparison site it was not practical to participate in the activity and a complete observer role was adopted. Data were collected about specific events, social interactions, physical activities and the characteristics of the environment.

#### **4.4.3.3 Analysis of artefacts**

The computer and artefacts associated with the computer were also included in the analysis. This included the blood gas machine, printed outputs, and the computer database. Examination of these artefacts helped to develop a broader perspective of the role of the computer system and provided insight into the technical operations concerning the application. Documents, including protocols and guidelines, were examined and prompted further lines of inquiry. These were helpful in identifying contradictions that would not otherwise have been readily apparent.

### **4.5 Data analysis**

Initially the data were organised from an individual phenomenological perspective, which included the emergence of recurrent themes to develop metaphors to try to capture the essence of the experience. This proved impractical, as midwives and medical staff had no experience with the computer database, therefore linkage to the analysis of the computer system database was problematic, and so the work system perspective was lost. In addition the design team did not find metaphors helpful. The data were reorganised using an activity theory framework and emergent themes were organised into contradiction, breakdowns and focus shifts. The term contradiction indicated a misfit with or between elements, different activities or different developmental phases (Kuutti 1996). Breakdowns occurred when work was interrupted by something or when the system did not behave as intended. A focus shift was a change of focus or object of the activity that was more deliberate than those caused by breakdowns. Excerpts from interviews were presented to illustrate the issues. This formed the basis for further inquiry and comparison of data from different sources, such as computer databases, official and unofficial documents, and additional interviews.

## **4.6 Findings**

In the exploratory interviews it was found that users viewed the system in different ways both within and between sites. The work system and computer system are described in their historical situation, as this appears to have some bearing on the general perspectives of the two units and on some of the contradictions that emerged.

### **4.6.1 Unit A: context of work setting and computer system**

The development site (Unit A) was a Maternity Unit with a delivery rate of about 4,700 per annum. The midwives, doctors and auxiliary nurses routinely undertook cord-blood analysis at the time of delivery. Researchers initially provided training and education in the technique and use of equipment, but subsequently a computerised teaching package was developed for this purpose. The staff had integrated the procedure into an apparently efficient process. Immediately after delivery of the baby a segment of umbilical cord was passed out of the delivery room for immediate sampling, usually by an auxiliary nurse. The results and interpretation, printed on adhesive labels, were available within a few minutes of delivery. The system was conveniently located within the labour ward and the hospital's medical physics department maintained the blood gas analyser and provided technical support. The procedures, processes and tools surrounding cord blood analysis evolved from research projects in which staff had actively participated over a number of years.

### **4.6.2 Unit B: context of work setting and computer system**

The comparison site (Unit B) was a Maternity Unit in the South West of England with a delivery rate of approximately 3,500 per year. Following recommendations from the Royal College of Obstetricians & Gynaecologist (1993) the obstetric consultants in Unit B requested the introduction of routine cord blood analysis. However, the blood gas analyser provided was complicated and midwives found it difficult to operate. Research workers arranged for Unit B to use the same model of blood gas analyser and computer system used in Unit A to see if this resolved the problem. The new analyser, which was easier to use, was purchased for use in Unit B. However, this particular make of analyser did not conform to the purchasing policies of the Biomedical Department; therefore on-site support was not provided by the hospital. A midwife had to take on this role with direct support from the manufacturers of the new blood gas analyser. There were no dedicated researchers for Unit B so a midwife from this site was trained in cord blood analysis and

the use of the equipment. This midwife in turn, trained a number of midwives to act as 'trainers' (cascade training). It was not considered appropriate for auxiliary nurses in Unit B to undertake cord blood analysis, although the reasons behind this decision were not clear. The procedure was adapted so that cord blood sampling could be delayed up to one hour after delivery. A segment of cord was isolated at time of delivery and after attending to the mother and baby, blood samples were taken from the cord and analysed. The computer system's location was not a great distance from the delivery area, but it was rather isolated.

### **4.6.3 Conflicts, contradictions and focus shifts**

Contradictions occurred in how tools, objects and subjects were seen within and between the two sites and between other activities. In Unit B, a clash with the Biomedical Department's existing rule of purchasing one particular make of analyser resulted in withdrawal of technical support. Consequently, the blood gas analyser was frequently out of service. The system would often calibrate or request a 'slope' (injecting the analyser with a special solution), prior to analysis of cord blood. A midwife summed up her feelings:

"Its a pain." Staff Midwife, Unit B

Breakdowns resulted in prolonged troubleshooting sessions and instead of the procedure taking a few minutes it could take up to 20 minutes. In these situations, the tool or part of it became the focus of attention.

"It depends if it all goes smoothly then that's all right but often I find that - may be its me - it flashes up things like calibration fault - but I can't make the whole thing go from A to Z. It's probably user error as well as the machine." Staff Midwife, Unit B.

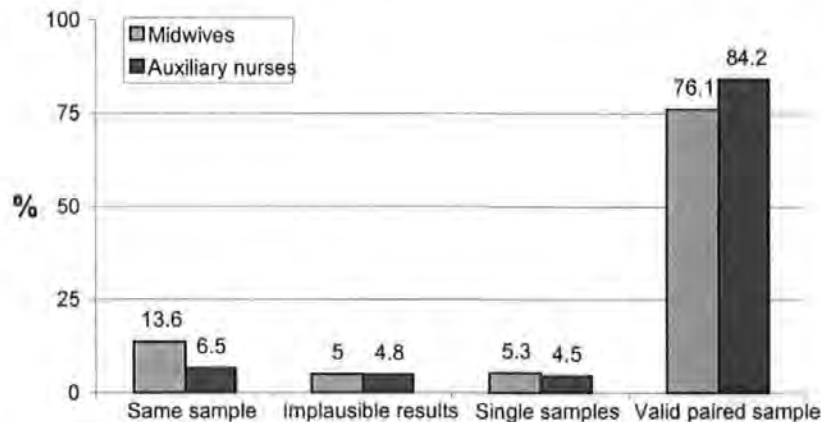
The implicit rule in Unit B that auxiliary nurses could not undertake cord blood gas analysis resulted in the workload being allocated to midwives. This implicit rule may be embedded more deeply in hierarchy and tribalism, a view, which in the past, may have been held by some midwives in Unit A.

"When we first started there were a few midwives who thought that auxiliaries shouldn't do it [cord blood gas analysis] and that was a bit upsetting to think they didn't have the confidence in us." Auxiliary Nurse, Unit A.

Lack of confidence in the ability of the auxiliary nurses was unjustified as a study of the computer database found they had a lower error rate than midwives. A comparison of 360



consecutive cord blood samples taken by midwives in Unit A and 1299 consecutive cord blood samples taken by auxiliary nurses over the same four month period in Unit A found auxiliary nurses obtained more validated paired samples than midwives. Figure 4.2 shows the percentage of validated paired samples (a sample from both the artery and vein with no measurement errors), implausible results and the incidence of taking two samples from the same vessel. The source data for figure 4.2 is provided in appendix 4, page 274, table A.



**Figure 4.2:** Comparison of cord sample error rates of auxiliary nurses and midwives in Unit A

The auxiliary nurses in Unit A undertook the majority of cord blood gas analysis work and use of the computer and it was viewed as an important aspect of their work.

“It’s an interesting change ‘cause I mean we do so much cleaning it’s quite a change to do something, well, you feel at least that’s useful. I mean you do feel as though you are doing a little bit towards something.” Auxiliary Nurse, Unit A.

The other aspects of the auxiliary nurses’ work were vital to the smooth running of the labour ward but were associated with more menial tasks. In Unit B, respondents did not feel that the use of the computer should be exclusive to midwives, but were unsure why auxiliary nurses had not been trained for this role. Despite adapting the sampling procedure so that it could be delayed up to one hour, the midwives experienced conflict with their other duties.

“It’s a technological thing. Anyone can do it. I feel I need to be with the mother and baby.” Staff Midwife, Unit B.

“It’s a task - something else to do. It could easily be done by others - non professionals” Staff Midwife, Unit B.

The delay in analysis also weakened the utility of cord blood gas analysis. Immediate analysis of cord blood can be of considerable help to paediatricians when a baby is born in poor condition. More importantly, the delay reduced the opportunity to take further blood samples if required.

Focus shifts related to the output from the system and occurred in both units. Users often seemed unaware of the system's boundaries of knowledge and were also unaware of gaps in their own knowledge.

"There are times when the CTG (a graph of the fetal heart rate and contractions pattern) seems perfectly all right or when we thought it was satisfactory and the blood results come out as poor, then we are baffled." Midwifery Sister, Unit A.

If the blood results indicate a significant metabolic acidosis, then the likely explanation is that the CTG was abnormal and was misinterpreted. Conversely if a baby is born in poor condition but with normal cord blood gas results, causes other than hypoxia should be considered. Printed outputs from the system included:

"Significant risk of cardio-pulmonary sequelae"  
"Significant risk of hypoglycaemia"

While the textual interpretations appear clear it can leave midwives with unanswered questions and uncertainty of action. In these cases the focus shifted to the action of managing the infant 'at risk'. In unit A, the protocol for the care of infants at risk of hypoglycaemia included 'low pH' but did not give a numerical value.

Training and education are important for the effective use of technology. In Unit B, few of the respondents were aware of the aims of the system, why it had been introduced or how the information was used.

"When I came here there was a very good flow chart behind the machine ... but I think we've had a lot of problems with it and I wasn't really taught how to do it but I was shown how to do it." Staff Midwife, Unit B.

The quality of 'cascade' training can deteriorate over time as it takes considerable resources and effort to maintain consistent standards of education.

In Unit A the system designer downloaded Expert DataCare's database on a regular basis and linked this to the maternity unit's database. Discrepancies, missing data and errors were often discovered in both databases and were corrected through this activity. For example fetal blood samples, (taken from the fetal scalp before the baby is born) were frequently entered under a single sample option, which gave the false impression that the baby had actually been born. The system designer placed an adhesive label which stated "for fetal blood sample press 3" onto the front panel of the computer as a local solution to this problem. The amount of post processing that was undertaken had design and resource

implications (the user interface, the need for a more dynamic and flexible database, linkage to other computer systems, system administration, error notification and the amount of human resources that units would have to provide to support the computer system) but this received little attention.

#### 4.6.4 Contradictions between sites

The results from the computer databases were compared between sites. In Unit A the use of the computer system had resulted in a considerable decrease in the error rate from 25% before introduction of the computer system to 14%. Unit B had a sampling error rate of 28%. The proportion of significant metabolic acidosis was found to be 0.7% in Unit A and 2.7% in Unit B. This difference prompted further questions and possible explanations included; a more liberal second stage of labour management in Unit B, differences in models of care (team midwifery in Unit B), a higher risk population; a bias in sampling. A comparison of the maternity units' databases found 98% of deliveries in Unit A and 50% of deliveries in Unit B had cord blood analysis undertaken. If the midwives in Unit B were undertaking selective sampling then the data could be skewed towards a higher incidence of abnormal results. Inappropriate inferences could have been made from the data if this discrepancy had not been uncovered. The main differences between the two Units and the impact of this on the activity are outlined in Figure 4.3.

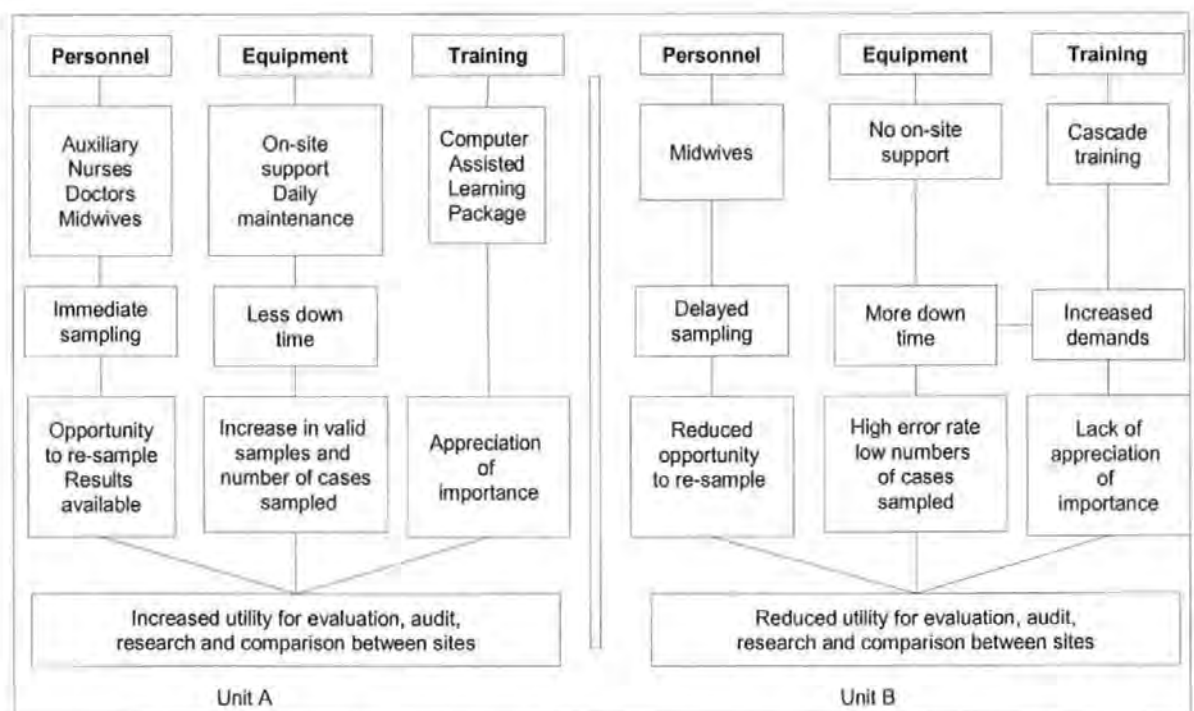


Figure 4.3: Differences in the work activity systems in Unit A and Unit B

## 4.7 Discussion

The case study approach was important for uncovering and understanding the issues surrounding the use of the computer system, some of which would have remained hidden. The use of multiple sources of data strengthened the interpretation of the interview data. The interviews from Unit B indicated tensions and conflicts. Subsequent analysis of the unit's databases found considerable omissions of sampling and high rates of errors. Activity theory as a conceptual framework offered some insight into the roots of contradictions, tensions and differing perspectives of the two units and the physical, social and historical circumstances, which shaped the emerging perspectives. The issues originated from broader activities surrounding the decision support system, including the rules, division of labour, and tools within the different activity systems.

The perspective of Unit A was information orientated, the activity was considered important for research, legal purposes and evaluation of care. The broader activities included using the output from Expert DataCare to discuss, assess, and reflect on how to improve intrapartum care. The maternity unit in Unit A had, over time, changed their activity system to develop a new activity system to accommodate Expert DataCare.

The perspective of Unit B was one of another task to be done without understanding what was possible. The changes to the activity system in Unit B did not support attainment of all the objectives of the computer system. The midwives did the work of cord blood analysis, but did not see a direct benefit. While activity theory suggests that motivated actions within an activity system merge to reach the shared motive, it is not always the case. When this specific type of polymotivation occurs those who benefit are not those who do the work and the technology is likely to fail, or be subverted (Norman 1993).

Holland and Reeve (1996) highlighted the contingent, historical and collective nature of perspectives and suggested four factors which influence the effect or effectiveness of technology: psychological factors such as being comfortable with the technology and seeing it as an opportunity rather than a threat, technical support, ease of access, and colleague and institutional support. Clearly, the study of decision support systems cannot be isolated from the work context, as these factors are embedded in the wider system of activity.



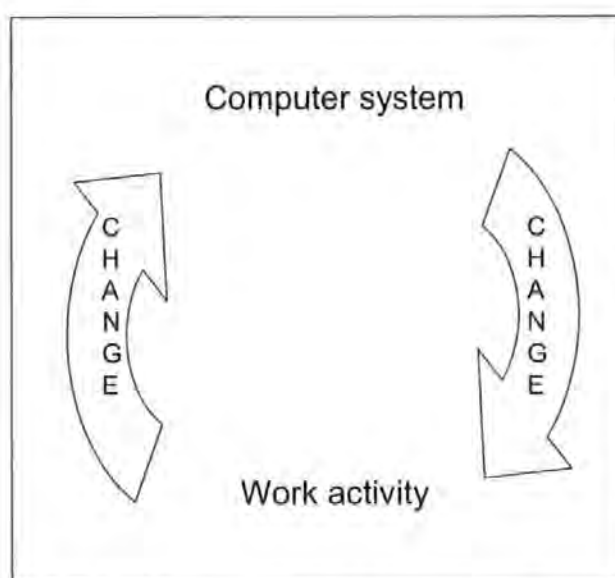
Midwives in Unit B did not appear comfortable with the technology or recognise opportunities for development. The practical difficulties involved in training may have contributed to lack of awareness. 'Cascade' training has a number of limitations. The quality of education becomes diluted over time, and it is difficult to assess consistency and quality of training. For cord blood analysis, it was an onerous task to transfer the required knowledge to a large number of staff. Furthermore, it was difficult to identify individuals with the skills and time to act as trainers, which combined with the costs, made this approach difficult to organise and sustain. Unit A addressed this practical problem with the use of an interactive computer-based teaching package. The improved morale associated with maintaining a commitment to staff development (Hannah & Osis 1988) may further shape their perspective of DataCare.

Ease of access and technological support imply institutional commitment through investment in the technology. The motivation for institutional support of Expert DataCare is compelling. When Murphy and co-workers (1990) undertook a study of 85 cases with an initial diagnosis of birth asphyxia, the paediatricians reversed their diagnosis in 25% of cases. Clearly, it can be difficult to establish on clinical evidence alone whether or not intrapartum asphyxia was responsible for damage. Objective data, from cord blood gas analysis, which reflects the oxygenation of the fetus during labour, provides useful additional information. However, within the same institution in Unit B the adherence to rigid purchasing policies and withdrawal of technical support was a barrier to effective use of the system. This type of problem was highlighted by the Audit Commission (1995) who noted that as long as the procurement procedure was followed, whether or not a system met real needs ceased to be an issue. Lack of on-site support impeded operational effectiveness and increased training demands.

For some units, routine cord blood analysis may be considered impractical due to limitations of personnel. In Unit A the role of auxiliary nurses was extended to include cord blood analysis and the use of Expert DataCare. This reduced demands on midwifery and medical staff and had a positive effect on the ancillary staff by enriching their work. The use of the system contributed to a change in work culture and a reduction in tribalism between groups in Unit A. There are many changes in the role of auxiliary nurses (Redfern 1994) and their ability to take on different roles is often underestimated.

On occasion, uncertainty arose due to the system's output. It is tempting to suggest a technological 'fix' and extend the systems boundaries to include management of infants at risk of hypoglycaemia. However, there is no agreement of the definition or treatment of hypoglycaemia. This can lead to the problem of localisation, that is, the development of site-specific computer systems (Berg 1997a). A more appropriate approach may be to ensure that some practice issues are addressed through training, education and structuring of local policies to include cord blood gas analysis.

Localisation of decision support systems has been portrayed in the literature as a dialectic relationship between 'disciplining' practice and narrowing the role of decision support systems (Berg 1997a). However, this study highlighted that this is not just a technical design issue and localisation may occur through inadequate system implementation. Decision support systems have rarely adopted change and implementation models. Active management of the process of change, in order to generate a shared commitment to the system and to changes in work, has received scant attention. This is in stark contrast to information systems research, which has learned some hard lessons from costly failures. The effect of change on process and context underscored the need to consider how the introduction of computer technology will change the work system and how changes to the work system impact on the use of the computer technology (figure 4.4).



**Figure 4.4:** Conceptual diagram of the context and process of change

Context has become a concept for a better understanding for work systems to inform computer design. However, the study of a real-life work setting is a challenge for research design. In this case study, the use of multiple sources and methods of data collection aided the explication of a complex process and uncovered important features in the work system.

The roots of difficulties in human computer interaction were not just limited to the direct interaction between the operator and the system (i.e. what is normally called the interface). The wider interaction of work system and a synergy of individually small factors can lead to the collapse in the effectiveness of a computer system. The study illuminated the need for a richer understanding of the wider work system to inform the further development of the decision support system for patient monitoring.

Development sites can be different from other sites. There is often a better understanding of the idiosyncrasies of computer systems that have been designed in-house and participants may be more cooperative. However, they can often provide the most comprehensive account of the context and process of the phenomena of interest. The initial time span of the pilot study was brief and greater explanatory power would have been achieved by prospective investigation of the actual implementation process. A small amount of additional work was undertaken and is described in the next section.

#### **4.8 Postscript: follow up and additional site visit**

The time taken for the evaluation of computer systems is often too brief to uncover the effect of the process of change. The image of a stable work context in which computer systems operate has contributed to lack of attention to the interaction of the process and context of changes in the work system and computer use in the longer term. A small amount of follow up work was undertaken in Units A and B and a visit to an additional site Unit C, in the South West of England, was undertaken.

The development site, Unit A, suffered a severe failure when the computer system needed to be repaired. The cost was estimated to be £50 but because there was no sense of ownership of either the computer system or the blood gas analyser (the managers viewed the system as a research tool) it was not clear who should pay for the repair. Consequently, for seven months, cord blood samples were processed without validation. This demonstrated a lack of commitment at an organisational level. Ownership has now been clarified however, the database is not examined, utilised or exploited at an organisational level. A decline in the cord blood sampling method was also observed. This was due in part to new health and safety policies on handling blood and the need to reduce the risk of contamination.



A follow up visit to Unit B found the blood gas analyser had been changed to conform to the purchasing policy of the hospital. Routine maintenance and technical support was, therefore, reinstated and a new computer system had been installed. A new consultant obstetrician championed the use of DataCare and asked the manufacturers of the blood gas machine to train all members of staff in its operation. The computer system was sited centrally rather than, as previously, in an isolated room remote from the labour ward. Therefore, help from colleagues was more readily available. The previous computer keyboard was covered with a plastic membrane that could be easily cleaned. The new computer was operated via a mouse, which was noted to be contaminated with blood. This raises issues of health and safety. Cord blood gas analysis was considered 'too important' to be undertaken by auxiliary nurses. The obstetric consultant was confident that Unit B was now undertaking routine cord blood gas analysis on all deliveries but could not be sure, as Expert DataCare did not link with their unit's information system. The consultant thought this was an important feature that should be developed.

The researcher visited Unit C, an additional site in the South West of England. A Senior Registrar was responsible for the introduction of the computer system and organisation of training. The researcher attended one of the unit's audit meetings where a consultant obstetrician presented the cord blood analysis data in combination with data from the unit's information system (a range of population characteristics) to highlight areas for audit. The sampling rates were high, the error rates were low and the data was used at an organisational level. However, when the Senior Registrar left, the unit also began to encounter problems, particularly with management of the computer database.

DataCare was not designed to automate the entire work process for cord blood analysis; it was designed to support work practice at an individual and organisational level. The work system should, in turn, support the computer system at an individual and organisational level. Designers too, need to support the process, as use of the computer system will bring changes to the work system, which will in turn bring new design issues to light.

The experiences of other labour wards with DataCare need to be explored. How many other units have encountered difficulties and if so when and how do those difficulties arise? Lack of good quality denominator data is the scourge of the NHS, it therefore seems wasteful not to make every effort to uncover and resolve these issues.

## 4.9 Relationship between pilot study and main study

The case study and the use of an ethnographic approach was found to aid understanding of a complex work system in context and was considered an appropriate approach for the main study. There were also many practical benefits from undertaking the pilot study. It allowed the researcher to develop experience with the analytical techniques, and informed the study design and data collection techniques required for the main study.

The use of interview as a data collection technique was problematic. It was useful in identifying underlying tensions but was not a benign data collection technique. There was a risk of making participants feel uninformed or ignorant of aspects of their work. Inadvertent use of leading questions and respondents wishing to present themselves in a good light increased the risk of bias. Strong (1979) pointed out that people often fail to notice the everyday and mundane. Consequently, interview data have a strong bias against the routine and uneventful aspects of practice, which observational studies are better equipped to capture.

The difficulties uncovered with the practical use of phenomenology to gain a system perspective may have been due to the inexperience of the researcher. However, Raeithal (1992) considered that phenomenology reduced the concept of communication to aural and written language only. It is interesting to note that the work of Bødker on the Scandinavian UTOPIA design project for the print industry was first based on a phenomenological approach. The data were subsequently reanalysed using an activity theory framework, although the reasons for this were not clear (Bødker 1991).

A case study approach was considered a useful and flexible research design. The combination of qualitative and quantitative data provided a more comprehensive account of the context and process of the interaction of the work system and computer system. There was, at the time of the pilot study, no existing fully operational computer system for the main study and therefore the researcher decided interviews would not be used as a data collection technique. In addition, the limitations of interview and treating 'accounts' as literal descriptions of work practice underscored the need to investigate the system of labour ward care and how care was practically accomplished.

The pilot study changed the researcher's view of computer system design from a rather mechanical process related to individual users, functionality and user specifications, to that

of a complex process from initial concept to implementation of the system *and beyond*. Hughes and colleagues (1993) noted:

“While we are confident that the ethnographic studies have been valuable in the context of system design, we must admit that this is as much a matter of faith as it is backed up by the evidence.”

(Hughes et al., 1993 p. 250)

This may reflect a narrow perspective of design that was prevalent at that time. Few ethnographic work practice studies had, at that time, been undertaken specifically to inform computer system design and the field has yet to mature. As described in section 3.8, and as demonstrated in the pilot study, a growing body of work practice studies and the insights gained are now beginning to help to inform system design. The role of qualitative methods and longitudinal case study research in informing this process is, therefore, wide ranging. The programme of work for the main study was shaped and refined through the experiences and insights gained from this pilot study.

#### **4.10 Summary**

Computer systems change organisations and the way that people work. The changes that occur are often emergent rather than planned and the process of change may support or undermine the objectives of the computer systems. Computer systems require considerable human support to achieve and maintain the ongoing objectives of the system but this is often neglected. A case study approach and qualitative research methods were useful in providing a more comprehensive account of the use context of the computer system.

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## Chapter 5

### Research methods for main study

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*Chapter 5 reports the research methods used for the investigation of the labour ward care system. The selection of research methods was shaped by the previous pilot study. Each study informed the selection of research methods for the subsequent investigation. The range of methods reflects both the complexities of the problem and the limitations imposed if a single research approach had been adopted. The chapter concludes with a reflection and discussion of the chosen methods.*

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## **5.1 Introduction**

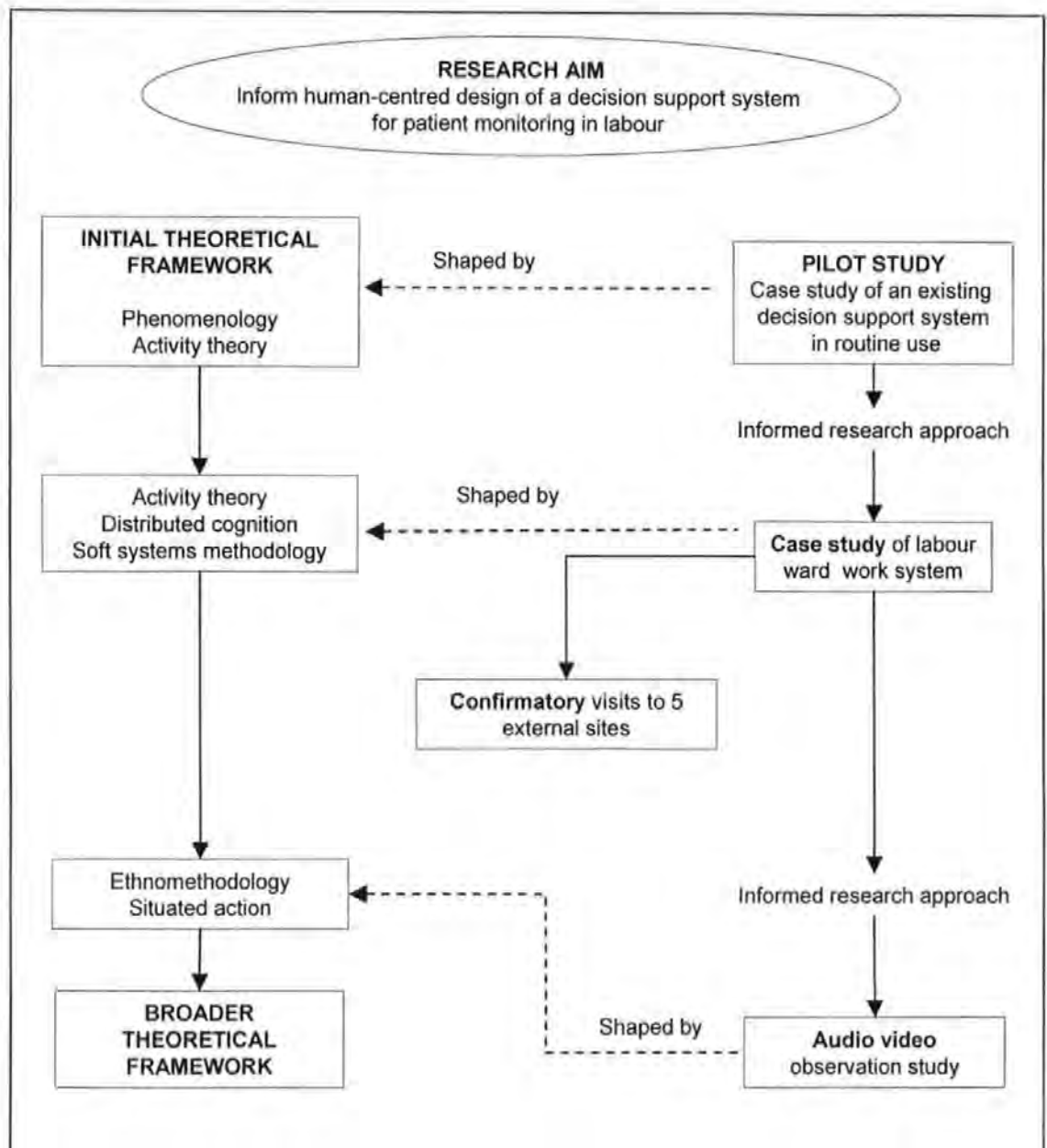
This chapter presents a description of, and justification for, the approach taken and the methods used for the present research. The previous literature reviews and pilot study indicated that a better understanding of the social and organisational context of the labour ward system of care was required to inform the further development of the decision support system for patient monitoring. The research was designed to address this by extending the area of investigation to the actual labour ward. The insights and experience gained from the pilot study, described in chapter 4, informed the synthesis of the research questions and the selection of research methods for the main study.

## **5.2 Research design overview**

The theoretical framework used in the pilot study was widened to include additional interpretive views, namely soft systems methodology and distributed cognition (described in chapter 3), to aid description and analysis of the data. An ethnographic case study of a single site was the initial choice for the investigation of the labour ward care system. Visits to five other labour wards in England were undertaken as a means of confirming the main findings from the single case study.

Over the course of the labour ward case study, unaided observation within the delivery room proved problematic. In particular, it was not possible to document, in detail, the multiple, overlapping activities, conversations and actions of the attendant midwife, parents and other clinicians. In addition, a potential conflict with duty of care emerged and there was a risk that this could disturb the natural setting. An observational study was therefore undertaken, to capture direct patient care within the individual delivery room by audio-video recording.

A further review of the literature was undertaken to inform the analysis of the audio-video data. Ethnomethodology and situated action, previously described in chapter 3, section 3.3, were chosen to aid the description and analysis of patient care within the individual delivery room. An overview of the research design is shown in figure 5.0.



**Figure 5.0:** Overview of research design for the investigation of the labour ward system of care

The research methods chapter is presented in two parts for ease of reading. The first part of the chapter deals with the methods for the labour ward case study and the confirmatory visits to additional labour wards. The second part of the chapter details the methods used to investigate patient care within the individual delivery room.

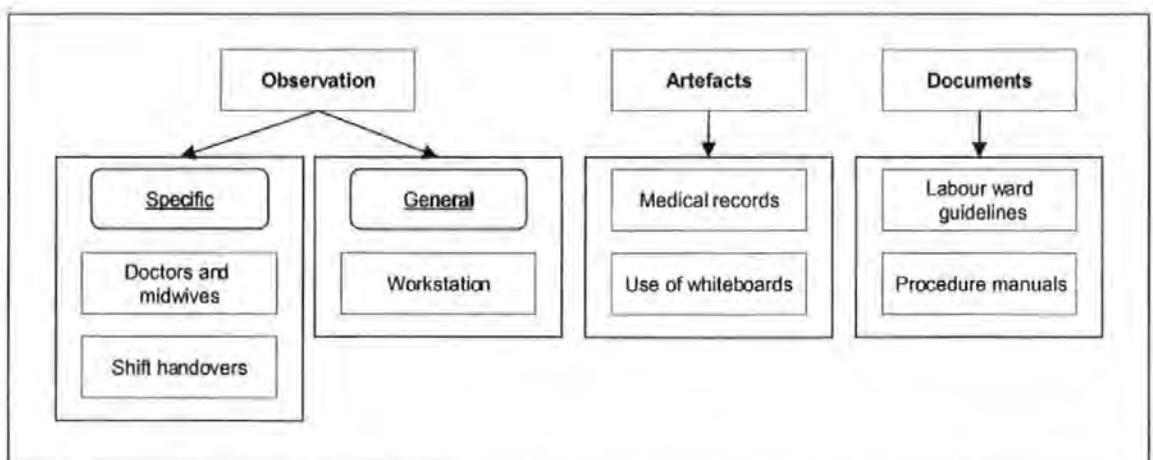


### 5.3 Case study design

An ethnographic case study design, previously described in section 4.4. of the pilot study, was chosen to investigate the labour ward system of care. This study would provide a deeper understanding of individuals and groups and their relationships and interactions. A model for the main structures and processes of the labour ward would be developed to aid understanding and description of the system of care. The selection of the research site was purposive, as it was the development site for the decision support system. Local Ethics Committee approval was obtained to conduct the study.

#### 5.3.1 Data collection techniques

A feature of case study research is the use of multiple sources of data, such as observation, interview, questionnaires and documents. This section provides an overview of the data collection techniques for the labour ward case study, outlines the differences between qualitative and quantitative observation and details the approach adopted for the present work. Figure 5.1 shows an outline of the data collection strategy for investigation of the labour ward care system.



**Figure 5.1:** Labour ward case study data collection strategy

Qualitative observation techniques differ from the more structured observation associated with quantitative research. Table 5.0 provides a comparison of qualitative observation techniques and quantitative observation techniques.

**Table 5.0:** Comparison of quantitative and qualitative observation

<b>Quantitative observation</b>	<b>Qualitative observation</b>
Focus on relationship between input and output	Focus on context and process
Use of observation schedule with prespecified codes	Unstructured observations documented in field notes
Short timescale	Longer timescale
Researcher avoids interaction with participants	Researcher interacts with participants

Qualitative observation provides insight into the context and processes of settings, rather than input and output variables. Qualitative observation produces detailed field notes, which enables review of the source data. Conversely, quantitative research is usually undertaken with structured observation schedules and predefined codes, which precludes the inspection of the relationship between the codes and the observed events.

In quantitative research, interaction with the participants is usually avoided or minimised. In qualitative research the degree of involvement of the researcher can range from complete observer to complete participant. This depends on the nature of the investigation, and practical and ethical considerations. Covert participant observation is rarely, if ever, acceptable. The nature of qualitative observation makes it difficult to avoid interaction with participants. However, when participants attend to their work and engage in practical activities, the researcher's presence often tends to be forgotten, particularly if the timescale is prolonged (Strong 1979).

Official documents can provide a useful source of information. Yin (1994) cautioned that they should not be taken as literal descriptions of actual events, but rather as a resource for the corroboration of findings or to identify differences, which may require further investigations.

Observation of the use of physical artefacts, for example medical records, observation records, graphs and charts can provide insight into the work culture and the technical operation of the work system.

Investigation of the labour ward care system was mainly by non-participant observation. This was augmented with source material from labour ward documents and observation of artefacts used in day-to-day practice.

#### **5.3.1.1 Observation of activity at the central workstation**

Preliminary observation was conducted at the workstation (see appendix 5, page 275 and figure 6.2 page 128) for the first week of the study. This was to allow midwives and doctors to become familiar with the presence of an observer and to provide an opportunity for the study to be explained in more detail. During this time the researcher made brief observation notes and consideration was given to the level of detail that could be documented or if a standardised observation schedule was feasible. A structured observation schedule was not considered feasible, as it would have given a superficial account of the activities that occurred at the workstation. This time also allowed the researcher to consider alternative observation approaches and data collection techniques, such as shadowing individual staff and / or individual mothers and the recording of conversations at the workstation. An approach was made to assess the acceptability of tape-recording conversations at the workstation and recording telephone conversations of referrals to other members of staff. This was considered to be too intrusive. However, there were often multiple conversations in progress at the workstation and so tape-recording conversations at the workstation might have proved difficult. The researcher therefore documented the actions and interaction of staff that occurred at the workstation.

#### **5.3.1.2 Observation of individual midwives and doctors**

Observational data were collected by 'shadowing' individual members of the medical and midwifery staff (junior to senior) over the course of their work shifts. The researcher observed and documented their actions and interactions with other members of staff and parents. It was not feasible to individually shadow Registrars, Senior Registrars and Consultants through their entire shift, as they spent a great deal of time in other areas of the maternity unit and hospital. Therefore, the documented observations were limited to their interactions with clinicians the researcher was 'shadowing', interactions at the workstation and during ward rounds.

#### **5.3.1.3 Artefacts**

Access and use of the medical records was observed. The structure of the labour ward whiteboards information display was documented and the use of whiteboards was observed.

#### **5.3.1.4 Official documents**

The investigation drew on the labour ward guidelines, which provide information about various official policies and treatment guidelines for a range of conditions and events, that

is, 'what to do'. The labour ward procedure manual also provided information about the standards of procedures, that is, 'how to do it'.

## **5.4 Interpretive frameworks**

The interpretive theories selected to guide the case study analysis (activity theory, distributed cognition, soft systems methodology) were described in chapter 3. The theories served as conceptual tools to aid the coding, organisation and understanding of the data, and the context and process of the labour ward care system.

## **5.5 Data analysis**

A computer database was developed and documented observations were transcribed into text files on computer. Each observation session was given a primary document number. Data analysis was aided with the use of ATLAS(ti) (Scientific Software Development, Berlin), a qualitative data analysis software program ([www.atlas.de](http://www.atlas.de)). The transcripts were reviewed and regular events, patterns of interaction and recurrent issues were given preliminary codes. The codes were linked directly to the transcript segments.

### **5.5.1 Examples and use of the coding process**

The unstructured nature of documented observations, and the context of the data, limits the utility of computer text-based search operations on 'raw' text files. The researcher's observation notes are usually transcribed, reviewed and coded as an ongoing and iterative process. In qualitative research codes serve a variety of purposes. Codes act as an index for issues identified by the researcher and as a device for structuring and ordering the data. They can indicate some meaning in the data and different levels of abstraction (Kelle 1995). The code operation broadly entails review of the transcripts and observing relevant features, identification of other instances, and the organisation of regular patterns of events into themes, which show similarities or different patterns of interaction. The codes do not necessarily represent precise facts, but may represent broad topics (Silverman 1993). They initially help with the search and retrieval of relevant information. The code names do not act as representation of the topics, rather they represent conceptual networks of issues. Figure 5.2 shows an example of a transcript and coding of part of an observation session.



Each observation session was transcribed to a text file and allocated a primary document number.

The screenshot shows a text editor window with a document titled 'P 2'. The main text area contains a transcription of an observation session, with several lines highlighted in yellow. Overlaid on the right side of the editor are two windows. The top window, titled 'Code', shows a list of codes with a tree structure on the left and a list of code names on the right. The bottom window, titled '13 Quotations for: M/C to SHD', shows a list of quotations with their corresponding line numbers and coordinates.

Primary document pane switched to read-only mode

RO ANSI 07.18

Transcripts were reviewed. Observable events and recurrent themes were coded.

The codes were linked to the source data (quotes). The coordinates show the source document and line number.

Figure 5.2: Example of review and coding of transcribed observation notes

Concrete observable routines, for example shift handovers, were coded as such. Face-to-face interactions were coded for individual roles. These were broadly grouped under the categories of referrals and reports. Abstract codes were labels that conveyed broad contextual terms for observations that had similarities. For example, 'role conflict' was a code that indexed observations of issues about who could or should perform certain *tasks* such as perineal repair or taking certain blood tests. Whereas the code 'role ambiguity' indexed observations of issues related to people in their various *roles*. Take, for example, the following two text segments from observation of midwife coordinators:

"I bleeped you because the midwife in the room does not believe in Senior House Officers." [Midwife coordinator Rhona]

"I'm not sure if she [a core midwife] wanted me to give an opinion or tell her what to do." [Midwife coordinator Lisa]

The two segments were coded as role ambiguity. The data could be filtered and examined for people in their roles and their relationships with other codes could be examined. For example, the code 'role ambiguity' could be compared with the code 'accountability', which indexed observed or articulated tensions, conflicts and disruptions related to actions and interactions. Through linking various codes, comparisons could be made to explore interrelated issues.

### **5.5.2 Rich picture diagram**

The first two stages of Soft Systems Methodology, previously discussed in section 3.6, involve the examination of the background of the problem (Checkland 1981). The data gathered from labour ward observations and the issues identified, were presented and discussed with a senior clinician and a systems analyst. This was an iterative and collaborative process. The main features of the system of labour ward care were expressed in the form of a rich picture diagram, which aimed to show the elements of persistent *structures* and elements of *process* within the situation being investigated (chapter 6, figure 6.0, page 120). The rich picture diagram served as an emerging model for the local labour ward care system.

## **5.6 External confirmatory site visits**

Additional visits to five labour wards in England were undertaken to provide a cross-sectional 'snapshot' of the systems of care, to confirm or refute the existence of the main features of the emerging local model across the sites. Selection of external sites was



purposive, as the sites would be involved in a randomised study of the decision support system for monitoring in childbirth. The rationale for the confirmatory site visits were to address issues and concerns relating to localisation; that is the development of a site-specific computer system which meets only local user needs (Berg 1997a). Moreover, the evidence from multiple sites is considered more compelling and therefore more robust (Yin 1994). The design had been likened to replication of experimental studies in quantitative research. If similar findings were obtained in all five sites, then replication would have been achieved. If the findings were not similar, the implications for the design of the computer system could be considered.

### **5.6.1 External site visits - data collection procedure**

The researcher and systems analyst conducted a one-day pilot visit to an external site before undertaking the main external site visits. This helped refine the method of data collection for the confirmatory site visits. There was a limited amount of time that could be spent in each site therefore detailed observation was not possible. As a result of this pilot study an interview schedule was developed with the following broad headings:

- Allocation of mothers and staff.
- Communication and information flow.
- Staff resources and infrastructure.
- Technology such as electronic fetal monitors, blood gas analysers and computer systems.

The interview schedule acted as an aide memoire and helped to ensure that all relevant issues were covered within the timescale of each site visit. The same two researchers then visited the five other maternity units in England. Four to eight hours were spent in each unit to cover both day and evening shifts. Each visit usually began with a tour of the labour ward accompanied by a consultant and / or a midwife. The researchers observed the activity and interactions of clinicians at the central workstation and at change of midwifery shifts. When staff were not engaged in clinical care, informal interviews were conducted to cover the main themes in the interview schedule. Discussions involved all levels of midwives and doctors (from junior doctor to lead consultant). The researcher and the systems analyst independently documented their findings from each site. The data from each site were anonymised and confidentiality was assured. The main structures and processes of each labour ward were compared with the local rich picture diagram.

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## Part II: Research methods

### Audio-video observation within the delivery room

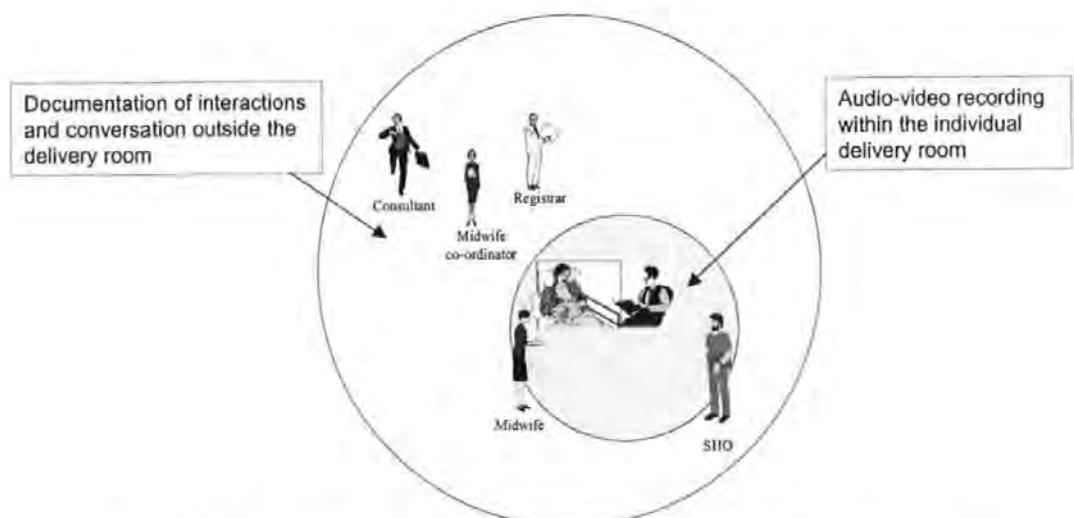
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#### 5.7 Introduction

The use of audio-video recording to investigate work practice has been undertaken in settings such as doctors' consulting rooms, airport baggage terminals and municipal control rooms (Heath 1986; Goodwin & Goodwin 1996; Heath & Luff 1996). Most of those investigations were of time-limited focused interactions, which occurred in well-defined workspaces. This is evident from analytical strategies that recommend the video recordings should be replayed from start to finish without interruption (Jordan & Henderson 1995). In contrast to previous studies of conventional work settings, the delivery room was not a well-defined workspace. People could locate themselves in any area of the room, the interactions involved a range of people and the labour could span many hours. The nature of the setting and the very special and emotional life critical event required an unobtrusive means of investigation. It was also important to address the problematic issues of unaided observation and conflict with duty of care previously described in section 5.2.

#### 5.8 Study design

A non-participant observational study was undertaken to investigate direct care of mothers within the individual delivery room. Figure 5.3 shows a conceptual diagram of the study design.



**Figure 5.3:** Method for the investigation of individual patient care

Audio-video recording was chosen as the data collection technique. In addition, the researcher documented clinicians' interactions and conversation relating to the individual case, which occurred outside the delivery room.

## **5.9 Choice of equipment and software**

Attempts were made to identify information to guide the choice of audio-video equipment. However, few investigators discuss the practical and technical trade-offs, which have to be made when audio-video recording is used. There was little up-to-date information available to guide the researcher on the choice of camera, if it should be fixed or mobile, type of video recorder, or other technical or practical considerations. A considerable outlay for equipment that did not serve its purpose would have been wasteful. Therefore, the researcher sought advice from the British Broadcasting Corporation. A technical consultant, who specialised in video and sound quality, assessed the individual delivery room and identified a number of technical and practical considerations.

### **5.9.1 Camera selection**

A 'goldfish bowl' camera lens could capture the entire room but at the expense of a distorted image, which would make it difficult to judge the proximity of the clinicians to the mother. A wide-angle camera would capture nearly all of the room and would not distort the recorded image. A camera fixed on the wall above the delivery room window, would capture most of the room apart from a metre border under the window. This camera position would also capture conversations that occurred around the delivery room door.

#### **5.9.1.1 Light and sound quality**

Different light levels would occur not only between day and night, but also with different light sources such as overhead lamps, fluorescent lights, and the use of powerful, heavy duty lights for visibility during procedures. A colour camera would not produce good quality video recording under such conditions. A black and white camera would provide good quality recordings and even at very low light levels the recordings would be reasonable.

The technical consultant identified sound quality as the most problematic area and recommended a camera with a built-in microphone. Separate recording of sound and video would have required specialist equipment, as it is extremely difficult to synchronise

different media. An alternative was to use individual microphones for each participant and a real-time sound mixer to control each microphone during conversations, which would have required specialist equipment and operators. In addition, this approach would have been more intrusive and was also impractical, as it was not possible to predict in advance which clinicians might enter the delivery room.

The need for an unobtrusive data collection method informed the choice of a small camera fixed in the delivery room, rather than a portable camera. This avoided the reactivity that would be caused by equipment set-up and the presence of a researcher for change of videotapes. A small wide-angle camera with a built-in microphone was chosen and tested in various areas of the delivery room. The camera location suggested by the technical consultant provided an adequate view of the delivery room, as shown in figure 5.4.



**Figure 5.4:** Screen shot of the delivery room

Midwives were involved in the testing of the video equipment. This was of benefit as they commented that the camera was unobtrusive and not aimed at any particular area of the room.

### **5.9.2 Choice of video recorder**

A video recorder with facilities to embed continuous date and time (hours, minutes, and seconds) information direct to videotape was selected. There were also a number of frame sampling options, and a long play recording of 24 hours was available if required. The investigator used a real-time recording rate for the present study. Good quality (VHS) videotapes were also purchased.

### 5.9.3 Additional technical and practical issues

The video camera was fixed just above the delivery room window as shown in figure 5.5. The camera cable was routed through the ceiling to the office next-door. The recording equipment was housed on a small trolley, so that it could be removed and stored in a secure area when not in use. The effects of data collection were minimised, as staff were not inconvenienced by cumbersome and intrusive equipment.



Figure 5.5: The delivery room and location of the video camera

Previous work undertaken by the researcher, but not reported in this thesis, had investigated the occupancy of the labour ward delivery rooms. A delivery room next to the labour ward office was chosen as it was used frequently and the recording equipment could be housed in the office. In addition, the researcher could conduct unobtrusive observation from the workstation, which was directly opposite the delivery room (see schematic diagram of labour ward, appendix 5, page 275).

#### 5.9.3.1 Computer software

Data management of the audio-video recordings was an important consideration. The few software packages available for analysis of audio-video material have been developed as research tools mainly in human psychology and animal behaviour. The researcher visited a local laboratory that used a commercial software package for audio-video analysis (The



OBSERVER, Noldus Information Technology, Wageningen, The Netherlands). However, the OBSERVER required a predetermined coding framework and was also very expensive.

The present study required data analysis software that did not impose a predefined coding framework. It was also important that access, retrieval and review of video segments were easy and efficient. ATLAS(ti) a qualitative data analysis software package, previously described in section 5.5, was chosen as it fulfilled those criteria. The coding facility was flexible and the digitised audio-video data could be easily accessed and reviewed. The software package also allowed fine grain segmentation with single frame review and repeat mode review. The audio-video analysis facilities were not particularly sophisticated, but the flexibility of ATLAS(ti) carried considerable advantage over more sophisticated but less flexible video analysis packages such as the OBSERVER. Further details of the audio-video facilities in ATLAS(ti) are provided in section 5.11.3

A commercial software program for video capture (Hauppauge WinTV) was used to digitise the audio-video tapes in 10-minute segments to computer files. The digitised files required a 40-gigabyte hard drive to store the data. The data were also backed up onto DAT-tapes and CD-ROMs.

## **5.10 Pilot study**

Ethics Committee approval to conduct the study was obtained and written information was provided to members of staff to inform them of the nature of the study (appendix 17, staff information sheet, page 420). A pilot study of one case was undertaken to test the equipment under real conditions and to identify any technical problems. Written information was provided to one mother and informed consent obtained (appendix 16, patient information and consent sheet, page 419). The staff involved with the mother's care did not object to the video recording.

The camera cable connected easily to the video monitor. The real-time view of the room was clear and the participants clearly visible. The real-time sound quality was also adequate. The participants' conversations and the signal from the fetal heart recorder were clearly audible. The video monitor was then switched off to protect the participants' privacy. A notice was placed on the door of the delivery room to inform staff that video recording was in progress. This was to protect staff who might later become involved in the mother's care. In an urgent situation, it would have been inappropriate for the



researcher to distract clinicians to inform them of the study. This may have undermined the objectives of minimising the observer effect but the researcher was concerned that covert monitoring could inadvertently occur.

The pilot audio-video recording was reviewed and the picture quality was excellent, however, the sound quality was disappointing. There was a background 'white noise' that had not been apparent when listening to the real-time recording. Advice was sought from the technical consultant who suggested placing some gauze over the microphone to act as a muffler to reduce the level of artefact. This reduced the level of 'white noise' on subsequent recordings. The parents and midwives involved in the pilot study did not find the camera intrusive.

The researcher conducted unobtrusive observation at the workstation where there was an unrestricted view of the door to the delivery room. It was not possible to capture entire conversations or document, in detail, the interactions that occurred outside the delivery room, but the researcher attempted to record as much as possible.

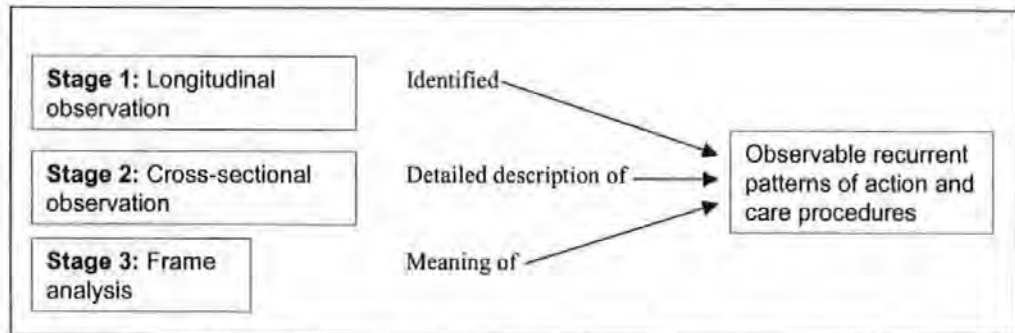
An approach was again made to assess the acceptability of tape-recording conversations at the workstation, recording telephone conversations of referrals to other members of staff and also video-recording activity outside the room. This was considered to be unacceptable and the response was hostile. Clearly there were boundaries that could not be crossed. This was, perhaps, not surprising, as this was the first time a study of this nature had been conducted.

## **5.11 Data analysis**

This section describes the approach to data analysis. A feature of qualitative research is the collection of large amounts of unstructured data, which can sometimes overwhelm the researcher. Researchers can also easily become beguiled by the powerful images of audio-video recording and focus on unusual or dramatic events played out before them. Video analysis can be extremely time consuming and labour intensive. Mehan (1979) noted that some researchers analyse only a few segments of video data in detail, which can result in misrepresentation of the typicality and context of the data. The present study analysed the recorded material over a number of stages to manage the data analysis process, address potential bias and deal with the complexity and volume of data.

### 5.11.1 Overview of data analysis approach

The analysis of the data was undertaken in three stages to deal with the complexity of the data and to ensure a systematic approach. Figure 5.6 shows a conceptual diagram of the data analysis strategy.



**Figure 5.6:** Overview of the stages of audio-video data analysis

Stage 1 was longitudinal observation and description of each case where observable patterns of action were identified. This stage of data analysis identified '*what was done*'. These were not unique, unusual or exotic events or activities, but regular actions and care procedures, which occurred over the course of labour and apart from one (a fetal blood sample), were common to all cases. The recurrent patterns of actions and care procedures were selected because they were objective. There could be no dispute that they had occurred.

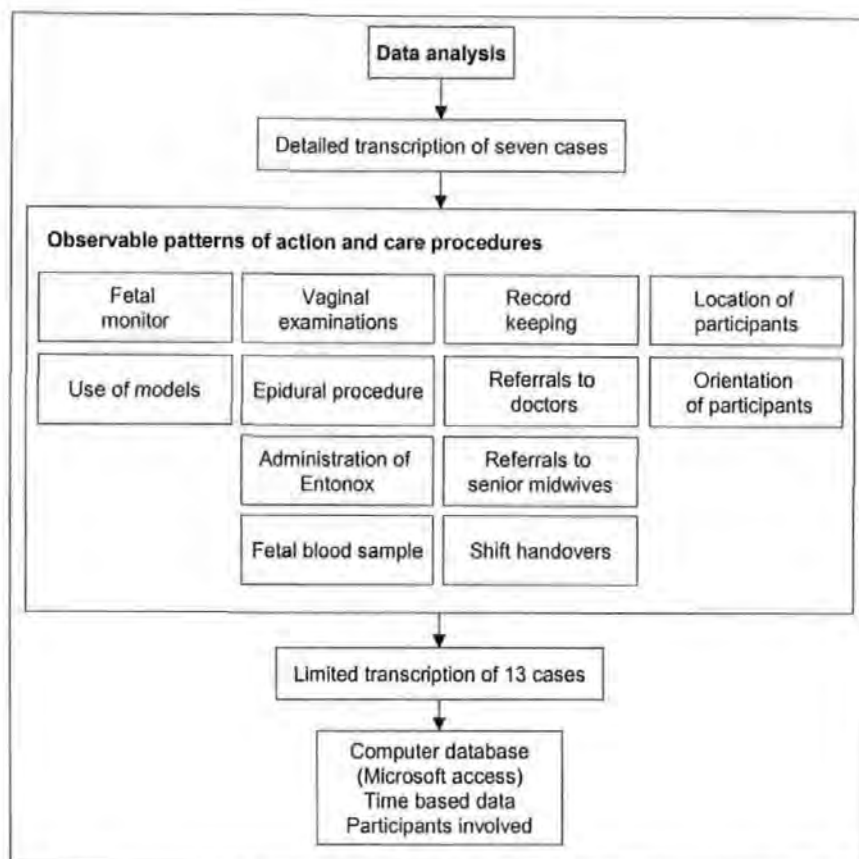
Stage 2 was cross-sectional, repeated observation and consistent comparison of each action and care procedure. This stage of data analysis was observation and description of each recurrent interaction and care procedures and identification of subfeatures i.e. *how it was done*.

Stage 3 examined the meaning of actions, care procedures and subfeatures, drawing on frame analysis (Goffman 1974), previously described in section 3.4.

### 5.11.2 Stage 1: Longitudinal observation and transcription

This section describes longitudinal observation of each case and familiarisation with the data. The first seven cases were reviewed and detailed transcription of the recordings was undertaken to identify recurrent actions and care procedures. Transcription of recordings should not be seen as a technical operation. The production and use of transcripts were part of the research activity, as they involved close repeated observation of the recordings,

where recurring patterns of talk and action were revealed (Atkinson & Heritage 1984). Figure 5.7 shows a conceptual diagram of stage 1 data analysis approach.



**Figure 5.7:** Stage 1 Longitudinal observation and transcription of audio-video data

The level and detail of transcription of audio-video material is guided, in part, by the underlying methodological stance. For example, conversation analysts use a complex numerical and symbolic transcription notation (Atkinson & Heritage 1984). This is a cumbersome and detailed analytic approach and was not considered suitable for the analysis of the large volumes of recorded data collected in the present study. A simplified transcription notation was adopted to mark inaudible segments of talk with parenthesis ( ) and researcher comments in square brackets [ ].

The transcription format was a six-column table as shown in table 5.1. In the first column, the time was recorded. Given the volume of material the start time of every speech turn was not recorded. On average, a time marker for a speech act was entered approximately every 30 seconds to one minute. The second column identified the digitised video segment (SEG) and the third column (person) identified the participants involved. Each person was given an identifying code for example, mother (M:) partner (P:) and attendant midwife

(AM:). A list of participant codes is provided in appendix 6 (page 276). Actions (AC:) such as record keeping events and care procedures were transcribed with consistent terms so that systematic searches and quantitative analysis could be undertaken with computerised database or spreadsheets. Documented observations of events, which occurred outside the delivery room, were transcribed and coded as OR in the action column. The researcher's initial review comments were recorded in the final column.

**Table 5.1:** Example of the transcription format

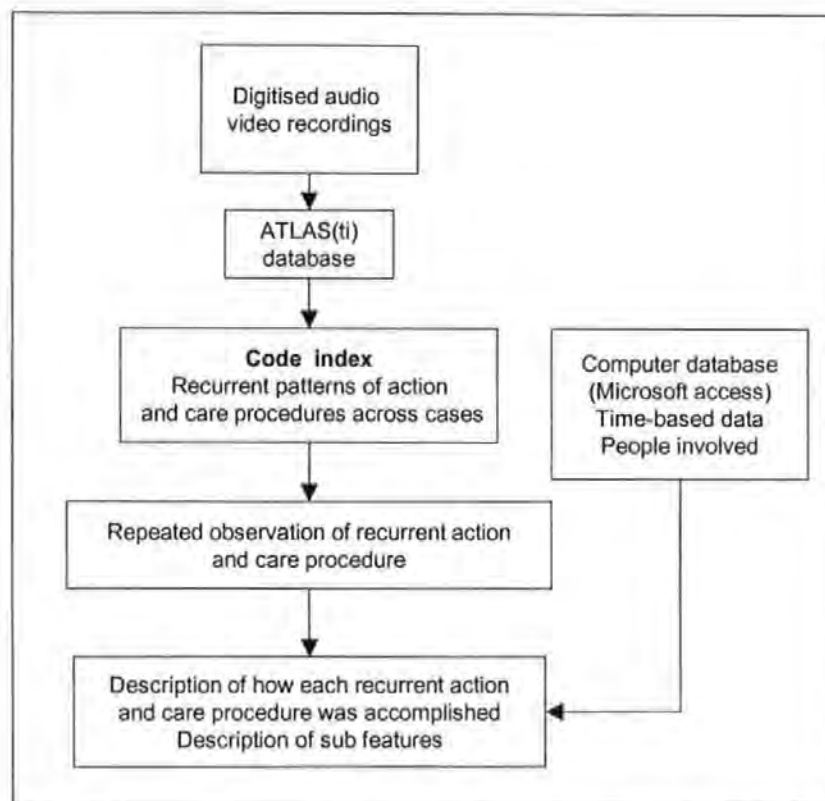
Time	SEG	Person	Action	Description	Initial comments
18:46:32	03_2	AM1:	AC:	Record keeping [NBS]	
		AM1:		So you're due another Labetalol now aren't you?	Back turned not looking at mother
		M:		Yeah	
		AM1:		OK I'll get that in a second	
18:47:05		AM1:	AC:	Record keeping ends [NBS]	
		AM1:		I'll just get some warm water as well. OK?	
18:47:09		AM1:	AC:	Leaves room	
		M:		( ) [talking to baby]	
			OR:	AM1: Who's got the keys? Have we got any Labetalol? MC1: gives AM 100 mg Labetalol.	
		M:		( )	
			C:	[Loss of signal on fetal monitor]	
		P:		Is that the baby?	

The transcription of the data was very time consuming but necessary. It was through the detailed and repeated observation of recordings that the researcher became familiar with the data. Each detailed transcript produced a large volume of data. For example, detailed transcription of case 3 (six hours of video recording) produced an 85-page table. A 'less' detailed transcription was undertaken for the remaining 13 video recordings (a transcription of four hours of video recording produced a 23-page table).

### 5.11.3 Stage 2: Cross-sectional observation

The second stage of data analysis was cross-sectional observation of recurrent actions. Figure 5.8 shows the approach taken for stage 2 data analysis. Each audio-video recording was digitised in 10-minute segments to computer. Each segment was reviewed using ATLAS(ti) qualitative data analysis software and recurrent patterns of actions and care procedures were coded. The codes did not imbue any value judgements; they were factual labels, which served as an index of the actions and care procedures that were observed, that

is, an index of *what was done*. For example, the code vaginal examination contained an index of all video segments where vaginal examinations had been undertaken. This provided instantaneous access to the video segments for detailed review, to examine how actions and procedures were accomplished, that is *how it was done*.



**Figure 5.8:** Stage 2 Cross-sectional observation and analysis of audio-video data

The codes at this stage allowed the researcher to identify and describe similar and contrasting actions and patterns of care. As was stated previously, at this stage the analysis was descriptive and guided by ethnomethodology.

The indexed segments could be replayed consecutively for the same case and across different cases. Further coding was then undertaken to identify the subfeatures of actions and care procedures. For example, ‘vaginal examination technique’ was a code where aspects of the vaginal examination procedure did not conform to the ‘ideal’ model describe in appendix 2, page 271.

Frame analysis, as described in section 3.4 was used to link and discuss the observations, and to consider the meaning of the observed actions and care procedures (Goffman 1974). Figure 5.9 shows an example of ATLAS(ti) for data management, coding and retrieval of video segments.





Click on a code and a list of all digitised video segments marked with that particular code drops down. Click on the item in the list and the marked segment automatically plays.

Figure 5.9: Example of ATLAS(ti) video data management, video review and coding

#### **5.11.4 Independent review and checking procedures**

- An independent review of one audio-video recording was undertaken by a non-clinician and discussed with the researcher.
- A team of reviewers including a senior obstetric consultant, a sociologist and two systems analysts examined six hours of audio-video recording from a single case. Each review session was captured to audiotape.
- The researcher and a midwife independently reviewed a 10% systematic sample of the audio-video recordings. An observation schedule, developed by McNiven, Hodnett and O'Brien-Pallas (1992) for the classification of American labour nurses' activities, was adapted to classify midwives' activities in the delivery room. The observation schedule consisted of six categories of activities and their features (see appendix 13, page 413).

### **5.12 Assessment of qualitative research: issues of 'validity'**

This section discusses the relationship between qualitative and quantitative research. It is argued that rather than being mutually exclusive, they can be complementary. Research is not a value free activity. Walsham (1993) highlighted that:

"epistemology, the basis of one's claim to knowledge and research methods are interrelated."

(Walsham 1993, p. 15)

The selection of conceptual models, theoretical frameworks and research methods are shaped by how we see the world. As Zuboff (1988) points out:

"... behind every method lies a belief. Researchers must have a theory of reality and of how reality might surrender itself to their knowledge-seeking efforts."

(Zuboff 1988, p. 423)

One received view is that there is only one 'scientific' method and that knowledge and truth is generated through logical empiricism. Quantitative research is considered rigorous, 'hard' and formal, with a narrow focus that seeks to test and explain through control, manipulation, randomisation and statistical analysis. However, the imposition of experimental conditions on natural settings often limits the generalisability of research findings as much of the phenomena of interest is removed or ignored. This has led to criticism that health technology assessment has focused on variables that can be easily

measured and consequently lacks critical perspectives of context and process (Dixon-Wood & Fitzpatrick 2001).

Conversely, there are those who consider that context and process give meaning to action and are part of the phenomena of interest. Qualitative research does not seek to control or manipulate. It is concerned with the study of real-world situations as they unfold naturally, to gain knowledge and understanding. Qualitative studies are not intended to replace quantitative research but to complement them by providing a rich resource to inform system design and / or to act as a vehicle for user participation.

There are considerable tensions and debates regarding the 'quality' of qualitative research (Barbour 2001). Can and should qualitative research be judged using the same criteria as quantitative research? What alternative criteria could be adopted and how can those criteria be assessed? Table 5.2 lists the main quantitative criteria to establish validity and a number of qualitative strategies that can be considered as alternative rather than equivalent criteria, which are discussed in the following section.

**Table 5.2:** Quantitative validity criteria and alternative qualitative strategies

<b>Quantitative criteria</b>	<b>Alternative qualitative strategy</b>	<b>Technique</b>
<b>Construct validity</b>	Triangulation	Multiple sources of data / methods / theories
	Member checking (respondent validation)	Participants check the researcher's analysis
<b>Internal validity</b>	Reflexivity	Consideration of the impact of research and researcher
	Rationale for selection of site / participants	Relate to theoretical propositions
	Mapping of analytic strategy	Description of the coding strategy Use of consistent comparison
	Use of counts	Provide tabulation of frequency / duration of observations and events
<b>External validity</b>	Ecological validity	Demonstrate relevance to theory / policy / practice
	Replication	Multiple case studies
<b>Reliability</b>	Data management	Database and data management software
		Audit trail and plausibility check

### **5.12.1 Construct validity and qualitative alternatives**

Construct validity in quantitative research refers to the degree to which variables have been operationalised so they can be measured. Qualitative research usually begins with a broad question and often it is not possible to state, at the outset, the aspects of the phenomena, which might be of interest. However, exploratory case studies should be preceded by a statement of what is to be explored, its purpose and the criteria by which the study should be judged. This helps to delineate the boundaries of the case study and the units of analysis (Yin 1994).

#### **5.12.1.1 Triangulation**

Triangulation was first suggested by Denzin (1970) to strengthen the weaknesses of participant observation through the use of additional sources of data, for example, interviews or questionnaires. The strategy has been extended to include investigator triangulation, where different investigators are used in the same study and theoretical triangulation, where different theoretical frameworks are used in the same study. Triangulation has been the subject of debate and criticism due to a lack of consensus about its purpose and meaning. It is not possible to discuss, in detail, all the issues related to triangulation due to limited space. The reader is referred to a review and discussion of triangulation by Murphy et al., (1998) for additional information.

Triangulation has been proposed as a means to enhance the validity of qualitative research (Murphy et al., 1998; Silverman 1993; Fielding & Fielding 1986). The technique of drawing on multiple sources of data and the use of multiple data collection methods can increase confidence, as the comprehensiveness and relevance of the research is enhanced. Differences revealed through triangulation offer opportunities for further investigation to provide a richer and more complete understanding. This view of triangulation is generally accepted.

It has been suggested that qualitative research findings could be considered valid when triangulation between different sources and methods achieved convergence (Denzin & Lincoln 1994). The analogy of plotting a navigation position is often used to support the purpose of this strategy. This claim has been subject to criticism as it is based on the assumption that the weaknesses of one method will be offset by the strengths of another. Fielding and Fielding (1986) point out that:



"The accuracy of a method comes from its systematic application, but rarely does the inaccuracy of one approach to data complement the accuracies of another."

(Fielding and Fielding 1986, p. 35)

Divergence of research findings may be due to the data collection technique and there are no clear criteria to establish when divergence or convergence has occurred. The analogy of triangulation with navigation also implies a degree of precision rarely possible in qualitative research, which deals with complex unstructured data that are difficult to organise and analyse. Convergence of data can increase confidence in the findings; however, it is not a 'test of validity' in the same way as inter-rater agreement, or statistical testing of a hypothesis (Silverman 1993). Triangulation can be counterproductive if applied in an uncritical manner. The methods need to be appropriate to the purpose and subject matter.

Quantitative research does not confine itself to one theory or framework to understand, model and predict, as exemplified by particle and wave theory which both explain the behaviour of light. The use of a number of theoretical perspectives in qualitative research can prevent cognitive tunnel vision and adherence to a narrow perspective. Purists might consider this as 'method slurring' or incompatible due to philosophical differences. However, it cannot be assumed that there is an ultimate or superior 'truth' with either qualitative or quantitative research. The important issue is what can be learned from their application.

Triangulation increased the comprehensiveness and relevance of the present work through the collection of data from a number of different sources (observation of actions and interactions, formal and informal conversations, official documents). Audio-video recording of care within the delivery room provided a reproducible database and overcame the limitations and conflicts associated with non-participant observation. Confidence in the rigour of an investigation can be increased with the use of audio-video recording but it is not always possible to collect data by this means (Murphy et al., 1998). The use of multiple sources of data, methods and theory in the present work allowed the researcher to address a broader range of issues that provided a 'system' perspective and increased the scope of the investigation.



### **5.12.1.2 Member checking (respondent validation)**

Member checking (respondent validation) is a strategy where participants are asked to judge the researcher's analysis. The most common technique is to provide participants with a written report of the analysis and to record their comments and criticisms. The feasibility and practical application of member checking as a validation technique has been subject to criticism (Silverman 1993; Bloor 1997). Participants may not read the report in enough detail or with a critical perspective, or may feel obligated to make comments regardless of their relevance. There may be consensus seeking behaviour between participants and the researcher to avoid sensitive issues or conflicts and participants may have their own agenda, which may be reflected in their responses. Different groups may agree with some aspects of the findings and not with others and it is not clear how to address competing versions when member checking is adopted as a validation technique (Silverman 1993).

In the present work, the focus was the system of care and what participants actually did and, as previously stated, participants' literal descriptions were considered insufficient as a means of informing design. It is not clear if participants would see 'taken-for-granted' features of their routine actions and interaction. For example, one midwife was shown an anonymised video clip of parents who had been left alone when the CTG was abnormal. The midwife was quite shocked that the parents were unattended under such circumstances, more so when the researcher informed her that the midwife was aware of the changes in the CTG and had gone to have a cup of tea at the workstation. The primary carer for that particular case was actually the midwife watching the video clip. In the present work, failures and inadequate standards of care were observed and participants may not have recognised or acknowledged these events. Making individuals aware of deficits in care could have introduced additional risks to the participants. Selecting individuals for member checking would also have been problematic. In particular, review of the video recordings by participants would have, in some cases, compromised the confidentiality of other clinicians involved in the study.

### **5.12.2 Internal validity and reflexivity**

Internal validity refers to the application of strategies to ensure consistency of conditions and standardised procedures under which a quantitative study is performed. Qualitative researchers must enter the setting and interact with people to undertake a study. Reflexivity refers to the researcher's assessment and consideration of the ways in which the research and the researcher's presence contributed to the data collection and research findings.

### **5.12.2.1 The impact of the research and researcher**

Qualitative research seeks to study the natural setting and to minimise the effects of the research on the setting and participants. All studies have an observer effect; therefore, the initial observed actions might be the 'best behaviour' of participants. However, prolonged observation is less intrusive and provokes less reactivity, as over time participants begin to behave more naturally. In the present work all participants were aware that their actions were being observed and documented or recorded to video. Steps were taken to minimise the camera effect with the use of a small unobtrusive recording device and prolonged observation. Participant comments related to the study were also captured on video and so were available for consideration. Five midwives' and two doctors' unsolicited comments indicated that they tended to forget about the camera once they were engaged in care of mothers.

There were occasions when aspects of care were not of a standard that would be expected when the researcher was present and openly documenting events and when participants were aware that video recording was in progress. The researcher did assume that participants would perhaps be more 'careful' and do what they 'should' rather than what they usually did. This does not seem to be the case, as reflected in observed events such as lack of basic hygiene, an unprofessional and vocal argument between a paediatrician and a senior midwife while resuscitating a baby (to the point where they stopped resuscitating the baby), which took place in front of the parents and the researcher, and episodes of poor standards of care such as manual removal of a placenta on a mother with no analgesia and with a total disregard to hygiene and asepsis. The researcher did not expect to witness such events. It may be that over time, the observer effect was reduced or that the participants did not feel threatened by the research or the researcher as they were assured confidentiality.

The need to conduct unobtrusive non-participant observation conflicted with the researcher's duty of care as a midwife. It was difficult to know when to intervene as this risked disturbing the natural setting. For example, on one occasion an SHO ordered an enema for a mother who was admitted to the labour ward at 20 weeks gestation with abdominal pain and vaginal bleeding (an enema is contraindicated in these circumstances). The researcher did not intervene until it was evident the midwife was about to give the enema. Clearly, participants can view the researcher's actions constructively, as a necessary 'intervention', or negatively as 'interference' and there is a fine line between the

two. The application of duty of care may seem very black and white, but if this were so, healthcare workers who raise concerns would not be marginalized.

Audio-video recording resolved issues related to unaided observation within the individual delivery room. Remaining a 'non participant' observer outside the delivery room was problematic as clinicians wanted the researcher to pass messages on, or to tell them 'what was going on' in the labour ward. Initially, the researcher did pass on the occasional message, but on reflection realised this action would affect the research setting. The researcher then referred any requests to the midwife coordinator. This was sometimes difficult as there were times when the researcher was aware of information that had been omitted during exchanges between clinicians.

#### **5.12.2.2 Rationale for selection of participants**

In quantitative research the use of a random sample drawn from a population enables researchers to apply statistical tests and draw inferences from the analysis. Qualitative research is usually concerned with analytical inference to theoretical propositions. Probability sampling can increase the representativeness of the sites or people involved and control for selection bias, which strengthens the validity of a qualitative study. However, finite resources, limited timescales and practical issues, such as intentional investigation of small homogeneous groups, often make probability sampling impractical. In such cases, the researcher should provide sufficient detail of the rationale for the selection process and provide an adequate description of the research setting and participants, so that the reader can judge if the findings apply in similar settings.

The present work investigated the care system and direct patient care over a range of morning, evening and night shifts, weekdays and weekends. The nature of the work setting precluded random sampling as it was not possible to predict in advance which midwives would be allocated to labour ward, or allocated as midwife coordinator. The two Senior House Officers (SHO) who were 'shadowed' were the only SHOs allocated to labour ward at the time of the labour ward case study. A stratified random sample of medical staff was not practical as senior doctors did not spend a large amount of time on the labour ward and the researcher could have spent the entire day or night in another part of the hospital. However, this in itself was an important observation.

The researcher had no control over the allocation of midwives or doctors who participated in the audio-video study. The midwife coordinator allocated the attendant midwife and video recording was undertaken with the agreement of the staff. No member of staff refused to take part in the study however, at the shift changes there was sometimes a discussion between midwives on whose 'turn' it was to take part. This may have led to an element of self-selection with more confident midwives participating in the study.

The mothers who took part in the audio-video study were a convenience sample, biased towards induced labours or mothers who were admitted in very early labour. This was for pragmatic reasons as there are difficulties in approaching mothers in established labour to gain consent. However, even if mothers had been randomly selected prior to admission, the researcher or the appropriate delivery room may not have been available.

#### **5.12.2.3 Mapping of analytical strategy**

Quantitative research begins with a clearly defined hypothesis, predefined variables and the selection of appropriate tools and statistical tests. Prior conceptualisation is often inappropriate in qualitative research as concepts and categories are usually developed over the course of the investigation. A common criticism of qualitative research is failure to provide an adequate description of how low-level classifications developed into more sophisticated themes. The present work addressed this with:

- The use of consistent comparison of actions to identify and illuminate important similarities and differences.
- The use of rich picture diagrams to provide a visual representation of the emerging network of themes.

The approach to data analysis was systematic. First, the most frequent actions and care procedures were identified. These were examined in detail, looking for patterns, orderliness and recurrent actions. Evidence was sought for contrasting cases and differences in how the same actions and care procedures were accomplished. The ambiguous nature of various roles and communication activities made the coding process difficult, but this was the characteristic of the setting and an important finding.

#### **5.12.2.4 The use of counts**

The tendency of some qualitative research to support conclusions with a few quotes selected by the researcher has led to distrust and criticism. The present work attempted to focus on observable actions, interactions and care procedures. Where possible, at each



stage of analysis, data were coded quantitatively and qualitatively. Simple counts and tabulations were used to provide the reader with a sense of the frequency and extent of the observations.

### **5.12.3 External validity and ecological validity**

In qualitative research external validity refers to the generalisability of the research findings to other settings or samples. The findings from qualitative research are often ecologically valid as they investigate real settings and real people, under everyday routine conditions and over a longer timescale.

#### **5.12.3.1 Relevance**

Case studies are valuable for the study of complex work in real-life settings (Yin 1994; Keen & Packwood 1995). Few investigators take the time to examine the social and organisational context of the work setting before the deployment of an intervention. A number of ethnographic studies have been undertaken to provide retrospective accounts of disruption, rejection and failures of technology. It is therefore difficult to determine the actual impact of the intervention and if the problems encountered were related to the computer system design or the deployment method or both.

In the present work, a single case study was chosen to provide in-depth understanding of the labour ward care system to inform the design of the decision support system for monitoring in childbirth. An important point to make is that the issue is not whether the site is 'typical' in a statistical sense of hypothesis testing. The critical issue is whether the observed actions and interactions are typical of the broad class of phenomena in an analytical sense. Subsequent research can then be undertaken to focus on the relevance of the findings in other settings (Silverman 1993). The present research, therefore, gives a more comprehensive account of a real-life setting and thus aids understanding of the context and contingencies of everyday care. The data gathered therefore provides a resource for design and baseline data to track changes to the care system when the decision support system is deployed.

#### **5.12.3.2 Replication**

The use of multiple case studies can increase the validity of qualitative research. However, this is often difficult to achieve with finite resources and limited timescales. There are also problems when dealing with systems that are constantly evolving, therefore replication of



the same study in the same site may not necessarily produce the same findings or invalidate the previous investigation. It is, in fact, the process and context of change that is often of interest and contributes to the preservation of organisational memory.

In the present study multiple case studies were initially planned, but as the main study progressed, it became apparent that investigation of additional sites would increase the breadth, but reduce the in-depth understanding of labour ward care systems. This was partly addressed by undertaking brief confirmatory visits to five additional sites. The limitation of the amount of information that could be gathered in a day visit to each site is acknowledged. However, the visits were useful in confirming that the main features of the local labour ward model were also present in the sites visited.

#### **5.12.4 Reliability and qualitative data management**

Many qualitative investigators do not make their primary data available for scrutiny (field notes, transcripts). There have also been criticisms of the tendency to select data to fit an ideal conception or bias towards the exotic or unusual (Silverman 1993). This present research addressed these issues with:

- The use of qualitative data analysis software to aid systematic coding and analysis.
- Provision of a sample of the transcription material in appendix 12 (page 404-412) and on the CD-ROM provided within the thesis to enable reference to source material.
- The use of a computer database for storage and review of anonymised source data.
- Limited independent and team review.

Qualitative data analysis software is mainly a data management *tool*, rather than a package for inferential statistical analysis, although many of the software packages also have powerful statistical tools. Qualitative data analysis programs can be an invaluable aid to keep control of, organise and explore unstructured data. The software program used in the present study aided data management, as each code was linked to the primary source document and audio-video segment and so the context of the data was preserved.

Provision of transcription material, in appendix 12, pages 404-412 and on CD-ROM can enable the reader to reference the source material. However, it cannot be assumed that the reader would have the time or motivation to review all the material. In addition, the

researcher organised and coded the data based on the aims of the research, prolonged observation and the theoretical frameworks, which underpinned the work.

The potential for bias, through selecting evidence to support prior assumptions, can be addressed by openness to the review of data by other members of the research team. Anonymised transcripts of documented observations were available for review by other members of the research team. However, there are obvious resource implications as it is time consuming to review transcripts. There are also methodological issues as inevitably, the researcher has first-hand knowledge of the events and much is lost in the transcription process (body language, tone of voice and so on). In addition, other 'versions' may be equally valid and it is, therefore, difficult to achieve independent 'verification' based on the criteria applied in quantitative research. Discussion of the main findings from the analysis of the labour care system was undertaken with a senior obstetrician and a systems analyst, to serve as a 'plausibility check' on the researcher's analysis. The care system was complex and it was unrealistic to think that a single investigator could analyse an entire system. In fact, given the richness and complexity of the research setting, a number of perspectives were desirable.

The digitised audio-video database provided rapid access to specific actions, care procedures and subfeatures, without the need to access the original recording, which would have been time consuming. The audio-video data provided a permanent record and captured far more than unaided human observation. Atkinson and Heritage (1984) suggest:

"In sum, the use of recorded data serves as a control on the limitations and fallibility of intuition and recollection; it exposes the observer to a wide range of interactional materials and circumstances and also provides some guarantee that analytic considerations will not arise as artefacts of intuitive idiosyncrasy, selective attention or recollection, or experimental design."

(Atkinson and Heritage 1984, p. 4)

The researcher's practical experience with analysis of audio-video data suggests that this is an ideal view of the process. The camera only records, the data has to be interpreted and remains subject to bias and selective attention. Audio-video analysis clearly offers many advantages over unaided human observation. However, the amount of data can be overwhelming and if only a few selected video segments are examined in detail then the analysis will be less rigorous (LeCompte & Preissle 1993). The analysis can also be time consuming. Sampling frameworks may aid data management but there is a risk of narrowing the scope of the investigation and loss of context.

Attempts were made to establish verification procedures for the analysis of the audio-video data but these proved problematic. A sociologist was asked to independently review a six-hour tape. The first review comment made was that the midwife had performed an episiotomy without the mother's consent or knowledge. This was not the case. The mother actually had an intact perineum. This raised questions about the practical and methodological issues of individual non-clinician reviews. In addition, to do any justice to the richness of the recordings, they should be reviewed in detail. The independent reviewer had made brief notes, which provided a superficial account of one case, while the researcher had undertaken detailed transcription and analysis of 20 cases over several months.

It was then decided that a team approach might be more appropriate, serving as a plausibility check of the researcher's analysis. In addition, the sharing of different perspective would identify areas for further pursuit or alternative explanations. A review process was established and involved a senior obstetrician, a sociologist and two systems analysts. The sessions were tape-recorded and comments made by the review team were available for consideration. However, attempts to gather a team together to review the recordings was difficult due to their clinical and academic commitments. Six months after the review process had commenced, the team had examined only six hours of videotape from a single case. The researcher found the team review helpful as it provided alternative views. However, it was not feasible to sustain the team review process due to limited resources, time constraints and the labour intensive nature of the review process.

The researcher and a midwife independently reviewed a 10% sample of the digitised video segment. The midwives' activities were classified using a predefined observation schedule (McNiven, Hodnett & O'Brien-Pallas 1992). However, both reviewers found the classification of observations such as praise, reassurance and information giving were problematic. Statements with positive words did not necessarily reflect encouragement or praise. The content of some statements seemed supportive, but their context (no eye contact, orientation away from the mother) suggested otherwise. Furthermore, calling a mother a 'good girl' may undermine her position by reducing her to a childlike figure. On the other hand, mothers may need to be 'mothered'. The fact that information was given does not mean that it was received and understood by the mothers. Communication is more than just information giving: the insensitive offhand remark; the fathers' attempts to engage in conversation blocked; a midwife's departure from the room on the mother's

initial use of gas and air; the midwife's lack of eye contact; none of these features can be captured with a sampling framework. There is an inevitable loss of context and detail when a sampling framework is applied. This does not mean to say that no attempt should be made to apply checking or verification procedures, but clearly those strategies also have limitations.

### **5.13 Protection of participants and research site**

Reducing the risk of harm to participants and the host organisation are important considerations. Preparation prior to fieldwork is particularly important so potential participants have a full understanding of the nature of the research, have time to reflect on the implications of the research and have the opportunity to raise any concerns. The researcher presented the proposed research at one of the maternity unit's departmental meetings and written information explaining the nature of the study was also provided (see appendix 17, staff information sheet, page 420). However, many midwives did not attend the department meeting and it could not be assumed that clinicians would have the time or inclination to read information leaflets. The researcher considered it important to provide a number of briefing sessions for midwives and doctors. A series of weekly meetings were held over a three-week period, in the afternoon and late evening, to inform as many staff as possible about the study. The researcher also visited all the ward areas and spoke to as many of the individual staff as possible about the research work. This reduced the potential for misunderstandings and misinformation about the nature of the research. It also provided an opportunity for staff to ask questions and voice concerns, particularly for those who were unfamiliar with qualitative research methods.

No research method is benign and observation may have made some of the participants anxious. Non-participant observation, in particular, was more intrusive than audio-video observation. One attendant midwife, who was directly observed by the researcher, did say the presence of the researcher made her feel nervous at times. It must be said that the researcher also felt nervous at times, particularly when the fetal heart rate was not monitored for long periods of time or when observing poor standards of care.

#### **5.13.1 Issues of confidentiality**

Participants were given pseudonyms and no details of the mothers' name or hospital identification number were documented. The observation notes were stored in a locked



filing cabinet. Transcripts of medical records were anonymised and the audio-video recordings were given a unique identifier. All videotapes were stored in a locked filing cabinet. In qualitative research, risk of harm often emerges with dissemination of the research. There are a number of ways to counter this but their effectiveness is limited. Even with the use of pseudonyms, participants may recognise or think they recognise themselves. Many workers undertake research at local sites and their institutional affiliation may reveal the identity of the organisation. Research findings about groups and organisations may not necessarily be favourable. This may cause participants to feel they were treated unfairly, especially if the research had a hidden agenda. Managers may feel that the research findings have damaged the image of the organisation or shows them in a bad light. These issues can jeopardise future research work. Multiple sites can give a better degree of institutional anonymity and this will be undertaken in future work. A further discussion of the ethical and medicolegal implication of audio-video recording actual clinical care is provided in Appendix 15, page 415-418.

## **5.14 Limitations**

This work has drawn on qualitative research methods but it was not a sociological study. The approach was entirely consistent with the aim of developing a better understanding of the labour ward system of care, where the research approach needs to align with the development cycle of computer systems.

Many ethnographic investigations provide few details of the approach to coding data. Wolcott (1994) distinguishes between systems that allow data to be handled efficiently and procedures in which features and relationships are identified. The approach in the present work was not to generate 'sociological' categories and metaphors as they ignored the way activities were accomplished. The data were managed with the use of an index of observable events and actions, consistent comparison and the development of rich picture diagrams to represent the care system. It therefore provides a representation, not a reproduction of the system. However, this representation was derived from observation of actual clinical practice, not accounts of clinical practice.

Much of the published literature of investigations where data has been captured with audio-video recording has provided no details of the amount of data that was actually collected or analysed, and provided no sense of the frequency of observed events



(Goodwin & Goodwin 1996; Heath & Luff 1996). Ethnomethodology often involves extremely detailed analysis, in some cases 100 hours of analysis for one hour of video (Preece, Rogers & Sharp 2002). This approach is impractical when dealing with a large set of observations, each of which spans several hours. Clearly choices need to be made based on a level of analysis that will meet the aims of the investigation, rather than adherence to a theoretical principle for its own sake.

The case study of the labour ward provided breadth and insight into the context of the care system while the audio-video recording within the individual delivery room provided depth and insight into the process of care. It is difficult to balance depth versus breadth when undertaking an investigation of a clinical system. It has become clear that there are many areas where more detailed investigation of particular routines and practices is required.

The strength of qualitative research is the richness and detail of the context and process of the setting it provides. Qualitative research produces a representation of the system and recognises that other versions may be equally valid, rather than claiming a single 'truth'. This strength is also a weakness as it creates practical and methodological difficulties with 'verification' procedures. There are no clear-cut answers to this paradox. The alternative, however, is the study of input and output, without actually looking inside to see the context and process of care, and the behaviour and interactions of clinicians and parents. The system of care would remain a 'black box' with understanding limited to a superficial account, reduced to the measurement of variables that can be identified, rather than uncovering issues and versions, which enlighten and challenge assumptions. The limitations of the methods in practice will be discussed in chapter 6 and 7.

## **5.15 Summary**

The chapter has introduced, described and provided a rationale for the chosen research methods. It was proposed that qualitative methods could be complementary to quantitative methods and increase the comprehensiveness and relevance of the research. The research approach was compatible with human-centred design.

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## Chapter 6

### Findings: Labour Ward Case Study

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*This chapter reports the findings of the labour ward case study. A rich picture diagram was developed as a model for the main structures and processes of the labour ward care system. These findings were compared with five other labour wards in the UK to produce a generic rich picture. Core categories, derived from the observational data, and their relationships were described. The case study highlighted complex and problematic relationships between communication, decision making and accountability. The chapter concludes with a discussion of the implications of the findings for the system of care.*

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## **6.1 Introduction**

The previous chapters of this thesis have developed an argument that it is necessary to examine the everyday, taken-for-granted aspects of the labour ward care system. In particular, it was suggested that a better understanding of how labour ward care was coordinated could inform the further development of the decision support system for patient monitoring in childbirth. In addition, such an investigation could also inform changes to the care system.

Ethnographic case studies of 'centres of coordination' include municipal control rooms, air traffic control rooms and airport terminals (Heath & Luff 1996; Hughes et al., 1993; Goodwin and Goodwin 1996). Suchman (1997) described such settings as having the following characteristics:

- Strict division of labour with different personnel having different responsibilities.
- Personnel co-located in the 'same' physical domain.
- Individual tasks have to be coordinated 'simultaneously' and 'sequentially' with the activities of others.
- The information needed to accomplish individual tasks is dispersed amongst personnel within (and outside) the domain.
- Some tools are available to facilitate the coordination of tasks in real time.

The characteristics of the present system were rather different. Firstly, it dealt with an emotional and very special life event. Secondly, the division of labour was not clear cut, midwives and doctors were not always co-located in a shared workspace, the majority of care was undertaken in the privacy of individual delivery rooms (the microenvironment) and few tools were available to coordinate real-time tasks. This study therefore sought to describe the context of the wider labour ward system (the macroenvironment) and the relationships between people in their various roles.

The aim of the case study was to shed light on how the care of mothers in labour was coordinated. The study was necessary to provide an understanding of the context of labour ward system to inform the analysis of care within the individual delivery room, which is reported in the next chapter.

## **6.2 The research setting**

The study was conducted in the labour ward of a District General Hospital with 4,600 births a year. The labour ward comprised 12 individual delivery rooms. A schematic diagram of the layout of the labour ward is provided in appendix 5, page 275. Mothers with complicated pregnancies were preferentially allocated to rooms 1, 2, 5 and 6 while those with normal pregnancies were preferentially allocated to rooms 12, 14 and 15. Room 12 tended to be allocated to 'domiciliary bookings' (DOMINO); a service where community midwives provide antenatal and labour care. Community midwives who attended labour ward to 'update' were often allocated to room 14.

The remaining rooms served a number of purposes; room 3 was disliked by midwives and rarely used; room 7 contained a water birth facility; room 8 was used as a family room; room 9 was used as a bereavement room; room 11 was used for high dependency post-delivery patients. There was also a three-bedded early labour area, however this was rarely used. Room 4 served as the communal labour ward office and a workstation was located in the centre of the labour ward.

## **6.3 Duration and pattern of fieldwork**

Fieldwork was conducted over a four-month period (August to December). The first 38 hours comprised preliminary observation at the workstation and initial recruitment of members of staff for the study. This data was not included in the main analysis. It was considered best to discount this time, as there may have been a greater effect on the behaviour of staff (Kirkham 1983). All midwives and doctors who were approached agreed to take part in the study. A further 182 hours of observation data of people in their various roles and over their shift patterns were documented:

- Five attendant midwives were observed for 37 hours.
- Two Senior House Officers (SHOs) were observed for 61 hours.
- Three midwife coordinators were observed for 49 hours.
- Observation at the labour ward workstation was conducted for 35 hours.



## 6.4 Findings

The findings of the case study are presented in three parts. The first section presents a model for the main structures of the labour ward in the form of a rich picture diagram, derived from documented observations. A narrative section then follows which describes the structure of the model in more detail. The second section, presents the core categories and their relationships, derived from the observational data, augmented with narrative descriptions. The narrative descriptions are linked to the source data by reference to documented observations with line numbers in square brackets. The documented observations can be found in appendix 6, page 276 to 321. The third section presents the findings of confirmatory site visits conducted in five maternity units.

### 6.4.1 Model of current labour ward care system

The rich picture diagram shows the main structures of the labour ward care system centred on the individual delivery rooms (figure 6.0). This included:

- The main people involved and their roles: attendant midwives, midwife coordinator, SHOs, Registrars (junior and senior) and the Consultants.
- The potential communication paths where information was passed to people in their various roles, and where 'advice' was available from more experienced clinicians.
- Routine formal communication structures (ward round, shift handovers).
- Information and communication artefacts.

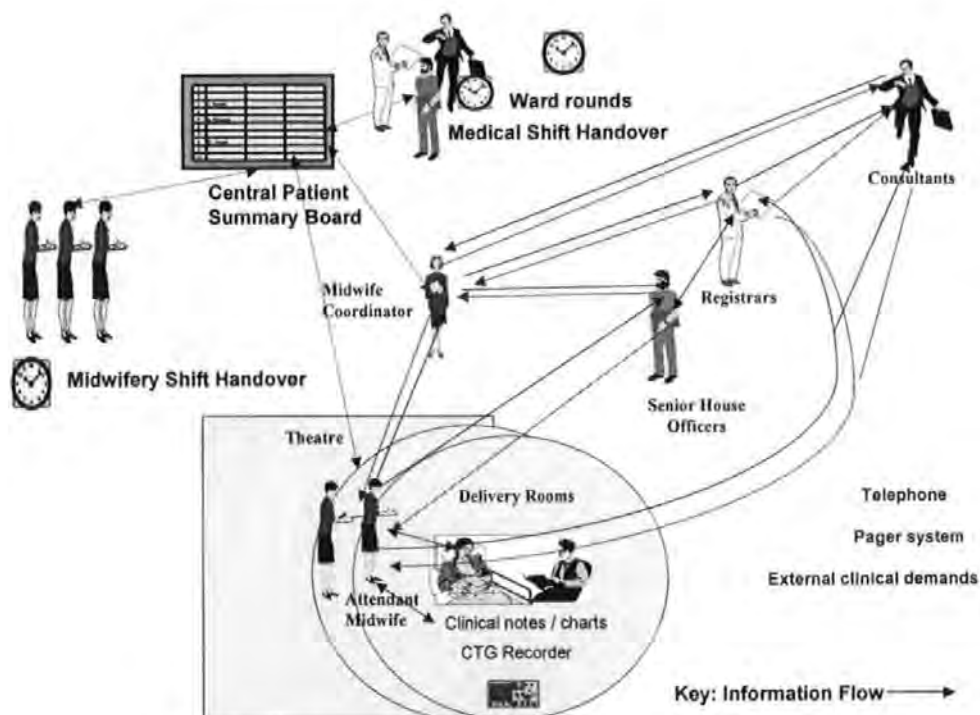


Figure 6.0: Rich picture diagram of the labour ward care system



#### **6.4.1.1 The attendant midwife**

The role of the midwife includes the provision of physical care, information and advice during labour and to conduct deliveries of her own responsibility. It also includes detection of abnormal conditions in mother and baby and procurement of medical assistance (UKCC 1998). The experience of attendant midwives who provided direct care of mothers varied greatly as did their allocation to the labour ward, which could range from a single shift of seven hours to an allocation of up to six weeks. The attendant midwives often sought 'advice' from the senior labour ward midwife, allocated as the midwife coordinator for each shift [811; 820; 905; 918; 922; 949; 966; 968; 1005; 1011; 1061; 1127; 1142; 1254; 1283; 1293; 1394; 1653; 1947; 1999; 2009; 2124; 2763].

#### **6.4.1.2 Midwife coordinator**

Core midwives (G-grade) were permanent members of labour ward staff. There were normally two core midwives on duty for each shift. One core midwife was allocated as the midwife coordinator, who was in charge of labour ward for each shift. The midwife coordinator allocated mothers to their designated rooms and allocated midwives to provide direct care. Over a 'typical' seven hour shift, the midwife coordinator: assisted with one normal delivery; dealt with 10 patient referrals; received / requested reports on mothers' condition on six occasions; took over the duties of an inexperienced midwife for one urgent case, and made / received seven telephone calls. In general, the midwife coordinator was not allocated a specific mother to look after, but during busy periods, this was not always possible and at night, they often had to provide direct care.

Details of the mother's condition (risk factors, diagnosis, progress in labour and deviations from normal) were reported to the midwife coordinator [519; 910; 940; 949; 951; 969; 1055; 1061; 1102; 1150; 1346; 1360; 1469; 1522; 1526; 1582; 1586; 1693; 1699; 1706; 1711; 1849; 1864; 1934; 1989; 1976; 1983; 998; 2000; 2004; 2039; 2061; 2197]. The midwife coordinator provided 'advice' to attendant midwives, however this often consisted of being told what to do [520; 924; 970; 1059; 1134; 1284; 2010; 2032; 2040]. Decisions made by the midwife coordinator were sometimes based on incomplete information and subject to misinterpretation [939; 941; 954; 1059]. On occasion, the midwife coordinator implicitly took over the attendant midwives duties [939; 974; 1177; 2825] or explicitly at the request of the attendant midwife [966; 1266].

There was no formal description, specification, training or regulation of the midwife coordinator's role. However, there was a documented reference in the labour ward guidelines that senior midwives were available to provide advice. The midwife coordinator also provided informal support and teaching to the SHOs.

#### **6.4.1.3 Senior House Officers**

The SHOs (junior doctors) were qualified doctors undertaking additional training to become either General Practitioners or Obstetricians. Observation of a 'typical' nine hours of continuous duty found the SHO spent 50% of her time dealing with ward patients; was paged six times; dealt with 10 patient referrals and received two reports on mothers' condition; sited two intravenous infusions; gave two intravenous injections; assisted with one caesarean section; performed one perineal repair and sutured one abdominal wound dehiscence.

Midwives sometimes forgot to call or deliberately bypassed the SHO when there were learning opportunities [346; 690; 1365]. On occasion, midwives just wanted to inform the SHO about a particular mother but did not require the SHO to visit the mother [38; 390]. This was seen by the SHOs as 'buck passing' [47; 87; 391]. When the SHO was informed about a mother's condition the communication of information was sometimes unclear [39; 249; 475], decisions were already made by midwives [137; 251; 261; 341; 399; 934; 941] and accountability for decision making was implicit rather than explicit.

The SHOs were informally supported and supervised by core midwives, but they were sometimes placed in unsafe learning situations [248; 939]. This is illustrated in section 6.5.3. Formal supervision and teaching of the SHOs was provided by the designated labour ward Registrar / Senior Registrar and Consultant [288; 311; 353; 415; 419; 436; 449; 671; 697; 756; 799; 832]. This was often limited by the availability of senior medical staff. One SHO commented that if she remained on labour ward she was asked to do tasks that midwives would normally undertake [94; 122; 794; 964]. The SHOs were often told what to do by the midwife coordinator [137; 141; 247; 497; 941; 949; 978; 980; 1413; 1063; 1069; 1975].

#### **6.4.1.4 Registrars**

The Registrars were qualified doctors who had gained further qualifications and were training to become obstetricians. The doctors in these posts were training to develop

advanced practical skills and to gain further qualifications. The Registrars undertook most of the routine practical medical procedures and routine management decisions on the labour ward. One Registrar commented that if s/he remained on the labour ward, s/he was told things s/he did not need to know and was asked to do tasks that midwives would otherwise undertake [2047].

#### **6.4.1.5 Senior Registrars**

Senior Registrars were qualified doctors who had undertaken additional training and gained further qualifications. They formed the 'middle grade' tier of the medical staffing structure. The doctors in these posts were training to achieve specialist status, not simply to learn practical skills. The Senior Registrars also provided much of the routine labour ward duties. One Senior Registrar indicated that if doctors remained on labour ward they were asked to undertake additional tasks [964].

#### **6.4.1.6 Consultants**

The Consultants were the senior members of the medical teams. They provide the expertise for the care of mother and baby, where the course of pregnancy or labour has deviated from normal. When the study commenced there were seven Consultants in post. Each mother was allocated a designated Consultant for the duration of her pregnancy. The mother may never have met or required the attention of the Consultant but s/he was responsible for the medical care that was provided.

The Consultants had allocated 'labour ward sessions' where they were free from other clinical commitments, but the full 40-hours per week of Consultant labour ward sessions, recommended by the Royal College of Obstetricians and Gynaecologist (2000), was not fully implemented at the time of the study.

The Registrars, Senior Registrars and Consultants spent a great deal of their time in other areas of the hospital (clinics, theatres etc.). Senior doctors were mainly present on labour ward for formal ward rounds and shift handovers, if there were concerns about mothers or if they were requested to attend.

### **6.4.2 Regular formal communication structures**

This section describes routine, formal communication structures and processes, which were observed on the labour ward.

#### 6.4.2.1 Shift handovers

Information was made available to other staff through regular, routine reporting structures, which included shift handovers. Three types of global shift handovers (exchange of patient related information for all mothers in the labour ward) were observed.

The handovers between midwifery shifts occurred three times a day (7:30; 13:45; 21:30). There was a global handover by the midwife coordinator, where the incoming attendant midwives and midwife coordinator were given information about all the mothers on labour ward. The global midwifery shift handover was conducted in the main labour ward office and centred on the whiteboard, which displayed patient specific information (see appendix 5, schematic diagram of labour ward, page 275 and figure 6.1, the official whiteboard, page 126). The whiteboards are explained in more detail in section 6.4.3.1.

There was a global handover by the SHO to the incoming SHO. Handovers between SHOs occurred twice a day, usually between 07:30 and 08:00 and at 18:00. The handover was usually conducted at the workstation and centred on a small 'portable' whiteboard located at the workstation (see appendix 5, schematic diagram of labour ward, page 275 and figure 6.2, the labour ward workstation, page 128).

There was a global handover by the Registrar to the incoming Registrar. Handovers between Registrars occurred three times a day usually between 08:00 and 08:30, 12:30 and 13:00 and 17:30. The handovers were usually conducted at the workstation and centred on the small portable whiteboard. The characteristics of the global shift handovers included:

- An overview of current labour ward status / 'situational awareness'.
- Awareness of who was the midwife 'in charge' (midwife coordinator) of labour ward.
- Awareness of the medical staff responsible for labour ward duties.
- Awareness of primary carer allocation (attendant midwives).
- A handover of responsibility and continuity of care.
- Clinical information was available for mutual monitoring.
- Not shared between groups.
- Vulnerable to omissions and inaccuracies.

Attendant midwives received a more detailed individual handover in their allocated delivery room from the out-going attendant midwife. The SHOs' and Registrars'



handovers occurred at different times and so were conducted separately. The handovers between midwives and doctors were not usually shared.

#### **6.4.2.2 Ward rounds**

Ward rounds were regular, routine reporting structures. There was a maximum of four doctors' ward rounds performed: an early morning round (starting between 08:30 and 09:15), a midday round (between 12:30 and 14:00), a late afternoon round (at about 17:00), and a late evening round (at about 22:00). The midwife coordinator was usually, but not always, involved in the medical ward rounds, which were sometimes 'virtual' – that is conducted at the whiteboard. Doctors did not usually visit all mothers during their ward round. The midwife coordinator usually identified mothers who needed to be seen by medical staff. Some of the evening ward rounds were conducted by telephone. The Consultants did undertake ward rounds, although it must be said that the researcher observed few formal ward rounds. Most of the contacts observed were by phone via the Registrar [432; 736; 1531]. The characteristics of the ward rounds included:

- An overview of current labour ward status / situational awareness.
- Awareness of who was the senior doctor / Consultant responsible for labour ward.
- Identify patients with specific concerns.
- Continuity of care.
- Identify deficits in care.
- Virtual, that is mainly conducted at the whiteboard.

### **6.4.3 Tools**

This section describes the various communication tools (artefacts) that people used over the course of their shift.

#### **6.4.3.1 Whiteboards**

There were two whiteboards, which displayed patient specific information. An 'official' whiteboard situated in the communal labour ward office (figure 6.1) displayed the allocation of rooms and midwives to mothers (room number, mother's name, Consultant's name, various obstetric risk factors, cervical dilation, midwife's name). The boards were divided into a grid with the room numbers down one side, and boxes for patient details and comments across the grid.





**Figure 6.1:** The official whiteboard (patient summary board)

The whiteboards were important communication tools for all labour ward staff, where staff looked at the boards on an ad hoc basis, during midwife shift handovers and during ward rounds. The 'official' whiteboard was originally sited at the labour ward workstation but due to perceived concerns about confidentiality it was moved into the labour ward office. A small portable 'secret' whiteboard was used by staff and kept out of sight at the workstation.

The information on the whiteboards was of variable quality, abbreviated, informal and often not up-to-date. When the labour ward was busy, the whiteboards were updated less frequently. At night the 'secret' whiteboard was openly used and the official whiteboard was updated in the morning before change of shift [735; 2129; 2164]. The SHO was observed updating the 'secret' whiteboard by asking the midwife coordinator or other midwives, not necessarily the allocated midwife, what was happening in each room [567; 582; 806; 1321; 1336; 2028; 2084]. The auxiliary nurses used the information on the 'secret' whiteboard for keeping track of blood samples that needed to be taken from the umbilical cord after delivery. It was also used when visitors arrived to direct them to the appropriate room.

#### **6.4.3.2 Case notes**

The mother's obstetric case notes were usually kept in the individual delivery room. The case notes were sometimes brought out of the room for discussion with the midwife coordinator and medical staff. The attendant midwife reviewed the notes and abstracted information onto other forms, such as the birth registration form, admission form, epidural form, observation forms and the baby's case notes. There was considerable duplication of information and midwives tried to 'keep ahead' of the paperwork. There was an emphasis on record keeping particularly for medicolegal purposes. The researcher observed one attendant midwife who paid more attention to record keeping than to the parents [2524]. It was difficult to elicit salient clinical features from the case notes when there was a large amount of information documented over the course of labour. Some midwives underlined text or used different coloured ink to highlight events or deviations from normal. Record keeping by medical staff was often conducted outside the delivery room. The case notes were usually taken out of the room for telephone referrals to Consultants.

#### **6.4.3.3 Telephones and pagers**

Telephones were situated at the workstation and in the communal office. Telephone referrals and consultations were usually conducted at the workstation. Information conveyed by telephone was, on occasion, presented in a biased manner [267; 298]. It was observed when shadowing the SHO that clinical interviews and care of mothers on the ward were interrupted by pager calls. Pagers were usually answered immediately as there was no means of discerning the nature of the call, apart from emergency calls, which had a distinctive tone. One locum Registrar, who was unfamiliar with the paging system, responded to an emergency call (for a shoulder dystocia) by phoning the switchboard and spent two or three minutes waiting for a reply [341-349].

#### **6.4.4 The workstation**

The focal point of the labour ward was the workstation (figure 6.2) situated in the centre of the labour ward (appendix 5, page 275). It was the main centre of communication and served as a meeting place, where people sought help from colleagues and discussed the care of mothers. Clinicians sought information on the status of labour ward, left pagers to be answered or asked staff at the workstation to pass on messages to other members of staff.



**Figure 6.2:** The labour ward workstation

When the labour ward was quiet, midwives had tea at the workstation and often shared their experiences of interesting or difficult deliveries. Visitors who reported to the workstation were usually attended to quickly and escorted to the appropriate room. The SHOs and Registrars sometimes remained at the workstation and socialised with midwives. Few senior doctors were observed sitting at the workstation, apart from when there were concerns about a mother.

## **6.5 Issues of roles and relationships**

This section describes the core categories derived from the observation data. A narrative section then follows and provides more details of the core categories and their relevance to the coordination of care and to people in their various roles. The core categories derived from the data included:

- Referrals: exchange of patient related information between clinicians, associated with a patient specific action or recommendation.
- Reports: exchange of patient related information between clinicians not associated with a patient specific action or recommendation.
- Accountability: Issues relating to ambiguities and tensions, which occurred in exchanges between clinicians.
- Role ambiguity: issues related to the nature and scope of various roles.
- Hierarchy: issues related to rank and authority between various roles.

Table 6.0 shows the frequency of core categories and their relationships over 182 hours of observational data. The table is intended to give the reader a sense of the density of core categories. However, they should not be seen as deterministic because a characteristic of labour ward communication was its ambiguity. Rather they represent a conceptual network of issues.

**Table 6.0:** Core category frequencies and their relationships

Core Categories	n	Referrals	Reports	Accountability	Role Ambiguity	Hierarchy
Referrals	78	-	0	37	35	3
Reports	62	0	-	0	1	0
Accountability	42	37	0	-	35	14
Role ambiguity	35	35	1	35	-	14
Hierarchy	14	3	0	14	14	-

### 6.5.1 Referrals

Referrals were exchanges of patient related information between clinicians, associated with a patient specific action or recommendation. Some referrals were explicit, when a direct request was made to medical or midwifery staff to attend a specific patient. However, on many occasions, when a clinician initiated an exchange, the initial purpose was not clearly stated. It was therefore sometimes difficult to determine a referral, as distinct from a report to 'update' the clinician, until an action was undertaken or recommendations made. The following excerpt from documented observations illustrates the issue:

A core midwife informs the SHO of a mother transferred to the labour ward for induction of labour and then tells the SHO:

"She's dipping and I can't do an ARM [amniotomy]."

The SHO referred the midwife to the Registrar. In this case, the initial purpose of the exchange was not clear, as the midwife did not specifically ask the SHO to attend the mother. The SHO constructed the exchange of information as a referral and appropriately passed it to a more senior level (the Registrar performed an amniotomy, the umbilical cord prolapsed and the mother required an immediate caesarean section).

For the purpose of this study, referrals and reports were considered mutually exclusive categories. However, as stated previously, a feature of referrals and reports was their ambiguous nature. The categories identified similar patterns of interaction, that is, the



exchange of clinical information, which appeared to have different functions. Furthermore, in clinical practice the distinction between referrals and reports was even more ambiguous than the lack of clarity of purpose, as midwives sometimes recorded 'doctor informed' or 'discussed with coordinator' in the case notes. Therefore, a report could be constructed as a referral without the person involved (or researcher) being aware of this.

It was observed that referrals in relation to CTGs were frequent and their description was often informal and unstructured [246; 263; 297; 411; 474; 696; 733; 811; 939; 948; 950; 968; 1061; 1066; 1127; 1147; 1182; 1561; 1702; 1722; 1984; 2067; 2124]. Furthermore, the referrals often lacked the context of additional clinical information and additional information was rarely sought at the time of initial exchange, as exemplified in the previous transcript excerpt.

### **6.5.2 Reports**

Reports were exchanges of individual patient related information between clinicians, which were not associated with an observable patient specific action or recommendation. Information was made available by reporting events or actions to specific individuals such as the SHO, Registrars and/or the midwife coordinator. Specific events, such as full dilatation of the cervix, onset of active pushing and imminent delivery were shared with any member of staff who was available, not necessarily the midwife coordinator [596; 710; 808; 827; 1346]. The global reporting (announcement) of these events may be related to perceptions of risk and readiness to respond.

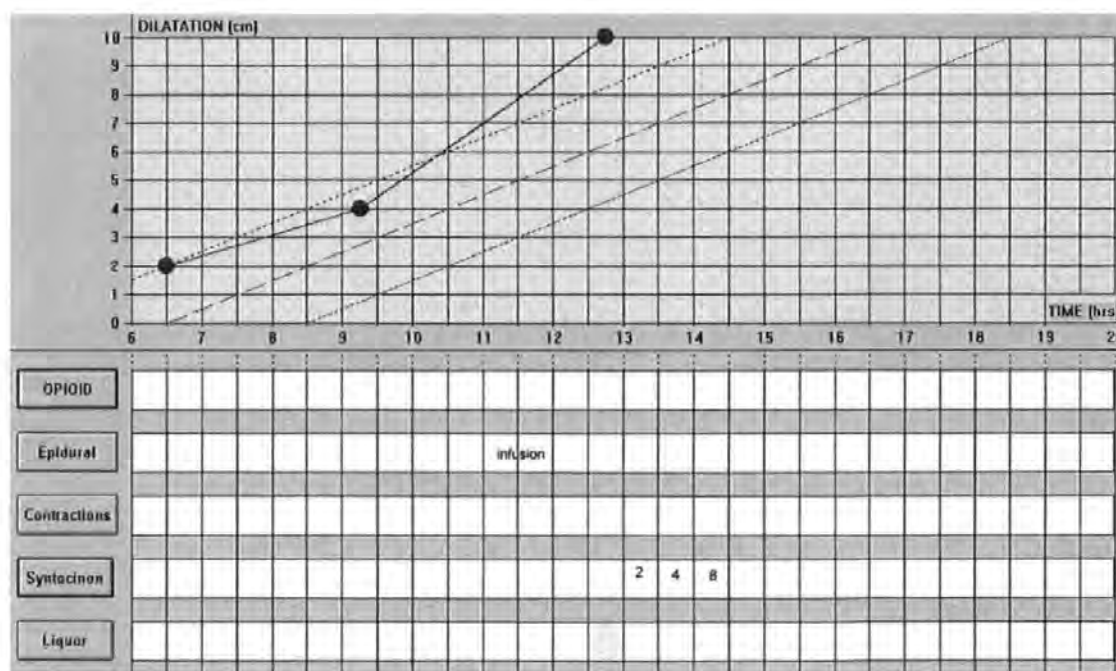
### **6.5.3 Role ambiguity, hierarchy and accountability**

There was a lack of involvement of attendant midwives and SHOs in the decision making process as they were often told what to do by the midwife coordinator. The limited availability of senior medical staff increased the dependency of the SHO on informal support from senior midwives. The reasoning for decisions was often not articulated and was sometimes based on incomplete information or incomplete assessment. The 'recommendations' of the midwife coordinator were followed, and even when questionable decisions were made, they were rarely challenged. The role of midwife coordinator was considered 'supportive' but the labour ward hierarchy made it difficult for junior staff to question their decisions.

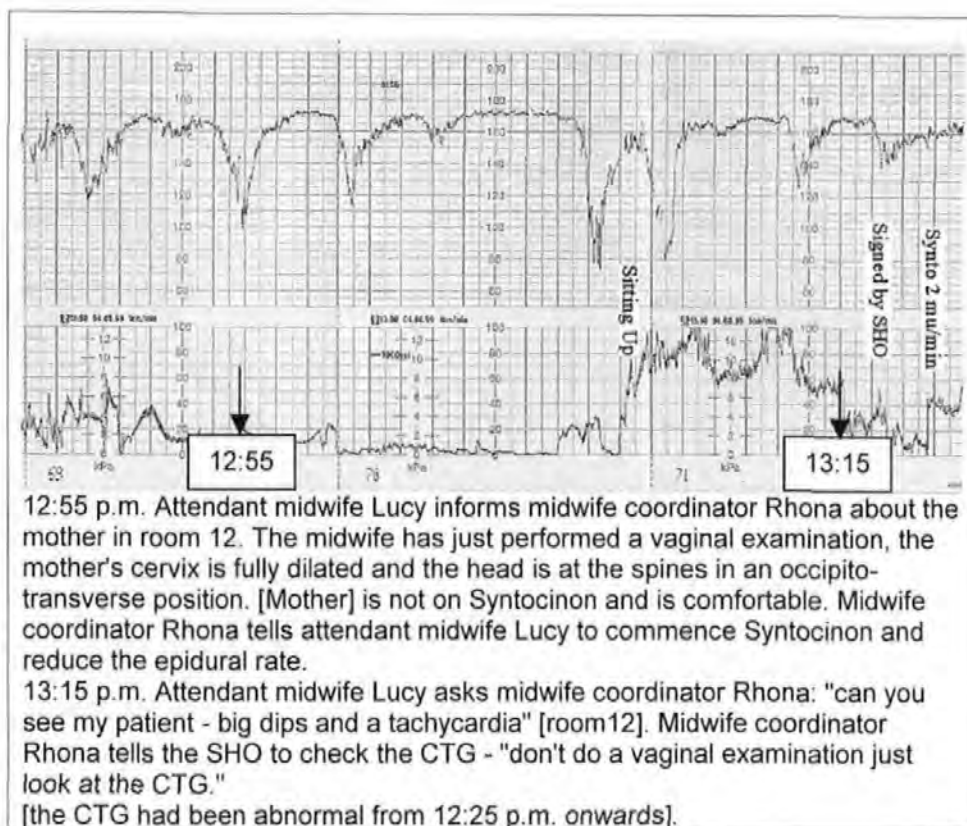


The informal support of core midwives was of variable quality. SHOs were placed in unsafe learning situations and expected to 'rubber stamp' decisions that had already been made. In some situations it was not clear who was accountable, who actually made the decision and if it was at an appropriate level of experience. The senior doctors' role in the support and supervision of the SHOs was limited by their availability. The labour ward hierarchy contradicted clear lines of accountability as the passing of accountability was often implicit and on occasions so subtle that the recipient was unaware that this had occurred.

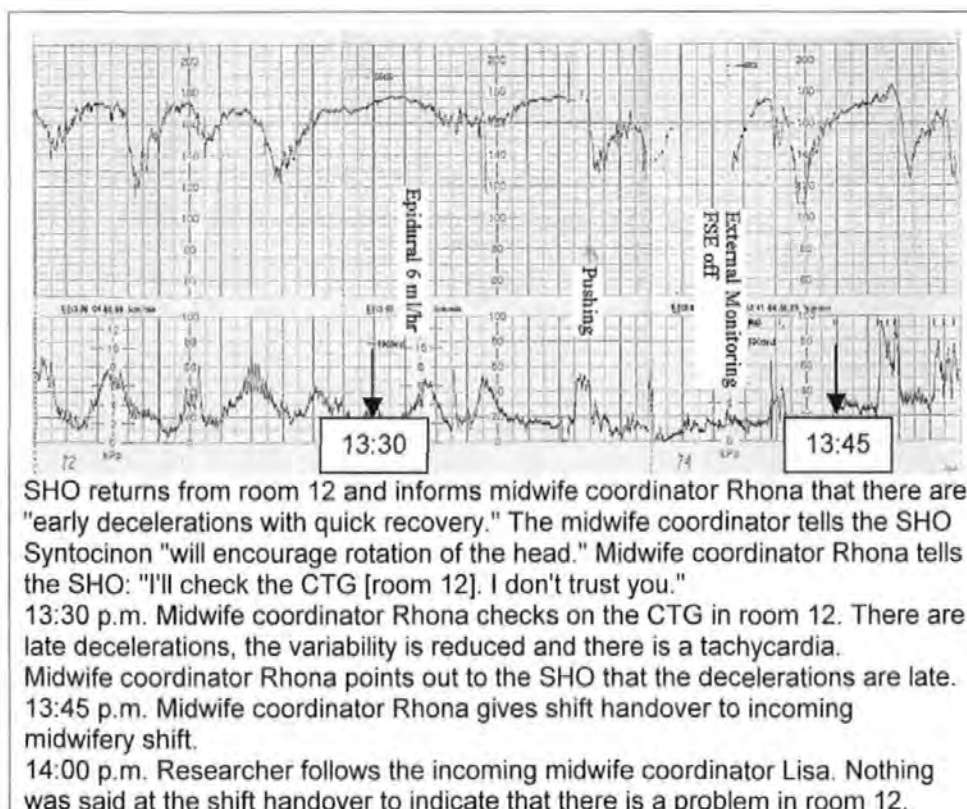
The following example of a 'near-miss' incident (case A), observed while shadowing a midwife coordinator, is presented to illustrate these issues. A healthcare near-miss is defined as a situation in which an event or omission, or a sequence of events or omissions, arising during clinical care fails to develop further, whether or not as the result of compensating action, thus preventing injury to a patient (Department of Health 2001). Figure 6.3 shows the mother's partogram, with reasonable progress of labour. The mother's CTG is shown with excerpts from the researcher's field notes in text boxes below each CTG segment (figure 6.4 - 6.6). A narrative account of the issues raised then follows.



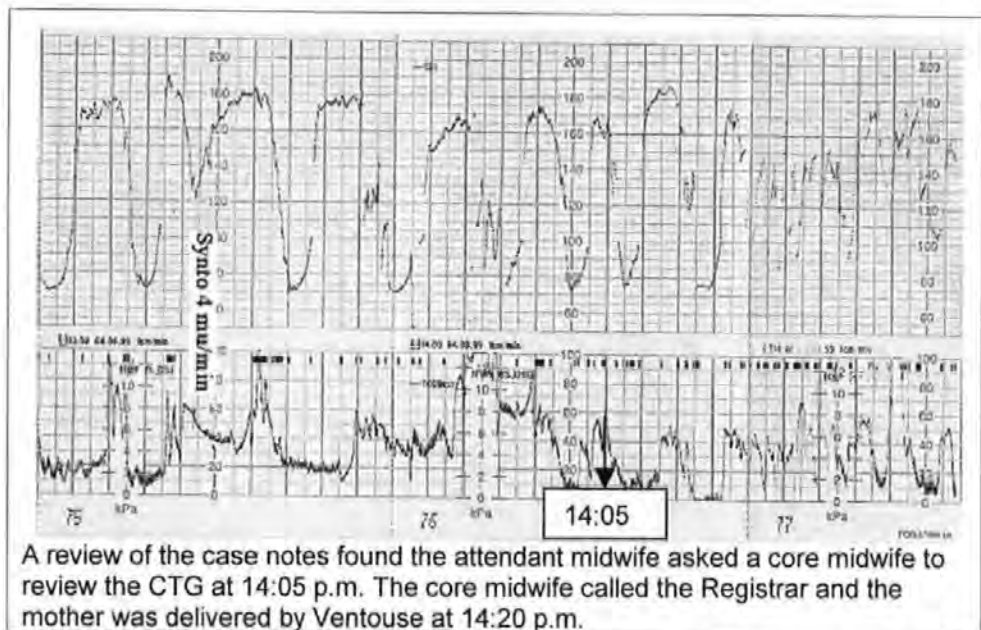
**Figure 6.3:** Case A partogram



**Figure 6.4:** Case A CTG segment 1



**Figure 6.5:** Case A CTG segment 2



**Figure 6.6:** Case A CTG segment 3

### 6.5.3.1 Issues raised from observation of a near-miss event

1. The CTG was abnormal 30 minutes before the attendant midwife reported to the midwife coordinator at 12.55 p.m. The attendant midwife initially failed to report there was a fetal tachycardia of 165 b.p.m. with late decelerations. The features of the CTG were pathological and there were two management options: obtain a fetal blood sample or expedite delivery (National Institute for Clinical Excellence 2001). Referral to a senior doctor would have been an appropriate course of action.
2. The rationale for the use of Syntocinon was not clear, as there was no report of delay or inadequate contractions. The explanation given to the SHO may indicate that the midwife coordinator misinterpreted the reported information. Occipito-transverse position is not, by itself, an indication to commence Syntocinon.
3. There was no rationale for reduction of the epidural infusion rate as there was no report of the level of anaesthesia and the mother was comfortable.
4. An inexperienced SHO was sent to review the CTG despite the features described by the attendant midwife being serious enough to warrant review by an experienced clinician.
5. The SHO misinterpreted the CTG. The midwife coordinator pointed this out to the SHO but took no further action. There was no discussion of the plan of care.
6. The learning situation was unsafe and unsatisfactory.
7. The midwife coordinator's management was erroneous, as there was no referral to a Registrar. The use of Syntocinon in the presence of an abnormal CTG is the province of senior medical staff. The decisions were 'signed off' by the SHO who signed the CTG and the prescription for Syntocinon. The midwife coordinator did not document her involvement in the case notes. The attendant midwife documented 'discussed with sister' in the case notes.
8. The attendant midwife and SHO complied with the instructions they were given and were accountable for decisions made by the midwife coordinator.
9. The abnormal CTG was not reported at shift handover.

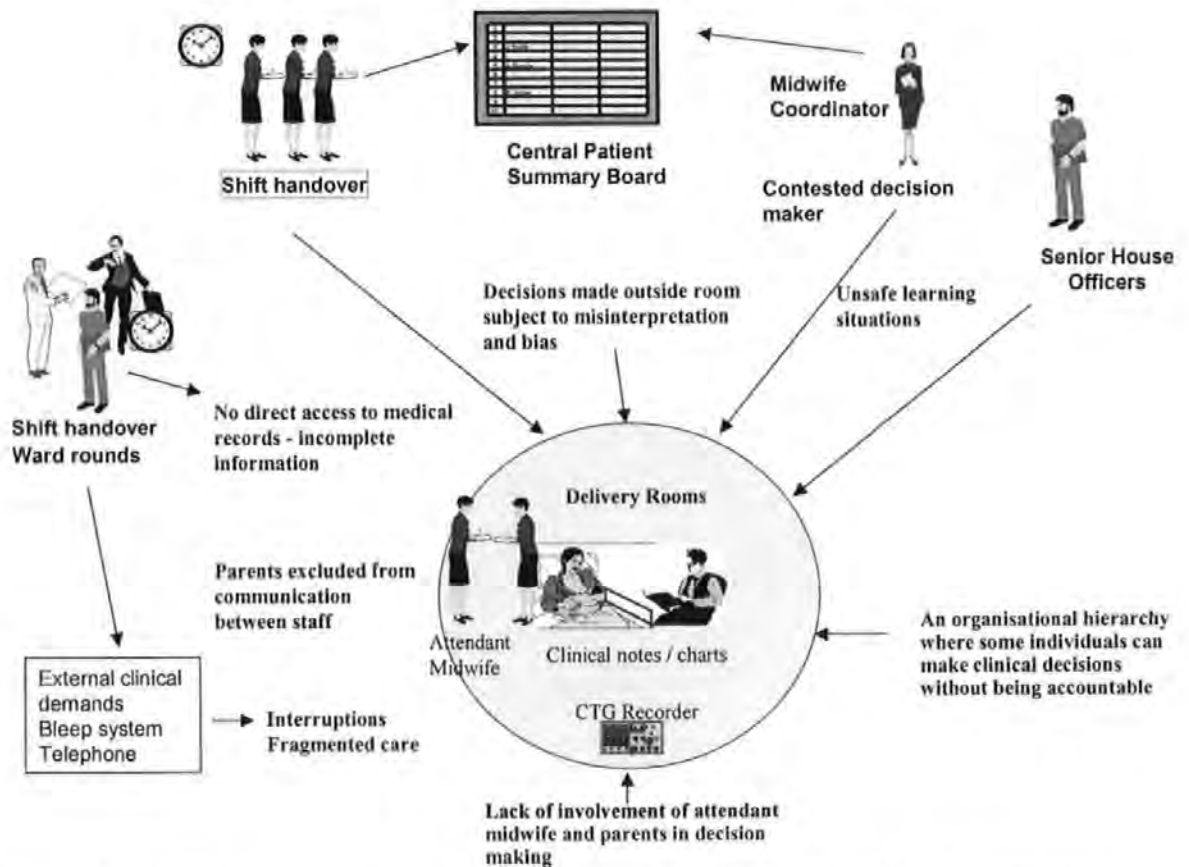
The 7<sup>th</sup> Annual Confidential Enquiry into Stillbirths and Deaths in Infancy (2000) states:

“As soon as a CTG is recognised as PATHOLOGICAL, referral must be made immediately to an experienced SHO, Registrar or Consultant and the Labour Suite Co-ordinator, as fetal blood sampling (FBS) or delivery may be necessary. This should be done prior to administration of Pethidine, epidural or initiation of Syntocinon. The Labour Suite Coordinator may refer directly to the Consultant on call in the event of suspected mismanagement.”

(CESDI 2000, p. 104)

There is no reference for the action to be taken when the coordinator is the source of mismanagement.

The care of mother and baby in this case embodied many of the networks of issues, which occurred over the course of the labour ward case study. The issues identified from the labour ward observation data were used to derive a rich picture diagram, shown in figure 6.7, for a model of the context of the vulnerability of the care of mothers in labour to error.



**Figure 6.7:** Rich picture diagram of the context for the vulnerability of the care of mothers in labour to error



## **6.6 Confirmatory external sites visits**

This section presents the findings from visits to five labour wards in England to determine if the main structures of the local model were present across the sites. Space precludes the inclusion of all the information related to the site visits within this thesis. Appendix 7, page 322 to 325, provides summary tables of the information gathered. This includes a general description of the sites (table B), use of information technology (table C), routine communication processes (table D), staff levels and coordination (table E).

### **6.6.1 Midwifery staff**

The ratio of midwives to mothers varied quite considerably (appendix 7, table E, page 325). Whilst all units seemed to aim for one-to-one midwifery care, this was rarely achieved; one midwife to two patients was the usual standard with three patients per midwife being necessary on occasion. The attendant midwife responsible for each mother was expected to refer to the midwife coordinator before referring to doctors. However, it seemed acceptable for experienced midwives to refer directly to doctors when they considered it was necessary. In general, midwives were encouraged to stay with mothers as much as possible.

All labour wards allocated a midwife as being in charge of and coordinating each midwife shift (referred to as midwife coordinator, team leader, shift leader, midwife-in-charge, sister-in-charge, and/or senior midwife). This was usually a G-grade (senior) midwife. The midwife coordinator allocated patients to rooms and midwives to patients, provided advice and acted as a point of reference for the attendant midwives (this acted as a filter for referrals to the doctors). It was observed that midwife coordinators had a global overview of all activity in the labour ward (patients, midwives, and doctors) rather than in-depth knowledge of each case. They were in almost constant demand by midwifery and medical staff. They triaged patients, acted as first point of contact for labour ward staff and supported junior midwives and medical staff (particularly the novice SHOs). The midwife coordinator and Registrars stated they worked closely together to ensure priorities were set and mothers had clear management plans and regular reviews and that opportunities for learning were facilitated. In general, the midwife coordinator was kept clear of personal responsibility for specific mothers but during busy periods this was not always possible.



### **6.6.2 Medical staff**

There was less opportunity for the researchers to talk with doctors, as they were mainly involved in direct patient care. The SHOs received help and guidance from experienced midwives (especially the co-ordinating midwife and other G grade midwives). This was indicated by clinicians at all levels (experienced midwives, SHOs, Registrars, and Consultants) and across all units. However, the degree of freedom given to SHOs varied across units. In at least one unit the midwife coordinator was encouraged to refer to the SHOs as much as possible (to maximise the SHOs exposure to clinical decision making): the SHOs were encouraged to form an opinion and then discuss (check) this with the midwife coordinator, Registrar, or Consultant. As the SHOs became more experienced, they were expected to require less support and supervision. In one unit an SHO indicated that the decision to refer a case to a Registrar or Consultant was difficult, especially at night when this could disrupt the sleep of senior staff.

### **6.6.3 Patient summary boards**

All labour wards used whiteboards to display patient details (room number, mother's name, midwife's name, and varying patient details) and current shift information (name of the midwife coordinator, and name and pager numbers for the on call SHOs, Registrars, Consultant, anaesthetist, and paediatrician). There was also a place for notes and messages, which consisted mainly of 'incoming' patients details. All labour wards were aware of the potential of these boards to compromise patient confidentiality (table D, appendix 7. page 324).

### **6.6.4 Midwife shift handovers**

All labour wards operated three shifts of midwives per day: an early shift (starting at about 7:30 a.m.), a late shift (starting between 13:15 and 14:00 p.m.), and a night shift (starting at about 21:30 p.m.). The format of the handover varied slightly across labour wards. In most labour wards, there was some form of global exchange of information where a summary of each case was presented to the incoming midwife shift. This usually occurred at the central workstation (usually with reference to the central patient summary board), and was undertaken by either the midwife coordinator or the attendant midwife.

A more in-depth handover usually followed this global exchange of information, where the midwife responsible for each case presented a more detailed account of the case to the

incoming attendant midwife. This usually occurred in or just outside each delivery room. In all units except one the incoming midwife coordinator was responsible for allocating the midwives on her shift to patients/rooms. In one unit, the midwife coordinator did this before the incoming shift reported for duty.

### **6.6.5 Ward rounds**

Across the external sites there was a maximum of four doctors' ward rounds performed: an early morning round (starting between 08:30 and 09:15 a.m), a midday round (between 12:30 and 14:00 p.m), a late afternoon round (at about 17:00 p.m.), and a late evening round (at about 22:00 p.m.). Three labour wards operated all of these rounds, one operated the first three, and the other operated only the early morning and late afternoon rounds.

In all external sites, the midwife coordinator accompanied the doctors on ward rounds. There was variation between labour wards in which doctors attended these rounds (SHO, Registrar, or Consultant). Usually, the attendant midwife presented the salient features of the mother's labour and care, outside the delivery room. Generally, the doctors only attended the mother if there was a problem. However, in one labour ward, the ward round was normally conducted inside each delivery room.

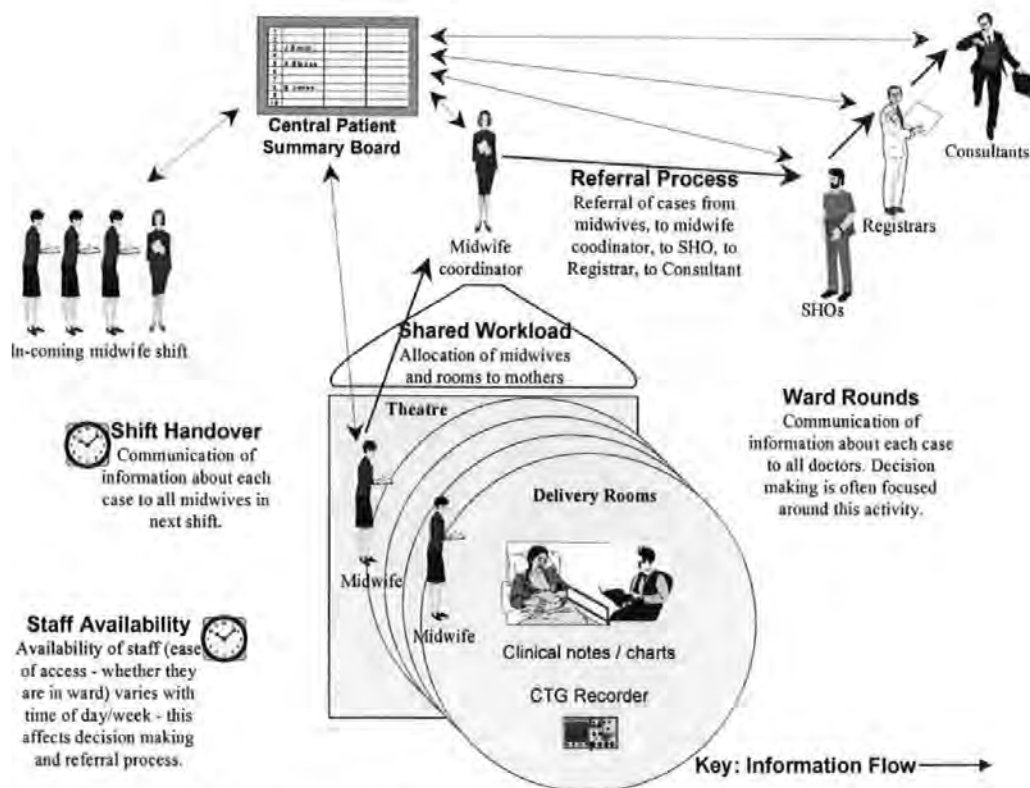
### **6.6.6 Summary of confirmatory site visits**

The main structures and processes of the local labour ward were similar across the other external sites. This included clinical staff in their various roles, the referral process, the role of the central patient summary board, midwife shift handovers and doctors' ward rounds.

The main difference between the local site and the external sites was the mother to midwife ratio. The one-to-one midwifery care achieved locally was rarely possible in the external sites and busier units had medical staff allocated for dedicated labour ward duty, that is, they had no other clinical commitments. In three units the doctors were encouraged to remain on labour ward and one unit provided a doctors' study room with computer facilities on the labour ward.

The external visits extended the local model for the care system to a more 'general' model that described features common across all labour wards and variations within and across

labour wards. It now includes a more comprehensive rich picture (figure 6.8), which confirmed that the local site could be regarded as largely typical.



**Figure 6.8:** Generic rich picture diagram of the labour ward care system

## 6.7 Discussion

Coordination of care seeks to bring the required resources and interactions together to achieve the objective of the care system. Labour ward activity was mainly demand driven due to the unpredictable workload. Coordination of care was therefore dynamic and required a free flow of information and communication. The present study has developed a model for the main structures and processes of the current labour ward care system, which can be characterised by:

- Division of labour.
- Communication structures.
- Shared representations.

### 6.7.1 Division of labour

The situated and distributed nature of knowledge through people in their various roles and the emphasis on the social nature of knowledge is of particular importance for the labour ward care system.

### **6.7.1.1 Roles and relationships**

In the present study the division of labour was based on tradition rather than rational assessment of how such relationships should be organised and supported. In the midwifery hierarchy, the midwife coordinator undertook much of the decision making. This created a context for overdependence and role ambiguity, which could stifle long-term development. In other healthcare settings, models of development from novice to experienced nurse have been based on continuous allocation in a specific clinical area. The level of supervision and support required from the shift leader decreased with time as the novice nurse gained confidence and experience (Benner 1982; Endacott 1999). In most maternity units, the development of labour ward experience is based on the rotation of attendant midwives who work for periods of time in different clinical areas. This suggests that the confidence and experience of attendant midwives may take longer to develop than their nursing counterparts. It also indicates a greater level and timescale of supportive demands on the midwife coordinator. The attendant midwife cannot be expected to perform at the same level or take on the same responsibility as core midwives. Clearly, the workload of the midwife coordinator would be much greater if there were several inexperienced midwives on a single shift.

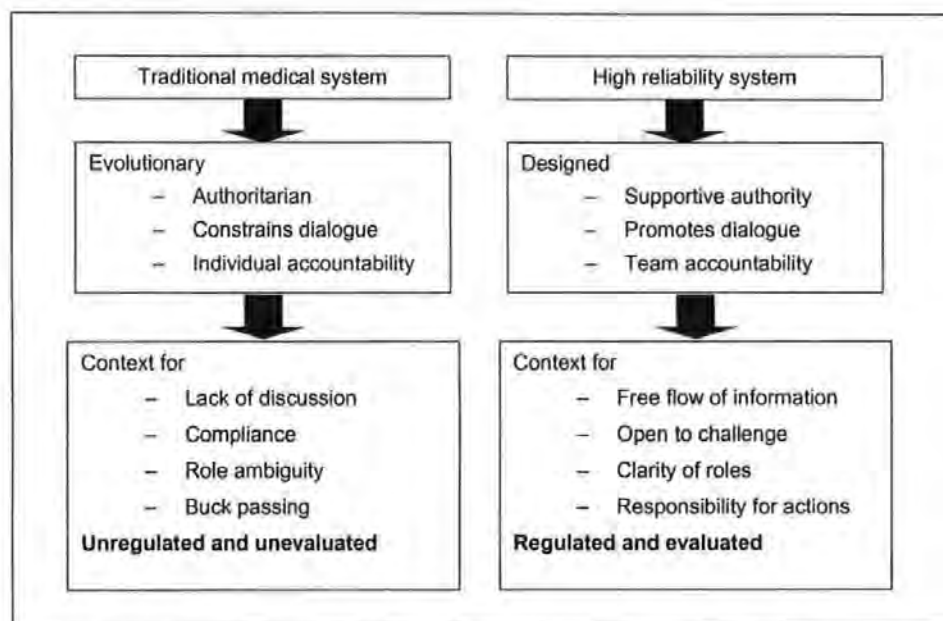
The presence of the Consultant on the labour ward is vitally important, to provide expertise, ensure technical skills are passed on and to maintain the highest standard of care for mother and baby. The researcher observed few face-to-face interactions with other medical staff or midwives, apart from routine ward rounds, which were mainly conducted at the whiteboard. A recent national survey of maternity units found that only 16% of maternity units with over 1,000 deliveries a year achieved the recommended 40 hours per week of dedicated Consultant time for labour ward (Thomas & Paranjothy 2001). The present work was undertaken around the same time as the national survey and so the findings of the case study may reflect the lack of resources many maternity units face. Increased Consultant input on labour wards is unlikely over the short or medium term (Royal College of Obstetricians & Gynaecologists 2000). Failure in a system can be caused by conflicting goals. Managerial imperatives to spread resources can contribute to conflicts between patient safety, as suboptimal care has been linked to lack of senior accountability (CESDI 1997).

There is an increasing trend within the NHS for people to work beyond the scope of their training. This is not surprising as distinction between traditional roles have become blurred



with small iterative changes that have spanned several years in response to the increasing complexity and sophistication of clinical practice. It is institutionally convenient for job descriptions to be less specific, as extended practice requires formal training, recognition and greater financial reward. The organisational failure in this case is to allow it to go unmonitored. Failure to address these issues may be counterproductive as role ambiguity creates unclear lines of accountability and can increase the vulnerability of the system to error (Helmreich & Schaefer 1994).

A well-designed hierarchical system, where authority is structured to promote dialogue and information flow among members, can be robust and error tolerant (Moray 1994). Figure 6.9 shows the features of the traditional medical system, which evolve over the years and high reliability systems, which are designed as safety critical systems.



**Figure 6.9:** Comparison of traditional medical system and high reliability system

This study highlighted a complex relationship between hierarchy and decision making, which created a context for ‘buck passing’ through tacit aspects of practice. Patient ‘classification’ (for example, “she needs a FBS”) and ‘procedural anticipation’ (for example, placement of equipment outside the delivery room) can frame expectations. This strategy uncouples the associated implicit judgement from any imputations of accountability. Furthermore, experience does not necessarily equate to competence. Without formal acknowledgement of the role of senior midwives in teaching trainee obstetricians, their contribution to decision making will remain unregulated and unevaluated. The same mistakes will continue to be made.



The midwife coordinator was clearly central to support. Without a filtering process, demands on medical staff would have been much greater. However, this carries with it a greater level of responsibility. In most safety critical systems, accountability is a major feature in the design of the organisation and is explicitly set out. This is exemplified in air traffic control, where the action of handing an identifier strip (a paper strip which shows the flight details) to another controller represents the passing of explicit accountability (Hughes et al., 1993). In the aviation model, which the health service seems so keen to embrace, one pilot is designated as globally accountable for the safety and good practice of a flight (McCarthy et al., 1997). The clinical system needs to recognise and address interrelated issues of external demands, hierarchy, role ambiguity, and accountability and address this. The UKCC (2001) has recently identified a number of recurrent themes, which need to be addressed to strengthen and support the midwifery contribution to quality of care. One recurring theme was a lack of consensus of the midwife's role.

### **6.7.2 Communication structures**

The operation of safety critical systems requires specification and understanding of future goals, an accurate representation of the current state of the system and an accurate internal model of changing circumstances. Systems that operate continuously require a mechanism for the transfer of relevant information to ensure safe and effective working. The shift handovers in the present study were routine factual reports, had a variable format and were mediated by whiteboards. Links between shift handovers and error have been identified in a number of studies (Shepard & Kostopoulou 1999; Department of Energy 1990). It has been suggested that error vulnerability was increased because of omissions and high cognitive load. Lammond (2000) investigated communal nursing shift handovers and found they had a specific format. The main function of the handover was to aid continuity and planning of care. The summarised information given at the shift report reduced cognitive overload and eased assimilation of information. It was proposed that the sequence and content of the shift handover was associated with mental schema, which facilitated information processing. There appears to be a paucity of empirical investigations of doctors' shift handovers. The role and effectiveness of ward rounds in communication and reduction of errors has also received little attention.

The frequency of the two codes, referrals and reports, reflects the communication intensive nature of labour ward system of care and the role it plays in the coordination of care. This

study also found there was a preference for synchronous and face-to-face communication. Over the course of the shift, changing circumstances were transmitted by individual reports to the midwife coordinator. The term 'patient trajectory' is a metaphor for the total organisation of patient care and the consequences of those processes on the system (Strauss et al., 1985). A key component for the coordination of a patient trajectory, termed articulation work, is characterised as assembling, scheduling, monitoring and dealing with the local contingencies or gaps of an open work system. Starr (1992) suggested this was mainly undertaken by nurses. Midwives who rotate to labour ward from other areas of the maternity unit do not have a current, extensive shared representation of the labour ward, which is required for articulation work. This was undertaken mainly by the midwife coordinator but was sometimes based on incomplete information and inadequate assessment of the mother's condition.

The 5<sup>th</sup> Confidential Enquiry into Stillbirth and Death in Infancy (1998) drew attention to communication failures and stated:

"good communication involves inter alia: ability to talk and write in terms which the other party whether parents or professional, can understand; willingness to hear and understand another's point of view; and mutual understanding about outcome at the end of the discussion."

(CESDI 1998, p. 81)

Recommendations to improve communication included more training, education and guidelines. Reason (1995) highlighted that this typical response is unlikely to be effective, as it assumes the individual is the source of communication failure. What is actually being stated in the above quote is the need for shared representations and shared mental models to aid expression, reception and external notation. This requires a systems approach. The present work found many of the issues were embedded in a system of tacit practice that can lead to communication breakdowns, misinterpretation and inappropriate action.

#### **6.7.2.1 Fragmentation and interruption**

The present study found communication between clinicians was often fragmented and interruptive. Communication between clinicians is an everyday, taken-for-granted interaction and perhaps that is why few prospective studies of communication between clinicians have been undertaken. Coiera and Tombs (1998) observed eight doctors' and two nurses' communication behaviours in a District General Hospital and found they resulted in an interrupt-driven environment. In addition, their communication efforts were often inefficient or unsuccessful. The effects of interruptions on human performance are

well known (Reitman 1974). Pagers and telephones create a context for synchronous communication when, if more consideration was given to the nature of communication and means of support, much of it could be reduced or asynchronous, leading to less interruptions and reduced load.

### **6.7.3 Shared representations**

The whiteboards were an important tool for staff to maintain and regain their situational awareness of labour ward status. Situational awareness is fundamentally concerned with the awareness of the current (and future) state of the system and requires an appreciation of the information available to make optimum decisions (Endsley 1997). However, the whiteboards were not dynamically updated and were prone to misinformation. It also encouraged virtual ward rounds, often without reference to the medical records. The whiteboard provided a shared representation and was the focus of attention for reports and ward rounds. However, the variable content and inaccuracies may adversely affect communication, information processing and search patterns, and contribute to the formulation of inappropriate mental models. The contribution of communication failure through erroneous whiteboard information and lack of reference to the medical records remains unclear. In response to perceived issues of confidentiality, the whiteboard was moved from the workstation to promote communication in the office. This changed the nature of communication and the social interaction that makes work practice responsive.

Studies in air traffic control, naval navigation and process control rooms found the way individual work was performed made it available to others, without the need for overt communication (Hughes et al., 1993; Hutchins 1995; Heath & Luff 1996). Informal work practice, such as overhearing conversations and flexible division of labour, were important for the coordination of work and management of unexpected events (Heath & Luff 1996). In the research setting, communication was necessarily overt as the individual delivery room was not available for overhearing or mutual monitoring. The existence of the 'secret' whiteboard at the workstation may reflect the importance of maintaining awareness through overhearing and mutual monitoring when the board is updated or shared. Despite the limitations of whiteboards, they served a number of important functions. They were shared artefacts, which acted as a resource for collaboration and discussion, provided a representation of patients for monitoring progress and were graphical representations of the labour ward.

More comprehensive accounts of human cognition suggests that people form mental models of problem situations, aided by training and experience, which enable them to navigate around a problem space in a flexible manner (Gentner & Stevens 1983). People in their various roles would, therefore, have access to the same representations and consequently improve the chance of people sharing the same mental model. Furthermore, external representations such as functional diagrams are known to support cognitive activities (Payne 1992). This may enable more satisfactory interactions between clinicians, articulation of reasoning and sharing of experiences to support the learning and development of inexperienced clinicians. The present work has shown that the coordination of care was supported with rudimentary, but important artefacts. This indicates opportunities to provide a comprehensive means of support through the development of effective external shared representations.

## **6.8 Limitations of the study**

This study has taken its cue from qualitative observation methods and was influenced by a number of theories, including ethnomethodology. The work therefore focused on the observable actions and interactions, rather than trying to gain access to what people thought they did. A single researcher undertook direct observation and the limitations are recognised. However, the researcher followed the same individuals through a number of their shifts and therefore the present work provides a more complete picture of their roles and their relationship with other staff. A sampling framework would have given breadth but less depth and provided access to superficial meaning. It would also have suggested that enough was known about the system of care in order to design a sampling framework or observation schedule and would call into question the need for a qualitative study.

The case study would have been strengthened and data collection more complete through tape-recording of conversations and telephone consultations. There were both practical and technical limitations to this approach. Participants considered this was intrusive and unacceptable. In addition, the environment was noisy, as there were often ongoing multiple conversations. Therefore, transcription of the recordings may have proved difficult and the quality of the data would be variable. Furthermore, audio recording would not have been very practical when shadowing staff around various areas of the maternity unit.



The involvement of a senior obstetrician and systems analyst was helpful, and on reflection, this should have been undertaken earlier. The systems analyst had a wide range of skills and techniques, which were invaluable for organising unstructured data and representing the findings in a way that would be meaningful to clinicians and designers.

This study provides a comprehensive account of people in their various roles and linkage between structure and process, by describing roles and relationships in the context of the macroenvironment. While the methods used for this study could be reproduced, organisations are always in flux. Already in the present labour ward, additional Consultants have been appointed, the ward rounds have changed, and the allocation of midwifery staff has been restructured. It is assumed that the changes will augment practice. This is not always the case and unanticipated consequences do occur. In large competitive organisations, there is usually a continuous programme of ethnographic investigation, which maps changes and preserves organisational memory.

The confirmatory visits to additional sites were necessarily brief and the limitations are recognised. The findings were relevant for the units taking part in the future planned trial of the decision support system, but may not be relevant to other units. For example, unlike the sites visited, in Central London the rates of agency midwives (locums) can be as high as 60% of the ward staff (University College Hospital, London; personal communication).

## **6.9 The role of the researcher**

The researcher had previous experience of working in this labour ward several years before the study. Therefore, the researcher's background and clinical knowledge has bearing on the findings and has both advantages and disadvantages. The very familiarity with the environment could 'blind' the researcher. However, the researcher was mainly a non-participant observer and was not involved in decisions about clinical care. In addition, much of the organisation of the labour ward had changed. Furthermore, in the present study, the use of a range of interpretive theories provided a different perspective, to look at the system of care in a different way. The effect of the observer may have changed the behaviour of participants. However, on occasion the standard of care was not at a level that would be expected when participants were aware that a researcher was documenting their actions. It is acknowledged that sometimes procedures may be overridden due to the exigency of the situation; none of the breaches appeared to be of this nature. It may be that



because the researcher was known to some of the staff they did not feel threatened by her presence and therefore behaved more naturally.

## **6.10 Summary**

This study has described how labour ward care is currently coordinated, enabled and constrained. This study makes visible, explicates, and provides more concrete evidence for many tacit aspects of practice and taken for granted structures, which are significant to both patient care and the development of support systems. The few *studies* of labour ward that have been undertaken have viewed doctors and midwives as isolated groups rather than as part of an interacting system. This is the first time a qualitative study of collective labour ward practice has been undertaken. All work systems are social systems; they involve a community, whether harmonious or otherwise, that rely on mutual understanding.

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*Chapter 7 reports the findings of the audio-video observational study of direct care of mothers within the individual delivery room. Recurrent actions and care procedures were quantified and described. Data were analysed qualitatively to describe the practical accomplishment and meaning of actions and care procedures. The study identified features within the care system that enabled and constrained care. The chapter concludes with a synthesis of the layers of analysis to explore and discuss emergent practices.*

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## **7.1 Introduction**

This chapter reports the findings of the audio-video observation study, which was undertaken to describe care within the individual delivery room (the microenvironment). There is no conventional format to present the findings from audio-video observation. A number of published papers report, in detail, accounts of the analysis of just a few minutes of recorded data (Hutchins 1990; Heath & Luff 1996). The richness of the data in the present study and its highly visual nature was problematic in terms of following a traditional quantitative report convention of 'results and discussion' or qualitative reportage narratives such as 'a day-in-the life', or description of critical events (Wolcott 1994).

The findings of the present study are, therefore, reported in three sections to characterise the context of care within the delivery room, while avoiding mechanistic oversimplification. The first section describes the setting and participants. The second section provides details of the quantitative analysis of observed actions. The third section presents a qualitative analysis of the observable patterns of action and care procedures. The meaning and consequences of observable actions are discussed in relation to the psychosocial, technocentric and medicolegal frames. Where relevant, reference is made to previous research findings. The final section serves two purposes. First, it links observed actions and care procedures with emergent practice, relationships in the delivery room and the wider macroenvironment. This draws the layers of analysis together to provide a more complete picture of the care system. Secondly, the final section forms the discussion by linking the layers of analysis with published research.

## **7.2 The setting and participants**

The research site and the labour ward setting were described in the previous chapter, section 6.2. This section describes the individual delivery room (the microenvironment) and participants (parents, companions and staff).

Additional details of the participants have been provided in appendix 8, page 326-335. This includes a more detailed summary of the obstetric and labour characteristics of each mother (table F, page 326-329), further details of the grade and number of midwifery and medical staff involved in the care of each individual mother (table G, page 330), details of the characteristics of the duration and quality of electronic fetal monitoring, (table H, page 331-334) and duration of second stage labour (table I, page 335).

The source data used to derive the figures for the quantitative data analysis described in section 7.3 is provided in appendix 9, table J and K, page 336-337. Additional information for each individual case (details of medical and obstetric history, labour and delivery outcome) is provided in individual clinical review forms, identified by case number, in appendix 10, page 338-359. Anonymised transcripts of midwives' and doctors' documentation of the care of each individual mother in labour are provided in appendix 11, page 360-403.

It was not possible to include the entire transcripts from each of the audio video recordings in the appendix, due to limitations of space. A small sample of transcript material from case 2 has been included in appendix 12, page 404-412 and anonymised transcripts for each audio-video recording have been provided on a CD-ROM which can be found in the pocket at the end of the thesis (it is not permitted to copy, reproduce or distribute the material provided on the CD-ROM).

The observation schedule for the reviewers' classification of midwives' activities on a 10% systematic sample of the digitised audio-video segments is provided in appendix 13, page 413. The results of the reviewers' classification of the midwives activities have been provided in appendix 14, tables L to Q, page 414.

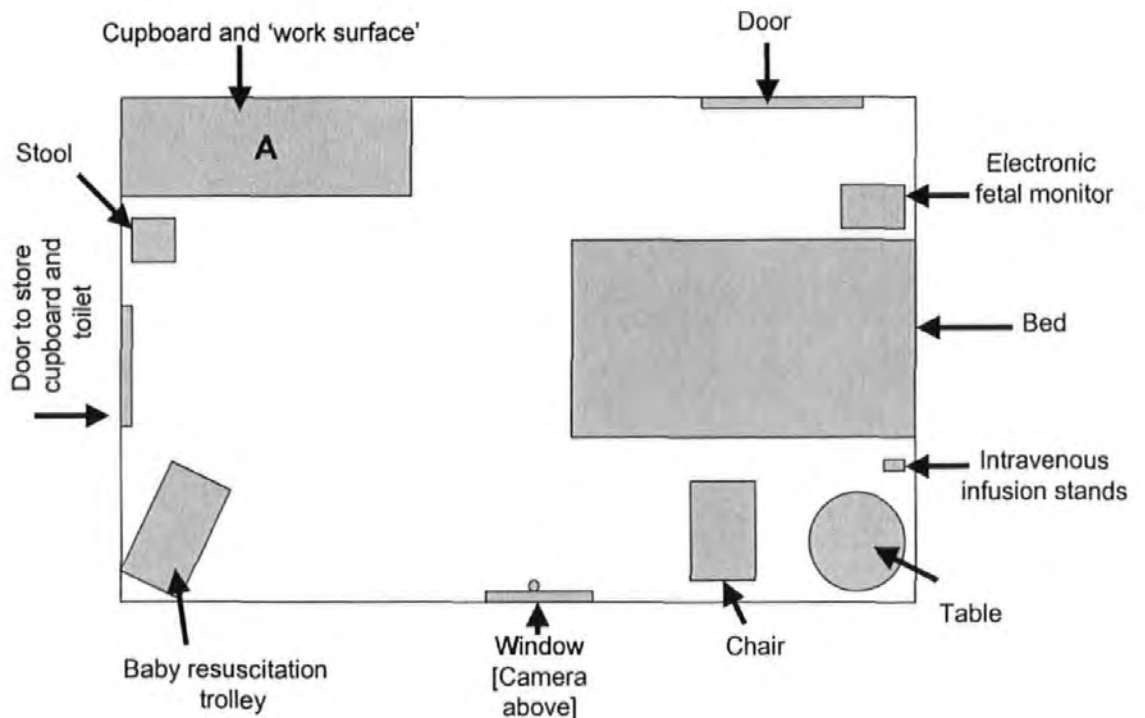
### **7.2.1 The individual delivery room**

The present study was conducted in one of twelve individual delivery rooms. The view of the delivery room obtained by the wide-angle camera is shown in figure 7.0.



**Figure 7.0:** Screen shot of the delivery room

Figure 7.1 shows a schematic of the general layout of the delivery room and the usual location of equipment and furniture. Box A shows the area where most record keeping and shift handovers were conducted.



**Figure 7.1:** Schematic of the delivery room showing the usual location of equipment, furniture and the position of the video camera



## 7.2.2 Description of the participants

A total of 20/23 mothers who were approached agreed to participate in the study. Mothers were accompanied by their partner for 15 labours, by their partner and a female companion for two labours, and by a female relative alone for three labours. All mothers were allocated a midwife who had no other duties apart from to provide care (one-to-one care).

Continuous electronic fetal monitoring was applied for all labours. Details of the quality of electronic fetal monitoring and the features of the CTGs are provided in appendix 8, table H, page 331-334. The case mix was biased towards mothers with induced labour. This reflected the difficulty of approaching women admitted in spontaneous labour to obtain informed consent. Table 7.0 shows the main obstetric characteristics for all 20 mothers.

**Table 7.0:** Obstetric characteristics of 20 mothers

Maternal age (years) mean	26
range	18 - 35
Gestational age (weeks) mean	39
range	35 - 41
Primigravidae	9
Antenatal complications	
Total	16
- antepartum haemorrhage	2
- preeclampsia	2
- previous caesarean section	1
- growth retardation	1
- others <sup>1</sup>	10
Breech	1
Induction of labour	17
Epidural analgesia	11
Meconium liquor	2
Syntocinon 1 <sup>st</sup> & 2 <sup>nd</sup> stage	12
Syntocinon 2 <sup>nd</sup> stage	1
Fetal scalp blood sample (FBS) <sup>2</sup>	1
Birth weight (grams) mean	3483
range	2300 - 4760

1. Crohn's disease, pre-labour rupture of membranes, suspected macrosomia, gestational diabetes, hypertension, Haemolytic Streptococcus

2. pH 7.28

The range of labour outcome is shown in table 7.1. This shows a reasonable mix of labour outcome with a shoulder dystocia in the normal delivery group.

**Table 7.1:** Labour outcome for 20 mothers

Mode of delivery	n
Normal vaginal delivery <sup>1</sup>	13
Neville Barnes forceps	2
Ventouse delivery <sup>2</sup>	3
Caesarean section	1
Assisted vaginal breech	1
<b>Total</b>	<b>20</b>
Mean length of 1 <sup>st</sup> stage (hours: mins)	5: 30
range (hours)	2 - 14
Mean length of 2 <sup>nd</sup> stage (mins)	19
range (mins)	4 - 120

1. One shoulder dystocia

2. One trial of Ventouse in theatre

Infant outcome is shown in table 7.2. No infants were admitted to the Neonatal Intensive Care Unit. All umbilical cord blood acid-base results, routinely obtained at time of delivery, were within normal limits. There was one low 1-minute Apgar score associated with a breech delivery.

**Table 7.2:** Infant outcome

Infant outcome	n
Female	8
Males	12
Apgar >7 at 1 min	19
Apgar < or equal to 7 at 1 min <sup>1</sup>	1
Apgar >7 at 5 min	20
Admission to TCW <sup>2</sup>	1
Cord artery pH (mean)	19 (7.25)
range	7.19 - 7.38
Cord artery BD <sup>3</sup> (mean)	17 (2.05)
range	-2.8 - 7.4
Cord vein pH (mean)	20 (7.37)
range	7.31 - 7.49
Cord vein BD (mean)	18 (2.67)
range	-0.9 - 5.4

1. Case 2 Apgar score at 1 min = 5

2. Admitted for infection screening

3. BD = Base Deficit m.mol/l

A total of 108 members of staff were observed in the delivery room for all 20 audio-video recordings. The mothers' care involved 61 midwives and 41 doctors (10 anaesthetists, four paediatricians) over the course of labour. There were also three medical students involved in care of mothers and three observers (two student midwives and one general

practitioner). Table 7.3 shows the number and grade of midwifery staff involved. A total of 36 midwives (including two senior student midwives) were allocated as primary care provider (attendant midwife). Table 7.4 shows the number and role of medical staff involved.

**Table 7.3:** Midwifery staff observed in the delivery room

<b>Midwifery staff</b>	<b>n</b>
Attendant midwife	36
Midwife coordinator	13
Temporary midwife carer	9
Core midwife	3
<b>Total</b>	<b>61</b>

**Table 7.4:** Medical staff observed in the delivery room

<b>Medical staff</b>	<b>n</b>
Anaesthetist	10
Senior House Officer	9
Senior Registrar	7
Staff grade	4
Paediatrician	4
Registrar	4
Consultant	3
Medical student	3
Observer	3
<b>Total</b>	<b>47</b>

There were 123 hours of intrapartum audio-video recording; 111 hours of first stage data and 12 hours of second stage data. There were also 37 hours of post-delivery recording but this was not included in the present analysis.

Data from first and second stage labour were analysed separately because the dynamics and nature of communication and interaction changed. Two attendant midwives were allocated to mothers at the onset of second stage labour, therefore the analysis of first stage data is for the 34 midwives involved. The shortest case was two hours of first stage recording and the longest 14 hours. Table 7.5 shows the grade of attendant midwife and hours of recorded first stage labour.

**Table 7.5:** Grade of attendant midwife for the first stage of labour

Grade of midwife	n	Hours
Junior ward midwife (E-grade)	13	46
Core midwife (G-grade)	11	34
Senior ward midwife (F & G-grade)	6	22
Senior student midwife	2	5
Community midwife	2	4
<b>Total</b>	<b>34</b>	<b>111</b>

### 7.3 Patterns of actions and care procedures observed

This section provides details of the main observable actions and subfeatures. The observed care i.e. '*what was done*' was the main concrete actions that occurred over the course of labour. These were actions where spatial arrangements, bodily orientation and information exchanges could be observed across cases and so consistent comparisons could be made. The subfeatures refer to *how* those actions were accomplished (table 7.6). The analysis at this stage was descriptive and did not imply any judgement of 'good or bad' care for the individuals concerned. The issues implied at a subfeature level relate to compliance with or departure from aspects of the 'ideal' model of care as described in appendix 1, page 269-271. The purpose of the following table of actions, care procedures and subfeatures is to provide a sense of the frequency and extent of the full range of main practices as a preamble to qualitative analysis in section 7.4, following.

**Table 7.6:** Actions, care procedures and subfeatures

Actions and care procedures	n	Subfeatures	n
Record keeping	659	21/111 hours	(19%)
		Average duration [2 minutes]	
		Participants comments	14
Location of participants		Midwife in attendance [81/111 hours]	(73%)
		Midwife sitting at bedside [16/111 hours]	(15%)
		Partner sitting at bedside [42/111 hours]	(38%)
Vaginal examinations (VE)	59	Hand washing before	51
		Hand washing after	16
		Inadequate examination technique	22
		Gloves not removed after examination	23
		Information giving	54
		Use of cervical dilation model	5

Medical consultations	36	Courtesy call [described by clinicians as]	4
		Doctor and midwife located at bedside	2
Senior midwife consultations	31	Assess CTG	8
		Attend delivery	5
		Confirm examination findings	4
		Progress report	4
		Others	10
Hygiene issues	22	Lack of hand hygiene for invasive procedures	4
		Glove wearing and contamination	18
Fetal monitor	20	CTG orientation of midwives	13
		CTG verbal response of midwives	12
		CTG parents' responses	12
		CTG clinicians' free comments	10
		Orientation of parents to monitor	8
		Fetal monitor signal quality	8
		Parents use of monitor	5
		Midwives verbal comments on reliability of monitor	4
		Risk - fetal scalp electrode	2
		Mother's articulation of CTG terminology and features	1
		Use of models	18
Partogram	6		
Midwife shift handover	17	Structure and content of handover	17
		Midwife bedside handover [2 partial]	3
Syntocinon use	12	Syntocinon metaphors	4
		Syntocinon rate reduced	1
Epidural procedures observed	10	Consent	9
		Risk of epidural procedure	9
		Support provided by father alone	6
		Support provided by midwife and partner	3
		Risk of pressure sores - consequently disturbing mothers' rest	9
		Epidural 'shakes'	3
		Support provided by midwife alone	1
Initial Entonox administration	9	Location / orientation of participants	9
		Entonox instructions	5
Midwives supportive physical contact	5	Observed for five mothers (hand holding, back rub)	5
Human factors safety	3		
Shoulder dystocia	1		
Fetal blood sample	1		



### 7.3.1 Quantitative analysis of actions and care procedures

This section presents details of the two most frequently observed actions and a further breakdown by case and grade of attendant midwife. Discussion of the implications of these data takes place in section 7.4.

#### 7.3.1.1 Record keeping

Record keeping was defined as recording in the medical records for greater than nine seconds. This was the most frequent action of attendant midwives and occurred on average every 10 minutes for the first stage of labour, with an average duration of two minutes (range 10 seconds to 16 minutes) and a total of 21/111 hours (19%). Figure 7.2 shows the amount of time midwives spent record keeping for each recorded first stage of labour ordered by duration of recorded first stage of labour. The source data for figure 7.2 and 7.3 are provided in appendix 9, table J, page 336.

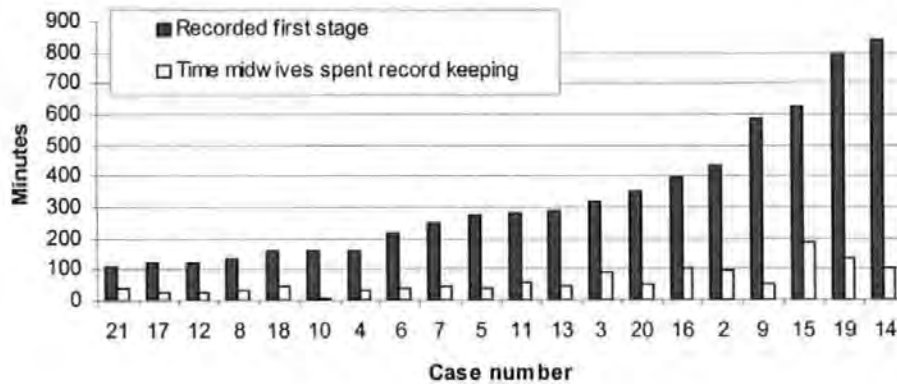


Figure 7.2: Time spent record keeping for each recorded first stage of labour

#### 7.3.1.2 Midwives attendance in the delivery room

Figure 7.3 shows the amount of time midwives spent in the delivery room for each case, ordered by duration of recorded first stage of labour.

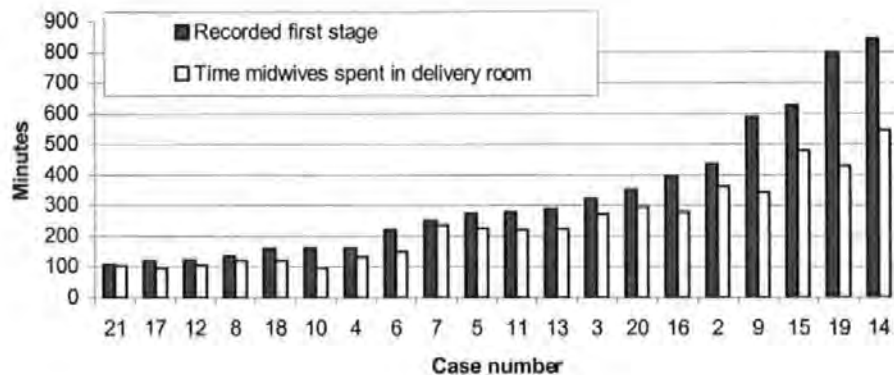


Figure 7.3: Time midwives spent in room for each recorded first stage of labour

Midwives spent a total of 81/111 (73%) hours of the recorded first stage of labour in the delivery room and left the delivery room on average every 15 minutes for an average duration of four minutes (range 10 seconds to 24 minutes).

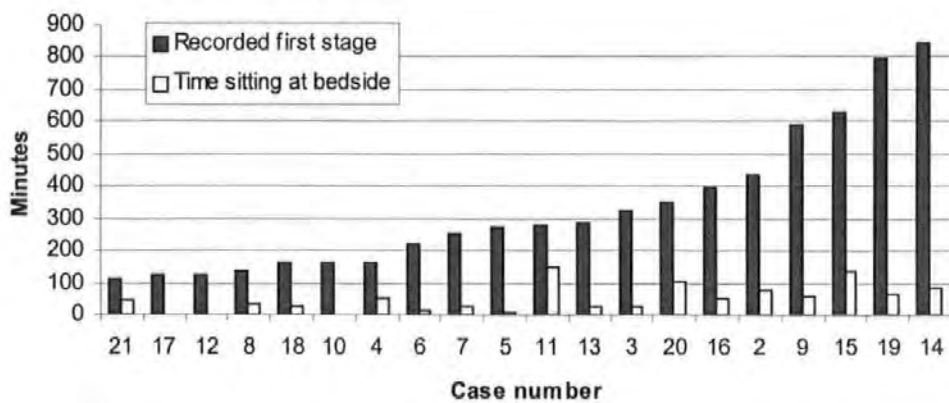
Attendant midwives sat down next to the mothers' bedside for 16/111 (15%) hours. Next to the mother's bedside was defined as in direct contact with the bedside (figure 7.4) or next to the bedside (figure 7.5).



**Figure 7.4:** Midwife sitting in direct contact with bedside

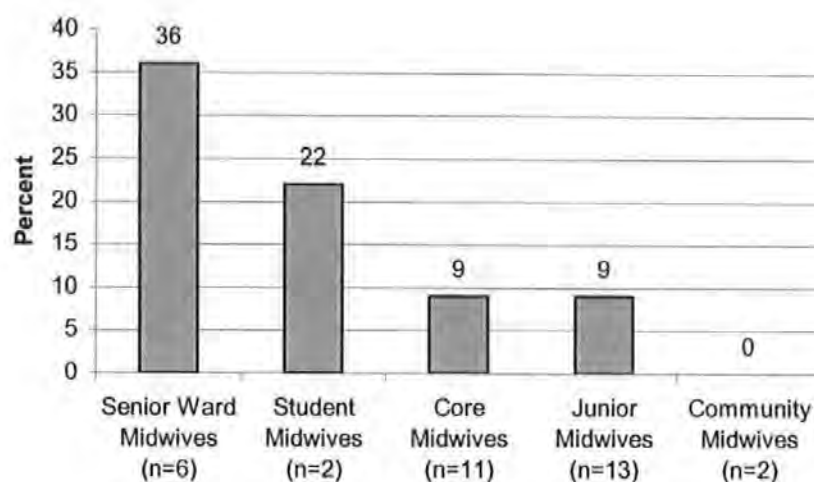
**Figure 7.5:** Midwife sitting next to bedside

Figure 7.6 shows the amount of time attendant midwives sat down at the mother's bedside for each recorded first stage of labour. The source data for figure 7.6 is provided in appendix 9, table K, page 337.



**Figure 7.6:** Time midwives spent sitting at the bedside

The percentage of recorded time attendant midwives sat down at the mothers' bedside (16/111 hours) by grade of attendant is shown in figure 7.7. A detailed table for each individual mother can be found in appendix 9, table K, page 337.



**Figure 7.7:** Percentage of time spent sitting at the bedside by grade of midwife

Analysis of data from second stage labour recordings found midwives' record keeping occurred on average every five minutes, parents were left unattended on one occasion for five minutes and one midwife sat down at the bedside for the majority of the second stage of labour. The duration of the recorded second stage for each individual mother is provided in appendix 8, table I, page 335.

## 7.4 Qualitative analysis of actions and care procedures

While the preceding analyses give a picture of the frequency and extent of *what* actions occurred, they in no way convey the rich, interconnected nature of actual events. This section describes *how* care in the delivery room was accomplished. The data are presented here to characterise the context of the mothers' care while avoiding mechanistic oversimplification. However, it is not possible to address or discuss every issue in an individual transcript excerpt. The data in this section is presented in the form of excerpts from audio-video transcripts, which can be accessed on the CD-ROM provided, and screen shots from video recordings with reference to the original source transcript material in square brackets.

Care of mothers is not just a set of technical operations; the way care is undertaken, the relevance and irrelevance of the care procedures, frame both carer and parents. The

practical accomplishment of care, people and technology are inextricably linked. Goffman (1974) proposed that rules of relevance and irrelevance constitute the frames through which settings are defined and relationships are reflected in and framed by the way actions are performed. This section seeks to introduce the interweaving of care, the people involved and technology.

The objective of the labour ward care system is a safe and emotionally satisfying birth experience for parents and staff. The ideal model of birth underscored that care should be centred on the needs and wishes of the mother (appendix 1, page 269-271). The psychosocial frame is orientated to attention to physical comfort, emotional support with reassuring touch, physical presence, communication (social or giving information) and advocacy (McNiven, Hodnett & O'Brien-Pallas 1992). The mother is viewed as the central and most significant figure. The technocentric frame is task and technology orientated and the mother is viewed as an object to be processed. The medicolegal frame is orientated to recording everything regardless of its clinical relevance, defensive practice such as 'buck passing', reluctance to make decisions and over supervision. The mother is viewed as a potential source of litigation and complaints.

Data are presented on how the care of mothers was accomplished in relation to the psychosocial, technocentric and medicolegal frames. For example, observations from case 10 presented below in section 7.4.1, where a fetal blood sample was performed, demonstrate the interweaving and linkage of actions and subfeatures tabulated in table 7.6. The context of the example is given in 7.4.1.1, followed by the meaning of the observations in terms of frames in section 7.4.1.2.

#### **7.4.1 Fetal blood sample**

A fetal blood sample (FBS) is an invasive procedure sometimes undertaken during labour when there are changes in the baby's heart rate pattern. Additional information on the baby's condition can be obtained by measurement of the pH of a sample of blood from the baby's scalp. This is a very cumbersome and intrusive procedure. The mother is required to lie on her side and an assistant lifts the mother's leg upwards while the doctor passes an amnioscope (a long hollow tube) into the mother's vagina. The baby's scalp is punctured with a small blade and a sample of blood is collected into a very thin glass tube (capillary tube). The sample of blood is measured with a blood gas machine. Delivery would be normally be expedited if the fetal blood sample pH was 7.20 or less.

#### 7.4.1.1 Context of the case leading to a fetal blood sample

Mrs X, an 18-year-old primigravida, was accompanied in labour by her partner and her mother. Labour was induced by Prostin pessary at 41 weeks and five days gestation. The family were received onto labour ward by a core midwife who was allocated as primary carer (attendant midwife). The mother requested and was provided an epidural. External electronic fetal monitoring was commenced once the epidural procedure was completed and there were audible decelerations of the baby's heart rate.

Eight minutes later a vaginal examination was performed. The attendant midwife did not prepare an examination trolley, attend to hand hygiene or place a wedge under the mother back to reduce the risk of supine hypotension (see appendix 2, page 272 for the 'ideal' vaginal examination procedure). Cervical dilation was four centimetres, the membranes were artificially ruptured (amniotomy) and a fetal scalp electrode was applied. The mother was totally exposed throughout the examination.

The midwife did not remove her surgical gloves after the examination and so contaminated the fetal monitor, the overhead light, fluid containers, work surfaces, cupboard, mother and bedding (figure 7.8).



**Figure 7.8:** Midwife failed to remove surgical gloves after a vaginal examination. This shows the subsequent contamination of the mother and also humiliation through unnecessary exposure.

The mother asked the midwife if the baby was OK.

The midwife said:

“Well he’s complaining a little bit but then you expect that when you’ve had an epidural. I just want to know whether it is complaining because of the epidural or is he just complaining.”

Ten minutes later the mother asked again “Is baby happy?” The midwife said:



“Em not at the moment. That’s all right he’s allowed to have some complaints. If you see me swinging from the chandelier that’s when to worry.”

The midwife returned occasionally, spending about four minutes in the room on each visit. ‘Grandmother’ and partner told the mother it was important for her not to get stressed (figure 7.9).



**Figure 7.9:** An abnormal CTG with episodes of fetal bradycardia. This shows the family as the mother’s main source of support.

The partner attended to the fetal monitor and his body language indicated anxiety as shown in figure 7.10.



**Figure 7.10:** An abnormal CTG with episodes of fetal bradycardia. This shows the partner’s orientation to the fetal monitor and his body language indicated anxiety.

When there was signal loss the partner moved the electrode lead and changed the mother’s position to try to reacquire the baby’s heartbeat (figure 7.11).



**Figure 7.11:** The partner responded to loss of the fetal heart rate signal and moved the mother further onto her side to reacquire the signal.

There was a fetal bradycardia of about 50 beats a minute. The baby's grandmother (SO) left the room to find the midwife (figure 7.12).



**Figure 7.12:** An abnormal CTG with a prolonged fetal bradycardia down to 50 b.p.m. This shows the response of the baby's 'grandmother' who left the room to summon assistance.

The Registrar was called and visited. He introduced himself to the parents, examined the CTG and told the mother:

"I'll get your midwife to have a look at you to examine you to see what you have done from inside."

The midwife performed a vaginal examination. No hand hygiene was observed. The midwife asked the mother to bear down [the researcher suspects the midwife was manually dilating the cervix, due to the length of time it took to perform the examination]. A catheterisation was then undertaken without any attention to hand hygiene or asepsis. Registrar 1 entered the room while the mother was completely exposed. The midwife said:

"I just changed her round, I'm just going to move her around and see how it settles down."

Registrar 1 later informed the researcher that he was thinking of doing a fetal blood sample.

The midwife told the mother:

"OK just as he was going he mumbled something. What he said was if the baby carries on like this he is going to put a probe inside take a bit of blood from the baby's head and put it through the machine to see if the baby is compromised in anyway. Like oxygen and things like that. If the baby's oxygen levels are low we have to take you down to theatre OK?"

The attendant midwife departed the delivery room and within earshot of Registrar 1 told the midwife coordinator that a fetal blood sample would be entirely normal and was a waste of time. No discussion of the trace or the context of the case took place between the attendant midwife and Registrar 1. Registrar 1 returned to the delivery room a few minutes later, examined the CTG, and told the mother:

"OK the plan would have been if baby continued to be uncomfortable to take some blood from baby's head to test for oxygen. Baby's fine for now so we will just hold off. You are making progress so we will just be patient."

Half an hour later Registrar 1 visited the mother. Registrar 1 told the researcher he wished he had taken a fetal blood sample earlier. Registrar 2 arrived and both Registrars visited the mother. The discussion between the staff took place away from the bedside. The parents were orientated towards the staff, but were excluded from the conversation (figure 7.13).



**Figure 7.13:** Discussion between clinicians, which occurred away from the bedside. This shows the parents were excluded from communication.

This exchange took place as if the parents were not even in the room. Outside the room, in the middle of the corridor, Registrar 2 told Registrar 1 than he should have done a FBS 'ages' ago. Registrar 2 spoke to Registrar 1 as if he was a naughty schoolboy. This

exchange took place in front of other midwives. The attendant midwife was standing at the workstation and within earshot of both Registrars said to her colleague that the FBS would be entirely normal. In the room, the baby's 'grandmother' said:

"What it is they have to, the amount of dilation that you are now, they have to decide whether you are going to be delivering it or caesarean. What I meant to say is you've got to do what is best for baby. Presumably what they are doing now is saying are we going to go this way or are we going to go that way."

The midwife returned and prepared the equipment for the fetal blood sample. The mother had not been directly informed that a decision had been made to take a fetal blood sample, but 'grandmother' made conversational statements that elicited the information. The midwife departed the room and informed Registrar 2:

"You've got your wish. It's all ready in there. I don't think she's going to be long."

Registrar 2 prepared the equipment for the fetal blood sample; no hand hygiene was observed. The attendant midwife was moving the mother and talking while Registrar 2 was trying to tell the mother what was to happen:

"Its just a tiny little pin prick on the baby's head. Little tiny, em tiny sample and we just check how much oxygen the baby's getting."

The mother was exposed throughout the fetal blood sample procedure. The door was left open on occasions so the midwife could talk with staff outside. There was lack of attention to privacy and the mother's modesty as shown in figure 7.14.



**Figure 7.14:** The mother was inadequately draped during a fetal blood sample. This shows inadequate attention to the mother's dignity and a disregard of privacy as staff entered the room over the course of the procedure.

The 'grandmother' commented that it was "like having a party." The father was told to hold the mother's leg. The attendant midwife repeated her prediction of the fetal blood sample result (which was correct). Registrar 2 did not remove her gloves after the fetal blood sample and the light source and trolley were contaminated. The mother gave birth shortly after the fetal blood sample. No hand hygiene was observed for the delivery.

#### **7.4.1.2 Frames for fetal blood sample**

This exemplar case shows the reality of some aspects of clinical practice, illustrates the intervention cascade and the predominance of a technocentric frame, which focuses on individual tasks and technology. The primary objective of the care system, a safe and emotionally satisfying birth experience, appears to be given a low priority.

There was no monitoring of the baby before or during the epidural, therefore there was no baseline data to assess if the change in baby's heart rate pattern was related to the epidural procedure. The ensuing vaginal examination and amniotomy may have made the situation worse. A wedge (to reduce the risk of supine hypotension) was not used for any of the vaginal examinations, which added to the hypotensive risks already present from the epidural. The amniotomy exposed the baby to compression forces and removed its protection from infection. This was particularly relevant in this case with such disregard of basic hygiene. The mother and her companions, other members of staff and future room users were also exposed to risk of infection due to contamination of equipment and work surfaces. Manual dilation of the cervix was suspected in this case in response to a suggested fetal blood sample intervention. It may be seen as less of an intervention than a fetal blood sample, but it is not without risk. It is often carried out illicitly and may actually make the situation worse due to supine hypotension.

The mother was aware of changes in the baby's heart rate pattern and it is questionable if her concerns were addressed. This must have been a very worrying time for the family. The CTG is not just a graph or an electronic representation of the heartbeat interval, it symbolises the baby's life. Parents listening to the gradual slowing or loss of the baby's heart rate are worried that their baby might die and the father's observed behaviour suggests this may well have been the case. The 'grandmother' was the main source of support for her family and summoned assistance when she was concerned.

The mother was exposed for all clinical procedures. There was no effort on the part of clinicians to cover the mother and she spent a considerable amount of time naked from the



waist down with both strangers and family in the room. We have to assume that she could only have felt distressed, concerned for her baby, exposed and vulnerable.

The divergence of clinical opinions was not openly discussed. The attendant midwife did not openly articulate her opinion to the clinicians. Registrar 1 was uncertain, but his weighting of the case was changed with waiting. Registrar 2 had more information to make an assessment and was certain that a fetal blood sample should be done. The family were not included in discussions between clinicians and it was the 'grandmother' who used 'non-confrontational' conversational probes to gain information.

The way care is accomplished frames relationships. Definitions of care include having concern, regard or consideration for or to look after. What kind of care did this family receive? The family may have had no complaints. They may have been unaware of the care they should expect. The parents may have been grateful that their baby was alive and seemed well. However, if the mother or baby later succumbed to overwhelming infection there would have been no explanation, because it would be assumed that hands were washed and procedures followed.

This exemplar case raises many questions. How do clinicians see parents and their companions? The family were unassuming and of a low social class. Patients who are 'undemanding' or of low social class have been found to receive less information from midwives and doctors (Kirkham 1983). How do parents and companions see clinicians? Power structures have an inhibiting effect on communication, which promotes compliance (Kirkham 1983; Silverman 1993). Would the outcome have been different if a supportive female companion had not been present? Continuous female companionship has been found to reduce intervention (Hodnett 2002). In this case it was left mainly to the family to provide support.

What are the consequences of disregard of hygiene and the undignified treatment of the mother? Infection after delivery has been shown to contribute to negative views of birth (Tilden & Lipson 1981). Mothers can feel shamed by genital exposure, particularly when there are numerous carers in attendance (Kitzinger 1992). Embarrassment can be a trauma-producing event (Kendall-Tackett & Kauffman-Kantar 1993). Loss of self-esteem can have a negative impact on parenting skills (Rubin 1968). In this case we can begin to see the

intended and unintended consequences of the way frames were used. In this case, the family were almost incidental to the procedures undertaken.

### 7.4.2 Departures from the delivery room

Frequent departures from the delivery room were observed. The following transcript excerpts show some of the fathers' responses when they were left alone with their partner.

Time	Person	Action	Line	
11:24:54	Midwife	AC:	1	Leaves room
11:25:28	Mother		2	"Are you bored?"
	Partner	AC:	3	Reading book
		C:	4	[Mother restless, groaning]
11:26:00	Mother		5	"Will you rub my back for me?"
	Partner	AC:	6	Rubs mother's back.
11:27:20	Partner		7	"Where's she [the midwife] gone?"
11:30:13	Mother		8	[Breathing laboured]
11:34:00	Midwife	AC:	9	Enters room
	Midwife		10	"All right?"
	Mother		11	"No."

Case 12: transcript excerpt video segment 12\_09 to 10

Time	Person	Action	Line	
02:07:29	Midwife	AC:	1	Enters room
	Midwife		2	"I'm just going quickly to get something to eat. If there is any change just ring the bell."
			3	
	Partner		4	"What happens if there are three of us?"
	Midwife		5	"Say that again."
	Partner		6	"If there is like three of us I'll let you know."
02:07:59	Midwife	AC:	7	Leaves room

Case 19: transcript excerpt video segment 19\_77

Time	Person	Action	Line	
12:07:55	Partner		1	"Are they supposed to stay with you all the time?"
	Mother		2	"Sometimes, especially when you've got an epidural."

Case 20: transcript excerpt video segment 20\_01

Time	Person	Action	Line	
15:21:57	Midwife	AC:	1	Leaves room [call bell not provided]
	Mother		2	"I'm pissin' me self."
	Partner		3	"You sure?"
	Partner	AC:	4	Looks under bed sheet
	Mother		5	"NURSE I'M PUSHING."
	Partner	AC:	6	Rushes to the door
15:23:10	Partner		7	"You still pushing?"
	Mother		8	"QUICK."
	Partner	AC	9	Leaves room - tells midwife "She's pushing."
15:23:19	Midwife	AC:	10	Enters room

Case 13: transcript excerpt video segment 13\_27

Frequent departures from the delivery room did not create a calm environment and, in some cases, made the midwife appear very busy. It also, on occasion, left partners as the sole source of support for the mother. The cryptic comment made by the partner in case 19 may reflect the amount of time (46%) he was left alone with his wife (mother with continuous epidural infusion, Syntocinon intravenous infusion, Labetalol intravenous

infusion to control her blood pressure). Even brief departures from the room can cause the parents concern, as shown in case 12 and 13.

### 7.4.3 Record keeping

This section presents data to show the way record keeping was accomplished. It was observed that most midwives attended to record keeping at the ‘work surface’ located in the corner of the delivery room, shown previously in section 7.2.1, figure 7.1, box A. Therefore, midwives were orientated away from the parents as shown in figure 7.15.



**Figure 7.15:** Midwife record keeping away from the bedside shows the subsequent orientation of the midwife away from the parents.

The following excerpt from case 3 [video segment 03\_07] illustrates the impact of record keeping on midwife-parent interaction.

Time	Person	Action	Line	
19:35:52	Midwife		1	“Right I’ll just start reading through your notes.”
19:35:52	Midwife	AC:	2	Record keeping [non bedside]
19:37:58	Partner		3	“You OK there?”
19:37:59	Mother		4	“Yeah.”
19:38:11	Partner		5	“You got a pain now?”
		AC:	6	Mother and partner look at fetal monitor
19:38:12	Midwife	AC:	7	Glances at parents
19:38:16	Partner		8	“It’s gone up to thirty now.” [looking at fetal monitor]
19:38:56	Midwife		9	“What were you on antibiotics for?”
			10	[Midwife does not look up from the notes when asking this
			11	question]
19:38:59	Mother	AC:	12	Looks over to midwife
19:38:59	Mother		13	“A water infection.”
			14	[mother’s breathing laboured]
19:39:14	Mother	AC:	15	Looks over to midwife
	Midwife	AC:	16	Midwife turns round and establishes eye contact
19:39:14	Mother		17	“I’d be all right if it wasn’t for my back.”
19:39:14	Midwife	AC:	18	Record keeping ends
19:39:16	Midwife		19	“Do you want to use a bit of gas and air?”

Case 3: transcript excerpt video segment 03\_07

The midwife's remark (line1) acted as a disengagement cue. The midwife turned her back to the parents and attended to the medical records. The partner's comments did not initiate reengagement of the midwife (line 5 and 8). The mother orientated herself to the midwife when a question was asked (line 12) however the midwife did not look up from the records and so remained disengaged. Reengagement was achieved when mutual eye contact was established (line 16). Parents made statements, or observable actions, which served as engagement cues. These were often not responded to or noticed by the attendant midwife. This is further illustrated in the following excerpt from case 3 [video segment 03\_18]. There had been some previous technical difficulties in obtaining an adequate recording of the fetal heart rate and the parents were orientated to the fetal monitor. The midwife was record keeping with her back turned to the parents and did not respond to the father's comment (line 4), or notice the mother (line 5) or father's orientation (line 7). It was only when the mother made a statement of fear (line 9), that reengagement was achieved.

Time	Person	Action	Line	
21:22:22	Midwife	AC:	1	Record-keeping [non bedside]
21:22:36			2	[Audible slowing of heart rate]
			3	[No response from midwife]
21:22:48	Partner		4	"It's going down." [the fetal heart rate]
21:23:03	Mother	AC:	5	Looks over to midwife
21:23:03	Midwife	AC:	6	Looks at fetal monitor then continues with record keeping
21:23:09	Partner	AC:	7	Stands up and looks at fetal monitor
21:23:09	Partner		8	( )
21:23:12	Mother		9	"Its scaring me now."
21:23:14	Midwife	AC:	10	Record keeping ends
21:23:18	Midwife	AC:	11	Bedside [sits at]
21:23:15	Midwife		12	"Don't worry probably just baby moving or they don't like
			13	some positions or his head is getting squashed or any number of
			14	reasons but like Sister said the trace overall is very, very good.
			15	Its not a trace that suggests that there is anything to worry
			16	about. There are certain things we look at and it seems to be
			17	fine. It would be a lot easier if we could get the contractions but
			18	that's our problem not yours."
21:24:04	Midwife	AC:	19	Bedside [sitting ends]
21:24:02	Mother		20	"It gets on my nerves."

Case 3: transcript excerpt video segment 03\_18

Some comments made by midwives prior to record keeping activities impacted on communication as shown in the following transcript excerpts from case 3 and case 14.

Time	Person	Action	Line	
21:05:48	Midwife		1	"Right I'm going to be over here scribbling but if you want me
			2	just shout. OK?"
21:05:48	Midwife	AC:	3	Record keeping [non bedside]

Case 3: transcript excerpt video segment 03\_16

Time	Person	Action	Line	
14:01:47	Midwife		1	"What I'll do is get the paperwork up-to-date."
	Mother		2	"While it's quiet."

Case 14: transcript excerpt video segment 14\_19

Some midwives commented on the amount of paperwork and the need to record ‘everything’ contemporaneously as shown in the following transcript excerpt.

Time	Person	Action	Line	
17:12:37	Midwife	AC:	1	Record keeping ends [non bedside]
	Midwife		2	“There is a lot of paperwork.”
	Partner		3	“Is that standard is it?”
	Midwife		4	“You more or less try to write everything that you do. It’s
			5	supposed to be as you do it as well but a lot of the time it’s
			6	retrospective. And then we keep them for 21 years just in case
			7	you decide to come back.”

Case 16: transcript excerpt video segment 16\_37

The medicolegal frame portrayed parents as a potential source of litigation and complaints. The emphasis on record keeping, leading to the pressure to record ‘everything’ regardless of its relevance, created spurious care priorities. The frequency of record keeping overshadowed psychosocial support and downgraded the midwife’s supportive role to a clerical role. It also made some midwives appear to be very busy. Parents have been found to be reluctant to ask questions in such circumstances (McIntosh 1988). Presence in the room is, according to the ideal model of birth (appendix 1, page 269-271), not enough; it is proximity, orientation to the mother and face-to-face *attention* that is important.

#### 7.4.4 Sitting at the bedside

In contrast, it was observed that three midwives involved in six cases undertook the majority of their record keeping activities at the bedside [case 2, 9, 11, 15, 20 and 21], that is, they were orientated to the mothers as shown in figure 7.16.



**Figure 7.16:** Midwife record keeping at the bedside showing orientation to mother, eye contact and interaction.



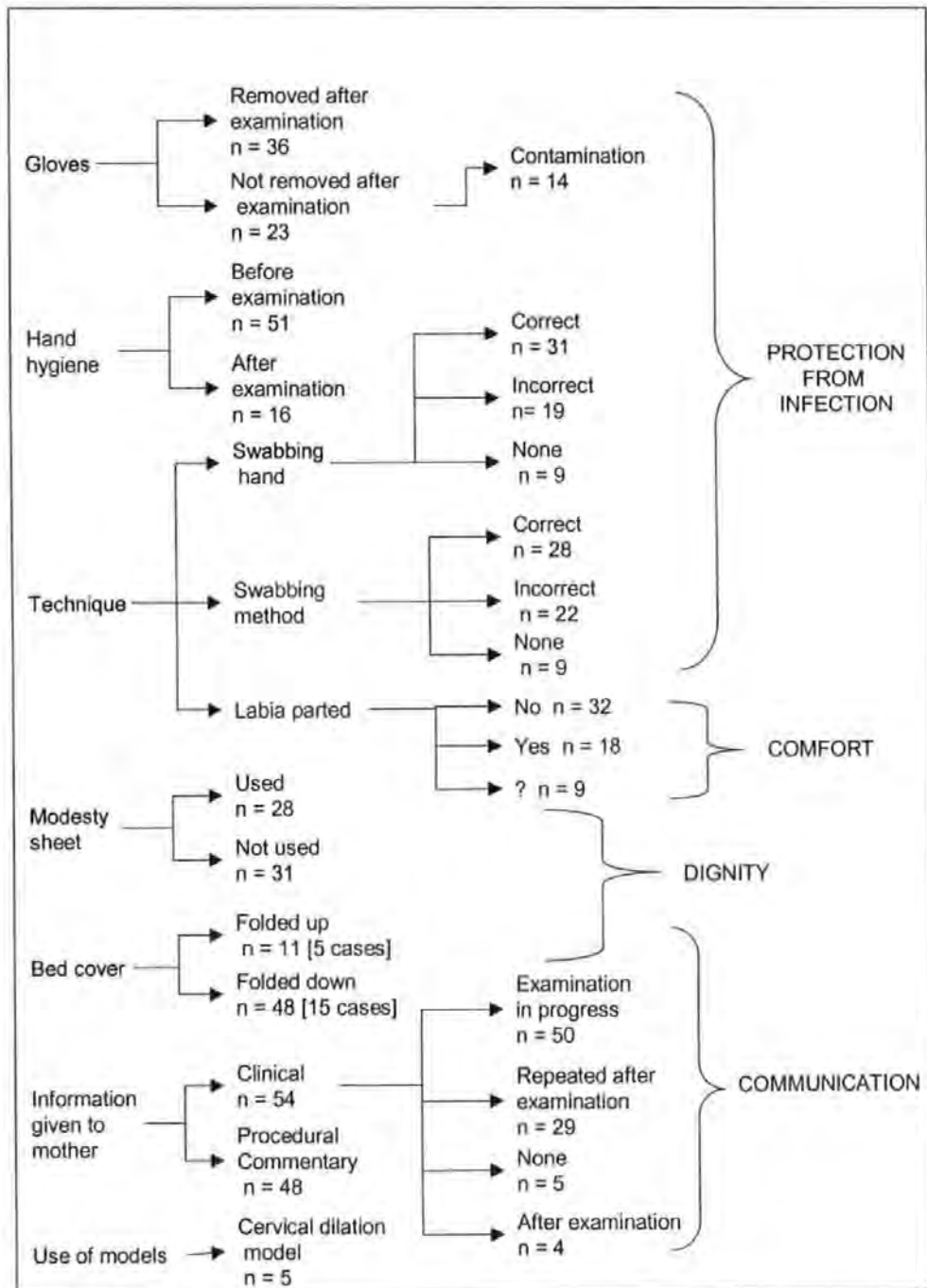
With this style of care there were more opportunities for engagement and interaction between midwife and mother. This allowed the midwife to remain available to parents and to simultaneously monitor activities, but at the expense of an interruptive style of record keeping. When those particular midwives were not engaged in direct physical care, they sat at the bedside and so were orientated to and in close proximity with mothers [time spent sitting at bedside: case 2 (30%), 9 (22%), 11 (54%), 15 (46%), 20 (48%) and 21 (44%)]. One student midwife undertook most of her record keeping away from the bedside, but also sat with the mother for 36% of the time [case 4]. Small talk (social conversation) is considered a marker of psychosocial support (McNiven, Hodnett & O'Brien-Pallas 1992). When midwives sat down with mothers there was an opportunity to chat. For example in case 2 (436 minutes of recording), midwife 1 used a bedside style of record keeping and sat at the bedside for 75/252 minutes (30%). There were 13 episodes of small talk (greater than two minutes duration). After a change of shift, midwife 2 did not sit at the bedside for the remaining 184 minutes. There were two episodes of small talk (less than one minute duration).

There were 10 midwives who did not sit down at the bedside with the mothers [case 2, 4, 7, 9, 10, 12, 13, 14, 17, 19]. The time the remaining midwives sat at the bedside ranged from 5/273 minutes (2%) to 29/95minutes (31%). A detailed table is provided in appendix 9, page 337. When those midwives did take the time to sit down at the bedside the 'atmosphere' in the room was transformed. The effect was almost immediate, as conversation and interactions were initiated. In case number 3, midwife 1 sat at the bedside for 7/204 minutes and three minutes of the time was spent attending to the fetal monitor. There were two brief episodes of 'small talk' for the entire 204 minutes. After a change of shift, midwife 2 sat at the bedside for 20/118 minutes. This was not a great deal of time but the effects were noticeable and midwife 2, who had first appeared to be rather distant, engaged the parents in conversation [video segment 03\_27]. This was the most the parents had talked with their midwife and with each other.

The psychosocial frame defines the mother as the central figure of care. Sitting with the mother signals availability, intention to stay and attention to mother. This creates a participation setting and the mother becomes the focal participant. The engagement between midwife and parents was conversational, rather than didactic advice or biomedical information orientated.

## 7.4.5 Vaginal examinations

A total of 59 vaginal examinations were performed (minimum one, maximum eight). Five vaginal examinations were repeated by a second clinician to confirm findings or reapply a scalp electrode. The average frequency of vaginal examinations was two hourly. Figure 7.17 shows a flow diagram of how the vaginal examinations were accomplished in actual clinical practice and the aims of compliance with the 'ideal' vaginal examination procedure described in appendix 2, page 272.



**Figure 7.17:** A flow diagram showing compliance or departure from the 'ideal' vaginal examination procedure

No single vaginal examination fulfilled all the criteria of the 'ideal' model. The correct hand was used for 'swabbing' in 53% of examinations. The mother's labia were not parted in 54% of examinations. On eight occasions clinicians did not attend to hand hygiene before the examination and on 43 occasions after. Modesty sheets were not used in 53% of cases, so mothers were exposed for the entire procedure (figure 7.18). Bed covers were folded up for 11 examinations (figure 7.19).



**Figure 7.18:** The prevailing vaginal examination procedure, which shows unnecessary exposure of the mother.



**Figure 7.19:** A vaginal examination procedure, which shows the midwife demonstrated respect for the mother's dignity, ensuring there was no unnecessary exposure of the mother.

Failure to remove gloves after examinations resulted in contamination of overhead lights, bedcover, mothers, monitors, work surfaces, cupboards, doors and curtains. This is illustrated in video segments 10\_09 and 10\_10 (figure 7.20). There was no attention to hand hygiene before the examination. The midwife did not remove the gloves used for the vaginal examination until completion of a routine urine test outside the delivery room. In

addition to the contaminative exposure listed previously, there was contaminative exposure of the mother to her own bodily fluids and public exposure when the Registrar entered the delivery room. This was a recurring theme for the care of this particular mother.



**A:** Vaginal examination, no attention to hand hygiene or asepsis. Contaminative exposure of mother.



**B:** Gloves not removed after examination resulting in contamination of equipment and mother



**C:** Registrar enters room uninvited, while mother totally exposed.



**D:** Midwife leaves room wearing the same gloves used for the vaginal examination

**Figure 7.20:** Vaginal examination, which shows unnecessary exposure of the mother, contamination of the mother with her own bodily fluids, and contamination of the room.

Clinicians provided a commentary of what they were actually doing for 81% of vaginal examinations; however the content varied from “two cold fingers” to a running narrative. Clinical information, usually dilation of the cervix, was given for most examination. Information was repeated after the examination in half the cases. Five mothers were given no information and five received information after the examination.

A plastic model of cervical dilation was used on five occasions to explain the findings of vaginal examinations to mothers [case 2, 9, 14]. Figure 7.21 shows a midwife using a plastic model of various stages of cervical dilation to explain the findings from a vaginal examination to the mother [case 02 video segment 02\_16].



**Midwife:** “Yeah so it was about four centimetres, isn’t it, we said? Probably a little bit more than that. Perhaps nearly five, four and a half, but not a huge amount of change from the last time. So em, the contractions although they are coming quite often they are not quite strong enough.”

**Figure 7.21:** A midwife repeated the findings of a vaginal examination to the mother. This shows the use of a model of dilation of the cervix as an aid to communication.



Later in case 2 the mother was examined again (figure 7.22). After the examination the midwife prepared the room for delivery. The mother's final question shows that she was not aware that she was ready to give birth [case 2 video segment 02\_44].



**Figure 7.22:** The midwife performed a vaginal examination and then prepared the room for delivery. This shows inadequate communication of information to the mother.

Technical and lay terms were used to give information to mothers. The structure and content varied considerably. Mothers were often given information when they were in pain, as shown in the following transcript excerpt [video excerpt 06\_02]. The midwife informed the mother that "the baby's poohed inside" (line 3). The observation of green (meconium-stained) rather than clear liquor means the baby's bowels have opened before birth. This is considered a risk factor in labour and if the baby inhales the liquor, it can develop respiratory problems. A paediatrician is required to attend the birth to visualise and clear the baby's air passages to ensure the baby does not inhale the liquor.

Time	Person	Action	Line	
21:01:39	Midwife	AC:	1	Amniotomy [breaking the membranes]
21:01:29	Midwife		2	"There are no nerves in the womb so it's not going to be painful. That's the waters gone. Baby's poohed inside you"
			3	
	Mother		4	"Oh right. Oh. Ouch." [groaning throughout examination]
21:01:42	Midwife		5	"Nothing too alarming. The neck of the womb is about five centimetres. Just relax that other leg if you can. Baby's head is low down. I'm just putting a clip on baby's head.
			6	
			7	Its on baby's head to monitor the heartbeat. As I say it's nothing to worry about. It happens sometimes."
			8	
			9	

Case 6: transcript excerpt video segment 06\_02

There was no further mention of the meconium-stained liquor until an hour and half later when the mother asked for clarification [case 6 transcript excerpt video segment 06\_11]. The following excerpt shows the information given to the mother. It is questionable how much meaningful information was conveyed.

Time	Person	Line	
22:31:40	Mother	1	"What did you say about the baby pooing? What were you talking about?"
	Midwife	2	
		3	"Well baby's passed meconium in utero, in uterus. It happens in about five babies in every ten really in labour ward. It used to be a sign of distress if baby's heartbeat goes down a bit but em it also comes if you're overdue. They've done research and it doesn't really have great significance now. It just happens sometimes. If it was associated with other things like baby's heartbeat going down, but you're baby's heartbeat has been absolutely fine, so but because it is a sign of distress we have to monitor more frequently, but your baby is absolutely fine. Quite often when you're overdue it happens and you know when baby's born we have to have a baby doctor present just to make sure baby doesn't swallow any of the gunge into its lungs. We didn't have to do this ten years ago but 1 in 20,000 babies swallowed the green stuff."
		4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	

Case 6: transcript excerpt video segment 06\_11

In case 20, the midwife observed meconium-stained liquor at the time of the vaginal examination [segment 20\_12], but in contrast to case 6, there was no mention of risk or the need for a paediatrician to attend for delivery. The parents made light of the information.

Time	Person	Line	
14:00:43	Midwife	1	"See the pad that's slightly green. Baby's had its bowels open. Quite common actually when the baby is overdue."
		2	
	Mother	3	"Dirty baby."
		4	[all laugh]
	Partner	5	"Needs changing already."

Case 20: transcript excerpt video segment 20\_12

Some mothers can find vaginal examinations painful as illustrated in the following transcript excerpt.

Time	Person	Action	Line	
19:08:00	Midwife	AC:	1	Vaginal examination
			2	"OK Lets see what he's up to. Let's see what he's up to then we can take this thing off your tummy. You got a pain you breathe away. Pop that leg up and see if its going to go."
			3	
			4	
19:09:00	Midwife		5	"Go on then. Give us a push and see what's happening."
19:09:37	Mother		6	[Groaning]
	Midwife		7	"OK breathe away."
	Midwife		8	"Give a push, big push right down in your bottom."
	Midwife		9	"OK just breathe away now. Pain gone?"
19:10:17	Midwife		10	"Pain gone?"
	Midwife		11	"OK stop breathing that now [gas and air] 'cause next pain you give me a big push."
19:10:36	Mother		12	
			13	"You're hurting me. Get out you're hurting me. You're hurting me."
			14	
	Midwife		15	"I'm not doing anything. Look I'm not doing anything. It's the baby's head that's there."
			16	
	Mother		17	"You're hurting me. You're hurting me."
19:10:54	Mother		18	"That's not the baby. You're hurting me."
	Midwife		19	"I'm not doing anything. It's not that far down."
	Mother		20	"You are hurting me"
	Midwife		21	"Just breathe your Entonox"
	Mother		22	"No."
	Midwife		23	"Breathe on the gas and air and give a good push."
	Mother		24	"You're hurting me."
	Midwife		25	"Listen ( )."
	SO		26	"It's the baby coming."
	Mother		27	"( )."

19:11:59	Midwife		28	"I want to see what position its in. You've got a rim of cervix
			29	and I don't want you to push. I don't want you to push unless
			30	my fingers there."
	Mother		31	"Why?"
	Midwife		32	"Cause you've got a little bit of cervix I want to push out of the
			33	way. If you push it will go all ( ) shaped."
19:12:32	Midwife		34	"Breathe into your Entonox. That's the baby's head coming.
			35	Big push. There is the baby's head coming now. You can feel it.
			36	Listen don't go spoiling it 'cause you're doing so well."
	Midwife	AC:	37	FSE applied
19:14:00	Midwife	AC:	38	Vaginal examination ends

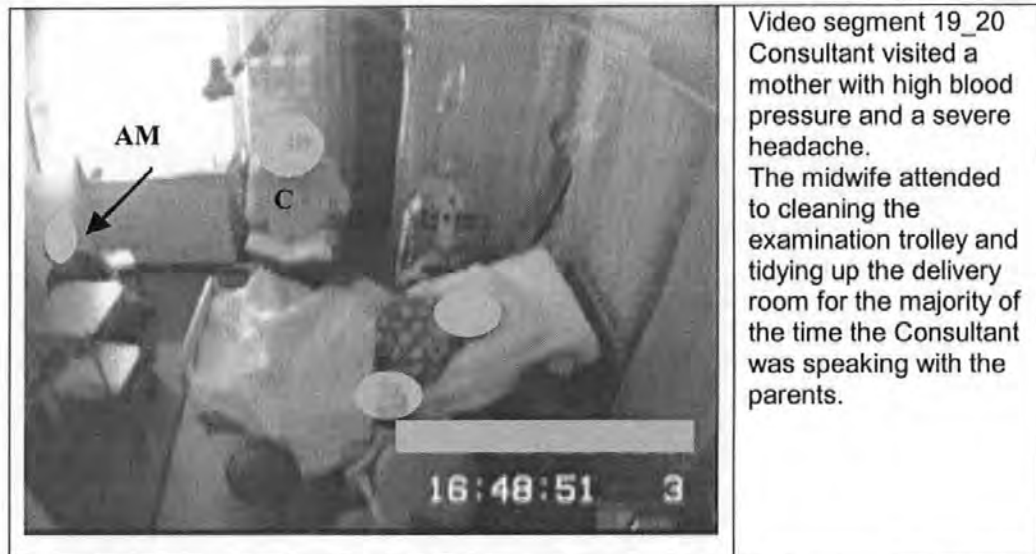
Case 18: transcript excerpt video segment 21\_09

In this particular case the need for the vaginal examination was questionable. A previous vaginal examination at 18:00 hours found the cervix was six centimetres dilated. In addition, it was recorded in the case notes that the mother requested the application of a fetal scalp electrode (FSE), when no such request was apparent on the video recording. Both the researcher and an independent reviewer considered this particular examination was abusive.

Vaginal examinations were the most frequent care procedure. This intimate examination can be embarrassing and painful for mothers. However, in Western cultures, it is considered a necessary part of childbirth to determine onset or progress of labour. The ideal vaginal examination procedure is designed to protect mother and baby from risk of infection, maintain dignity, reduce discomfort and convey information. The technocentric frame defines the mother as an object of work rather than a person who needs care. Lack of hygiene portrays the mother and baby as inconsequential. The mother is disempowered because she cannot challenge people in authority to wash their hands. The mother is framed as technically ignorant as she does not know how the examination should be undertaken. The mother is portrayed as an object that has no feelings, as her comfort is unimportant. The exposure of the mother portrays her as having no self-control and disrespected. The way information was given portrayed the mother as a passive recipient, who did not need to worry or question what was happening. The way the vaginal examinations were undertaken often portrayed staff as people who did not care, as a *custodian* (looking after a place or thing) rather than *carer* (protection or charge of a person). The frequency of vaginal examinations may reflect an underlying view that it is a benign procedure, when it can actually have detrimental consequences. Mothers can find this procedure abusive and a mechanism for imposing control (Bergstrom et al., 1992).

#### 7.4.6 Medical and senior midwife consultations

Doctors usually introduced themselves to mothers by name and grade and generally stood at the bedside when talking with parents. Midwives often stood away from the bedside or undertook menial activities when doctors were talking to mothers, as shown in figure 7.23.



**Figure 7.23:** The midwife undertook menial tasks while the Consultant talked with the parents. This shows a lack of joint effort.

One event was observed where both the doctor and midwife stood together at the bedside and shared the case notes (figure 7.24). The mother was included in the conversation and the plan of care [case 2 video segment 02\_18].

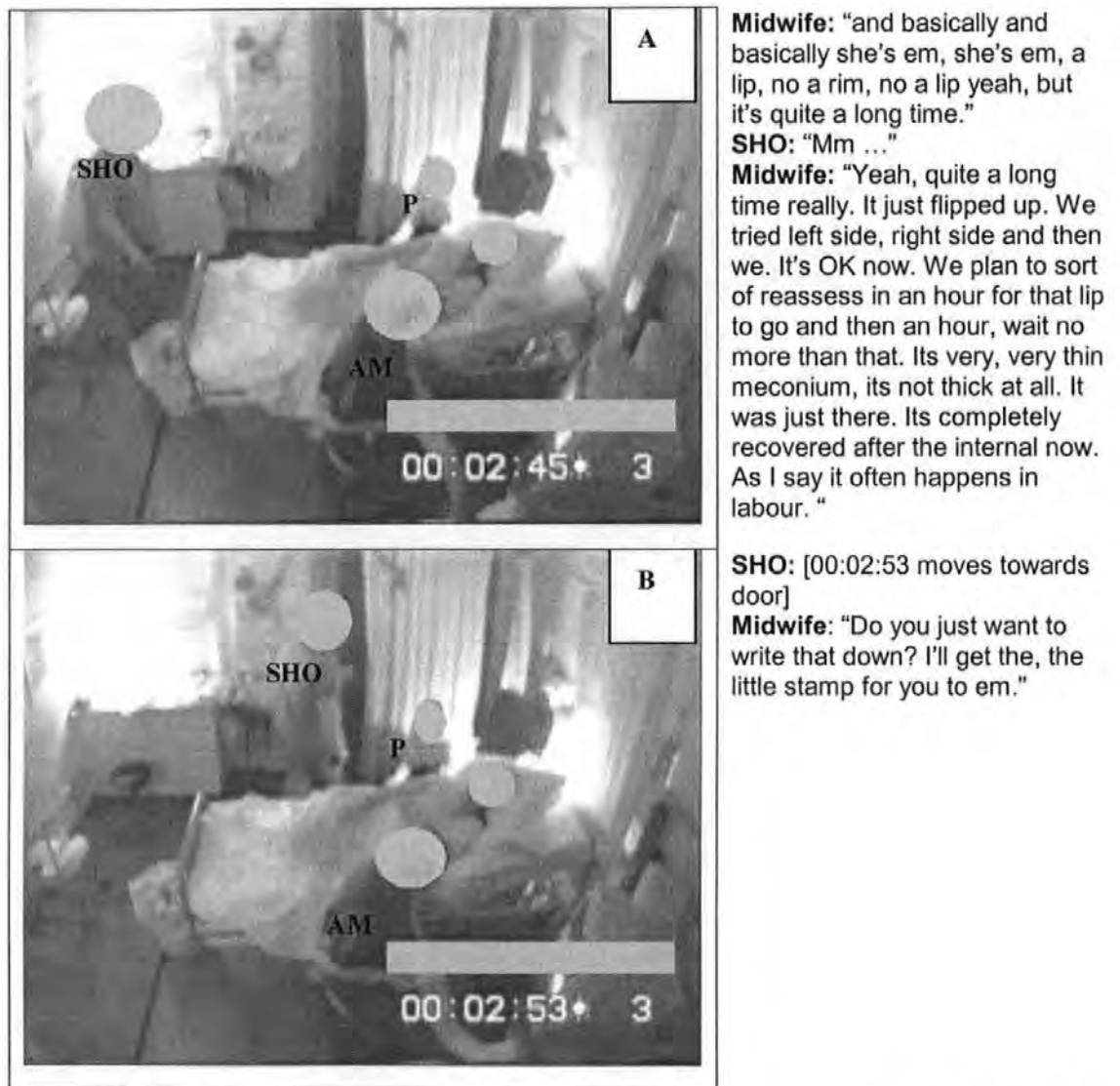


**Figure 7.24:** Both Registrar and midwife attended the mother's bedside. This shows joint effort and included the mother in the exchange

This type of bedside interaction seemed to engage the mother. This was the only mother who directly asked questions of doctors. However, in general, communication *between* clinicians usually occurred away from the bedside and excluded the parents.



In case 6 a SHO was called to review a CTG [case 6 video segment 6\_21]. The communication of information was unclear and the key statement related to accountability was implicit rather than explicit, as shown in figure 7.25.



**Figure 7.25:** An inexperienced SHO was called to review an abnormal CTG. This shows issues of communication, decision making and accountability.

In this situation it was not clear who was accountable, who actually made the decision and if it was at an appropriate level of experience. The parents were excluded from the exchange between the midwife and doctor.

The midwife coordinator was involved on 31 occasions for 10 of the 20 mothers; this included eight referrals related to fetal monitoring and eight referrals relating to timing of vaginal examinations. Six mothers were cared for entirely by senior midwives (grade F and G) and of those, the midwife coordinator was involved in the care of one mother.



The need for cautious use of Syntocinon (a synthetic hormone) was described in the intervention cascade appendix 1, page 271. In case 3 the midwife coordinator suggested the Syntocinon infusion should be increased. The mother had already made rapid progress in labour with cervical dilatation from two to nine centimetres in just over two hours and decelerations were present on the CTG. An increase in Syntocinon was clearly inappropriate; in fact it would have been more appropriate to reduce the rate of Syntocinon.

In one case [case 17] the attendant midwife documented a core midwife as 'in-charge' of the care of the mother. The core midwife had not attended the delivery and had transferred care to the attendant midwife two hours before delivery. However, the core midwife had entered the room to commence a Syntocinon infusion. It was not clear who made this decision. The mother and the attendant midwife were not involved in the decision.

Most decision making between clinical staff took place outside the delivery room at the workstation and the small whiteboard, previously described in chapter 6, section 6.4.3.1, page 125-126, was referred to in the discussions. The notes were not often referred to, although the attendant midwife sometimes made them available. One mother's history of previous stillbirth was omitted five times in exchanges between clinicians outside the room.

Lack of joint attention, that is both doctor and midwife in attendance at the bedside, does not create an engaging participation framework for parents. Menial tasks undertaken by midwives during doctor-patient interaction create noise, cause distractions and impair communication. Midwives attendance at the bedside, to help parents ask questions and to show joint attention, supports the psychosocial frame. The technocentric frame often overshadowed this. Communication between clinicians generally excluded parents, even when the parents were orientated towards clinicians. The medicolegal and technocentric frame shaped communication between clinicians. The medicolegal frame should support clear lines of accountability to empower clinicians to act in the best interest of mothers. Accountability should be a concept, which clarifies roles and responsibilities. However, fear of litigation may engender defensive practice where accountability is framed as culpability, to identify someone blameworthy. The hierarchical structure did not support discussion or questioning of management decisions by junior members of staff or parents.

### 7.4.7 Hygiene issues

Hygiene issues were previously described in relation to vaginal examination in section 7.4.5. This was also observed in case 10, 14, and 16, where clinicians did not attend to hand hygiene before instrumental delivery and the fetal blood sample procedure previously described in section 7.4.1. Other hygiene issues, such as disposal of urine down the clean sink, used bedpans placed on top of the clean sink and failure to remove surgical gloves after handling soiled material were common. One midwife kept a pair of surgical gloves in her pocket and used the same gloves repeatedly for various procedures [case 19].

It would be expected that rules of hygiene in a hospital would be given high priority. Yet this was not the case. Clearly the range of hygiene issues transgresses all three frames. The downgrading of many procedures from 'sterile' to 'clean' may contribute to a cavalier attitude to risk of infection. In addition, acts of omission are not traceable to an individual.

### 7.4.8 Fetal monitor

The mothers in this study all had continuous electronic fetal monitoring. The indications for continuous monitoring complied with national guidelines (NICE 2001). When the CTG was normal midwives volunteered information such as: "*the baby's happy*"; "*excellent trace.*" Midwives' commentaries and explanations were sometimes lacking when changes in the CTG pattern occurred [case 3, 6, 10, 14, 15]. Prolonged attention to the fetal monitor was also observed. This is illustrated in the following transcript excerpts and screen shots shown in figure 7.26 [video segment 15\_54].



**A:** Midwife attends to fetal monitor  
Mother sleeping



**B**

**B: Midwife:** "Can I get you to change position? Baby's sleepy."



**C**

**C: Midwife:** Attends to fetal monitor.



**D**

**D: Midwife:** "Try the right side. I just want him to be a bit more active before I leave."



E

**E: Midwife:** Attends to fetal monitor



F

**F: Midwife:** Attends to fetal monitor.



G

**G: Midwife:** "He's just a very tired baby."



**H:** Partner arrives [P]  
Midwife leaves room



**I:** **Partner:** "What's up?"  
**Mother:** "He's gone to sleep."  
**Partner:** "He's been asleep for quite a while now. He must be awake now."  
**Mother:** "Yeah she was worried he was sleeping too long. The most they should sleep is forty minutes."  
**Partner:** "You might get a caesarean."

**Figure 7.26:** The midwife's orientation to monitor, preoccupation with the CTG and lack of verbal communication shows how the parents' confidence could be undermined.

Parents observed midwives' actions and their non-verbal behaviour did not convey reassurance to parents, as illustrated in figure 7.26. In this particular case there was a history of a previous stillbirth. The CTG trace for this baby was entirely normal and the midwife's preoccupation with the fetal monitor may have unnerved the parents.

In case 6 [video segment 06\_19] the baby's heart rate had slowed. The mother was given facial oxygen and turned onto her side. The midwife left the room to inform the medical staff. The partner continued to read his book (figure 7.27). The mother was left facing the wall. Even when there are people in the room, mothers can still be isolated.





23:53:16  
**Midwife:** "OK. I'm going to get doctor just to check this bradycardia. Baby's heart rate is a little bit low and of course you've moved on quite quickly. Everything's fine. All right? I'll just get him to check it and then we'll start pushing."

23:53:44  
**Midwife:** Leaves room

**Figure 7.27:** A mother, with an abnormal CTG, was turned onto her side and given facial oxygen. This shows the mother's isolation from human contact at a critical moment.

Partners have their own anxieties to deal with, while at the same time providing emotional support to the mother. In this case the partner held the mother's hand (figure 7.28). However, as soon as the midwife entered the room the partner returned to his seat.



**Partner:** Stops reading book and looks at the fetal monitor. Holds mother's hand

22:55:14  
**Mother:** "What's it doing now?"  
**Partner:** Looks at monitor  
**Partner:** "It's 117."  
**Partner:** Points to CTG

23:56:27  
**Midwife:** Enters room  
**Partner:** Returns to his seat

**Figure 7.28:** The partner held the mother's hand. This shows the circumstances in which partners were expected to address both their own and the mother's anxieties.

Parents were aware of changes to their baby's heart rate pattern and articulated their concerns by asking the attendant midwife if their baby was happy / all right. The following excerpts illustrate mothers' concerns and midwife's response.

Time	Person	Line	
00:23:17	Mother	1	"Is the heartbeat all right? Is it not too slow?"
	Midwife	2	"Yeah. No. It's going down with most contractions. It's all right
		3	nothing to worry about love."

Case 6: transcript excerpt video segment 06\_23

Time	Person	Line	
21:41:31	Mother	1	"My nerves are beginning to go."
21:41:34	Midwife	2	"Ah. Don't worry. What happens is the clip goes along with them
		3	and ends up em ( ) somewhere."
21:42:06	Midwife	4	"It's all right. Don't panic. When we do you do."

Case 3: transcript excerpt video segment 03\_20

It is questionable whether the responses of midwives conveyed reassurance to parents. In most cases they were told not to worry.

When parents were left alone they 'monitored' their baby and episodes of loss of the fetal heart rate signal or changes to the heart rate pattern caused them anxiety [case 3, 10]. This is illustrated in the following transcript excerpt:

Time	Person	Action	Line	
20:41:54	Partner	AC:	1	Fetal monitor [looks at monitor screen]
	Partner		2	"It is going down now."
	Mother		3	"Yeah."
	Partner		4	"Its sort of bouncing around at 135."
20:42:16	Mother		5	"Yeah. It dips when you get a contraction."
	Mother	AC:	6	[Trying to sit up]
	Mother		7	"I'm afraid to move."
20:43:15			8	[Fetal monitor signal loss]
20:43:46	Partner		9	"Just about had a heart attack then."
	Mother		10	"Baby ( ) survive for 20 minutes."
	Partner		11	"I don't think I could."

Case 3: transcript excerpt video segment 03\_14

Figure 7.29 shows a mother, who was alone, reaching over to look at the CTG [video segment 11\_11].



**Figure 7.29:** A mother, who was unattended, reached over and examined the CTG. This shows the current care model may not meet the information need of mothers.

Non-verbal behaviour of partners included standing up and prolonged attention to the fetal monitor. One father was observed pacing, placing his hand over his mouth with prolonged

attention to the fetal monitor [case 10]. If the mother could not see the CTG she sometimes asked her partner what was happening [case 3, 6, 10].

The technocentric frame portrayed the parents as objects, who did not need to worry and who did not notice the responses of staff to changes in the heart rate pattern. A focus on tasks and technology, leading to episodes of preoccupation with the fetal monitor may cause parents anxiety and loss of confidence. The psychosocial frame was often overridden as parents were not given explanations or were left to interpret the fetal monitor recording for themselves. Two partners used the fetal monitor as a tool and alerted the mother to the onset of a contraction, to aid the mothers' use of gas and air [case 15 and 19]. This enabled a lay companion to provide support when the midwife was absent or engaged in other duties.

#### 7.4.9 Partogram and computer representations

The partogram was shown to mothers (a graphical display of labour progress) in six cases [7, 9, 10, 11, 16, 20]. One mother had remarked on the strength of the contractions [video segment 11\_22]. The midwife volunteered information and used the partogram to explain how labour progress was charted and gave the mother a rough idea of when the baby might arrive as shown in figure 7.30.



**Figure 7.30:** A midwife and mother shared the partogram. This shows the way the midwife used the partogram to provide the mother with a predicted time for the birth of her baby.

Mothers wanted to know, roughly, approximately, what time their baby might arrive, but some midwives were reluctant to give this information. Computerised partogram displays were used to give two mothers details of labour progress [case 7, 9]. One birth companion

was observed interacting with a computer display of the cardiocotogram to explain the contraction pattern to the mother [case 7].

Figure 7.31 [video segment 5\_18] shows the attendant midwife was standing under the camera just out of shot. The following screen shots and transcript excerpts show the responses to the mothers' questions. A similar response was observed on five occasions for four mothers.



**Figure 7.31:** A mother inquired when her baby might arrive. This shows reluctance on the part of the midwife to provide a predicted time of birth.

Figure 7.32 [video segment 13\_02] shows the midwife record keeping when the mother asked when the baby might arrive. The midwife responded to the mother without turning round or looking up from the case notes.



**Figure 7.32:** A mother inquired when her baby might arrive. This shows a lack of responsiveness to the information needs of the mother.

Most mothers used words like *reckon*, *roughly*, when they asked questions about length of labour which implied they were aware it was difficult to give precise information. Only one mother received an estimate of the time she might give birth [case 11]. Shared models acted as a vehicle for communication and this supported the psychosocial frame.

#### 7.4.10 Midwife shift handovers

A total of 17 shift handovers between midwives were observed. There was no systematic format or structure to the content of the shift handovers. Some midwives started with information about the present pregnancy and the events in labour. Others started with the most recent labour events. Omission of information occurred both inside and outside the delivery room. This is shown in the following excerpt where the presence of meconium-stained liquor was omitted from the initial handover. Midwife 1 later reported it as an afterthought on departure from the room [video segment 20\_17].

Time	Person	Action	Line	
14:49:34	Midwife 1	AC:	1	About to leave the room
14:49:38	Midwife 1		2	[on departure] "Oh there's meconium liquor. OK." [laughs]
	Midwife 2		3	"Really? Seriously?"
	Midwife 1		4	"Yes I was in the room next door and I thought oh I really must tell her."
	Midwife 2		5	"Now she tells me."
	Midwife 1		6	"The ARM [amniotomy]. I could barely see it, next there was mec [meconium] on the pad."
			7	
			8	

Case 20: transcript excerpt video segment 20\_17

The handover usually took place in the corner of the delivery room and therefore midwives' were orientated away from parents. However, parents were usually orientated towards the midwives as shown in figure 7.33 [video segment 3\_21].



**Figure 7.33:** Shift handover conducted away from the bedside. This shows the orientation of the parents to the midwives. The orientation of the midwives excluded parents from the exchange



One complete bedside handover, shown in figure 7.34, was observed [video segment 11\_26]. In two cases the handover started at the bedside but the midwives gradually moved over to the corner of the room [case 13; 14]. When the handover took place at the bedside the mothers engaged in the exchange, either to confirm facts or to provide additional information.



**Midwife 1:** "... assessed her and she was found to be three centimetres, so she went for an ARM but no fore waters were felt and you did feel it might have been an hour before I came on duty?"

**Mother:** "Mm. Yeah."

**Midwife 1:** "Syntocinon started straight away ( ) to achieve contraction three to four in 10 regularly. Once established to stop Syntocinon. I have gone via the multips regime and its on 7.5 mls. She'll get the odd really strong one and then niggling ones that lingers for a while."

**Mother:** "Yeah. Don't go away."

**Figure 7.34:** A shift handover at the bedside. This shows the mother was included in the exchange.

The technocentric frame excluded parents from exchanges and the psychosocial frame was overridden. Parents resorted to eavesdropping. Shift handovers were undertaken as a task-based information exchange rather than as an opportunity to engage parents in their care. The orientation of midwives resulted in exclusion of parents, albeit unintentionally, as the parents' interactional availability could not be observed. When the handover took place or started at the bedside there were requests for additional information or confirmation from parents. Goodwin (1981) proposed that this procedure was a "request for aid from a knowing recipient", which invited participation.

#### 7.4.11 Syntocinon

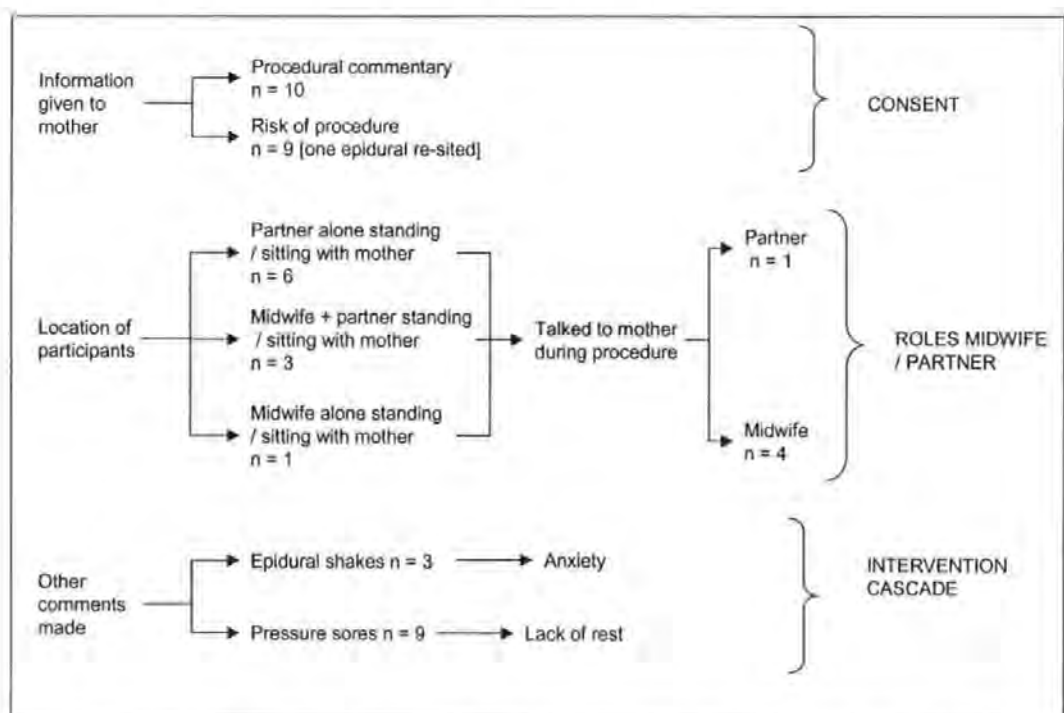
Syntocinon was used in the first and second stage of labour for 12/20 mothers and for one mother in second stage labour. Syntocinon was referred to as "Synto" and metaphors were used in four cases where it was described to mothers as "Jungle Juice." In case 17 [video segment 17\_19], Syntocinon was used in the second stage of labour and mother was told:

"I've got a little gun powder for you 'cause we don't want this to go on too long since you're doing so well. All right? You should have had it when you came down but you were doing so well we decided not to do it."

No discussion took place with the mother on the use of Syntocinon or the possible risks. It was also not clear who actually made the decision to commence Syntocinon. The use of informal terms may represent inappropriate mental models of a drug that should be used with extreme caution. The psychosocial frame and medicolegal frame highlights that great care should be taken with the use of Syntocinon. Metaphor can be a powerful explanatory device, but it can also be a euphemism, which hides risk.

#### 7.4.12 Epidural procedure

An epidural is a regional anaesthetic, which usually provides effective relief of pain. This is an invasive procedure, described in appendix 1, page 269-271 under the intervention cascade. The procedures were carried out under strict aseptic conditions and the midwife initially assisted the anaesthetist in preparing the epidural equipment. Prior to the epidural procedure information was given to mothers of the risks of epidural and on how the procedure was performed. Figure 7.35 shows how the epidural procedure was accomplished and the issues derived from the observations.



**Figure 7.35:** Flow diagram of the main features of the epidural procedure

Clinicians emphasised to the mother that it was important not to move while the procedure was in progress. This was difficult for some mothers, particularly when there was a contraction present. Some mothers were given a large amount of complex information when they were in pain. Examples of the differences in the communication of risk are shown in transcript excerpts from case 15 and case 3.

Time	Person	Line	
10:19:23	Anaesthetist	2	"Hi there. Dr [A]. I believe you'd like an epidural. Had one before?"
	Mother	3	"Yeah."
	Anaesthetist	4	"So you know all that's involved."
	Mother	5	"Mm."
10:19:30	Anaesthetist	6	"Carries a few risks. Biggest risk of headache."
	Mother	7	"Yeah."
10:19:33	Anaesthetist	8	"Sometimes we struggle to get it in, doesn't work very well. OK?"
		9	All the other nerve damage and stuff is very rare, one in 50,000.
		10	Are you happier to do it sitting or lying on your side?"

Case 15: transcript excerpt video segment 15\_04

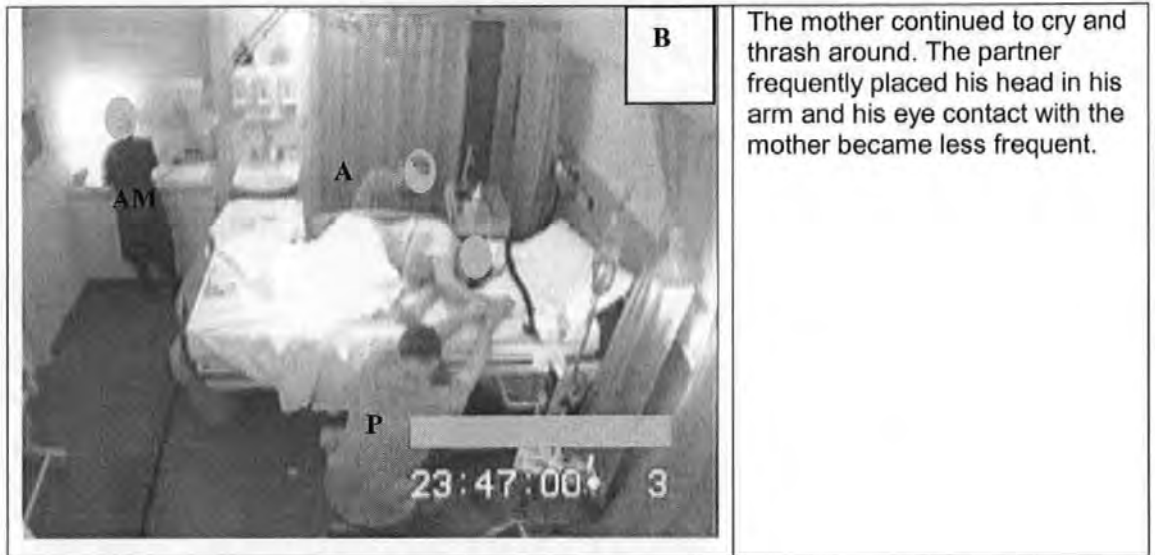
Time	Person	Line	
19:48:11	Anaesthetist	1	"Em what we want to do is get you numb from your toes up to the
		2	middle of your tummy OK and still keep the movement in your legs.
		3	Now hopefully the pain will be taken away but you will still feel
		4	pushing and pulling and movement and that sort of thing. OK? And
		5	there are a few things I need to tell you about epidurals. Firstly that
		6	it might not work OK and if it doesn't work you have to have
		7	another one if you still want one. Secondly you can sometimes get a
		8	missed patch on you tummy or on your legs, which is nobody's
		9	fault really. OK and there is usually things we can do like give you
		10	an extra bit down the epidural. Sometimes if it is really bad we can
		11	put another one in. There is the risk of a headache sometimes quite
		12	a bad headache. Again there are things that we can do about that but
		13	we'll tell you about it ( ). There is a small risk of nerve damage.
		14	Usually it gets better. There is a small risk of permanent nerve
		15	damage in the back and that's about 1 in 20,000. OK?"

Case 3: transcript excerpt video segment 03\_08

In cases 2, 9, 20, both midwife and partner were orientated to the mother throughout the epidural procedure and for case 14 the midwife alone was orientated to the mother. In the remaining six epidural procedures [case 2 (second epidural), 3, 6, 10, 15, 19], partners alone were in direct contact with the mothers throughout the epidural procedure while the midwife attended to record keeping. This is illustrated in figure 7.36, which shows screen shots from case 2 on insertion of a second epidural [video segment 02\_38 to 02\_39].



A  
The mother was crying and thrashing around. Her partner [P] held her hand. The midwife [AM] attended to record keeping.



The mother continued to cry and thrash around. The partner frequently placed his head in his arm and his eye contact with the mother became less frequent.

**Figure 7.36:** The partner was the sole source of support for the mother during the epidural procedure. This shows the partner was unable to maintain eye contact with the mother and spent most of the time with his head buried in his arm.

In the preceding case, earlier in the evening the mother had told the staff how fearful she had been after the initial epidural was completed.

Time	Person	Line	
18:37:42	Mother	1	"I was petrified about this."
	Anaesthetist	2	"Were you?"
	Midwife	3	"Oh were you?"
	Anaesthetist	4	"You should have said."
	Mother	5	"I was really petrified ( ) on the ward."
18:38:01	Midwife	6	"Oh. Well it didn't show."

Case 2: transcript excerpt video segment 02\_06

Figure 7.37 [video segment 14\_26] shows the midwife in direct contact with the mother during the epidural procedure and the midwife coordinator assisted the anaesthetist.



**Figure 7.37:** Epidural procedure that shows the midwife was in direct physical contact with the mother and the midwife coordinator assisted the anaesthetist.

The partner had left the room because he did not like the sight of needles. The attendant midwife talked to the mother and made positive statement to her throughout the procedure. Only one partner was observed talking with the mother while the epidural procedure was in progress [case 19].

Figure 7.38 shows the attendant midwife and student midwife orientated to the mother and later in the procedure the partner was also orientated to the mother [video segment 20\_09].



**A:** The midwife and student were both orientated to the mother. The student midwife remained by the mother's side throughout the procedure.

**B:** The mother's partner wipes the tears from her face.

**Figure 7.38:** Epidural procedure, which shows the carers' and partner's orientation and their physical contact with the mother.

Mothers were not given information on the risks of interventions such as catheterisation, use of Syntocinon or risk of pressure sores before the epidural procedure. Mothers also seemed to have little opportunity to rest or sleep, due to frequent observations and frequent changes of position to prevent pressure sores as shown in the following transcript excerpt.



Time	Person	Action	Line	
15:06:35	Midwife	AC:	1	Takes blood pressure
	Midwife		2	"Never stops does it?"
	Mother		3	"It's hard to get any rest."

Case 20: transcript excerpt video segment 20\_18

Four mothers had remarked on their fatigue due to induction of labour. Some mothers had only just dozed off [case 12;14;16;19] when they were disturbed for routine observations or to change position in order to prevent pressure sores. The consequences of lack of rest in labour have been paid scant attention. Three mothers commented on shaking after the epidural. Two midwives referred to this as the 'epidural shakes' but offered no further explanation. Butani and Hodnett (1980) found 10/50 mothers interviewed about their perceptions of labour reported severe shaking after epidural administration and over half the mothers said they were unable to rest.

The epidural procedure was predominated by the medicolegal and technocentric frames. It is debatable if mothers could actually give 'informed' consent when they were in pain. Under such circumstances, conveying information can be difficult. The volume of information may be difficult for patients to process (Yamagishi 1997). Patients' comprehension of numerical representation of risk can sometimes be insufficient. A comparative reference, for example, everyday risk, can aid understanding. Patients have shown preference for simple bar charts for visual displays of risk (Edwards, Elwyn & Mulley 2002). The information conveyed did not appear to be to help mothers make an informed choice; it seemed to be a medicolegal requirement to make known the risks of the procedure. Antenatal access to various media, which aids conveyance of information on risk, may better support the principles of informed consent.

The medicolegal frame also created spurious care priorities with partners' supplementing the midwives' supportive role in over half the cases, while midwives attended to record keeping. Clements and co-workers (1999) surveyed 1,714 mothers' labour experience and found epidurals were rated as just as much of a major medical intervention as caesarean section. In the research site over 60% of first time mothers have an epidural. It may be that it has become a taken-for-granted technical procedure, reflected in the lack of psychosocial support during a major intervention. In contrast to other invasive procedures, all epidural processes were conducted as sterile procedures and no transgressions were observed.

### 7.4.13 Administration of Entonox

Entonox is a gaseous mixture of nitrous oxide and oxygen, which mothers can inhale to help relieve pain, administered with the instruction and support of a midwife, as described in appendix 3, page 273. Midwives were observed giving instruction on the use of Entonox to five mothers and four mothers received no instructions. The midwives' instructions underscored the need to use the Entonox the moment the contraction started. Midwives attended to record keeping for initial use of Entonox in six cases [case 3, 4, 5, 6, 7, 14], and for two mothers [case 3, 4] the midwife paused to tell the mother to "take a deep breath." This is illustrated in figure 7.39 where the mother received 10 seconds of attention [video segment 04\_06].



**A:** 11:19:36: Student midwife instructs mother on use of the gas and air.



**B:** 11:20:08 Mother uses gas and air for the first time.



**C:** 11:20:14: Student midwife moves to bedside.  
**Student Midwife:** "Take a deep breath. That's it."



**D:** 11:20:24: Student midwife's attention has now moved from mother to monitor.



**E:** 11:20:32: Student midwife annotates CTG recording



**F:** 11:20:47: Student midwife attends to record keeping

**Figure 7.39:** An example of Entonox administration. This shows the mother's initial use of 'gas and air' and the brief amount of support received before the student midwife's attention turned to technical and clerical tasks.

No midwife was observed alerting the mother to the onset of a contraction by either abdominal palpation of uterine activity or observation of the fetal monitor. One mother asked her partner to alert her when the recording on the fetal monitor reached '30' so she could start to use the Entonox [case 11].

One midwife sat with and instructed the mother on initial use of Entonox and throughout most of the labour as shown in the following transcript excerpt.

Time	Person	Action	Line	
11:11:08	Midwife	AC:	1	Record keeping [bedside]
	Midwife		2	"Keeping going. All right good. Right until the end. Good.
			3	One more right until the end."
	Midwife		4	"Good all right. Well done then. It's really taken off. Tell
			5	me if you feel a bit of pressure in your bottom."
	Mother		6	"I feel quite dizzy."
	Midwife		7	"It will be quite obvious when you do. The effects will
			8	wear off. Sometimes people don't like the feeling much."

Case 21: transcript excerpt video segment 21\_04

In two cases the mother's partner helped with the use of Entonox as no midwife was present at the time of initial use [case 15 and 19]. One midwife, involved in case 7 and 8, did take some time to sit with the mothers, although not with initial use, and helped the mothers to use the Entonox [case 7 video segment 07\_15 to 07\_18 and case 8 video segment 08\_09 to 08\_11]. This is shown in figure 7.40 where the midwife knelt down at the bedside, talked to the mother, held hands, maintained eye contact and gave praise [case 7 video segment 07\_17].



Mother using gas and air. Midwife kneels down next to bedside, holds mother's hand, maintains eye contact and talks to the mother. Supportive female companion also attends to mother

**Figure 7.40:** Ideal support with Entonox use. This shows the carers' orientation to the mother, use of the 'en face' position and eye contact.

The medicolegal and technocentric frames predominated with attention to record keeping, tasks and technology. Little time was spent supporting the mothers' initial use of Entonox.

#### 7.4.14 Supportive physical contact

In 15 cases there were no episodes of midwives providing supportive physical contact. In the remaining cases, there were three episodes of midwives holding the mother's hand, and one doctor held a mother's hand. One midwife rubbed the mother's back [case 7 video segment 07\_22] as shown in figure 7.41. One father provided a back rub for the mother, but sat down to read his newspaper after each contraction [case 12 video segment 12\_09]. In case 8 [video segment 08\_12] the mother's friend mopped her brow, gave praise and helped with the use the Entonox as shown in figure 7.42.



**Figure 7.41:** The midwife offered and provided a back massage. This shows a simple comfort measure, which demonstrated personal care and attention





**Figure 7.42:** The presence of a female (non-professional) companion. This shows support of the mother, the midwife and the partner. The partner used the monitor to alert the mother to the onset of a contraction.

#### 7.4.15 Human factors safety issues

Two events relating to use of equipment were observed. A Syntocinon syringe was removed from the syringe driver to allow the mother to go to the toilet. This removed the protective mechanism of the device and the mother was at risk of an inadvertent bolus of Syntocinon. Figure 7.43 shows the mother on her way to the toilet with a syringe in one hand and an intravenous infusion bag in the other [video segment 11\_08]. It is not clear how the mother actually managed to attend to her personal hygiene and at the same time attend to a Syntocinon syringe and infusion bag.



**Figure 7.43:** Syntocinon syringe removed from pump housing. This shows the risk of an inadvertent infusion bolus.

One midwife [case 19] expressed her concern that the packages of syringes for the continuous epidural infusion and the Syntocinon were exactly the same colour and size. Look-alike packaging has contributed to a number of medication errors.

In case 5, a medical student rushed forward and prevented the mother from falling out of bed after she had removed her legs from the lithotomy poles (figure 7. 44)



**Figure 7.44:** A mother removed her legs from the lithotomy poles and was at risk of falling out of the bed. This shows the medical student averted a potential injury to the mother.

#### 7.4.16 Shoulder dystocia

One shoulder dystocia was observed. This is an obstetric emergency, defined as the inability to deliver the fetal shoulders after delivery of the head, without the aid of specific manoeuvres (Bruner 1998). The Advanced Life Support Obstetric course (<http://www.also.org.uk/>) recommends the HELPERR mnemonic for the shoulder dystocia emergency drill, which comprises:

- Help - call for assistance.
- Evaluate for an episiotomy (not necessarily done at this point).
- Legs (McRoberts' - flexing the thighs up onto the maternal abdomen).
- Pressure (suprapubic).
- Enter (internal manoeuvres - Wood Screw).
- Remove posterior arm.
- Roll onto hands and knees.

The management of this case was reviewed by a senior clinician, to assess compliance or departure from recommended management. In this case, a curtain obscured the emergency

call-bell and the standard call-bell, which does not necessarily provoke an immediate response, was used to summon aid. Staff outside the delivery room were unaware there was an emergency. The call-bell was answered after delivery had been achieved. The midwife did not follow the recommended drill and achieved delivery with downward traction to the baby's head. The baby suffered an Erb's palsy (paralysis of the arm due to nerve damage). The midwife involved asked to see the video recording and made several comments about communication but made no comments about how delivery was achieved. This particular case raised issues of how to provide positive feedback on individual performance. This case should not be seen as the failing of the individual. Labour ward emergency drills are a requirement of the Clinical Negligence Scheme for Trusts (2002) to prepare staff to deal with rare but severe emergencies system. No drills were routinely undertaken in this particular labour ward.

In a second case, the student midwife had difficulty delivering the shoulders and the attendant midwife turned the mother *onto her side* and used downward traction to the baby's head to affect delivery. In this case, the baby was not particularly large. One core midwife reported that when there was difficulty with delivery of the shoulders she always turned the mother onto her side to affect delivery. It was pointed out that this was no longer accepted practice, due to increased risk of nerve damage and such management would not be defensible. This did not change the midwife's view as none of the babies she personally delivered had suffered nerve damage and so she would continue to use this technique. This does raise the question of how many midwives are adhering to this type of practice. Clearly, change in practice is not just about presenting the evidence base. It requires a range of methods to inform, enable and if necessary, enforce compliance.

## **7.5 Tacit features of practice**

There were other issues which were not directly observable, but came across strongly from tacit indicators such as body language, spatial orientation, lack of engagement between participants and so on, or were absent when they should have been there (table 7.7). It is not possible to cover all the features in detail. A short narrative is provided for the tacit features of practice. However, the role of the partner was unexpected and will be discussed in more detail.

**Table 7.7:** Tacit features of practice

Tacit features	n		n
Role of father		Location – concerned they were in the way	9
		The care provider	9
		Fathers' support efforts	8
		Midwife offers of food, chair for father	7
		Marginalisation of father	5
		Father articulated powerlessness	1
Time: control, anticipation, planning	13	Parents - how long procedures take, labour progress, scenarios	13
Advocacy	3	Articulated by partner	1
		Referred to by midwife	2
Relationship breakdown [distressed mother]	1		

Just because these features were tacit does not make them any less important. In some cases they may be more important than directly observable features because they point to underlying system faults.

### 7.5.1 The role of the partner

Partners sat at the mothers' bedside for a total of 42/111 hours (38%). Some fathers sat on a small stool at the bedside. One father perched on the stool for several hours as shown in figure 7.45.



**Figure 7.45:** Seating arrangements in the delivery room. This shows the midwife and father sitting on small uncomfortable stools.

There was one comfortable chair but the distance from partner to mother was two metres (figure 7.46). One mother [case 5] commented to her partner “Why are you sat all the way over there?”



**Figure 7.46:** Seating arrangements in the delivery room. This shows the distance of the partner’s chair from the mother.

Some partners moved the chair over to the bedside but this blocked access to equipment and partners were concerned they were in the way. Partners were observed to sometimes defer their place at the mother’s side, move back from the mother or stop holding the mother’s hand when staff entered the room.

It was previously identified that partners ‘supported’ mothers during epidural procedures. They also assisted midwives with procedures and care of the mother, monitored their partner and baby’s condition when midwives were not in attendance, responded to pump alerts and alarms and generally assisted the mother. Birth partners are not trained assistants and they are not trained to provide psychosocial support but they were used as an aide and to supplement midwifery care. A midwife joked with one partner “you’re the barman” [case 20] and indeed that was one of their tasks. They were allocated as the ‘water monitor’ and a jug of water and one glass was provided for the mother. No glass was provided for partners. The same midwife later told the partner “You can join in, in a minute.” He was then invited to hold the mother’s leg.

Birth partners were marginalised in a number of ways. In case 3, the father was left standing for two and a half hours before he was told to sit down by his partner. In case 10



the father was told to support his partner's leg when his baby's heart rate pattern warranted a fetal blood sample. It is questionable if this is appropriate under such circumstances.

One partner was marginalised in his absence [case 18]. The partner was on his way to the hospital, but the midwife examined the mother and pushed the remaining cervix out of the way. The father missed the birth by two minutes. The mother had told the midwife she wanted her husband present as he had lost his first little boy from cot death and if it was a boy this time he would be overjoyed. It was a boy and he was overjoyed, but he did not see his own child being born.

The partner in case 5 was reduced to someone helpless and powerless as illustrated with his direct quotes:

"There is nothing I can do. Listen to me there is nothing I can do."

"I know you can't take any more but at the end of the day the decision is theirs."

There is little research on the role of the father in labour ward. Most studies have been small, selective and North American. Klein and co-workers (1981) conducted a time sample observation of 40 first-time fathers' behaviour in the delivery room. It was found that fathers touched their partner more than the labour nurses. Interviews conducted with the mothers after delivery found that partners were considered highly supportive, even if they just sat in the delivery room and read a newspaper. A small observational study, which compared the labour support of 14 first time fathers with doula support (an experienced woman) for 27 mothers, found that partners tended to withdraw when the mothers were in pain (Bertsch et al., 1990). Odent (1984) proposed that men sometimes find it hard to understand the behaviour of mothers during childbirth. The close emotional ties of male partners may limit their ability to meet the mother's needs as they have to deal with their own emotions (Klaus 1992). Anthropological studies have found that in most non-industrialised societies an experienced woman was present with the mother during labour (Jordan 1993). On the rare occasion when fathers were permitted to attend they had a specific function, such as supporting the mother's position in labour. In the present study partners were used to supplement rather than complement care and only five mothers were accompanied by a female (non-professional) companion.

### **7.5.2 Time: control, anticipation, planning**

Issues of time were important for parents to orientate themselves to labour. Information was sought regarding the time of arrival on the labour ward, how long the mother had been

in labour and how long procedures such as epidurals would take. This information was needed to anticipate and discuss scenarios. For example in case 2 the mother wanted to know what would happen if there was no progress at the next planned vaginal examination.

### **7.5.3 Advocacy**

Support of mothers' decision making was not evident in the present study. For example in case 6, the midwife told the mother: "We don't have to break your waters [amniotomy] but it's a good idea." The mother was really given no choice in the matter. One partner acted as advocate for his wife. When the midwife offered an epidural, he stated that his wife did not want an epidural. One midwife gave detailed information about vaginal examinations, amniotomy and Syntocinon and placed great emphasis on the fact that the mother did not have to agree to any of the procedures. It seemed, however, that the mother had little choice as she had been admitted to labour ward to be induced for severe hypertension [case 14]. One mother's case notes were documented as 'fetal scalp electrode applied at maternal request' when no such request was evident on review of the audio-video recording [case18].

### **7.5.4 Relationship breakdown**

Caring for a mother who screams and cries can be an emotionally draining experience for clinicians. It is sometimes difficult to judge if a mother is 'distressed' or if their behaviour is just their way of coping with labour. Offers of epidurals, when mothers have specifically stated they do not want one, can undermine their confidence and commitment to a normal birth, as it implies that the midwife believes she is not 'coping' with labour. On the other hand, compliance with requests for epidural, particularly in advanced labour, may undermine the longer-term wishes of mothers and they may later experience regret (Christensen-Szalanski 1984).

A difficult situation occurred in case 5, but the actions of the carer contributed to the problem. The mother had a previous unpleasant birth experience, but seemed to be 'coping' this time with just the gas and air. Progress of labour seemed normal and the mother began to feel the urge to push. The midwife encouraged the mother to push. An hour later there was no 'progress' and the mother was by this stage begging for Pethidine, an epidural, a Ventouse delivery and to see a doctor. The midwife told the mother that she was "spoiling everything" and another midwife was going to come and take over. The

second midwife performed a vaginal examination. The mother was informed there was still some cervix round the baby's head and the midwife "pushed it out the way." The mother was persuaded to push for a bit longer. After a further 30 minutes of pushing the mother was pleading to be delivered and said on 10 occasions that no one was listening to her. She then insisted on seeing a doctor. The midwife left the parents alone to "get their act together" and the partner said he could not do anything as they [the midwives] had the power. The Senior Registrar was eventually called. He asked the mother how long she had been pushing and she said "ages", which was true. The midwife interjected and told the doctor "she's only been fully for half an hour", which was also true. The Senior Registrar considered that it would be best to undertake a trial of Ventouse delivery in theatre, as some of the baby's head was palpable on abdominal examination.

The researcher found this recording unsettling to watch. A pleasant and jovial setting gradually deteriorated to an unpleasant, conflicted and argumentative scene. Under those conditions, it was hard to imagine any form of emotional satisfaction for the participants. The person who bore the brunt of this breakdown in relationship was the partner. After observation of this recording the researcher did wonder if the marriage would survive this experience. Clearly, the psychosocial frame should include both parents.

## **7.6 The role of the midwife**

This study has characterised the core actions of midwives in the delivery room. Absence from the delivery room and record keeping accounted for 46% of midwives time. A work sample of nurses' activities in a Canadian hospital, over a three-week period, found 48% of the time was spent out of the delivery room, with 21% of that time spent attending to documentation. Most nurses were providing care to two mothers (McNiven, Hodnett & O'Brien-Pallas 1992). The present work has found similar results with midwives providing one-to-one care. Although record keeping was mainly undertaken in the room, it was a time when most midwives were interactionally unavailable to provide supportive care.

The birth of a baby should be a time to be savoured and enjoyed. It is vitally important that mothers have confidence in themselves and feel good about themselves. The present work raises questions of how much psychosocial support midwives can or want to give. A number of studies have found that midwives considered their continuous presence was unnecessary and that midwives felt devalued by the task (Breart et al., 1992; Hodnett &

Osborne 1989). Yet there is a very strong evidence base, which has demonstrated the benefits of the continuous presence of a female companion (Sousa et al., 1980; Klaus et al., 1986; Kennel et al., 1991). Mothers provided with continuous emotional support, that is a doula, were less likely to have medical intervention. Not only were the benefits evident for labour outcomes, Hofmeyr and coworkers (1991) found support in labour was associated with a higher incidence of breast-feeding, mothers experience less anxiety, depression and higher levels of self-esteem at six-weeks post delivery. The mothers also felt more satisfied with their partners and felt their baby was better, more beautiful, cleverer and easier to manage than the 'standard' baby. Surely all mothers should feel this way.

A meta-analysis of the effects of supportive female companionship (doula support) in labour found there was a greater beneficial effect when support was continuous (Scott et al., 1999). However, continuous support was provided by doulas (experienced lay women) and intermittent support by midwives and students. There may, therefore, be qualitative differences in the support provided by trained healthcare workers and doulas. The continuous presence of a midwife (defined as one midwife to one patient, *face-to-face*) was suggested as the 'active ingredient' of the active management of labour policy in the National Maternity Hospital, Dublin (Thornton & Lilford 1994).

The Audit Commission (1997) found around one in four women described themselves as 'being worried' when left alone in labour. The amount of time midwives spend with labouring women is related to satisfaction with care (Klein et al., 1981; Shields 1978) and Oakley (1983) suggested communication played an important role in improved outcome. Mothers have rated midwives talking with them as the most supportive action (Klein et al., 1981). O'Driscoll, Meagher and Boylan (1995) rightly point out that:

"Mere physical presence is not enough. The midwife must appreciate that her primary duty to the mother is to provide the emotional support so badly needed at this critical time and not simply to record vital signs in a detached manner."

O'Driscoll, Meagher and Boylan (1995, p. 93)

In the present study continuous support for some mothers seemed to have been given a low priority.

### **7.6.1 Spurious priorities**

No studies have been undertaken which quantified the amount and frequency of record keeping or the consequences of this on care. The present work has found that the focus on



record keeping impacted on midwife-parent interaction. The views of parents were not sought in the present work however, six parents commented on record keeping which indicated an awareness of the activity. A study of midwives' care in labour in the early 1980's did not report record keeping frequency or identify any issues related to supportive care (Kirkham 1983). However, in a recent small study of mothers' perceptions of their labour experience, 2/16 participants found midwives' recording keeping intrusive and detracted from their care (Anderson 2000). The manifestation of the prevailing medicolegal midwifery model and its consequences is beginning to emerge.

The frequency of record keeping demands may reflect an emergent fear culture and perceived 'defensive' recording to fend off litigation and complaints rather than for clinical requirements. Berg & Bowker (1997) suggested that medical records have become the body of law to provide a log similar to the records kept by every ship to show in case of accident that everything possible was done. A focus on record keeping may also be a way of dealing with the uncertainty and complexity of the labour ward (Davis & Atkinson 1991). It may also reflect midwives' drive towards 'professionalism', which is associated with bureaucracy, hierarchy and social distance (Oakley 1983).

## **7.7 Communication asymmetry**

It was shown that midwives did not have, or did not take, the time to sit at the bedside with mothers. This created a communication asymmetry with parents receiving information that clinicians want to give or think the parents need. This is an important issue. Kirkham (1983) proposed that the following criteria were necessary to enable patients to ask questions:

- The clinician has been present for a few minutes and appears to be likely to stay long enough to answer a question.
- The clinician is sitting near rather than standing over or at a great distance from the patient.
- The clinician is not speaking and is looking at the patient.
- The clinician is not actually causing pain or discomfort.

An additional caveat to add to this list is suggested: the mother is not disempowered by being exposed, contaminated or otherwise humiliated.



The present study found the orientation of midwives away from parents reduced eye contact opportunities. The importance of mutual gaze as the main way of initiating communication had been found in a number of studies. Goodwin (1981) found eye contact sequences were used to achieve interactional boundaries of events and to form engagement and disengagement signals.

A number of studies have found that communication was constrained when patients perceived staff were busy (Kirkham 1983; McIntosh 1988). The combination of frequent departures from the delivery room and record keeping activities made midwives appear very busy. In a survey of 200 mothers' perceptions of their birth experience in Finland, 29% of the respondents said that the midwife seemed to be in a hurry (Tarkka & Paunonen 1996). Observational studies of everyday social interaction (Goffman 1981) and medical consultations (Heath 1986) suggest particular arrangements determine the ways people take part in an activity. Participants organise themselves to display attention to one another to engage in focused interaction. Midwives who organised their activity to centre record keeping at the bedside made themselves more available for focused interaction. However, it is important to add that the midwives who used this style of record keeping were very experienced. They were perhaps more at ease with their practice and their cognitive load would be much less than inexperienced midwives.

There are no published reports on midwife-to-midwife shift handovers within the individual delivery room or participation of mothers in exchange of information at shift handover. However, mothers are very sensitive to comments made by their care providers (Highley & Mercer 1978) and in the present study were oriented to the midwives when shift handovers occurred. Kirkham (1983) found eavesdropping on conversations between clinicians was a strategy used by patients to gain information. This study found that parents were often excluded from exchanges between midwives and doctors within the delivery room. Discussion regarding management of labour often occurred outside the delivery room. Therefore, parents were not always involved in decisions about their care or aware of who was actually making decisions. Surveys of quality of care have found that women often feel excluded from decisions and consequently are less satisfied with their care (Brown & Lumley 1998). This suggests the need to organise actions and interactions that display attention to and support engagement of parents.

## **7.8 The stress of the environment**

Labour ward can be an emotionally intense and stressful environment. A small survey of a convenience sample of 43 labour ward midwives found 30% had stress levels at a threshold indicating psychiatric morbidity (Makin & Sinclair 1998). Another survey of 124 nurses and midwives found shortages of staff, excess paperwork and pressures of time were the three main sources of stress (Wheeler and Riding 1994). Perkins (1997) suggested that distance from patients was a coping strategy, which prevented staff becoming overwhelmed by emotional demands. It does, however, lead to a reduction in the quality of care and is considered a sign of 'burn out'. The core midwives in particular spent little time sitting at the mother's bedside. It may be the case that they become 'battle hardened' as a means of coping with the 'emotional' demands of individual care. Senior ward midwives spent more time at the bedside, however they had more experience than junior midwives and may have been more confident and at ease with their practice. They also had no additional administrative burdens and their attention to mothers may have been due in part to a change in environment.

Some midwives did seem to need to get away from the delivery room, even if it was just for a few minutes. In other high-consequence monitoring systems such as naval command, control and communication centres and air traffic control, a regular, formal relief system ensures high levels of vigilance are maintained (Krueger 1994). This is an important safety feature as it also acts as a means of crosschecking and mutual monitoring. Some midwifery shifts can be nearly 12 hours long and levels of alertness deteriorate over time.

## **7.9 The need for shared models**

Parents faced constraints as they were in an unfamiliar environment, with authority figures. Under such circumstances it can be difficult to ask questions or express concerns. The language used in the delivery room was mainly 'biomedical' talk rather than conversational 'psychosocial' talk. There was little effort on the part of clinicians to assess, reiterate or determine parents understanding of the information provided.

Predicted length of labour was information, which mothers actively sought, yet midwives were reluctant to give. It was found in prototype testing of the decision support system that some mothers used the computerised partogram display to plan their analgesic requirements. Providing information and explanations requires time and effort. Complex

concepts and information need to be translated into a language that parents can understand. In the present study visual communication aids (the partogram, models of cervical dilation) were used infrequently and not all mothers would find this representation helpful. The lack of a shared language and a shared mental model between midwives and parents constrained communication, explanations and instructions.

When there were changes in the CTG, communication was inhibited. In case 10, the midwife was aware of the changes in the heart rate pattern, yet frequently left the parents unattended. Under such conditions, watching and waiting can be a stressful time and doing nothing can sometimes be more difficult than taking action. Clinicians may feel pressured to take action if they are watching events unfold. However, leaving the parents and companions unattended places them in the role of 'monitor' with the assumption that they will call if the situation deteriorates. There was a need for a commentary of the baby's condition. When the midwife was absent mothers asked their partners to describe the CTG. Midwives' commentaries were sometimes lacking when the CTG showed changes. There may be an element of protecting patients from themselves, in case they become anxious or frightened. However, this study has shown that parents were aware of the CTG and were concerned for their baby when changes in the CTG occurred. Statements such as "don't worry" or "when we start to worry you can" do not convey reassurance. Kirkham (1989) also found that midwives and doctors communication with mothers was inhibited when there were concerns about the CTG and that parents wanted and needed information. The present study indicates that both midwives and parents needed information and reassurance.

When changes in the CTG occurred, junior midwives called senior midwives as part of the reporting and referral process, but there was perhaps the need for the presence of a supportive companion. This underscored two perspectives of the delivery room; an external series of 'snapshots' of the individual delivery room and a continuous, evolving, contemporaneous view held by the attendant midwife and parents. Both perspectives may require different kinds of support.

## **7.10 Infection and contamination**

It was perhaps an irony that the most frequent observation related to hygiene. Doctor Ignaz Semmelweis, in the late 1840's, observed a 30% mortality rate in mothers who delivered in

a room staffed by medical students. He noticed that students came from autopsies to the delivery room and thought they were carrying infection with them. Semmelweis insisted that doctors and medical students wash their hands with a chlorinated solution. The mortality rate eventually dropped to 1% but Semmelweis was vilified by his colleagues and eventually resigned. Worldwide, about 600,000 maternal deaths occur each year, with the overwhelming majority of them in developing countries. Sepsis, which is often a consequence of poor hygiene during delivery, accounts for some 15% of maternal deaths. Such infections can be effectively prevented by careful attention to clean delivery (World Health Organisation 1999). Resistance to hand hygiene remains an issue in 'modern' healthcare and some 5,000 patients a year in the UK die from hospital acquired infection. Hand hygiene is considered a quality of care marker. Hospital acquired infections cost the health service nearly £1 billion a year (Department of Health 2000). In the U.S.A. the situation is now of such concern that in some hospitals, patients hold up a cardboard 'lollipop' printed with "now wash your hands" when healthcare workers approach them.

### **7.10.1 Mortification**

It is also important to consider the psychosocial consequences of actions. The way things are done reflect relations of power. It is suggested that the way many actions and procedures were undertaken could be viewed as similar to the process of total institutional mortification typified by role dispossession and contaminative exposure (Goffman 1961). Role dispossession is the process where people are prevented from being who they are because communication is controlled and patients are excluded from knowledge of decisions taken about them. Contaminative exposure occurs in a number of ways. Physical contamination occurs through the besmearing and defiling of the body because the usual environmental arrangements for insulating one's own source of contamination are absent. Contamination from other materials occurs and is amplified when the source of contamination is another person. Contaminative exposure by public humiliation occurs when patients are exposed to others during intimate medical examination or when naked.

The Audit Commission (1997) suggested that vaginal examination were being carried out routinely, rather than being based on the needs of individuals. The present study also found vaginal examinations were frequently performed. A qualitative study conducted in a Mexican labour ward found that mothers' viewed vaginal examinations as both painful and shameful (Campero et al., 1998). Whether the findings were related to the procedure itself,



from a cultural perspective, or the way the procedure was performed is not clear. However, Butani and Hodnett's (1980) study of 50 mothers' perceptions of labour in the USA found that some mothers would have liked more attention to be paid to their modesty. Loss of self-esteem results in feelings of shame and humiliation. This can impact on the mothers' confidence in labour and on parenting skills (Rubin 1968). The consequences may be long term. Anderson (1976) defined support as the promotion of the mother's dignity by providing hygiene and comfort, actions that allow the mother to feel safe, to enable her to control her bodily functions and to help her actively participate in the labour process. There are debates about the 'reality' of the 'asepsis' of vaginal examinations (Hunt & Symonds 1995). However, the way intimate examinations are practically accomplished carries meaning. Emerson (1970) described the draping of women for gynaecological vaginal examinations, to minimise genital exposure, as rituals of respect. In the mothers' own homes postnatal examinations, which required inspection of perianal area, were always carried out in complete privacy and partners were also excluded (Lomax & Casey 1998). In the present study, care in labour seemed to be an exception to rituals of respect.

### **7.11 Fragmentation of care and lack of continuity**

The Audit Commission (1997) recommended that Trusts should aim to minimise the number of different professionals involved in caring for individual women. Mothers often encounter many people on their journey through labour; in the present work 108 members of staff were observed over the course of 20 labours. Most mothers went through at least one shift change. In four cases the Registrar provided continuity over the course of the labour. Clearly, it is important to provide the mother with privacy and to minimise the number of people entering the delivery room. On the other hand it is important for *clinicians* to have current knowledge of the mother's condition if they are to minimise the need to enter the delivery room. However, involvement of the parents in decision about their care may be undermined if discussions between clinicians take place outside the room.

### **7.12 Limitations of the study**

The case mix was biased towards mothers with obstetric risk factors who required electronic fetal monitoring. The mothers' need for information, advice and continuous support may be greater than those of mothers with no perceived risk factors monitored by intermittent auscultation.



The audio-video recordings involved 20 mothers and electronic fetal monitoring was applied in all cases and a high proportion of mothers had epidural analgesia. It may therefore be that, in this labour ward, the care and interactions are typical of 'high risk' patients. The case study would have been strengthened through recruitment of low risk mother's into the study. The problems of recruitment of 'low risk' mothers were due to the difficulties of approaching mothers in established labour to obtain consent.

The 108 clinical staff involved in this study covered a wide spectrum and are therefore likely to represent a range of experience and skills. However, the findings may reflect the practice of clinical staff who were confident enough to allow their care to be recorded. The study number was small but it is argued that the number of midwives and doctors involved increased the relevance of the study. In addition, some members of staff were involved in more than one video case, so recurrent patterns of interaction could be assessed over a single case and across other cases.

All studies have an observer effect. People change their behaviours as a consequence of a study. The observer effect was minimised with the use of an unobtrusive recording system. A notice was placed on the door to inform staff that recording was in progress but due to the frequency of midwives entering and leaving the room this may have served as more of a reminder than intended. However, it is very difficult to keep up an 'act' or change taken for granted, routine behaviour. Some participant comments about the study were captured on tape and so were at least available for reflection and consideration. The use of video recording was less intrusive and more reliable than unaided human observation. It was particularly suitable for this setting with multiple participants and simultaneous events, which could not be adequately documented without a permanent record for review.

Written information given to midwives and parents explained the nature of the study was to investigate the information needs of parents. Comments captured on tape revealed the study was viewed in various ways including: a time and motion study; a study about midwives work; a study of how doctors and midwives communicate. The study may represent the best efforts of midwives and doctors to give information but the comments captured on tape indicate that parent - clinician interaction or the supportive role of the midwife was not seen as a topic of inquiry. Moreover, if communication issues were not related to motivation, then it would be difficult for staff to improve.

The audio-video recordings captured what people actually said and what they did. It also provided a permanent record of the raw data. However, there were some limitations. There were short periods of time when participants were inaudible. The fathers in particular were often orientated away from the camera. Sometimes the volume of the fetal monitor was excessive, or midwives opened paper packages when a conversation was in progress and this rendered talk inaudible. Hutchins (1990) found inaudible sections of recording in his study of cockpit crews, despite the use of individual microphones.

The observation schedule used to classify midwives' activities was considered to be of limited value. While the researcher and independent reviewer (also a midwife) mainly agreed with the broad classifications, there was less agreement with the specific features. This, in part, is due to the overlapping and ongoing actions of clinical care. Both observers reviewed the video segments without pausing the recordings, to mimic real-life use of the observation schedule. In reality it is difficult to simultaneously observe and document events, so there is always a loss of data to some degree. In addition, specific features such as reassuring touch require interpretation. The qualitative analysis in the present work focused on requests or offers of touch, but did not necessarily interpret them as displays of reassurance. In addition, information giving was found to be an inadequate operational definition. It shed no light on the quality of the interaction, and both reviewers noted that sometimes the mother was incidental to the conveyance of information, as it was directed towards another clinician rather than the mother. The observation schedule confirmed the quantitative analysis of patterns of actions and interactions but provided no insight into the practical accomplishment of care. However, the advantage of audio-video observation is that the moments are captured and therefore provides a reproducible database. The issues and limitations of the observation schedule can be explored and contribute to the development of a more robust observation schedule.

Video recording is a data collection method. The data, quantitative or qualitative, still has to be interpreted. The video recordings were so rich that it posed a challenge for analysis. It was also extremely labour intensive and time consuming. Inevitably, decisions had to be made as to what could be included and what could be left to future work. It is difficult to convey the richness of the observations with mere words, which leaves the researcher with a sense of dissatisfaction.

### **7.12.1 The researcher's perspective as a midwife and mother**

As a midwife I thought I knew how I behaved and interacted with parents and colleagues. After the analysis of the videotapes, I was not so sure. How much time did I spend sitting with mothers, how much time did I spend in the room, did I pay attention to the needs of fathers, how good was my communication, did I wash my hands? On review of one video recording I observed a midwife enter the room without knocking on the door, walk over to the fetal monitor and depart the room with a cursory "sorry to interrupt" to the parents. It was quite a shock when I realised that midwife was the researcher. This had quite a deep effect on the researcher and her subsequent behaviour in the delivery room. It is clear that what we think we do and what we actually do is sometimes not the same thing.

On a personal note, as a midwife and a mother, the researcher found it disturbing that mothers with long labours and immobilised with epidural anaesthesia were not offered a bed bath, or at the very least, to have been given the opportunity to wash their hands and face and brush their teeth. One partner washed his wife's face, brushed her hair and cleaned her glasses. The mother remarked how much better this made her feel [case 14]. Mothers who had vomited were not offered a mouthwash or the opportunity to brush their teeth or wash their face, although the fact that they had vomited was recorded in the case notes or on the CTG [case 2, 9, 17,]

I did not expect to see mothers exposed, or vaginal examinations undertaken the way they were. In the past the importance of not exposing the mother was emphasised and the bed sheet was folded upward, to create an 'apron' so that exposure was kept to a minimum. The vaginal examination was also considered a sterile procedure. Usually an assistant helped to prepare the examination trolley and folded the bedcover upwards when the operator was ready. The presence of a colleague also acted as a form of peer review as they knew how the procedure should be done. Over the years, the procedure has been downgraded to 'clean' and performed without an assistant. The emphasis on protection of the operator from bodily fluids has de-emphasised the need to protect the mother and newborn from infection.

As a mother I would not have had confidence in a carer who did not wash their hands or respect my dignity. I would not have wanted to be strapped to a monitor unless it was absolutely necessary or made to lie in an uncomfortable bed, which might give me bedsores. Why do mothers need to stay in bed? They can be mobile with monitoring and it

may well be more comfortable and better for them to sit in a well-designed chair. The bed also promotes a passive sick role. I would have had no confidence in a midwife who left me alone or seemed to spend most of her time record keeping rather than paying attention to me, particularly during an epidural procedure or when doctors were giving me information I might not understand.

### **7.13 Summary**

In this study of a complex care system, meaning and significance have emerged in successive layers. This first layer, quantitative analysis provided an objective but superficial account of the balance of actions and interaction. The next layer, qualitative comparison with an 'idealised' model of care, begins to reveal the shortcomings of many of the practices. The concept of analytical frames, in this case medicolegal, technocentric and psychosocial, begins to attribute the possible causes of competing goals which seem to characterise the actions and interactions of clinicians. Finally the identification of emergent issues, such as communication asymmetry and lack of shared mental models, from tacit behaviours of participants begins to point the way to possible solution for the inadequacies of current practice. This theme in particular is developed in the following chapter.

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## Chapter 8

### Implications for re-design of the care system

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*This chapter reflects on the investigations undertaken to consider their implications for the design of the decision support system for patient monitoring in labour. The analysis suggests a re-specification of the decision support system to provide a range of function to augment relationships between clinicians and between clinicians and parents. There is a need for changes to the current care system so that it is aligned with its core purpose. A number of technical and non-technical solutions are proposed to augment patient-centred care. The chapter concludes with a discussion of the utility of a broader framework of analysis.*

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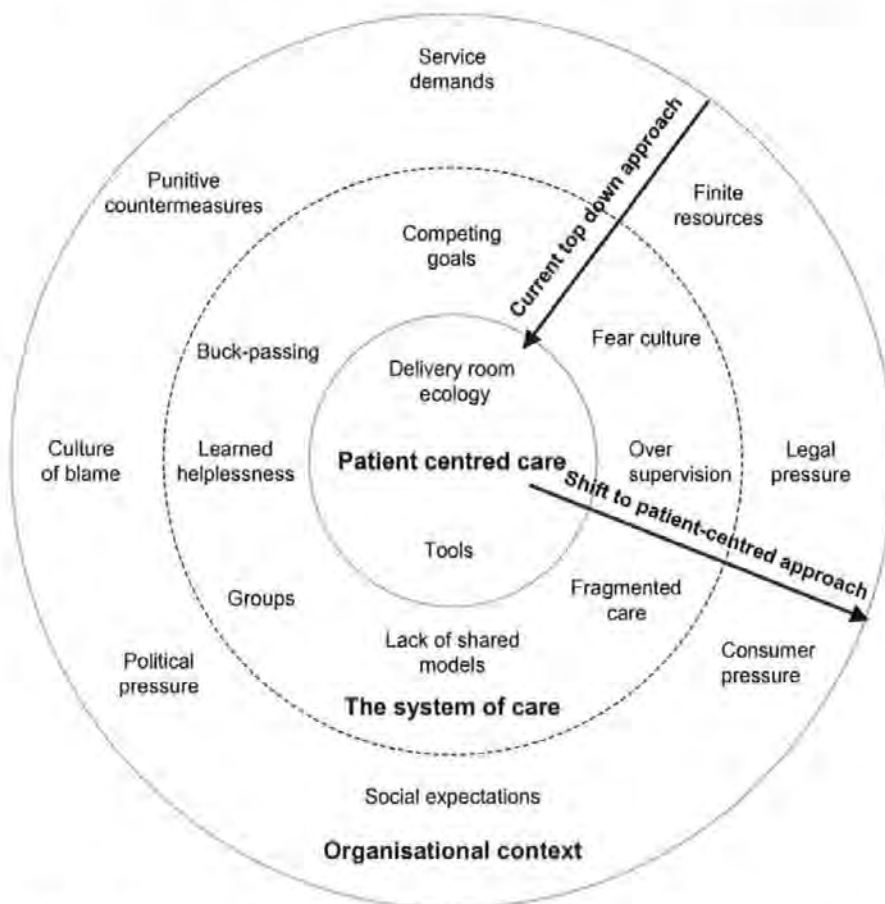
## **8.1 Introduction**

The birth of a baby is a momentous occasion and a time to cherish. It can also be a time of uncertainty, anxiety and stress for parents. The simple offer of a hand to hold, a motherly hug, or a kind word, can bring great comfort and a sense of security at such times. These acts of caring and the reassuring presence of a personal carer cannot be achieved with tools or technology. People need people. Drives to improve 'efficiency' and cost-effectiveness have often undermined the small, but very important aspects of care. O'Driscoll, Meagher and Boylan (1995) remind clinicians that it is a privilege to be with mothers at such a special time. However, clinicians need to be valued and supported if they are to provide adequate care. Managers too, may need to be reminded that their role is to enable clinicians to effectively engage in the care of mothers and their family.

This chapter reflects on the investigations undertaken to consider the options for support of the care system and to demonstrate the practical implications for the further development of the decision support system for patient monitoring in labour. In particular, this chapter identifies opportunities for a new conceptualisation of the labour ward, based on making good the deficiencies, tensions and contradictions identified in chapter 6 and 7. It is proposed that this requires a holistic approach from a human-centred standpoint, so that the performance of all the people in the system, clinicians and parents, is augmented and complemented by innovative, supportive technology. The first section presents an overview of the organisational context and some of the current contradictions and tensions. The second section deals with how the system of care might be better supported. The final section takes the ideals of patient-centred care as a framework for discussion and requirements in terms of the provision of support within the individual delivery room.

## 8.2 Conceptualisation of the care system

The labour ward can be viewed as two embedded systems; a collection of 'microenvironments' comprising individual delivery rooms and the 'macroenvironment' of the wider labour ward system of care. The 'microenvironment' is characterised by the situated, moment-by-moment practical accomplishment of direct care of mothers. The macroenvironment is characterised by people in their various roles and the cognitive tools they bring to bear upon the process of care. These two nested systems are in turn embedded within a context of organisational practice and values (figure 8.0).



**Figure 8.0:** Conceptualisation of the care system showing the organisational context and its consequences on the system of care, which undermine the objective of patient-centred care

This diagram illustrates the rich interconnected network of the care system and the contradictions, tensions and competing goals. The outer layer represents the organisational context of the care system. This illustrates a 'top down' approach geared toward process control, much more suited to manufacturing industries than care industries. The second layer represents the collective practice of the system of care, which is the end product of evolutionary and iterative changes arising from different management regimes, practical compromises and accommodations. The inner circle represents the objective of the system,

patient-centred care, which has in many ways been undermined and subverted by extraneous priorities such as cost and medicolegal concerns, which span many years.

### **8.2.1 The organisational context**

Changes in a system can have unanticipated consequences, as cause and effect relationships may not be apparent. It is only recently, galvanised by patient safety issues, that more attention has been directed to systems theory, which has been applied for many years in other safety critical settings (Perrow 1984). Reason (2001) points out that healthcare institutions tend to focus on numerical indices and that hospital managers do not always appreciate their limitations. Subtle interactions can, therefore, remain undetected and contribute to competing goals that lead to contradictions and tensions, which undermine patient care. The following issues are of relevance to the present work:

- Service demands outstrip supply. The NHS lacks sufficient doctors with 1.8 practicing doctors per 1,000 people compared to the European Union average of 3.1 per 1,000 (Woods 2001). In the UK, only 34% of registered midwives are currently in practice with an average decrease of 500 each year (Emerton 2000). Poor working conditions contribute to failure to attract and retain staff.
- The latest figures from the Department of Health (2002) show that less than half the births in the UK were classified as normal, yet normal births reduce costs by an estimated 30% (Rosser 2001). The continuous presence of a supportive female companion has been shown to reduce intervention (Hodnett 2002). In the UK a total of forty percent of mothers do not receive one-to-one midwifery care in labour (Thomas & Paranjothy 2001). Finite resources and financial figures are often used to justify why adjustments to the care system are not feasible.
- “The unaided healthcare professional cannot possess all the knowledge needed to deliver medical care with the efficacy and safety made possible by current scientific knowledge” (Fox 2002).
- The medical negligence bill in the UK has doubled in the past five years to £2.6 billion. Eighty percent of litigation relates to obstetrics and most cases relate to labour ward practice. Cerebral palsy and brain damaged babies account for 26% of claims by number; however they represent the largest financial costs (CNST 2002).
- The application of a systems approach to errors may not be practiced or perceived at a clinical level. Doctors are under considerable pressure and midwives have described their work system as punishment orientated (Edwards, Kornacki & Silversin 2002; Kirkham & Stapleton 2000). This leads to a culture of fear, a sense of ‘learned helplessness’ and low self-esteem.

It might be the case that these issues have started to generate a cycle of suboptimisation of care. What can be done to support doctors, midwives and parents to improve this? The following section considers a number of non-technical and technical interventions based on the work in this thesis.

### **8.3 Support of the macro-level care system: carer-centred view**

The reconceptualisation of the care system in terms of distributed cognition and collective practice widens the potential for support to consider how to augment and enhance relationships so they align more effectively with the objective of the care system.

#### **8.3.1 Communication, teamwork and shared mental models**

Healthcare settings are communication rich environments. However, there has been surprisingly little research on communication behaviours between clinicians. A number of retrospective studies have suggested that communication problems contributed to a large number of errors (Brennan et al., 1991; Wilson et al., 1999). Clinicians' communication behaviour has been investigated in a number of small prospective studies, which found a high level of interruptions and distractions, information overload, and a preference for face-to-face communication (Coiera and Tombs 1998; Coiera et al., 2002). Both studies modelled clinical communication as information processing activities and so provided little insight into the social nature of communication or the effect of hierarchy and authority.

The contribution of psychological and cultural factors to error has been known for many years. It, therefore, comes as no surprise that a recurrent recommendation from error investigations is to improve communication. However, given such a broad recommendation and the lack of research evidence in healthcare settings, it is difficult to develop appropriate interventions. An alternative is to draw on interventions that have been developed in high reliability organisations, such as the aviation and petrochemical industries. High reliability organisations are characterised as complex domains that, on a routine and long-term basis, address and reduce risk (Roberts 1993). High reliability organisations work hard to overcome the inhibiting effects of hierarchy on communication and are also mindful that changes to working practices may have unanticipated consequences. For example, in aviation, take-off and landing are recognised as critical times, therefore extraneous communication is discouraged (sterile cockpit rule). However, imbalances in authority between cockpit and cabin crew, confusion about when to transgress the sterile cockpit rule and its association with disciplinary action have, on



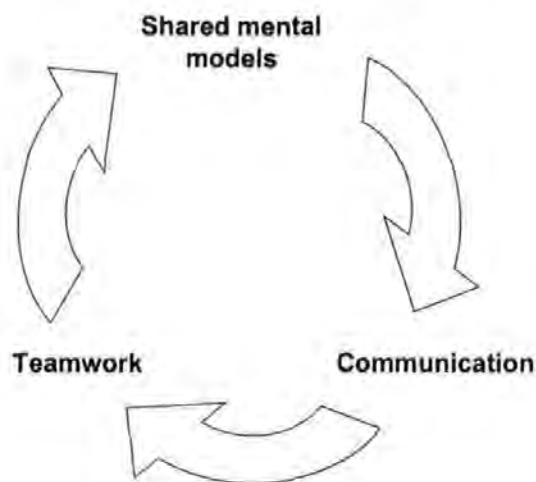
occasions, inhibited the reporting of safety-critical information with disastrous consequences (Chute & Wiener 1996). Such events have occurred despite training programmes such as Crew Resource Management to promote a safety culture and teamwork (Helmreich 2000). Of course, not all personnel are responsive to this type of training and cultural differences have limited its transfer to other countries. Furthermore, team training is only one aspect of organisational safety aimed at the cockpit and cabin crew. It is now recognised that interaction of national, organisational and professional cultures can both induce and reduce the risk of error.

Teamwork training is a predominant feature of high reliability organisations. This aids the development of clear objectives and understanding of the various roles, responsibilities and their interdependent relationships. Team communication is designed to promote shared mental models so that those functions are transparent. Communication patterns are also varied and share features that provide a common framework for assessment, planning and explanation of rationale, situational awareness and discussion. In other words, the team have a shared, current, mental model of the system. If people who receive the same information attain similar representations, then communication could be seen as efficient, producing shared cognition (Zajonc & Adelman 1987).

The present work found information-based handovers, lack of joint handovers between medical and midwifery staff, tensions within and between groups, lack of openness, role ambiguity and unclear lines of accountability. Groups of people who only consider their individual output are not working as a team, as there is lack of focus on collective performance and shared objectives. However, the emphasis of professional bodies and the hierarchical organisational structure on assuming individual responsibility for decision making perpetuates the illusion of the autonomous, independent practitioner, which can be counterproductive to teamwork. In the USA, in response to changes in work practice, Nursing Boards have set out the professional accountability of the team leader. The nursing team leader is held to a higher level of accountability and must assess patients' needs and delegate to an appropriate level (Mahlmeister 1999). In the UK, many hospitals often inadequately define care models and the scope of practice of team members. This is, in some ways, institutionally convenient, as clearer job specification would in many cases lead to official recognition and increased remuneration. Clearly, a focus on the individual or team as the main target for 'remedial' action does not address the interaction and competing goals of organisational and professional cultures.



The growth in medical knowledge and the increased sophistication of modern healthcare makes it difficult to deliver healthcare without technological support. Fox (2000) suggested that technological support will be increasingly required for efficient and safe practice. It is suggested that it will also be increasingly required to support healthcare teams and to promote teamwork. The description of the present labour ward care system in terms of relationships removes the constraints of system design based on 'information processing' models. The notion of tools and their role in the mediation of relationships recasts the functionality of the decision support system. Promotion and support of collaborative practice within and between professionals could be augmented with a well-designed infrastructure, resources and tools to support communication, shared understanding and teamwork. In this way, an upward spiral of understanding is created (figure 8.1).



**Figure 8.1:** Conceptual model of the relationship between shared mental models, which support shared understanding, aids communication and promotes teamwork

Tools can be tangible concrete artefacts, or a language, a sign system or a conceptual framework. Communication and comprehension can be aided by representation and transformation, the concepts from distributed cognition. Artefacts are seen as crucial and people who use them are viewed as cognisant and competent operators. This indicates the need for shared representations and common information spaces. This raises the possibility of developing varied communication structures and processes to augment and sustain shared representation, aid the formation of mental models and support relationships, that is, teamwork. Support of the care team need not stop at the doors of the labour ward. The technology exists to support medical staff who are often remote from the labour ward due to external demands. Personal digital assistants, hospital intranets and remote access can provide clinicians with access to the current labour ward status. If senior doctors cannot be brought closer to the labour ward the 'labour ward' can be brought closer to senior doctors.

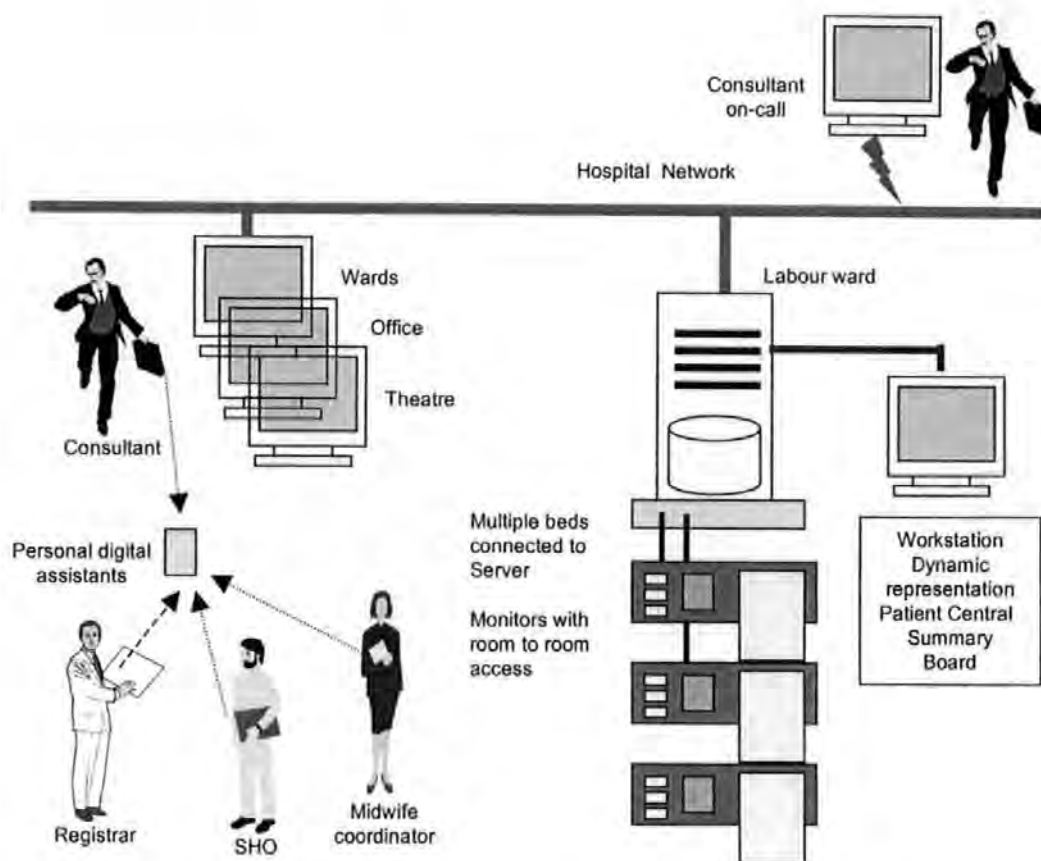
### **8.3.2 Dynamic coordination of the care team**

There is a possible role for the decision support system to provide representations of the current and historical situation in order to help users to assimilate changing circumstances into their mental models. Coordination of the care team could be augmented through a narrative function of the computer system to describe features, events and possible outcomes. Information, such as global announcement of specific events (for example active pushing commenced, imminent delivery) could be conveyed over the system network.

The nature of the care system was such that synchronous communication was a predominant feature (face-to-face and telephone). A preference for face-to-face communication is, in many ways, understandable. Such encounters require acknowledgement, can be less structured than telephone conversations and require less effort than text-based communication. However, the interruptive and ambiguous nature of communication and the associated tensions found in the present study has implications for care. Information could be more effectively managed, prioritised and filtered to reduce interruptions and information overload. Messages with different levels of priority (degree of urgency and acknowledgement of communication) and their purpose (reports and referrals) could support efficient and dynamic coordination of the care team. For example, the decision support system may assist the referral process by providing junior staff with a more systematic interpretation of the labour trajectory and decrease their dependence on the midwife coordinator. It could enable staff to be more confident about calling a senior doctor, particularly during the night or when they are engaged in patient care in other areas of the maternity unit. In addition, the decision support system requires the person who actually makes the decision to be identified using thumbprint recognition. This may help to ensure clear lines of accountability and promote a more supportive hierarchy. This could help to alleviate the burden of the midwife coordinator and free those experienced midwives, who have a preference for caring for 'high' risk mothers, to provide an appropriate level of midwifery and technical skills. Their current 'unofficial' role could be formally recognised and developed with additional training and regulation of their extended role.

The opportunities to support the system of care and people in their various roles are shown in figure 8.2. This shows the development of the system, from its original intent to address the vagaries and inconsistencies of individual CTG interpretation, to a dynamic support

system with fixed and portable shared information displays, and varied communication paths for the coordination of patient centred-care.

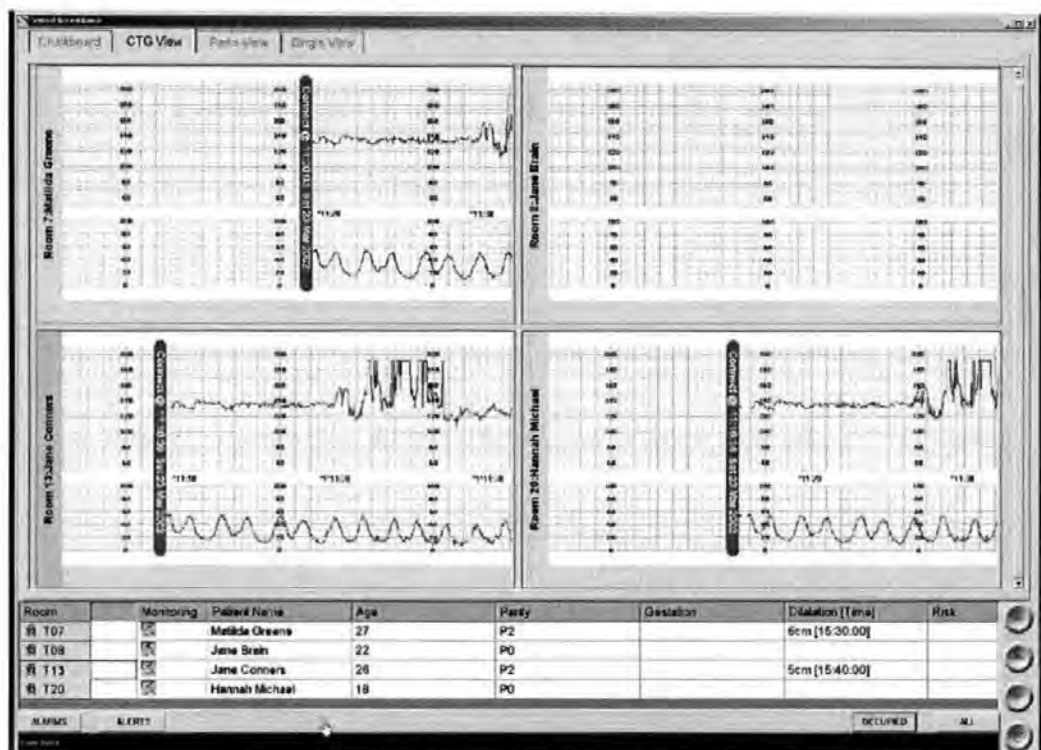


**Figure 8.2:** Opportunities to support the system of care and people in their various roles. This shows dynamic fixed and portable shared information displays, with decision support and varied communication paths for the coordination of care.

The decision support system could also potentially identify when the level of care required needs a higher level of care. At present the primary carer has to first recognise there is a problem before a senior clinician can assess the situation. If the problem is not identified, the situation will only get worse. A central display of the decision support system could directly aid the early detection and correction of problems by providing more objective interpretation of CTGs, and indirectly by support of communication and information management. This could help to resolve some of the current contradictions and tensions, which were observed in the present work. For example, respect for patient privacy increased the need for face-to-face reports. At the same time, clinicians faced tensions between entering the delivery room to gain information and possibly undermining the confidence of the attendant midwife.

The existence of different user groups confirms opportunities to provide explicit support for different types of users, who form a collective care team. The coordination and integration of care could be augmented as shown in figure 8.2 through the application of technology to improve portability, accessibility and availability of information. This could also aid specific role functions, for example supervision and the development of teamwork through support of mutual monitoring.

Overall management of the labour ward could be better informed via a central summary display of progress and requirements in each of the delivery rooms. Figure 8.3 shows an example of a shared display, where information from each individual delivery room, the clinical context and progress in labour can be displayed as a summary or in more detail if required.



**Figure 8.3:** Shared representation of labour ward, which shows the current and historical events for each individual delivery room and a dynamically updated whiteboard to aid the formation of shared mental models and situational awareness.

This can aid the formation of mental models, which provide a rich representation of the system and can facilitate the formation of search patterns to augment information processing and communication. This may reduce the risk of bias, omissions and misinterpretation. It could also improve problem analysis, level of participation in decision making and promote a less authoritarian hierarchy (Pinsonneault & Kramer 1990).



With the addition of decision support output, this display could provide a neutral narrative and a set of reasoned care paths to provide a resource for planning and situational assessment. The representations and shared displays could act as a forum for discussion and open up opportunities to gain insight into the reasoning and practices of different clinicians where they can, if necessary, be contested.

### **8.3.3 Overview of technological support of the macroenvironment**

From these findings it is clear that technology can provide far more than just ‘decision’ support. There are opportunities to provide a range of support, such as:

- Shared information displays.
- Varied communication patterns.
- Functional diagrams and shared models.
- Decision aids.

## **8.4 Support of micro-level practice: patient-centred care**

Patient-centred care is high on the political agenda due to increasing patient dissatisfaction and healthcare failures (Cleary & Edgman-Levitan 1997; Bristol Royal Infirmary Inquiry 2001). Gerteis, Edgman-Levitan and Daley (1993) proposed a network of dimensions to represent patient-centred care: respect for patients’ values, preferences and expressed needs; information, communication and education; coordination and integration of care; emotional support; physical comfort; involvement of family and friends.

Patient-centred care has always been high on most clinicians’ agendas, but some of these ideals can be difficult to achieve. For example, a qualitative study of doctor- patient consultations found 31/35 patients did not divulge worries about diagnosis, treatment side effects and social issues. In 14 cases this led to problem outcomes, such as unwanted treatment (Barry et al., 2000). Clearly, it can be difficult for patients to articulate their needs and for clinicians and patients to develop a shared understanding. Recommendations to improve communication usually include more training, more education and more guidelines. These strategies are usually ineffective because the barriers are often embedded in the wider system. As this work has shown the present system of care undermined patient-centred care. The following section suggests a number of ways that patient-centred



care could be better supported. This is effectively a list of requirements for design. In summary, these include:

- Recognise the importance of psychosocial support and opportunities to augment supportive relationships.
- Support non-intrusive record keeping at the bedside and orientation towards the parents.
- Alleviate the burden of electronic fetal monitoring and its associated anxiety.
- Allocation of and referral of mothers to appropriate level of carer.
- Facilitate and sustain shared mental models and unambiguous communication amongst carer, parents and their companions.
- Promote institutional respect for parents and companions.

#### **8.4.1 Delivery room ecology**

Norman's (1988) concept of affordance, where design creates an intuitive form of behaviour, was evident in the delivery room. The present study has shown that the design of the room distanced midwives from mothers and encouraged orientation away from the parents. The seating arrangements distanced partners from the mother. The only place for the mother was in bed, which encouraged the adoption of a sick role. It is disabling, in many ways, to be in a nightdress, on your back, and below the eye level of everyone else in the room.

The ecology of the room could be re-designed. The provision of appropriately designed chairs creates the opportunity to avoid the disempowering effect of being 'bedridden' and a more comfortable setting may encourage midwives to spend more time with mothers. It could also increase the confidence of mothers to encourage midwives to remain with them or to invite them into their personal space. A bed may only be required in the later stage of labour, or for epidural administration. In addition, mothers can be given a dominant position when they are in bed if clinicians sit at a slightly lower level.

Studies of computer systems often highlight concerns about the impact of technology on clinician-patient interaction and omission of important non-verbal cues (Greatbatch et al., 1995; Ridsdale & Hudd 1997). The present work has shown that this also occurs during midwives' interactions with paper-based records. This suggests respecification of the decision support system to provide methods to support efficient and less intrusive record keeping. The alleviation of this unhelpful burden could free midwives to engage in more meaningful supportive interactions. In addition, the care system needs to reconsider

whether there is a real need for the current high level of record keeping. Pilot tests of the prototype decision support system found that midwives preferred the touch screen data entry and reported sharing the screen with mothers. This was also observed on one of the video-recordings. Mothers were also reported to have used the partogram display to help them consider their options for pain relief. Emery and coworkers (1999) found that sharing a computer screen promoted a sense of joint effort and shared understanding. This could help to create a setting where midwives would have time to sit down and talk with mothers. Mothers may then be more able to express their values, preferences and needs.

#### **8.4.1.1 Creating a caring setting**

The NHS has been keen to embrace the aviation 'safety model' to investigate adverse events and improve safety. However, the NHS should perhaps also begin to emulate passenger care, which is also given high priority. Cabin crews are highly trained in how to support anxious passengers and how to make a flight comfortable and enjoyable. Over the course of the journey, information on flight progress is provided in a variety of formats, which passengers can also access at any time. In-flight entertainment is provided and there are regular intervals where the cabin environment and crew activity are arranged so passengers may rest or sleep. Comfort measures such as warm fragranced towel are offered on a regular basis. Why not in labour? Very often it is the simple things that matter, as they provide evidence of personal attention and caring.

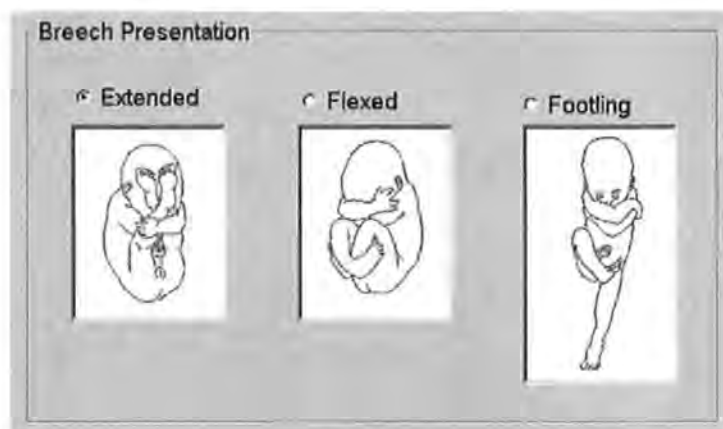
The present work found there were no information facilities, which parents could access, independent of the labour ward staff. No entertainment facilities were provided for parents. This could provide a distraction for parents and help promote relaxation and a sense of normality when labour was prolonged. Mothers' sleep was disturbed due to spurious care priorities and no midwife gave mothers, or fathers, the opportunity to 'freshen up' or brush their teeth. Labour and birth is a critical journey that parents face with much anxiety and there is more that could be done to make it a more relaxing and pleasurable experience.

#### **8.4.2 Change of power relationships**

Patients may find it difficult to identify or express their needs, particularly in a stressful situation with authority figures. This can lead to compliance and dependence. Unmediated offers of information, such as asking parents if they have any questions, assumes that they can easily formulate and articulate an appropriate response. Proctor (1998) found that mothers often did not know what to ask. A more engaging means of support, consisting of

a real-time narrative of progress and predicted outcome could result in a less compliant, more participative atmosphere. An interactive display of a range of ‘what if’ scenarios and opportunities to explore care paths, may provide a more effective means to enable parents to exercise choice. This could also serve as a ‘non-confrontational’ means of questioning decisions, in a similar way to aviation, where divergence of opinion on more than two occasions is automatically challenged. This is a particularly important issue, as a recent randomised controlled trial of ‘informed choice’ leaflets of labour care, given to mothers before birth, found that the material was not always accessed by mothers (O’Cathain et al., 2002). In addition, institutional structures, such as pressures on time and medicolegal concerns, undermined the use of the leaflets and created a context for compliance with institutional arrangements for labour care (Stapleton, Kirkham & Thomas, 2002).

The data entered into the decision support system can be transformed (for example models, functional diagrams) to aid comprehension. Mothers may then be more able to express their wishes. However, as with information leaflets, computer technology can be misused if they replace rather than support and augment meaningful dialogue with carers. A more open means of recording and displaying information could contribute towards the development of shared understanding. This suggests respecification of the decision support system to provide a narrative function, for example, portraying the progress of labour with visual aids and multimedia animations to support communication and shared understanding. Explanation of the presentation of the baby, such as breech presentation could be augmented using the visual aid shown in figure 8.4. Staff can sometimes find the different types of breech presentations confusing and this type of visual presentation may also aid their understanding.



**Figure 8.4:** Example of a visual aid to support communication and shared understanding

The provision of shared models and representations may lead to a sense of joint effort and shared understanding. The presence of a decision support system in the delivery room could help parents to be in control, ask questions and be involved in decisions about their care. This may represent a shift in power, as parents would have access to more information and may be more questioning of clinicians' actions.

#### **8.4.2.1 Responsiveness to parents**

Parents need supportive tools to foster an equitable partnership with clinicians. However, concerns about sharing 'sensitive' information were found in a study of 'simulated' patients and 15 General Practitioners (GPs). When 'high-risk' messages appeared on a computer screen shared with 'simulated' patients, the GPs experienced feelings of loss of control (Emery et al., 1999). Some clinicians have voiced concerns that information from the decision support system will be available to parents. In the delivery room, parents currently receive 'sensitive' information from the fetal monitor, which they are often left to interpret for themselves. This indicates a need for specific support of parents and their companions, particularly when they are unattended. For example, the decision support system detects signal loss, which can be conveyed to parents. The output from the system may help parents and companions to decide when to seek aid; a task they sometimes have to perform unaided. The output from the system may help clinicians to explain changes to the baby's heart rate patterns in meaningful ways, rather than telling parents not to worry or saying nothing.

#### **8.4.2.2 Pre-labour decision aid training**

Once parents enter the delivery room, their main source of information is healthcare professionals. Parents face difficulty with recall, presentation of biased information, and a stressful environment. A systematic review of decision aid protocols found improvement in patients' knowledge of options and outcomes and less decision conflicts (O'Conner et al., 1999). Decision aids increased relative and absolute active participation in decision making, particularly when coaching was involved. This indicates the need for pre-labour training material. Passive means of informing choice in childbirth, such as information leaflets, have been shown to be ineffective and not all parents find written material accessible or meaningful. A more active medium for learning, for example, interactive drama (Jagodzinski, Turley & Rogers 1999), can provide a more engaging means of exploring choices for childbirth. Digital television and increasing public access to



computer technology may be suitable vehicles for the delivery of this type of interactive childbirth information and training material.

### **8.4.3 Coordination of individual care**

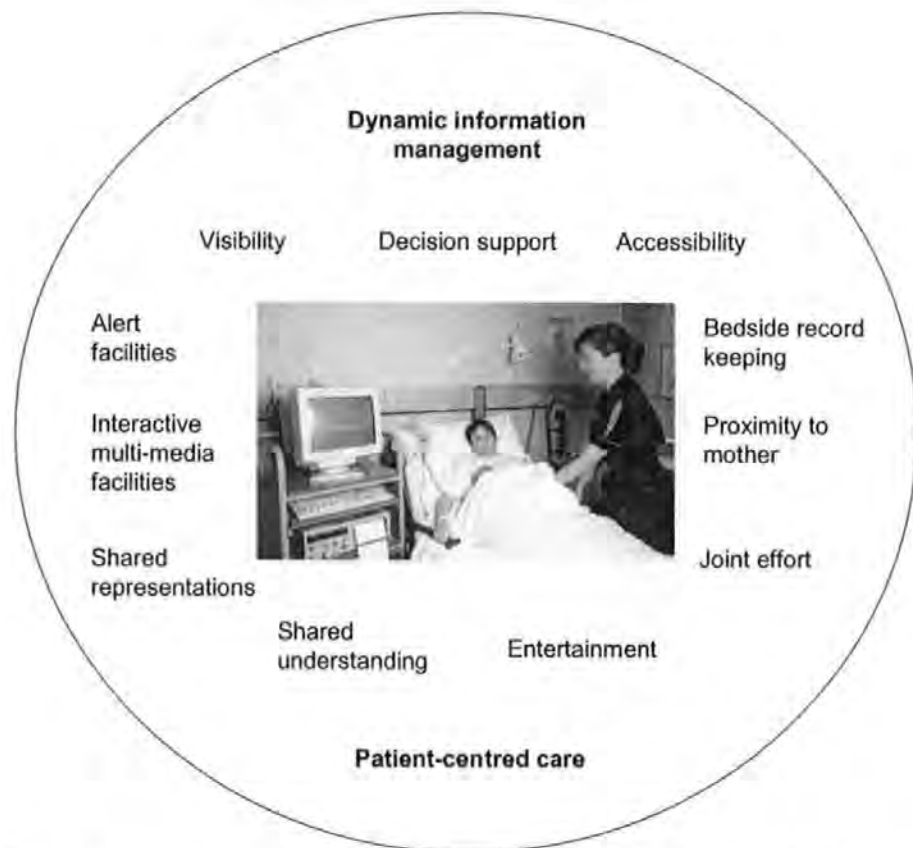
The present work found inexperienced midwives were allocated 'high risk' mothers so they could gain experience. Other researchers have also observed this (Kirkham 1983; Hunt & Symonds 1995). Unfamiliarity with a task or situation increases risk of error and the more complex the care package, the greater the cognitive load (Reason 1990). Time to consolidate and develop skills in normal births is often given low priority. Support of the 'ideal' model of birth would provide more opportunity for inexperienced midwives to consolidate their skills and gain confidence.

A number of the labour wards visited over the course of this work and subsequently, had a separate 'low risk' delivery unit. Other units were planning to implement such facilities in order to attract and retain staff. The decision support system could promote monitoring of the baby by intermittent auscultation for low risk mothers. Analysis of progress of labour could reduce unnecessary interventions such as amniotomy, vaginal examinations and the injudicious use of Syntocinon.

It is, of course, not always possible to match level of carer with complexity of care, particularly with changing circumstances over the course of labour. The decision support system would therefore aid inexperienced midwives, alert the midwife coordinator when the complexity of the case exceeded the experience of the carer and advise the appropriate level of referral. There is also a need to provide specific support for the attendant midwife when providing care for more than one mother. For example, the ability of a networked computer system in a delivery room to display summary information or alerts related to other mothers in the midwife's care. It may also be the case that support of teamwork would aid junior midwives to be more questioning of their allocation to mothers with complex care needs and for the learning needs of SHOs to be more appropriately addressed.

In gaining an understanding of the practical accomplishment of care in the delivery room, the design of supportive technology can be better informed. A radical alternative, using dynamic information management, which is geared towards the needs of parents, doctors and midwives is suggested and illustrated on figure 8.5.





**Figure 8.5:** Support of patient-centred care showing a range of facilities and functions which computer-based technology could provide

Taking this approach means that consideration can be given to the development of a broader range of tools, which support patient-centred care. For example making information visible and available can promote sharing and a sense of joint effort. Providing multimedia explanation facilities can aid communication and access for parents could promote self-reliance and control.

Continuous mapping and representation of the labour might also provide a detailed record of events and alleviate some of the unhelpful record keeping demands for the attendant midwives. The current paper-based intrapartum recording system comprised a number of representations and sources (text based labour summary, graphical partogram, CTG). Much of the information was duplicated and there was an increased risk of omission. Midwives can be reprimanded for 'poor' record keeping, yet the current system made errors and omissions almost inevitable. In addition, the volume of unstructured text decreased the visibility of important information.

#### **8.4.4 Overview of technological support of the microenvironment**

Patient-centred care could be supported and augmented with the provision of the following technical support:

- Bedside data entry and unobtrusive recording of information (touch screens).
- Narrative functions and shared representations.
- Multimedia explanation facilities.
- Interactive 'what if' scenarios.
- Alert facilities.
- Pre-labour training aids.
- Entertainment facilities.

#### **8.4.5 The precautionary principle**

Any change to a system can have anticipated and unanticipated consequences. The design and deployment of computer technology requires careful evaluation, particularly in a complex safety-critical system such as labour ward. Will clinicians use the decision support system? Will they use it as intended? What new and different kinds of benefits and risks will the introduction of the computer system bring?

The introduction of technology alone will not resolve staff shortages or improve working conditions. There is of course a risk that the use of technology would make it easier for midwives to care for more than one mother and that managers will see this as a means of delivering care with the minimum of resources. Clinicians could find themselves working in an even more tightly coupled system with multi-tasking as an acceptable practice.

Individuals may also misuse the computer system and spend less time with mothers. Spurious care priorities, observed with the current paper-based record keeping, could occur if excessive data entry demands are associated with the use of the decision support system. Clearly, this would undermine the objective of the computer system.

A more comprehensive and systematic analysis of information could help inexperienced midwives to plan and coordinate their care and promote confidence, self-reliance and problem solving skills. However, inexperienced midwives may also need the 'reassuring presence' of the midwife coordinator when there are changes to the CTG. Providing a systematic analysis of the CTG could better support the learning needs of the SHO. However, there may be fewer opportunities for the SHOs to review CTGs if they are no longer required to 'rubber stamp' decisions. The decision support system will require the

actual decision maker to accept or reject the system's recommendations using finger print recognition. The audit trail of who actually made a decision can either make accountability more explicit, or bring underlying tensions to the surface where they may be more readily articulated and resolved through changes to working practices.

The introduction of the fully developed decision support system for patient monitoring will clearly require a wider range of large-scale evaluation methods as well as ongoing ethnographic studies.

## **8.5 A broader framework of analysis**

In chapter 3 it was proposed that the care system and implications for computer system design could be better understood if the analysis was in relation to a broader framework. It was also suggested that the usefulness of the framework could be gauged through what was revealed. This section reflects on the use of a broader framework of analysis and what has been learned from its application.

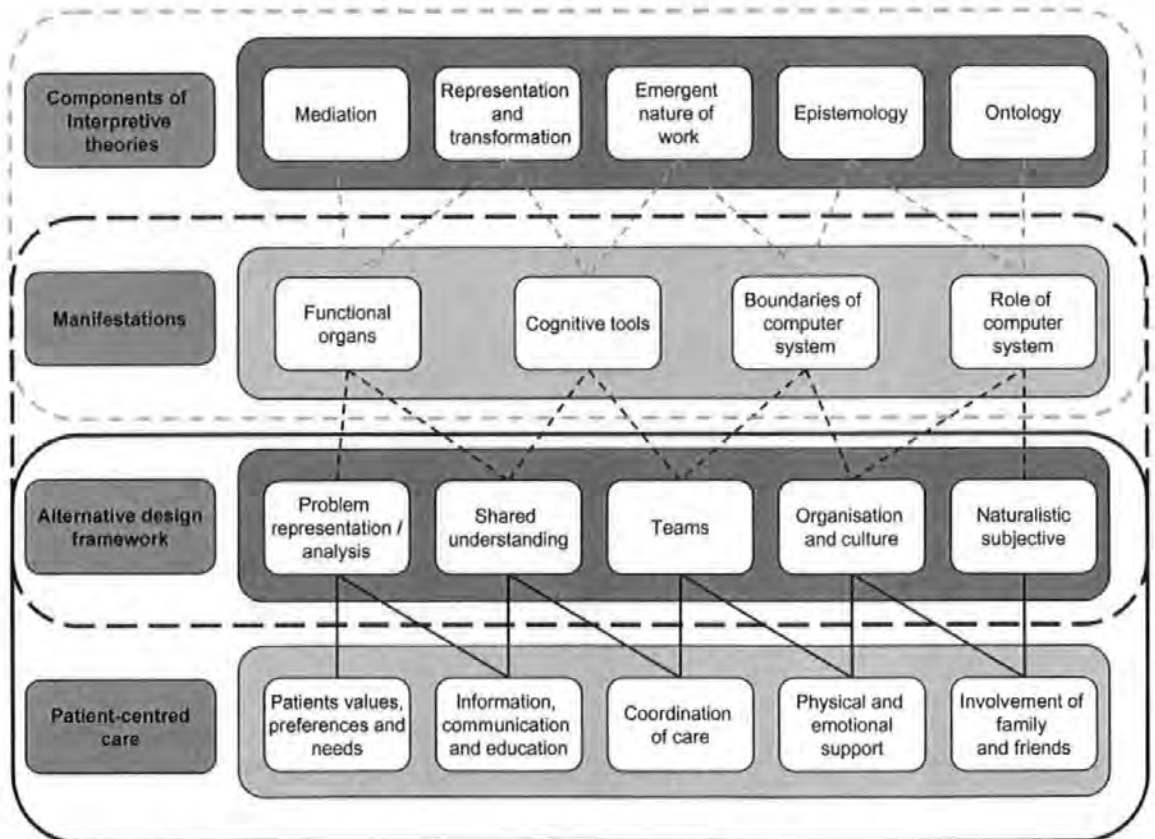
There are two broadly contrasting views within human computer interaction; functional and interpretive. The functionalist view focuses on objective reality to develop rational processes and product. This has been the dominant paradigm for computer system design. Blackler & Brown (1986) found a task-technology centred model was the most common approach for computer system design. This aligns with functionalist views as it focuses mainly on the technology. The model may produce a technically successful system that does not achieve critical objectives due to lack of consideration of organisational change (Symon & Clegg 1991). In many ways, much of the present work suggests that the labour ward system of care is currently aligned with functionalist views and all their consequences.

It has been suggested that *under* the right conditions, the sharing of different perspectives can lead to questioning of previous assumptions and changes in thinking (Monk & Gilbert 1995). The use of a range of interpretive theories and the development of an alternative framework for human-centred design, as suggested in table 8.0, has influenced the design of the decision support system to expand beyond a traditional individual task-technology model to a parent-centred model, which is intended to support the core objective of the care system.

**Table 8.0:** An alternative framework for human-centred design

Functionalist focus	Interpretivist focus
Problem solving	Problem representation
Single intervention	Shared understanding
Didactic advice	Cognitive tools
Single user	Team
Experimental; objective	Naturalistic; subjective
Patient excluded	Patient-centred
Individual expert cognition	Organisation and culture

The adoption of a broader framework of analysis has led to a better understanding of the natural philosophy of the care system and a more informed model on which to develop new and more appropriate technical and organisational solutions. The conceptual diagram, shown in figure 8.6, outlines the main components of the framework, the common threads that run through them, their link to the manifestations of interpretive theories and the subsequent alternative design framework. This, in turn, is mapped on to the goal of the care system. The following section explains the conceptual model and the relationships in more detail.



**Figure 8.6:** Conceptual diagram of the utility of a broader framework of analysis

The principle of **mediation** plays a central role in activity theory. External and internal tools shape the way people act and through internalisation, shape the formation of mental action. The underlying mechanism is the development of 'functional organs', which are the combination of human abilities with the capacities of tools, to perform a new function or to improve an existing one. For example through internalisation people can explore in their mind the consequences of their action without actually having to perform it. This led to the concept of functional tools, which provides a selection of 'what if' scenarios to explore options. This shifted the prevailing design model from computation to representation and from users as passive recipients to active participants. Support of externalisation and internalisation can aid expression and receptiveness to create a participative environment, which supports the development of shared mental models.

**Representation and transformation**, through various media, are the key concepts of distributed cognition. This led to the idea that input and output representations could be transformed into various media and distributed to people in their various roles. This would provide a range of tools (representations which staff and parents could access, transformation to support visibility, accessibility and comprehension) that would support distributed and situated team practice through shared understanding and support a more coordinated system of care.

Ethnomethodology as a framework for understanding the **emergent nature of work** was important in terms of emphasising that attention should be paid to the practical day-to-day work, which is so routine, mundane and unremarkable that it is unnoticed. This drew attention to the most important aspect of care and how it was undermined. This led to a reconceptualisation of the care system and recast the design of the decision support system to free midwives from onerous and repetitive tasks to support roles and relationships, which would promote more meaningful interaction with parents. Ethnomethodology and situated action pointed to underlying issues in relation to the difference between rule-based systems and naturalistic decision making in a situated and distributed cognitive system. Plans are a resource for action rather than determinant of action. Therefore, a reasoned set of options, rather than a didactic single intervention, may help clinicians ensure that all possible options have been considered.



**Epistemology**, that is the nature of knowledge, is of relevance for the boundaries of the computer system. While it can process and transform the data to produce and manage 'knowledge' it does not 'understand' in the same sense as a human being. It is not about the way the decision support system can aid the learning of a clinician; it is about the concept described by Vygotsky (1975) as the zone of proximal development. The theoretical intent is to reveal the mediated nature of human comprehension, which is fundamentally social. This reveals the potential for development of a shared understanding of the collective practice of clinical teams and parents and the emergence of new forms of interaction through the use of the decision support system.

Phenomenology as an **ontological** stance was not adopted as a method of inquiry for the main study, but this does not mean to say that it did not inform thinking or is irrelevant. Technology can change how people see themselves and so inevitably touch on the nature of being. Zuboff (1988) suggested that the responsible introduction of information technology would enrich the work place through the creation of knowledge workers. The previous sections have suggested a range of support tools that would help carers and parents as knowledge workers and could support, augment and sustain a more equitable partnership.

## **8.6 Institutional respect for parents and companions**

The computer system has the potential to help clinicians provide more personal attention. However, computer systems cannot promote institutional respect for parents and companions. Acculturation is part of organisational life. Workers develop values and beliefs that implicitly shape behaviour and these are expressed through rituals, policies and everyday practices. This chapter concludes with a brief discussion of the culture of the labour ward and some personal reflections.

The expectations of society in all aspects of life are higher than they have ever been before. It is hardly surprising that patients expect more and are no longer tolerant of lack of information and uncommunicative staff (Coulter 2002). Humane, dignified and respectful treatment is a basic right, not an added luxury. No amount of technology or skilled technical care will make up for insensitive treatment of parents and their companions.

Institutional respect for mothers is of primary importance but the culture of the labour ward did not reflect this. In many non-industrialised 'primitive' cultures, the violation of a

mother's modesty is considered disrespectful and disempowering. The traditional birth attendants practice according to the cultural values of the indigenous population (Jordan 1993). Much can be learned from the study of other so called 'developing' countries. Public exposure during intimate examinations and its ensuing humiliation can leave mothers feeling violated. Contaminative exposure due to disregard of hygiene, another form of humiliation, disenfranchises mothers. In addition, ensuing infection can contribute to negative views of birth. The mother can feel betrayed by her carers, when rather than providing help and support, they have treated her with insensitivity, lack of respect and exposed her to physical and psychological trauma.

A consequence of 'organisational creep' is that official representations of the system are often inaccurate and care evolves in such a way as to reflect the nature of relationships within the care system. For example, disregard of the mothers' dignity is reflected in way the care is accomplished and the unquestioning acceptance that mothers 'leave their dignity at the doorstep' of the maternity unit. This results from institutional views of the mothers' insignificance in the power structure of the system of care.

Society expects a 'perfect' outcome, and there is a pervasive belief that all deaths or handicaps of babies during birth can be prevented. Each scientific advancement brings a sense of increased public expectation and failure to 'deliver' perpetuates a sense of distrust and blame. It is an irony that an effective intervention, continuous female support in labour, receives little public attention and low institutional priority, perhaps because it is not perceived as sophisticated enough to merit a high profile.

**Conclusions and future work**

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*This chapter presents a summary of the findings and the overall conclusions. The present work developed a programme of research to investigate the labour ward care system, suggested alternative roles for the decision support system, based on a human-centred design framework; demonstrated the value of qualitative methods for the analysis of the care system; examined the implications of the findings for redesign of the care system. A further programme of research is required to follow-up the existing studies. The chapter concludes with a discussion of a number of areas for future research which include the use of non-professional (doula) support of mothers in labour; the role and needs of the birth partner; development of training material and individual performance feedback loops; patient safety research; tools for the evaluation of emergency drills and team training.*

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## **9.1 Introduction**

The aim of this research was to inform the human-centred design of a decision support system for patient monitoring. This work has taken the stance that, rather than assuming the initial problem of CTG interpretation was an individual, skills-based deficit, it was necessary to understand the social and organisational context in which the perceived problem occurred. It was, therefore, necessary to investigate the system of care. This chapter begins with a brief summary of the previous chapters. The overall conclusions are presented and placed in a wider context. The chapter concludes with suggestions for future work.

## **9.2 Summary**

- The design of clinical decision support systems has focused almost exclusively on individual tasks and technology. Consequently, many technically adequate computer systems have encountered lack of acceptance in actual clinical settings, as they imposed constraints on individual and collective practice.
- Ethnographic studies have provided a more comprehensive account of actual work practice and brought to light tacit features which were important for the design of computer systems. The implication for design can be better understood if the investigation of the work system is in relation to a broader theoretical framework.
- The suitability of a case study research approach was assessed in a pilot study of an existing decision support system in routine use (Expert DataCare). The study found that the objectives of the computer system were undermined by the synergy of seemingly individually small factors arising from cascade training, lack of implementation and change models, and lack of ongoing organisational support.

- This pilot study changed the initial research emphasis from a study of individual practice to that of wider collective practice and to the context of the care system. A case study approach proved to be an effective research design for the investigation of the clinical and social context of the labour ward. This was consistent with the aims of human-centred design.
- A case study of the labour ward was undertaken. Data were collected by unobtrusive observation at the workstation, and shadowing individual members of staff and documenting their actions. The observational data formed the basis of a rich picture diagram as a model for the main structures and processes of the labour ward care system. The key features for the coordination of care were the division of labour, communication structures and shared representations.
- Core categories for describing the care system, derived from observations of individuals in their various roles, included patient referrals and reports, accountability, role ambiguity and hierarchy. A complex relationship between communication, decision making and accountability emerged.
- The labour ward hierarchy constrained communication and discussion of mothers' care. Role ambiguity and unclear lines of accountability increased the vulnerability of the care of the mother to error.
- Visits to five other labour wards in England confirmed the main structures and processes identified in the local site were generic in all the labour wards visited. The main difference was that the other sites could not provide one-to-one patient care. Most midwives were expected to care for two or occasionally three mothers.
- Observations of the care of 20 mothers in individual delivery rooms, by audio-video recording, were made. All mothers had 'one-to-one' midwifery care. Midwives were absent from the delivery room for 27% of the first stage of labour and departed from the delivery room on average every 15 minutes for periods of up to 24 minutes.
- Record keeping by the attendant midwives was mainly done away from the bedside and this accounted for 19% of their time. Record keeping occurred on average every 10 minutes and during this, the orientation of midwives was away from the parents and this inhibited interactions.
- The frequency of activities and the arrangement of the room created a context for communication asymmetry, as such a setting inhibits parents asking questions of clinicians when they appear to be busy. Communication between clinicians generally took place away from the bedside. Parents were therefore excluded from the discussion.
- Midwives sat at the bedside for only 15% of the first stage of labour. When midwives did sit at the bedside there was focused interaction and the scene transformed into a participative setting with opportunity for parents and staff to engage in conversation.



- Clinicians' preoccupation with changes in the cardiogram, their lack of verbal communication and their observable body language frequently transmitted anxiety. Parents' concerns for their baby were not addressed. When parents were unattended they 'monitored' their baby on the cardiogram and their observable behaviour indicated anxiety.
- Disregard for the dignity, comfort and self-esteem of mothers' was observed. There was a lack of attention to hygiene and basic care. Psychosocial support and care was overshadowed by medicolegal and technological concerns.
- Birth partners were marginalized by the spatial arrangements of the room, and lack of engagement and support from midwives. Partners were used to supplement rather than complement the midwife's supportive role. Only five mothers were accompanied by a female companion.
- The total number of professionals involved in the care of 20 mothers reflects the problems of fragmentation of care and lack of continuity typical of many maternity units. This underscored the importance of communication to support continuity of care.
- The analysis of the system of care suggested a respecification of the decision support system to augment relationships between clinicians, and between clinicians and parents. Changes to the current care system were suggested so that it is aligned with its core purpose of a safe and emotionally satisfying birth experience for parents and staff.

### 9.3 Conclusions

It was argued that the core decision support system model needed respecification to avoid separating technical from social issues and individuals from their collective practice. In particular, it was suggested that a program of research, to explore the relationships between doctors, midwives and parents, in the context of the actual care setting, was required. The present research developed an approach and demonstrated its value. This comprised:

- A programme of research to investigate the labour ward care system.
- The development of alternative roles for the decision support system.
- A human-centred design framework for decision support systems.
- The demonstration of the value of qualitative methods for the analysis of the care system.
- The examination of the implications of the findings for redesign of the care system.

The present work has informed the development of a model for the care system, the persistent structures and processes, and a more detailed account of actual care in the delivery room. The research has thus attempted to provide a more comprehensive account of the labour ward system of care and has made visible, explained and provided evidence

for taken-for-granted and tacit aspects of practice, which were significant for system design and patient care. The initial assumptions of the design team were that a technically robust decision support system would overcome the problems of CTG interpretation. The present work has shown that the 'perceived problem' is not about individuals, it is about the system of care. The implementation of support is much more complicated and includes the social context of labour ward practice and care. The outcome has been a reconceptualisation of the care system in terms of its social and organisational relationships, objectives and priorities, and the nature of the support provided by technology. A range of technological and organisational forms of support was required to develop, enable and augment integrated patient-centred care. The work has also shown that the existing care system was not in tune with the needs of women or the needs of carers. The findings point to the need for a total overhaul of the care system so it is aligned with its objective - a safe and emotionally satisfying experience for parents and staff. The extent to which that reconceptualisation is successful and effective will be evaluated in the next phase of work.

## **9.4 Contribution to knowledge**

The present work employed and combined naturalistic research methods to describe and articulate the characteristics of the labour ward system of care. It contributes to knowledge in several areas: health technology assessment; human-centred design; methods of investigating care systems for patient safety research.

### **9.4.1 Health technology assessment**

The work has contributed to the development of health technology, methods for health technology assessment and a better understanding of the implications of such processes on outcome. In mapping the 'preclinical' phase of health technology development, areas where the decision support system might be problematic or successful have been identified. The methods used to investigate the care system have also informed the evaluation strategy for a multi-centre study of the decision support system. A combination of qualitative and quantitative methods, which encompass the wider care system and actual patient care, will be used to evaluate the implementation of the computer system. For example, the evaluation will describe if and how technological support is used by clinician and parents, the range of support used, communication between members of the care team and with parents, the impact of the technology on patient-centred care and human

relationships, and changes to the wider system of care. Hence, the present work contributes to methods for the assessment of health technology and to understanding the role and impact of computer technology in the healthcare setting.

### **9.4.2 Human-centred design**

Naturalistic methods for investigating work systems, such as ethnography, are now a recognised part of the toolkit of human-centred designers. However, examples of the direct influence of such methods on the design of technology-based systems are rare. McCarthy (2000) pointed out the problems of moving from descriptions of the context and process of situated practice to actual design. First, from a design perspective, the investigation begins with the assumption that technological support is required. Secondly the multiple perspectives gained from naturalistic investigations and their rich descriptions need to be organised and articulated in a way that facilitates understanding for design. Requirement analysis cannot fully take account of this 'richness' and this more complete understanding may be reduced to a set of components or viewpoints. This work provides examples of radical alternatives to decision support system design arising from the use of naturalistic methods. The simple truth is that a computer system, which is capable of enormous clinical benefit, can fail to achieve its objective due to inattention to the social and organisational context of the care system, inadequate implementation and failure to sustain the ongoing development of computer systems over the longer-term.

### **9.4.3 Vulnerability of the labour ward system of care to error**

Conducting research in a high-consequence clinical work system presented a number of issues, particularly in relation to an emotional life event such as childbirth. The present work has employed methods to investigate the labour ward care system that were non-intrusive and acceptable to both clinicians and parents. The work set out to describe the routine, mundane, day-to-day labour ward activities and not to specifically investigate 'human error'. However, it has become clear that ethnographic research can reveal a range of patient safety issues. For example, interruptive and unclear communication, role ambiguity, traditional hierarchies and unclear lines of accountability increase the vulnerability of patient care to error. This type of issue is unlikely to be uncovered through the current fashion of Root Cause Analysis (Ammerman 1998). In fact, a recent pilot study of 28 NHS trusts received 27,000 incident reports in nine months, but the reliability and utility of the data has been called into question due to problems with the reporting system

(Vass 2002). Only one alert, relating to phials of potassium chloride, was issued from the pilot study, yet the dangers of this have been known for many years. In the present work, some staff were concerned about the identical packaging of intravenous Syntocinon infusion syringes and Marcain epidural infusion syringes. However, their concerns seem to have gone unheeded and it has been described as an accident waiting to happen. Learning from adverse events and proactive management of risk are key components of the 'new' safety culture of the NHS. The evidence suggests that learning remains slow and haphazard (Department of Health 2001). Clinicians and managers know of many latent error-inducing conditions, yet they remain in the system. The question that we should seek to answer is why and what are the barriers to organisational learning?

## **9.5 Future work**

The principal aim of this research was to inform human-centred design of a decision support system for patient monitoring in labour. Whilst that has been achieved the work has uncovered a number of areas worthy of further investigation.

### **9.5.1 The role of decision support systems**

The rich account of the care system, which emerged as a result of naturalistic methods of observation, revealed few if any situations in which a traditional didactic model of computer-based support would have been appropriate or acceptable to clinicians. Instead, what emerged was the need for a new model of decision support orientated towards providing an informed narrative of events and probable outcomes, which would enable clinicians and parents to have a shared understanding of events, possibilities and priorities. Such a system would potentially also provide a neutral vehicle for open discussion of events, free from any imputations of authority or accountability. Appropriate training, based on the representational forms provided by the decision support system, would improve the chances that clinicians would be working under the same assumptions, and have similar expectations regarding their roles (Salas, Cannon-Bowers & Johnston 1997). The role of decision support systems in aiding teamwork is of relevance to other healthcare setting such as adult intensive care, high dependency units and neonatal intensive care units.



### **9.5.2 Education and training for parents**

The use of decision aids has been found to increase the relative and absolute participation in decision making by patients, particularly when training was involved (O'Connor 1999). Computer-based training for expectant parents on the understanding and use of such information would also improve their ability to participate. This approach also seems likely to alleviate the problems of status, authority and responsibility inherent in the system of care. Much of the information parents receive before birth is static and not necessarily unbiased. Traditional parentcraft classes tend to be pedagogic and aligned with the values of the institution. Furthermore, not all parents wish to or can attend such classes, and as mothers' comments on video revealed, there is so much to remember. There is potential to provide more accessible and engaging training material to help parents participate more and, through interactive multimedia, use the decision support system in labour (Jagodzinski, Turley & Rogers 1999). This would allow parents to explore different scenarios and play simulated cases. Parents provided with a model of a reasonable standard of care they should receive, may then feel more empowered to question the care they are actually provided.

### **9.5.3 Quality of the birth environment**

There is a tendency in the health service to focus on measures of input and output as part of 'Total Quality Management' strategies, as if clinical care was an industrial process (Øvretveit 1992). Little attention is given to how actual clinical care is delivered at point of source, or the effect of management pressures on the quality of care. The quality circle can become a vicious circle if directives are implemented without additional resources, support structures or re-design of the current system of care. In uncovering and questioning assumptions about every day practices there are opportunities to redesign the current care system.

Most of the deficiencies in care were not the failings of individuals. They were, ultimately, deficits in the system of care. This conclusion offers a means by which the findings can be presented to the care teams in a way that does not provoke a backlash from participants, who may otherwise view the findings as a personal slight. There is, however, the danger that management may take the view that the findings represent individual failings and react with punitive countermeasures, or may feel that the findings represent their failings.



Mapping the quality of the birth environment is clearly an area worthy of further investigation. An interesting tool, called the MM questionnaire, has been developed to measure the quality of work environments (Andersson et al., 1993). The tool combines both quantitative (physical environmental factors, ergonomics) demographic data, and qualitative data (for example, health symptoms and psychosocial factors of working conditions). This data is represented visually against a validated 'healthy' work system. Changes to improve the quality of the environment are implemented and the MM questionnaire is used to evaluate the effect of interventions. A similar approach could be taken to develop such a tool for the system of labour care. The present work forms the basis for the development of methods and tools to evaluate the quality of the birth environment. A range of items, scoring both the microenvironment and the macroenvironment for example, teamwork, role clarity, fragmentation and interruption of communication, occupational stress, levels of sickness and job satisfaction, and patient satisfaction could provide a more complete picture of the 'health' of the care system. Presenting the findings in this way may be less threatening to individuals and managers.

#### **9.5.4 Doula support**

It has been assumed that in the UK one-to-one midwifery care and continuous psychosocial support are one and the same. This work questions that assumption. Can midwives give the kind of support that an experienced woman provides? Do they have the time? Do they want to? There is often a downplaying of the importance of caring. Technical skills are highly valued and often seen as more important and it may be the case that the introduction of doulas would support both parents and midwifery.

It is unlikely that midwives can continue to do the number of jobs required of them in the current labour ward system. Many midwives in the UK are required to care for two mothers in labour, therefore psychosocial support is unlikely to be of a level that is beneficial. Further work is required to investigate, on a wider scale, the activities of midwives in different work settings and with different care models.

Early trials of doula support were undertaken in labour wards where most women laboured alone (Klaus et al., 1986; Kennel et al., 1991). However, a number of studies have since been undertaken in a variety of settings and all have reported beneficial effects. None of the individual studies had sufficient power to detect changes in significant outcome

measures and the pooled meta-analysis, which forms the evidence base, was a mixture of different cultures, combined intermittent and continuous support and professional and lay carer (Hodnett 2002). No such studies have been undertaken in the UK. The UK faces escalating caesarean section rates and a multi-centre study of doula support would be a worthy and fruitful area of investigation.

### **9.5.5 Role of partners**

There is a dearth of research on the role of partners and their experience. Their involvement in labour care has been based on assumptions and the present work has shown they were often expected to be the sole source of support. The audio-video observation has found the male birth partners, despite being marginalized, were used to supplement midwives' care and revealed aspects of their behaviour and interaction that were of concern. Their experiences and needs have received little attention and would be worthy of further investigation.

### **9.5.6 Ethnographic research and patient safety**

Most patient safety research has been retrospective and based on Root Cause Analysis (Ammerman 1998). There have been few prospective ethnographic investigations of the vulnerability of patient care to errors. The present work employed and combined qualitative research methods to articulate the deep characteristics of the labour ward care system. This work has established methods of investigation, which were successful in revealing hitherto unarticulated deficiencies in the care system. The present work examined actual, practically accomplished, collective work practice and took a more holistic approach following individuals in their roles and recording direct care in the delivery room. In doing so it produced a more comprehensive, in-depth analysis of the labour ward system. The approach is transferable to many other clinical settings.

### **9.5.7 Video as a medium for learning**

Audio-video recording is a powerful data collection tool. It also has potential as a training and learning medium in a number of areas.

#### **9.5.7.1 Training**

Simple but important aspects of care can become 'taken-for-granted' and their significance rendered invisible. This is particularly so with aspects of care on the 'softer' end of the

spectrum. Most care in labour is undertaken in private, therefore it does raise questions of how midwives develop from novice to expert. The traditional apprenticeship style of midwifery training has given way to a more academic foundation. It could well be the case that some aspects of caring, traditionally handed down through observation of experienced colleagues, are not being transferred to successive generations of midwives. The observations from this work could be reproduced as patient-actor scenarios and form the basis of a training package. A number of educationalists and practice development midwives have recognised the potential and requested a teaching package based on the observation data.

#### **9.5.7.2 Individual assessment and feedback.**

Most accreditation currently requires clinicians to provide evidence of continuing education. There are now moves towards providing evidence that reflects actual practice. While video recording cannot capture all aspects of performance, for example it is difficult to verify physical findings, it can capture the practices of clinicians. The transcriptions and analysis of audio-video material in the present study was time consuming and labour intensive, and would be impractical for large-scale investigations. This work forms the basis for the development of methods for direct assessment and evaluation of interventions to improve individual performance. The challenge is the development of structured assessment techniques for wider application.

#### **9.5.7.3 Evaluation of emergency drills and teamwork**

Emergency labour ward drills are a requirement of the Clinical Negligence Scheme for Trusts (2002). These scenarios provide a safe setting where staff can practice the management of emergencies and allows for all members to know and understand their specific roles and responsibilities. However, assessment of individual and team performance is recognised to be difficult in all settings. Video recording of labour ward drills could provide a reproducible database for the development of a structured method and tools for the evaluation of technical skills, behaviour and teamwork in simulated and actual clinical practice. The recording of actual clinical performance has generated interest from other researchers working in the field of patient safety research. A collaborative network for future investigations has been established with the NASA Systems Safety Research Branch (Doctor Irving Statler) and the Palo Alto Simulation Centre, Stanford University (Professor David Gaba). This collaboration will aid the development and

validation of tools for the analysis of technical skills and teamwork in simulated settings and in clinical practice.

## **9.6 Concluding remarks**

The labour ward should be a pleasant and enjoyable place to work. After all, normally everything is normal. Even for mothers with pregnancy complications, most will achieve a normal outcome. There is a risk that an unhealthy focus on 'human error' with all its negative connotations will discourage people from taking up a career in obstetrics and midwifery and also result in the loss of experienced clinicians who become dissatisfied and disheartened with the present care system. Anne Oakley (1992) pointed out that large institutions often undermine their own objectives. James Reason (2001) too, highlighted that organisations often end up pursuing the wrong kind of excellence. Changing the system of care is more than just introducing technical support. A better understanding of the actual system of care provides a rich resource to inform the development of technical and non-technical interventions and a source of baseline data to monitor changes in the system of care and direct patient care. In this way the creeping divergence of care systems from their real goals, such as those identified in the present work, could be detected and corrected earlier. The present work has revealed that a combination of supportive technology and changes to working practice has tremendous potential to improve the system of care and the basic personal attention that mothers currently receive.



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## **1. A simplistic description of childbirth and the intervention cascade**

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Childbirth is a short but very critical moment for the baby, the mother, her partner and their family. The rewards of a safe and emotionally satisfying experience extend well beyond the family. Society too benefits from this good start in life, as bonds are established and relationships cemented. A marred childbirth experience can affect bonding between parents and baby, impair physical and psychological wellbeing, and have adverse effects on relationships. The consequences can last a lifetime and affect not only the family but society as well.

The majority of women in the United Kingdom (UK) give birth in hospital and so the mother, her partner and / or her companions may enter a strange and unfamiliar environment. Parents may approach childbirth with a sense of anticipation and / or trepidation. It is therefore important that the parents have a care provider they can feel confident in and trust.

### **The 'ideal' model of birth**

The onset of labour is heralded by regular contractions of the mother's womb (the uterus) and progressive thinning and opening of the neck of the womb (the cervix). This process spans several hours. The course of labour can be relatively short but painful or occasionally it can be protracted and require life-saving intervention. The 'ideal' birth of a mature baby begins spontaneously, with regular contractions that progressively increase in frequency and strength, so the mother can acclimatise and cope better. The mother is accompanied by her partner and / or companions and they are welcomed into a pleasant, friendly labour ward environment. The continuous presence of a female companion is particularly important, as there is strong evidence of a beneficial effect, with reduced intervention and improved outcome for both mother and baby (Sousa et al 1980; Klaus et al 1986; Kennel et al., 1991; Scott et al., 1999). The mother should have the personal attention of a trained midwife, who is skilled, kind and respectful as these are qualities mothers value (Ness 1998).

The labour ward should be scrupulously clean, with due attention given to hygiene, as the mother and baby are vulnerable to infection. Vaginal examinations, to determine labour onset and progress, should be undertaken as an aseptic procedure and kept to the minimum necessary, as the process can introduce infection. Due regard should also be paid to the mother's comfort and dignity. A description of the 'ideal' vaginal examination is provided in appendix 2, page 272.

The bag of fluid (liquor) that surrounds the baby (within the membranes) remains intact, as this acts as a shock absorber to cushion and protect the baby from the squashing of contractions and from other mechanical pressure of labour. It also cocoons the baby from infection.

The mother is encouraged to remain mobile and active, and to deal positively with the pain of labour using non-pharmacological techniques such as distraction, focusing or breathing awareness. The mother is encouraged to assume any position, but not flat on her back as the heavy, baby filled womb falls backwards and squashes the large blood vessels that return blood to the mother's heart. The fall in blood pressure can cause the mother to feel faint (supine hypotension) and affect the blood supply to the placenta. The baby's heart rate pattern may then show changes. The situation can be corrected by moving the mother onto her side, but clearly, it is best avoided. This is particularly so during vaginal examinations and a wedge, placed under the mother's back during the procedure, tilts the womb to prevent supine hypotension.

Throughout labour the mother is cared for and supported by her midwife and companions. The contractions increase in frequency and intensity so it is important to check the baby's heart rate every 15 minutes, to ensure s/he is coping with the stress of labour. As labour progresses, the mother may begin to feel a slight urge to bear down. When the neck of the womb is fully open (10 centimetres dilated) the baby begins its descent down the birth canal. The mother feels tremendous pressure and the urge to bear down becomes more intense. A first time mother can take one or two hours to deliver the baby.



The mother may begin to grunt and vocalise. These primal sounds often herald the expulsive phase of labour, where the urge to bear down with contractions becomes overwhelming and irresistible. The top of the baby's head may just be visible at this stage. This is a time of great stress for both mother and baby. The baby's heart rate is monitored at five minutes intervals. The top of the baby's head appears and recedes with each contraction as the soft tissue of the birth canal is stretched. Eventually, the top of the baby's head no longer recedes between contractions and the head is crowned. Delivery is not far off. The vaginal opening begins to distend and slowly stretch until the baby's head is born. With the next contraction, the baby is born and lifted into the arms of his/her waiting mother and father. The baby begins to cry and changes colour from a rather alarming blue to a warm healthy pink. The parents embrace each other and welcome their new baby.

### **The intervention cascade**

It is sometime true that "Striving to better, *oft we mar* what's well" (William Shakespeare 1564-1616). This is particularly so in childbirth and intervention should not be undertaken lightly; the benefits must outweigh the risks. A seemingly benign intervention can lead to a host of additional interventions and perhaps a simplified model of the intervention cascade is best illustrated with pain relief options, which mothers can choose when they are in labour.

'Gas and air' or Entonox is an informal term for a gaseous mixture of 50% nitrous oxide and 50% oxygen, which is administered through a mechanical system called Entonox to relieve pain. The mother must breathe the gas and air into her system to build up a sufficient amount, so that when the contraction reaches its peak, enough of the mixture has accumulated to relieve some of the pain. The midwife can help by placing her hand on the mother's abdomen and alerting her to the initial onset of a contraction. The mother can reduce her intake of gas and air as the contraction eases in intensity. The nitrous oxide is quickly expired and so the effect is short-lived. Mothers can experience dizziness and disorientation when using gas and air. A description of the 'ideal' model for Entonox administration is provided in appendix 3, page 273.

Pethidine is a pharmacological form of pain relief, given by intramuscular or intravenous injection. This is a strong narcotic, which can make the mother drowsy and she may lose awareness of her situation or experience feelings of loss of control. The drug also crosses the placental barrier and can also make the baby sleepy. If the baby is born within two hours of the mother receiving Pethidine, the baby can be slow to breathe, and may require an injection of a reversal agent (Naloxone) to counteract the narcotic. A natural response to pain is hyperventilation (breathing rapidly). A consequence of this is a marked reduction in carbon dioxide levels. Carbon dioxide is a stronger stimulant to breathe than oxygen and the mother's respiratory rate can slow or cease when carbon dioxide levels fall. In this hypoventilation phase, oxygen levels fall and carbon dioxide levels begin to rise, and eventually the breathing reflex is stimulated. Narcotic agents such as Pethidine amplify this hyper-hypoventilation. This can have a considerable effect on the baby, as falls in the mother's oxygen levels are mirrored in the baby's oxygen levels.

An epidural is a regional anaesthetic, which usually completely relieves pain. A plastic catheter is inserted into the lower back and fed between the linings that cover the spinal column (the epidural space). A local anaesthetic is injected into the space to halt the transmission of pain. However, mobility and bladder sensation are also impaired, and catheterisation is usually necessary. The epidural can cause hypotension, which affects placental perfusion with consequent changes in the baby's heart rate pattern. Epidurals can also cause the uterine contractions to slow down, and it may be necessary to give a synthetic hormone called Syntocinon, which is used to stimulate contraction of the womb. Great care must be taken as too frequent contractions or contractions that are too long, will not give the baby the opportunity to replenish its oxygen supply, which is cut off during contractions.

These risks make it necessary to continuously monitor the baby's heart rate and the maternal contraction pattern, which is plotted on a graph from a fetal monitor. The mother finds herself surrounded by a plethora of medical equipment, strapped to a monitor, anaesthetised and unable to move without assistance. The mother is aware of audible changes in the baby's heart rate and can see the changes plotted on the graph produced by the fetal monitor. This may cause the mother anxiety and her adrenaline levels may increase in response to stress, which can slow down the rate of contractions (Lederman et al., 1978). The response of midwives and doctors to changes in the baby's heart rate pattern may cause the mother additional anxiety, further increasing adrenaline levels. More intervention is required, which increases anxiety and so the cascade of intervention begins to escalate. An abnormal fetal heart rate pattern or protracted labour can lead to an



emergency caesarean section or an assisted vaginal birth with forceps or a suction device called a Ventouse. These interventions carry additional risks and can lead to more intervention.

It would seem that intervention is the cause of all ills in maternity care and it would be best to abandon electronic fetal monitoring. Indeed, some critics might argue that improvements in perinatal outcome can be explained by better nutrition, health and social conditions. However, there is some evidence from a 'natural experiment' to suggest otherwise. In the United States of America (USA) women who are members of the Faith Assembly (a religious sect in Indiana) receive no antenatal care and deliver at home without trained attendants. From 1975 to 1982, a conservative estimate of the perinatal mortality in this group was three times higher than that of the whole state. These findings were unexplained by demographic data as sect members were predominantly white, aged 24 to 35, married, and had at least a high school education (Kaunitz et al., 1984). In addition, the maternal mortality rate was 100 times higher than the whole state population. This is in contrast to women who are members of the Hutterite (a religious sect in the USA) who do receive perinatal care and have similar demographic data as the Faith Assembly. Their perinatal and maternal mortality is comparable with the state population (Converse, Buker & Lee 1973).

Clearly, the 'ideal' model of birth is ideal, and for many women it is more emotionally satisfying and safer. Intervention should only be undertaken when no intervention would pose a greater risk and strategies to minimise the intervention cascade should be fully supported by the system of care. This is not to say that the 'ideal' model of birth will suit all parents but rather that it should receive a high profile and should be widely supported and promoted. Care providers have a great responsibility to support the mother in her wishes and choices, so that she is fully informed and can make decisions based on knowledge of the risks and benefits of intervention.

## 2. Ideal model of vaginal examination procedure

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The ideal model of the vaginal examination procedure was derived from two midwifery textbooks, which are required reading for many midwifery education programmes in the UK.

Myles Textbook for Midwives (1999) Bennett V.R. & Brown L.K. (eds), London, Churchill Livingstone. p.p. 401-402.

Mayes' Midwifery (1997) Sweet B. (ed), A Textbook for Midwives. London, Bailliere Tindall. p.p. 378-382.

The midwife should be aware that this intimate and personal procedure can be a cause of embarrassment and discomfort to the woman, who should be reassured as to the privacy of the examination. The midwife should prevent unnecessary interruption from other staff.

The procedure should be carefully explained to the woman and the midwife should give the mother an opportunity to ask questions. The midwife should explain the reasons for and method of examination.

The mother's bladder should be empty to avoid undue discomfort. A vaginal examination during labour is an aseptic procedure. If it is done carelessly there is a risk of introducing organisms into the vagina. The midwife must take precautions to prevent infection and cross-infection. Vaginal examination packs containing sterile swabs and bowls should be available along with sterile disposable gloves.

The woman is made comfortable in a semi-recumbent or lateral position with her legs separated. She can be encouraged to practice relaxation exercises.

The midwife washes her hands thoroughly and puts on her gloves. The vulva is swabbed, first the labia major, then the labia minor, from the top of the vulva down towards the perineum, using the non-dominant hand. Each swab is used once only. The first two fingers of the dominant (clean) hand are dipped in antiseptic cream and gently inserted downwards and backwards into the vagina while the labia are held apart by a thumb and finger of the other hand.

The vaginal examination is completed by cleansing and drying the vulva, applying a vulval pad, changing any soiled linen and making the mother comfortable. After the vaginal examination the midwife should remove her gloves and auscultate the fetal heart. All findings are recorded and the midwife must analyse the findings to establish a total picture on which to make an assessment of the progress of labour and forecast how the labour is likely to advance. The midwife is then in a position to relate to the mother and her partner the findings and together review the original birth plan for any adjustments which the mother and midwife feel are necessary.

### **3. Ideal model of Entonox administration process**

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The ideal model of the administration of Entonox was derived from Myles Textbook for Midwives (1999) Bennett V.R. & Brown L.K. (eds), Churchill Livingstone, London p. 444.

It is very important that the mother be instructed correctly if she is to obtain maximum benefit from inhalation analgesia.

Entonox does not flow continuously from the cylinder but must be obtained by the woman's own inspiratory efforts. She must therefore be instructed to fit the mask firmly over her nose and mouth or close her lips firmly round the mouthpiece and take a steady breath in.

Care must be taken to avoid hyperventilation, if this occurs the woman may complain of dizziness and numbness of the face and hands. She exhales into the mask or mouthpiece, which has an expiratory valve attached.

Analgesia is obtained from Entonox within about 20 seconds and the maximum effect is felt after about 45-60 seconds. The mother is instructed to start using the Entonox as soon as the contraction starts and to continue until the peak of the contraction has passed. The midwife needs to help the mother to recognise when a contraction is starting, as there will be no pain at first.

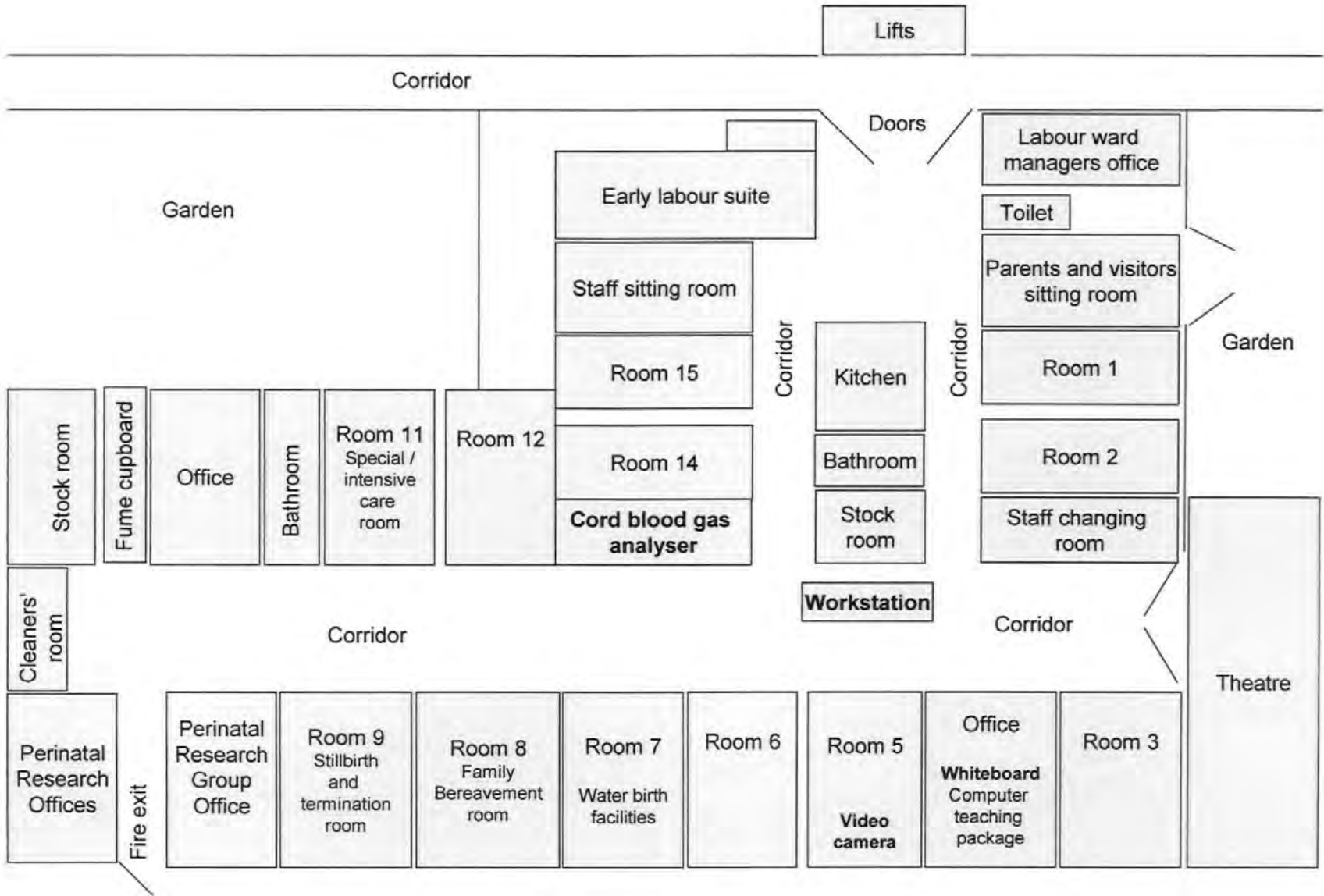
#### 4. Data used to derive figure 4.2

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Operator	Same sample		Implausible result		Single sample		Validated paired sample		Total
	n	(%)	n	(%)	n	%	n	%	
Midwives	49	(13.6)	18	(5.0)	19	(5.3)	274	(76.1)	360
Auxiliary Nurses	84	(6.5)	63	(4.8)	59	(4.5)	1093	(84.2)	1299
Total	133	(8.0)	81	(5.0)	78	(5.0)	1367	(82.0)	1659

**Table A: Comparison of cord sample error rates of auxiliary nurses and midwives in Unit A**

5. Schematic diagram of layout of labour ward





## 6. Documented labour ward observations

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A guide to the documented labour ward observations

Each primary document represents an observation session of a particular member of staff or observation at the labour ward workstation. Observation sessions were transcribed into individual primary documents. Each line of text is referenced by a line number. A selection of two primary documents from each grade of staff observed and observation at the workstation have been included. A copy of the documented labour ward observations can be found on CD-ROM.

All names are pseudonyms. All references to wards have been anonymised. Room numbers have been altered and dates anonymised.

Abbreviations for participants (case study and audio-video study)

AM	Attendant midwife providing direct patient care
MC	Midwife coordinator
CM	A core G grade midwife
Sister	F grade ward midwife on allocation to labour ward
Com. Midwife	A midwife who works predominantly in the community
SM	A ward midwife
SHO	Senior House Officer
REG	Registrar
SG	Staff Grade doctor
SR	Senior Registrar
CON	Consultant
MedSt	Medical Student
StM	Student Midwife
P	Mother's partner
SO	Significant other (support companion other than partner)
AuxN	Auxiliary nurse
Paed	Paediatrician
O	Observer (general practitioner)

Researcher comments and explanations are in square brackets [ ]

A glossary of terminology and abbreviations can be found on pages xiv- xv.

Primary document number 01: shadowing SHO

01 xx/xx/xx Shadowing SHO Anne [Senior House Officer]  
02 **18:00** Met SHO Anne on level X of the hospital, in the doctors room  
03 She told me she had a "34 weeker" to see on [ward]  
04 **18:03** Bleeped to see a mother in [ward]. We go to [ward] and see a mother at  
05 37 weeks gestation with backache and reduced fetal movement.  
06 The mother is upset, hot and tired. A CTG is in progress. SHO Anne examined the  
07 mother [vaginal examination] and palpated the mother's abdomen and told the  
08 mother that the baby was fine and there is no sign of stress. But because of reduced fetal  
09 movements, which can be very serious, she will have to return tomorrow for another  
10 CTG. Mother explained that transport difficult, taxi expensive, can't afford it and  
11 she has two small children to care for. She has no help and her husband can't take  
12 time off – his job is already on the line and he has been threatened with the sack. The  
13 husband asked if someone could come out to the house and do a CTG. SHO Anne  
14 does not respond to this – [not sure if SHO heard the husband or not].  
15 Mother started crying. SHO Anne told the mother she had seen a lot of women like  
16 her who were finding it hard to cope with the hot weather and the children off school.  
17 SHO Anne offered the mother stronger analgesia to help with her backache – the  
18 mother declined. SHO Anne asked the mother directly if she was asking to be  
19 induced – the mother said no she did not want to be induced. SHO Anne offered the  
20 mother the chance to come into hospital for rest – mother said this was difficult  
21 because of childcare. The mother decides to go home. SHO Anne documents her  
22 findings in the case notes and tells the ward midwife that the mother can go  
23 home. [The midwife could have arranged for a community midwife to visit and do a  
24 home CTG but the SHO does not mention the mother's problems to the midwife]  
25 **18:37** SHO Anne bleeped to suture mother on labour ward.  
26 **18:38** SHO Anne bleeped about a mother with a BP of /110 but asks caller to contact  
27 the Registrar (Betty) as SHO Anne is needed on labour ward.  
28 **19:15** SHO Anne completes the perineal repair. Staff midwife (AM) Edith is looking  
29 after the mother. The mother is still bleeding, AM Edith is attending to the baby.  
30 They want the researcher to check if the uterus is contracted. I palpate the uterus  
31 and express two medium size clots from the uterus. The SHO asks AM Edith to  
32 prepare some Syntocinon. The midwife coordinator and AM Edith enter the room  
33 with 40 units of Syntocinon in a litre of normal saline. AM Edith starts the intravenous  
34 infusion, documents the fluid bag number and signs the chart. The SHO tells AM  
35 Edith that the infusion is to run in over 1 hour. SHO Anne gives the mother Voltarol  
36 PR for pain relief.  
37 SHO Anne leaves and writes notes outside at the workstation.  
38 **19:25** SHO Anne goes to [ward]. A SM informs SHO Anne about a mother who  
39 wants to go home and the midwife is happy about it and that the mother does not  
40 need to be seen by the SHO. The SHO tells the SM that if she is telling her about  
41 this mother then she really ought to be seen. We go to see the mother. SHO Anne  
42 chats to the mother, reviews the case notes and then tells the mother she can go  
43 home, but must come back in if she feels unwell again or if she starts getting  
44 contractions again. SHO Anne tells researcher to ask her about this episode later.  
45 SHO Anne has another ward admission to see. On the way SHO Anne tells  
46 researcher that the discussion initiated by the staff midwife was so that the midwife  
47 could write in the notes – "doctor informed" and that SHO Anne would be  
48 "accountable" for a mother she had not seen. The midwife does not want the doctor  
49 to see mother, there are no concerns about the mother, but "informing" the doctor.  
50 SHO Anne 'clerks' the new admission to [ward]. Takes medical and obstetric details  
51 and clinical examination. This mother is 34 weeks gestation with abdominal pain,  
52 previous caesarean section, now has swollen face. Previous history of preeclampsia  
53 [high blood pressure, protein in the urine and swelling]. SHO Anne tells the mother  
54 she needs a urine test and if there is protein in the urine, she will need to stay in and  
55 have further tests. Throughout the doctor's interview, the mother's mother is constantly  
56 interjecting with comments of what happened in the last pregnancy or events that  
57 happened today. She also said her daughter had a big shock as her youngest child  
58 had set fire to the house! Her daughter has come to stay with her to get some rest  
59 and the child was now staying with relatives. SHO Anne tells the mother that if the  
60 water test is normal and the CTG normal she can go home. If the contractions pick  
61 up – to come back. "If I keep you in I wouldn't do anything to you but you are  
62 welcome to stay for a rest."  
63 **19:42** Clerking of mother complete [documenting the history and findings in the  
64 notes]. SHO Anne says she gives mothers the choice of staying in otherwise they

65 complain. "They come into hospital with non-specific problems – but they must want  
66 something."  
67 SHO Anne discussed the mother's condition with the midwife.  
68 "The CTG looks OK, not in labour, for mid-stream specimen of urine and if there is  
69 protein then we will do some bloods."  
70 SHO Anne asks if they have any prescription charts. A SM asks SHO Anne to write  
71 a prescription for a mother going home tomorrow.  
72 19:50 Back to labour ward. The mother sutured earlier by SHO Anne is still  
73 bleeding. The Senior Registrar (Allan) is sitting at the workstation – he advises SHO  
74 Anne that if the mother is still bleeding she will need to be examined and the sutures  
75 checked. Mother seen by SHO Anne and Registrar Betty. For a further infusion of  
76 Syntocinon.  
77 20:35 Sitting on labour ward round the central workstation. Registrar Betty, SHO  
78 Anne and CM Celia.  
79 20:50 I go with SHO Anne and Registrar Betty to the doctor's room for something to  
80 eat. SHO Anne says she will need to watch what she is saying as I am a midwife.  
81 Researcher explains that this information is confidential and that respondents are  
82 given a unique code, as is anyone referred to by her. SHO Anne says  
83 some midwives, like doctors, are more capable than others. CM Rhona for  
84 example, but that AM Edith is not confident [AM Edith is a mature midwife who  
85 has recently completed her midwifery training]. AM Edith called the SHO to suture  
86 the mother we saw earlier tonight when the doctor thinks she is quite capable of this.  
87 Passing of responsibility done by certain midwives.  
88 SHO Anne comments that the bleep does not go off during the midwives' handover.  
89 21:05 Bleeped by [ward] re: heparin infusion for a mother with a deep vein  
90 thrombosis. SHO Anne gives instructions over phone and to leave the prescription  
91 chart out; she will sign it later.  
92 21:10 SHO Anne and Registrar Betty go through Multiple Choice Questions as they  
93 are both studying for exams. SHO Anne says they need to get away from the labour  
94 ward because they will only be pestered to do work the midwives could do. The  
95 suture case tonight could have been done by a midwife. Why did she not do it?  
96 Researcher lets the doctors get on with their studies. They invite me to join in but  
97 the questions are very diverse, mainly gynaecology. I say I have never heard of half  
98 the terms in the questions and take the opportunity to look round the doctors' room.  
99 The room is on level X in the medical administration corridor. There are a few  
100 posters on the wall and a poster board with some memos and a whiteboard with  
101 some messages and a few notices. There is a television placed on a large clinical  
102 trolley with a video recorder underneath. There is a very large white bin, a few low  
103 chairs and a comfortable sofa. There is also an office chair and a desk with a  
104 computer on it. On the far side of the room there is a phone and another desk.  
105 Discussions take place between the doctors' study.  
106 Talk about experienced midwives and that there are certain midwives who are  
107 considered very competent.  
108 Both doctors identify CM Rhona, Lisa and Karen as being "practitioners."  
109 When those midwives call they respond immediately.  
110 SHO Anne suggests that it is important for me to do a few sessions with doctors to  
111 understand their perspective. [It is a very different – a bit insular for example, less  
112 doctors around at night, at clinics during the day. More midwives – spend more time  
113 together as a group. For doctors, much smaller groups perhaps spend less time  
114 together]  
115 21:45 Anaesthetist pops in to say hello before she goes to bed.  
116 23:10 Doctors finish studying and are now watching TV.  
117 00:10 Bleeped by labour ward: a mother needs antibiotic cover for pulmonary  
118 stenosis. Mother already delivered. We go to the labour ward. SHO Anne prescribes  
119 antibiotics, but considers they are not required. She explains this to the mother but  
120 gives them because the mother is expecting them. The recommended antibiotics are  
121 not available and have to be borrowed from another ward. SHO Anne comments that  
122 although CM Celia is qualified to give IV drugs she will get the SHO to do it.  
123 00:30 A mother has a retained placenta. SHO Anne examines the mother (palpates  
124 abdomen, checks vaginal loss) and sites an intravenous infusion. I notice the mother  
125 has a large tattoo of a dragon on her upper arm and shoulder. This is the mother's 5th  
126 baby. SHO Anne tries to deliver the placenta with controlled cord traction, but does  
127 not do a vaginal examination. Using controlled cord traction but the placenta is not  
128 moving.  
129 01:03 Registrar Betty enters the room and examines the mother [vaginal examination]

130 and says it [the placenta] is half out and it would be better to get it out now and it  
131 would save her from having an anaesthetic. Over the next 10 minutes Registrar Betty  
132 extracts the placenta piecemeal. The mother seems to be in considerable pain  
133 throughout this. The bulk of placenta looks rather small compared to the baby.  
134 [AM Donna, the attendant midwife keeps looking at the baby, then the placenta.  
135 I think she is thinking the same thing as me – there is more placenta in the  
136 uterus]  
137 **01:12** AM Donna asks for 40 units of Syntocinon. SHO Anne checks with Registrar  
138 Betty but she says that Syntocinon infusion is not necessary. [AM Donna does not look  
139 very pleased]  
140 **01:14** We go to visit [ward]. SHO Anne comments about the event with AM Donna  
141 and that she was told to rather than asked to prescribe Syntocinon. "It could be  
142 a difficult situation being caught between the Registrar's wishes and the midwives'  
143 demands." We go back to the ward to catch up on mothers to be seen.  
144 SHO Anne attends mother with preeclampsia to site an intravenous infusion before  
145 transfer to labour ward. The mother has a twin pregnancy at 30 weeks gestation and  
146 has been in hospital for more than a week with very high blood pressure and falling  
147 platelet levels. There is great concern for this mother and her twins. SHO tells the  
148 midwife that the mother is ready for transfer to labour ward.  
149 **01:20** Returned from visiting [ward].  
150 **01:40** MC Fiona comes out of room 2 and tells Registrar Betty and SHO Anne that  
151 she is putting up a Syntocinon infusion, as the mother who they had seen earlier and  
152 removed the placenta from, was now bleeding. A few minutes later MC Fiona calls  
153 for the doctors to see the mother and there is a very large bit of placenta protruding  
154 from the mother's vagina. Registrar Betty puts on some gloves and tries to remove  
155 the remaining placenta but without success. The mother now tells Registrar that she  
156 used to be an intravenous drug user but she gave it up on this baby. This is the first  
157 anyone knows about it. The mother will have to go to theatre but has just had a cup  
158 of tea. Registrar Betty arranges for the mother to have a spinal anaesthetic and to go  
159 to theatre. SHO Anne explains to the mother the need for an anaesthetic and manual  
160 removal of placenta and the mother signs a consent form.  
161 **02:25** The mother who was seen earlier on the ward with high blood pressure and  
162 twins has now been transferred from the ward to the labour ward. SHO Anne gives  
163 the mother a slow intravenous injection of Hydralazine [to reduce the blood  
164 pressure]. The mother's condition is monitored every five minutes and a midwife is  
165 doing intensive observation and monitoring the heart rate of the twins. The midwife  
166 is finding it difficult to monitor the fetal heart rates.  
167 **03:00** Mother admitted to labour ward. MC Fiona asks SHO Anne to see the mother  
168 as she has had a small vaginal bleed. We go in to see the mother. The SHO takes the  
169 mother's clinical history and physical examination done. AM Alice says she was not  
170 told of a history of bleeding. SHO tells mother that we need to look at the neck of  
171 the womb to see where the bleeding is coming from. We go outside and SHO sits at  
172 workstation and documents findings in case notes. SHO Anne mentions to MC  
173 Fiona that AM Alice, who was looking after this mother, was not told of the  
174 bleeding. MC Fiona tells SHO Anne: "She was told – twice."  
175 [The midwife, AM Alice who is looking after this mother, is newly qualified]  
176 We go back into the room and SHO Anne performs a speculum examination. No blood  
177 is seen coming from the cervix, although there is some old blood in the vagina and the  
178 mother's pad had some blood on it. A vaginal examination is done and the cervix is 3  
179 centimetres dilated but there are no contractions. SHO Anne wants the mother to  
180 remain on labour ward for an hour for observation.  
181 We go back to the workstation and the SHO documents the case notes. Registrar  
182 Betty arrives and the SHO tells her about the mother admitted with vaginal bleeding.  
183 Registrar Betty visits mothers with twins and preeclampsia. She tells MC Fiona  
184 that the mother will have a caesarean first thing in the morning, and she will see the  
185 mother at 7 am to prepare her for surgery.  
186 **03:30** SHO Anne and Registrar Betty go to bed. Researcher remains on labour ward  
187 and continues with general observation work.

Primary document number 02: shadowing SHO

188 xx/xx/xx Shadowing SHO Vera [Senior House Officer]  
189 **18:00** Arranged to meet SHO Vera on labour ward but she is not there. I go off  
190 round the wards and catch up with SHO Vera on [ward]. She has just seen a  
191 mother with a wound dehiscence that needs to be sutured. SHO Vera tells the staff  
192 midwife that she will suture the wound here on the ward. SHO Vera documents the



193 case notes at the workstation.  
194 **18:30** Bleeped by [ward]. To see a mother sent in to the ward by a community  
195 midwife. We go to [ward]. The ward midwife has undertaken routine observations  
196 and commenced a CTG. SHO Vera reads the mother's case notes before we go  
197 and see the mother. The ward midwife does not come with us.  
198 **19:00** SHO Vera introduces herself and me to the mother and takes the mother's  
199 history. The mother had high blood pressure and oedema.  
200 [Mother] had phoned her midwife as she was due for acupuncture. While having  
201 acupuncture she felt as though her blood pressure had gone up.  
202 [Mother] said that she can tell when her blood pressure goes up.  
203 She also had glycosuria on two occasions but it was investigated and was fine.  
204 The mother's temperature was also elevated and SHO Vera asked if she has a sore  
205 throat or cough. Mother says no but she has had diarrhoea for 3 or 4 days.  
206 SHO Vera: "Are you going to stay with us?"  
207 [Mother]: "I'd rather go home."  
208 SHO Vera: "Having high blood pressure in pregnancy is a risk. We need to take  
209 account of the whole picture. Think of it as a rest."  
210 [Mother]: "Can I go home and get some things?"  
211 SHO Vera says [mother] can arrange for her husband to get them.  
212 SHO Vera takes a more detailed history of medical illness and operations in the past.  
213 SHO Vera "Baby's trace was a little too happy."  
214 SHO Vera asks about fetal movement.  
215 [Mother] says they are less than usual and SHO suggests mother is given a kick chart.  
216 SHO Vera: "Baby's heart rate is a bit too high. That may be due to you feeling  
217 unwell." SHO Vera asks about medication. Mother is taking Mucaine.  
218 SHO Vera does an abdominal palpation and then a full physical examination. She  
219 remarks the mother is hot and a bit dry. Then she listens to the mother's chest and  
220 checks her reflexes.  
221 SHO Vera: "Has anyone had a look in your eyes yet?"  
222 SHO Vera goes out and asks midwife for ophthalmoscope but there is not one on the  
223 ward so an auxiliary nurse is sent off round the wards to find one.  
224 SHO Vera orders some blood tests and a stool sample, as well as blood pressure  
225 (BP) monitoring and 24-hour urine collection.  
226 SHO explains to mother that her condition needs to be reviewed daily.  
227 **19:34** SHO Vera returns to workstation and documents the mother's case notes.  
228 There is a comment that this mother has a needle phobia – but has been having  
229 acupuncture.  
230 A Staff Midwife [SM] tells SHO Vera the blood results of a mother on antenatal  
231 ward are normal and there is no need to rush to see her.  
232 SM Jenny tells SHO Vera that the latest uric acid of the mother she has just seen is  
233 normal. SHO Vera: "2.5 that's normal."  
234 **19:47** The ophthalmoscope arrives and SHO Vera returns to check the mother's  
235 eyes. She prescribes Paracetamol and Gaviscon for the mother.  
236 While still on antenatal ward SHO Vera is asked to see another mother who has been  
237 admitted for BP assessment but has not had her eyes checked [no ophthalmoscope  
238 earlier].  
239 **20:00** Retinal fundus check and discussion with mother about her management.  
240 Mother wants to know what will happen to her if blood pressure is normal. SHO  
241 Vera says best to discuss with the obstetric "firm" she is booked under.  
242 **20:15** SHO Vera sees another mother with high blood pressure for eye check.  
243 Fundus checked – no papilloedema but right optic disc blurred. Given Nifedipine  
244 for high blood pressure earlier – blood results fine now commenced on Methyldopa.  
245 **20:30** Called to labour ward to see [mother] room 15, para 1, 13 years ago.  
246 MC Rhona greets the SHO with "I bleeped you cause the midwife [CM]  
247 in there does not believe in SHOs. Get in the room, you need the experience."  
248 CM Lucy (the midwife who allegedly does not believe in SHOs) gives a summary  
249 of the mother's history, but it is done so quickly and in such a disjointed fashion that  
250 it is hard for me to take in all the information let alone write it down. Before the  
251 SHO had even entered the room CM Lucy said "I think she needs a fetal blood  
252 sample." We go into the room and CM Lucy presents the information – reduced  
253 liquor volume, amniotic fluid index = 6, below 5th centile, dips and thick meconium  
254 [at this stage she did not mention that membranes had been ruptured for three days],  
255 lack of progress, 3 cms. for past three hours, not on Syntocinon.  
256 Neither the SHO nor the researcher have been introduced to the mother.  
257 There is a CTG in progress and I notice that there have been some deep variable



258 decelerations earlier on and there are now two decelerations, which have been  
259 prolonged and associated with reduced variability. [Researcher thinks mother needs  
260 a caesarean not a fetal blood sample]  
261 SHO Vera explains to the mother about fetal blood samples and what it will entail,  
262 **20:35** We go out to the workstation, including CM Lucy. The mother is left alone  
263 in the room. SHO Vera bleeps the Registrar and documents the mother's case notes.  
264 **20:37** The Registrar answers his bleep. SHO Vera describes the trace as type 2 dips,  
265 prolonged, lack of progress, spontaneous rupture of membranes for 3 days, thick  
266 meconium.  
267 SHO Vera: "We were wondering if you would like to do a fetal blood sample."  
268 SHO tells me that Registrar John said it sounds as though she should go straight for  
269 caesarean section. CM Lucy asks if the Registrar is going to come and see the  
270 mother before taking her to theatre.  
271 SHO Vera tells CM Lucy that the Registrar is coming but he is in theatre doing  
272 another operation at the moment.  
273 MC Rhona, the midwife coordinator, asks CM Lucy to phone theatre and inform  
274 staff a section is pending.  
275 **20:45** The Registrar arrives but goes into the office to answer his bleep.  
276 SHO Vera labels a blood test request form.  
277 **20:47** SHO Vera gives intravenous Maxalon and Ranitidine to mother in anticipation  
278 of going to theatre.  
279 CM Lucy starts preparing the mother for theatre. SHO Vera gives the mother an  
280 explanation about going to theatre and not to be concerned that there are a lot of  
281 people –that is normally the case. She also explains the importance of the  
282 paediatrician when there is meconium. She also explains about the scar and epidural.  
283 [First the mother is told she needs a fetal blood sample, now she is told she needs a  
284 caesarean section]  
285 CM Celia [night shift] comes in to take over if required. SHO Vera documents the  
286 prescription chart. CM Lucy is completing the caesarean section checklist.  
287 **20:50** SHO Vera answers bleep by [ward].  
288 **20:51** Mother seen by Registrar John who has seen mother earlier. CM Lucy gives  
289 a summary of the case [to quick for me to capture]. Registrar John sits down and  
290 looks at the CTG. Registrar John: "Baby's heart rate pattern has changed since last  
291 time I saw you. If the baby was born soon it wouldn't be a problem but in this case  
292 the delivery is not going to be soon. The first thing is the duration of the ruptured  
293 membranes and second is the meconium." Registrar John explains that there is a risk  
294 to the baby if meconium is inhaled and that it would be wise to get baby out sooner  
295 rather than later. Mother: "I want what is best for my baby."  
296 **20:55** SHO Vera bleeped.  
297 Registrar John phones Consultant to let him know that he plans to do a caesarean  
298 section [the Registrar later told me that it was important to present the information  
299 to the Consultants in a way that you get the decision you want].  
300 **21:20** In theatre [by my watch, the clock in theatre is two minutes ahead].  
301 SHO Vera starts to scrub for the operation.  
302 **21:29** Baby born [by my watch]. Cord segment passed to AM Karen [night shift  
303 midwife]. CM Lucy is assisting the paediatrician with the baby. The baby is crying  
304 loudly. AM Karen asks the sex of the baby and for the birth registration form and  
305 blood group. [so the baby can be registered on the hospital computer and blood can  
306 be taken for Rhesus negative if required].  
307 SHO Vera finished assisting in theatre and we have a cup of tea. She tells me that  
308 she has worked abroad for 3 months doing obstetrics.  
309 **22:25** SHO Vera bleeped by ward to see a mother with high blood pressure. She has  
310 to review this mother and another admission [22 weeks pregnant with a pyrexia].  
311 **22:45** On [ward]. Registrar and SHO Vera visit mother with high blood  
312 pressure. A CTG is in progress. The Registrar recommends that the mother be  
313 transferred to labour ward for monitoring and a Hydralazine infusion.  
314 SHO Vera bleeped – an enquiry from a GP about a patient who has been exposed to  
315 chickenpox.  
316 SHO Vera returns to bedside and checks mother's blood pressure 174/112. She then  
317 sites intravenous Cannula and the mother is transferred to labour ward.  
318 **23:06** SHO Vera reviews the notes of a new admission. Booked for midwifery led  
319 care but had a few recent admissions with possible urinary tract infections and some  
320 vaginal bleeding. Mother also has a needle phobia. Proteinuria ++ and temperature  
321 is 37.5 C. SHO Vera: discusses the case with the Registrar and he recommends  
322 antibiotic treatment. Mother describes the pain and tells the SHO that she had a

**This thesis is dedicated to the memory of my brother  
Albert John Kesson  
21<sup>st</sup> December 1953 to 3<sup>rd</sup> June 1969**

323 show today. SHO Vera: "What do you mean?"  
324 Mother: "A yellow jelly that seemed to have a bit of blood in it."  
325 SHO Vera: "The last bleeding was on Friday. I see from your notes that you had sex  
326 today. Did anyone tell you that you should abstain from sex after you have been  
327 bleeding?" The mother does not answer this question but then tells the doctor of  
328 episodes of dysuria, with urgency and frequency.  
329 SHO Vera "You've got some protein in your wee. We will let your team decide if  
330 you need an ultrasound. You've got a bit of a temperature – as long as we have  
331 already got a urine sample we'll start you an antibiotic medication."  
332 SHO Vera takes a more detailed medical history including previous medications and  
333 allergies. SHO Vera tells mother she needs to stay in hospital and be reviewed by her  
334 team in the morning.  
335 **23:30** We now visit the mother who has been waiting to have her wound sutured  
336 since early this evening. SHO Vera now starts to suture the wound dehiscence. It  
337 takes SHO Vera a long time to do this. Setting up is prolonged because the ward  
338 doesn't keep stock for doing this kind of procedure and the wound is quite deep.  
339 **00:25** SHO Vera finishes the suturing. She now sites an intravenous line to give  
340 antibiotics to the mother.  
341 While SHO Vera was suturing on the antenatal ward, the Registrar was on the ward.  
342 He was fast bleeped [emergency call] for labour ward. He then phoned switchboard  
343 and spent 2 or 3 minutes waiting for an answer. [The fast bleep means there is an  
344 emergency call - the doctors usually respond immediately]  
345 **00:45** Returned to labour ward with SHO Vera who was not bleeped for the  
346 emergency. We discover there had been a shoulder dystocia and by the time the  
347 Registrar arrived, the midwives had delivered the mother. The midwives say there  
348 was also a delay with bleeping the paediatrician. They phoned switchboard and it  
349 seems that a number of emergency calls came in at the same time.  
350 **01:20** Sister Sally tells Registrar John that she thinks 'her case' has a third degree  
351 tear. He tells Sister Sally to let him know when they are ready for him.  
352 **01:50** The Registrar sees the mother. It is not a third degree tear. He takes SHO Vera  
353 with him and teaches her how to suture the perineum.  
354 **02:20** The SHO and Registrar finish suturing.  
355 The mother is bathed and sent up to the ward.  
356 **03:00** There is only one mother left in labour ward and that is the mother we saw  
357 earlier with high blood pressure, who came down to have a Hydralazine infusion.  
358 SHO Vera asks Sister Sally and CM Maggie if midwives are allowed to take blood  
359 cultures. They say NO that the doctors must do this.  
360 SHO Vera says that CM Rhona has told her that the midwives can do it.  
361 CM Maggie says "Well CM Rhona is not in charge of the labour ward, Ms X is."  
362 **03:30** The SHO and Registrar go to their on-call rooms. Researcher stays on to  
363 continue observation at the workstation.

Primary document 03: shadowing SHO

364 xx/xx/xx 14:00 Shadowing SHO Anne (Senior House Officer)  
365 SHO Anne just started her teaching session in the seminar room.  
366 **14:02** SHO Anne called to [ward]  
367 SM Val on [ward] - called doctor to mother with twins feeling unwell. "I'll just get  
368 you the notes." SM Val gives SHO Anne a summary of the case: previous  
369 admission four weeks ago with a suspected urinary tract infection, no problems and  
370 no high BP. CTG satisfactory. SHO Anne asks SM Val to chase results of the mid-  
371 stream specimen test and if OK then the mother can go home. To see community  
372 midwife on Monday - to return if fetal movements decrease.  
373 **14:35** SHO Anne documents mother's case notes.  
374 **14:37** SHO Anne bleeped by labour ward to come and put an intravenous line in.  
375 Still on [ward]. SM Angela discusses a case with SHO Anne: mother at 34  
376 weeks gestation, a total protein [urine] has just gone off to laboratory. Waiting  
377 for results of last total protein. Needs to be at the laboratory by Thursday as they  
378 only do the analysis once a week.  
379 **15:05** SHO Anne documents findings in hospital notes and orders 24-hour urine  
380 collection.  
381 **15:18** SHO Anne attends another mother on [ward] with vague abdominal pain,  
382 referred by GP [general practitioner] - can go home.  
383 **15:20** To labour ward to show CM how to site an intravenous infusion. SHO Anne  
384 hopes that this will mean fewer calls at night for SHOs.  
385 **15:43** Returned to [ward]. Another mother to see.

386 15:53 Seen mother with rash ? scabies. SHO Anne was going to do bile salts but  
387 Sister says NO, if there is a rash then its not cholestasis. Expense of test unjustified.  
388 SHO Anne looks up MIMS [pharmacological directory] for treatment of scabies.  
389 16:04 SHO Anne documents mother's case notes.  
390 16:10 SM Anne tells SHO Anne of another mother so that she can be discharged  
391 [decision already made by midwife]. SHO Anne tells SM Anna that she actually  
392 should see mother if she is telling her all this.  
393 16:14 SHO Anne discussing next mother with Sister - painless vaginal bleed.  
394 SHO Anne: " She will have to come in."  
395 Sister: "No not if it is tiny. We usually do a speculum and then they can go home."  
396 Mother at 35 weeks gestation with painless vaginal bleeding - everything else OK.  
397 16:27 SHO Anne finished seeing mother with bleeding, speculum examination and  
398 no abnormalities found so mother can go home.  
399 16:32 Next mother also with vaginal bleeding has been waiting a long time - not  
400 pleased.  
401 17:00 SHO Anne documents mother's case notes. Needs mid-stream specimen and  
402 Anti D results.  
403 17:02 Next mother: Had already been seen today, 32 weeks ?small for dates, normal  
404 liquor volume. Can't get hold of allocated team. SHO Anne asks Sister "What do we  
405 normally do?" Sister: For repeat scan in 2 weeks and kick chart. A discussion  
406 follows about teams going home early and not doing rounds after Friday teaching.  
407 17:12 SHO Anne finished seeing mother. To have kick chart and go home. For a  
408 scan in 2 weeks as palpates small. SHO documents mother's case notes.  
409 17:15 SHO Anne reviewing another case [mother], 31 + 2 weeks gestation with  
410 essential hypertension / pregnancy induced hypertension.  
411 17:27 Bleeped by labour ward delivery for fetal distress.  
412 [mother] to be admitted, blood results becoming abnormal, blood pressure high despite  
413 treatment. Mother concerns about possible early delivery. SHO Anne gone to do an  
414 abdominal palpation and now seems to be in a rush to get down to labour ward  
415 17:30 Arrived in labour ward where a delivery by Ventouse is in progress. SHO  
416 Anne has gone to help.  
417 18:10 SHO Anne documents mother's case notes from the Ventouse delivery. SHO  
418 Anne bleeped by [ward] to take bloods.  
419 18:20 SHO tells locum Registrar James about mother from [ward] who was  
420 for admission to the [ward] . The locum Registrar seems rather alarmed when this  
421 case is presented to him and wants [mother] transferred to labour ward. SHO Anne  
422 does not think this is necessary but does not want to tell the Registrar this.  
423 18:31 Registrar James goes into room 6 to see a mother.  
424 18:45 SHO Anne visits [mother] on [ward]. The midwives know [mother] very well  
425 and say there is no need for her to go to labour ward. "We know the mother and her  
426 condition does not warrant it." SM Angie asks SHO Anne to take some bloods from  
427 mother.  
428 18:50 SHO Anne to [ward] to take bloods from mother.  
429 19:05 Bloods taken by SHO Anne for a mother who is on Heparin. The ward will let  
430 SHO Anne know the results of the blood tests.  
431 19:20 We return to labour ward.  
432 19:27 Locum Registrar James has spoken to Consultant about the mother in room 6.  
433 Mother is going to have caesarean section now for 'failure to progress' in labour.  
434 The MC phones theatre and the anaesthetist. SHO Anne gives mother intravenous  
435 Ranitidine and Maxalon.  
436 19:32 [Mother] from room 6 is now transferred to theatre. SHO goes into theatre and  
437 assists the Registrar.  
438 20:00 SHO returns to labour ward.  
439 20:10 Bleeped by [ward] another admission to see.  
440 20:15 SHO Anne clerks mother admitted with vaginal bleeding. A speculum  
441 examination is done and some old blood was seen in speculum. Mother to remain in  
442 and be reviewed in the morning. SHO documents mother's case notes.  
443 21:00 Another mother to see on ward. [Mother] has severe itching, seen by community  
444 midwife, known cholestasis, bile salts increasing. Routine bloods sent. Now has  
445 abdominal pain. SHO Anne looks are CTG and thinks more CTG required before an  
446 assessment is made.  
447 21:25 Finished seeing [mother] who has cholestasis. For liver function tests and bile  
448 salts. SM Caroline will take the bloods.  
449 21:30 Bleeped for emergency caesarean section. [Mother], bradycardia and thick  
450 meconium. By the time we arrive the mother is already in theatre. SHO Anne rushes



451 into theatre.  
452 **21:45** Observations completed for tonight.

Primary document 04: shadowing SHO

453 xx/xx/xx Shadowing SHO Vera (Senior House Officer)  
454 **18:00** Arrive on labour ward. SHO Vera has started an hour earlier tonight. Sister  
455 Rose tells SHO Vera about [mother], a mother to be admitted for reduced fetal  
456 movement and also complaining of diarrhoea for two weeks.  
457 **18:45** SHO Vera bleeped to "sort out mother on ward who has constipation." CM  
458 Lucy tells SHO Vera [mother], admission in room 5 is a trial of scar.  
459 SHO Vera visits [mother] who has reduced fetal movement and diarrhoea. After  
460 examination of the mother SHO Vera writes a plan in mother's case notes: to send  
461 stool sample to laboratory, mid-stream specimen of urine and take bloods. The CTG  
462 shows two accelerations at beginning but variability reduced. CM Rose takes blood  
463 for blood cultures and a full blood count. SHO Vera documents the mother's notes  
464 and decides [mother] can go to the antenatal ward.  
465 **19:00** CM Lucy asks SHO Vera to prescribe intravenous fluids as CM Lucy has  
466 just sited an infusion for [mother] in room 5.  
467 Call bell rings for second midwife to attend delivery in room 2. Sister Pauline rings  
468 for paediatrician because there is meconium stained liquor.  
469 [mother] in Room 1 is in active second stage of labour.  
470 **19:06** SHO Vera bleeped by [ward] about [mother] who is constipated and going to  
471 have a caesarean section for severe preeclampsia. SHO Vera asks about recent  
472 blood tests tells caller [mother] needs an urgent clotting screen, liver function tests  
473 and urea and electrolytes.  
474 CM Lucy tells SHO Vera about an induction of labour. "She is dipping and I can't  
475 do an ARM [amniotomy] as the head too high." SHO refers midwife to Registrar.  
476 SHO Vera leaves a message for the Registrar who is in theatre about [mother] on the  
477 antenatal ward who is booked [arranged] to have a caesarean section.  
478 **19:12** SHO Vera phones anaesthetist to arrange theatre time and to inform him that  
479 [mother] blood pressure has been high and diastolic reading has been /120 on two  
480 consecutive occasions.  
481 **19:14** SHO Vera bleeped by [ward]. Four or five antenatal admissions to see and one  
482 mother has chest pain. SHO Vera decides to see this mother first as she will need an  
483 electrocardiogram and oxygen saturation measurements.  
484 **19:18** SHO Vera bleeped - personal call.  
485 **19:24** On [ward] . SM is taking blood from [mother] and has contacted the  
486 laboratory.  
487 **19:25** SHO Vera bleeped ? why  
488 **19:30** SHO Vera sited intravenous infusion on [mother]. SHO Vera gives [mother]  
489 intravenous Ranitidine and Maxalon. Also gave a dose of Nifedipine slow release.  
490 SHO Vera tells the Staff Midwife that [mother] is for caesarean section within the  
491 hour. SHO Vera informs the paediatrician of [mother] condition and the estimated  
492 birth weight (about 3 lbs).  
493 **19:50** On [ward] to see [mother] who was admitted with chest pain. Already had  
494 oxygen saturation done (98%). Electrocardiograph machine is on the ward but no  
495 attachments for leads. Mother complaining of left sided pain in chest and back.  
496 Mother phoned the emergency doctor who didn't want to come out. Sounds as  
497 though there has been a bit of a row with the emergency doctor. Electrocardiogram  
498 done and seems fine but to remain in the ward for observation.  
499 **19:55** Bleeped - personal call.  
500 **20:10** SHO Vera documents mother's case notes. Ordered investigation from nuclear  
501 medicine. Prescribed Gaviscon and some analgesia.  
502 Asked to see another mother. SM wants to know if [mother] is for ? Prostin or  
503 Syntocinon in the morning. Spontaneous rupture of membranes for < 24 hours. SHO  
504 Vera says that the mother should be reviewed in the morning but sees the mother any  
505 way. Waste of time. SHO thinks there is no need for her to see this mother. Not clear  
506 why mother in hospital, will probably labour tonight, if not review in the morning.  
507 Wards filling up with unnecessary admissions. Only four beds left in the unit.  
508 **20:30** SHO Vera now finished seeing mother - for team decision in the morning.  
509 **20:35** Another mother to review with abdominal pain - previous admission.  
510 **20:38** SHO Vera bleeped by labour ward to attend for an emergency caesarean  
511 Section.  
512 **20:40** On labour ward. The Registrar performed an amniotomy and the fetal arm  
513 prolapsed. Mother taken to theatre [previously described by CM Lucy in line 474].



514 **20:53** A segment of umbilical cord is brought through from theatre. AM phones  
515 maternity reception to register baby [most of the time the registration, that is entering  
516 the birth details into the hospital computer system and generating a hospital number  
517 for the baby is undertaken by staff on labour ward].  
518 SHO Vera still has three mothers to see on [ward].  
519 AM Jane tells CM Susan that the mother has the placenta retained. CM Susan  
520 tells AM Jane to put up an intravenous infusion with 20 units of Syntocinon.  
521 Auxiliary nurse tells CM Susan that the "gases OK on baby from the caesarean."  
522 The night duty staff begin to arrive.  
523 **21:05** AM Pat sent to help with [mother] in Room 1 who has a retained placenta.  
524 **21:18** SHO Vera returns to [ward].  
525 SHO Vera admits [mother] who has a history of recurrent admission. Anxious ++ for  
526 analgesia and tender loving care. SHO Vera comments that [mother] blood pressure  
527 has not been done and this is the second mother today that this has happened.  
528 SHO Vera comments this is a heart sink mother.  
529 **21:36** SHO Vera admits another mother with an unstable lie who is booked for  
530 caesarean but had ? spontaneous rupture of membranes at 39+3. SHO Vera asks  
531 SM Sally to do blood pressures and points out that there is no date on the CTGs that  
532 have been done. The mother is on Thyroxine and is self-administering. SHO Vera  
533 will talk to Registrar about what to do as there is not a convincing history of ruptured  
534 membranes. In the meantime the mother can have Pethidine if required.  
535 **21:40** SHO Vera bleeped to see a 19 week pregnant patient on [ward].  
536 **21:50** SHO Vera writing in notes on mother we have just seen. SHO Vera orders a  
537 mid-stream specimen of urine test.  
538 **21:53** Para 4, two miscarriages - to be seen and review analgesia as has had 'funny'  
539 turn. For Paracetamol and Codine.  
540 **22:00** SHO Vera gone to theatre for caesarean for the mother seen earlier who had  
541 preeclampsia.  
542 SHO Vera asked to ring [ward].  
543 **22:35** SHO Vera on phone to [ward] - she has just come out of theatre. Another  
544 admission to see. Documents mother's cases notes for caesarean section that  
545 has just been performed.  
546 **23:40** On [ward]. SHO Vera to see mother at 26 weeks gestation with abdominal  
547 pain. History taken, physical examination. To remain in for observation.  
548 **00:02** Return to labour ward. Auxiliary nurse gone for ultrasound scanner from  
549 ward. CM Susan comments that there is a big baby in room 5.  
550 [Mother] to have scan. Para 4 with twins and spontaneous rupture of membranes  
551 (conservative management).  
552 Whiteboard  
553 [current labour ward status]  
554 Room 2: Para 4 twins  
555 Room 5. Para 1 big baby  
556 Room 6: Para 2 for epidural  
557 Room 11: Para 2 31+4 CS [caesarean section]  
558 Room 14: Para 1 29 weeks TCI [to come in]  
559 [Labour ward starting to get busy]  
560 **00:12** Scanner for labour ward not here - looking for another.  
561 **00:20** Buzzer for room 5. MC Fiona goes in to take the baby.  
562 Registrar has gone to scan mother in room 2.  
563 Mother in Room 6 to have epidural.  
564 **00:37** MC Fiona having difficulty in getting cord results printed out of computer.  
565 Printer had been put on pause [second time researcher has observed this].  
566 Room 5 mother delivered  
567 **00:40** SHO Vera updates small whiteboard. Asks MC what is happening in each room.  
568 **00:45** Ward bleeped SHO Vera - to see mother with pyrexia [elevated temperature].  
569 **00:48** SM Jo gives SHO a summary of the mother's condition. Colour good,  
570 pulse 104, temperature elevated. Oxygen saturation levels ordered by SHO Vera.  
571 Blood results show anaemia - Hb dropped from 14 to 8.7 g/l. A mid-stream  
572 specimen of urine is tested and sent to the laboratory. Blood is taken for full count,  
573 and blood cultures.  
574 **01:10** SHO Vera examines mother. The oxygen saturation is normal but the mother  
575 has a distended bowel. To send a high vaginal swab to the laboratory tomorrow.  
576 SHO Vera returns to labour ward  
577 **01:40** Room 2: [mother] with twin pregnancy, premature, has the urge to push.  
578 Resuscitation trolley for babies brought into room 2. SHO Vera has gone in to see

579 the mother. Researcher has stayed out for the moment as there is a suspicion that one  
580 baby may be dead. The Registrar could not pick up a second heartbeat - but the scan  
581 was very quick. SHO Vera in with mother in room 2.  
582 **01:50** SHO Vera updates the whiteboard by asking anyone who is sitting at the  
583 desk what is going on in each room.  
584 **01:55** SHO Vera decides to go to bed.  
585 **02:45** MC Fiona admitting [mother].  
586 AM Val phones anaesthetist for epidural.  
587 AM Pat admitting [mother] to room 5.  
588 **02:55** MC Fiona tells the Registrar about mother on antenatal ward that she had  
589 been called about. Was transverse lie but now breech. Registrar tells MC he will  
590 visit ward.  
591 **02:57** AM from room 6 comes out with trolley and says mother "fully" but waiting  
592 one hour for descent. MC Fiona goes to admit [mother]. Registrar goes to see mother  
593 on [ward].  
594 **03:07** Brought scanner to [ward]. Registrar wants to check presentation of a baby  
595 as it might be breech or transverse lie.  
596 Mother in room 2 had epidural, the cervix was 2 cms dilated but now wants to push.  
597 Mother in room 5 not in labour.  
598 **03:35** Twins are now delivering in room 2. MC Fiona goes in to help. AM  
599 Margaret phones obstetric Registrar and SHO. SHO Vera asks for the scanner.  
600 **03:40** Registrar arrives to see mother in room 2. Paediatric Registrar arrives then  
601 paediatric SHO arrives.  
602 **03:47** Consultant paediatrician called in.  
603 **03:53** Placenta taken out for cord blood analysis.  
604 **03:55** Registrar tells me both babies are out - one is alive - not sure about the other.  
605 **04:08** MC Fiona goes into room 6 to "see what is going on."  
606 **04:10** MC Fiona asks Registrar to "OK some Syntocinon" for room 6 as  
607 contractions gone off. Registrar says fine, no questions asked about mother.  
608 **04:15** Consultant paediatrician discussing twins. Seems unhappy about resuscitation  
609 efforts. Midwives feel that the paediatricians took a long time to respond to call and  
610 don't appreciate the unpredictable nature of delivery timing.  
611 **04:30** Second twin transferred to Neonatal Intensive Care Unit.  
612 **04:32** AM Margaret asking SHO Vera about Nifedipine for mother in room 11  
613 [the mother who had a caesarean for preeclampsia]. Gives further dose.  
614 **04:35** Mother in room 6 has started pushing.  
615 **04:56** SHO Vera asked to prescribe Thyroxine [mother has been in hospital for three  
616 days]. Mother has been taking it without staff being aware, although documented in  
617 notes.  
618 **05:06** Mother in room 6 now delivered.  
619 **05:50** [current labour ward status]  
620 Room 1: Para 0 5cm dilated epidural  
621 Room 2: Para 4 Delivered  
622 Room 5: Para 0 TCI [to come in]  
623 Room 6: Para 2 Delivered  
624 Room 11: Para 0 CS [caesarean section] special care for mother  
625 Room 12: TCI  
626 Room 15: SRM [spontaneous rupture of membranes] 4cm Epidural  
627 SHO Vera goes to bed.

Primary document 05: shadowing SHO

628 xx/xx/xx Shadowing SHO Vera  
629 **18:00** Arrive on labour ward. There are five mothers on labour ward. The SHO is  
630 not here. I go round wards and meet up with SHO Vera on antenatal ward. She has  
631 already seen one mother on [ward] and one mother on [ward].  
632 Already been bleeped eight times.  
633 The ward midwife SM Anne starts to tell SHO Vera about another mother who  
634 needs to be seen.  
635 SHO Vera asks her to wait until she has finished documenting the previous care she  
636 has just seen with vaginal bleeding. Latest scan on 18th reported posterior placenta.  
637 The ward have a task list of mothers to be seen and tasks for the SHO to do and  
638 they tick it off when the SHO has completed each task.  
639 **19:30** Another admission mother at 35 weeks gestation with epigastric pain and high  
640 blood pressure /60 on booking now /80.

641 SHO Vera tells the staff midwife that bloods for liver function tests will need to be  
642 done. The midwife also suspects that the presentation may be a breech.  
643 Mother is having 24 hour urine collection starting tomorrow and also due to be seen  
644 at antenatal clinic. For blood tests, mid-stream specimen of urine and Algicon (for  
645 heartburn). Await results before deciding on discharge.  
646 19:45 [Ward] phoned the ward we are on ask if SHO Vera is there as they have  
647 mothers to be seen. [the SHO is aware that there are mothers waiting to be seen]  
648 19:55 SHO Vera seeing [mother] – SM informs SHO Vera that the mother has no  
649 fetal movement for 2 days. She is 29+6 weeks gestation. SHO: Has she got a kick  
650 chart? SM: "No." Also an in vitro fertilisation pregnancy.  
651 20:00 Interview with mother, concern about lack of movement. Felt some movement  
652 while on monitor, no vigorous movement. Did have "period type pain" yesterday.  
653 SHO Vera is worried about lack of fetal movement more than the pain. Will show  
654 the CTG to the Registrar and give mother a kick chart.  
655 20:10 Palpation by SHO Vera– that's fine. Tells mother that she will ask her boss to  
656 look at the trace. Sits at workstation and documents notes.  
657 20:30 Another mother to see. Primigravida, seen on [ward], ? urinary tract  
658 infection, social problems ++. For antibiotics. Booked for scan. To stay in for  
659 nursing care and blood tests.  
660 21:00 Go to doctor's sitting room and have something to eat.  
661 21:15 Bleeped by [ward]. Informed of blood results of mother.  
662 22:20 Bleeped by [ward]. Admission to see.  
663 22:25 On [ward]. Midwife tells SHO about mother. Diarrhoea and vomiting,  
664 maternal tachycardia, 38+4 weeks gestation, CTG – tachycardia. SHO Vera asks  
665 midwife to take some bloods [blood culture, and group and save]. Mother will need  
666 intravenous infusion so midwife suggests bloods taken then.  
667 22:32 SHO Vera takes history from mother in room 3. A CTG is in progress  
668 baseline 180 b.p.m. unreactive and reduced variability. Physical examination done.  
669 23:03 Examination completed. Bloods taken. SHO documents notes. 38+4 gravida 2,  
670 P1, diarrhoea and vomiting, unwell, pulse 100 T. 37.4, for Paracetamol suppositories.  
671 23:05 SHO bleeps Registrar and tells him about mother and her treatment plan [as  
672 above]. Registrar visits mother. Tells SHO: "Yeah fine just give her the Paracetamol  
673 and intravenous fluids. "  
674 23:15 SHO Vera bleeped by labour ward. They have eight in labour and no one  
675 available to site an intravenous infusion. SHO Vera tells them she will be down later.  
676 Gives mother her Paracetamol suppositories.  
677 23:30 Return to labour ward  
678 Whiteboard  
679 Room 1: 31/40  
680 Room 2: Previous PPH [postpartum haemorrhage]  
681 Room 5: Para 1  
682 Room 6: Para 1 Midwife Led Care  
683 Room 7: Delivered  
684 Room 11: Delivered caesarean  
685 Room 12: Para 0 Epidural FBS  
686 Room 14: Para 1  
687 Room 15: Para 1 to ward  
688 Room 16: TCI [to come in]  
689 [Labour ward very busy]  
690 23:30 SHO Vera goes into room 12 to help the Registrar who is taking a fetal blood  
691 sample [not called for fetal blood sample].  
692 23:55 Another mother arrives. Labour ward is getting quite busy now. MC Fiona is  
693 helping SHO Vera with the blood gas analyser for the fetal blood scalp sampling.  
694 They are using the old analyser as the newer one has a habit of "chewing up the  
695 FBS" and no results obtained, according to MC.  
696 Midwife reports to Registrar and SHO Vera that twin in room 1 is tachycardic.  
697 00:37 The Registrar and SHO have been attending to mother in room 1. Intravenous  
698 infusion sited, blood taken. When taking a high vaginal swab, the speculum filled  
699 with fresh blood. SHO Vera spoke to Registrar immediately. There had been some  
700 consideration about transfer to another hospital as the Neonatal Intensive Care Unit  
701 is full but after this episode of bleeding the Registrar spoke to the Consultant who  
702 said that there was to be no transfer.  
703 00:40 [Ward] phoned SHO Vera. Mother who was expected at 17.00 with reduced  
704 fetal movement has now arrived. SHO Vera is not pleased.  
705 MC Fiona questioned the Registrar about having Ritodrine in presence of bleeding.

706 The Registrar says he does not consider it to be an antepartum haemorrhage [the  
707 whole bill of the speculum filled with blood]. However, when the Registrar  
708 examined the mother there was no blood to be seen. Vaginal examination, cervix  
709 3-4cms. dilated. SHO Vera gone to see mother on [ward].  
710 **02:00** Mother arrives, midwife thinks she may be 'fully dilated' [mother came down  
711 from ward to room 14].  
712 Three midwives are completing notes. Asked to do cord analysis as it is busy. The  
713 machine has been washing and calibrating for 15 minutes. I asked the auxiliary nurse  
714 if this is usual. She says yes it drives them mad. They end up putting the cords blood  
715 samples through the spare machine – which does not record to computer. They do  
716 the same with the fetal blood samples.  
717 [this is an issue for the planned randomised trial of the DSS]  
718 Whiteboard.  
719 Room 1: 31/40 twins  
720 Room 2: Delivered  
721 Room 3: 3 cm dilated  
722 Room 5:  
723 Room 6:  
724 Room 7: Delivered  
725 Room 9: Cont 2:10  
726 Room 11: Delivered PET [preeclampsia]  
727 Room 12: Delivered  
728 Room 14: 8-9 cm dilated  
729 Room 15: 2-3 cm dilated Pethidine  
730 [All the midwives in the rooms with mothers]  
731 **02:35** Twins niggling. Ritodrine increased. SHO Vera is going to bed. She has been  
732 with [mother] in room 9.  
733 CM Celia informs the SHO that mother in room 3 is making progress, drop in  
734 baseline but CM Celia thinks it is OK. She was on her back at the time. Tells SHO  
735 mother's BP is /100 and cervical dilation has gone from 3 to 6 cms in one hour.  
736 **03:00** SHO Vera admits mother in room 9 – because there are no midwives available  
737 to do this. SHO informs MC of findings and midwife now available to take  
738 over. Vaginal examination, 2 centimetres contractions 3:10. For bath and await  
739 events. SHO Vera is thinking of going to bed.  
740 AM available to look after mother in room 9.  
741 **04:00** SHO Vera goes to bed. I stay on to do some observation at the workstation.

Primary document 6: shadowing SHO

742 xx/xx/xx Shadowing SHO Anne  
743 **18:00** SHO Anne on [ward]. Already had seven bleeps, but only one "significant"  
744 case to deal with on antenatal ward. Twins, 31 weeks gestation. Midwives very  
745 attentive to this mother. She has been on their ward for 6 weeks and needs a lot of  
746 physical and emotional care. The midwives are concerned that the mother may be  
747 moved because Neonatal Intensive Care Unit [NICU] is closed to admission. They  
748 do not want this mother to be transferred to another hospital.  
749 **18:30** SHO Anne visits mother and takes a detailed medical and obstetric history.  
750 This takes a lot of time as the mother has learning difficulties. The SHO performs a  
751 thorough physical examination. The mother complains of period type pains all day  
752 and twin 2 has possible intrauterine growth retardation.  
753 **19:15** SHO completes documentation of mother's case notes at workstation.  
754 19:45 Bleeped again. The [ward] phoned about mother to be seen [SHO was  
755 already aware of this mother].  
756 **20:15** Registrar comes to visit mother with twins. The Registrar and SHO visit  
757 mother but the communication is difficult as the Registrar is from Egypt and the  
758 mother has learning problems. The Registrar wants SHO Anne to do a speculum  
759 examination. Speculum examination by SHO Anne – high vaginal swab taken.  
760 Unable to visualise cervix. Old blood stained "show" seen. The SHO reports her  
761 findings to the Registrar who orders Nifedipine 30 mg "for low contraction" and  
762 Dexamethazone to be given. The SHO takes maternal blood for group and save.  
763 Registrar phones Consultant to discuss management of mother, as Neonatal  
764 Intensive Care is closed to admission. Feels mother is unsuitable for transfer as she  
765 is educationally subnormal and it has taken six weeks to build up communication  
766 and relationships with staff. Consultant agrees that mother should not be transferred.  
767 **20:55** On other antenatal ward. Another admission, 39 weeks gestation. Admitted  
768 with high blood pressure. Had a blood pressure assessment yesterday. Sent in today



769 by community midwife. Headaches worse, vomiting and blood pressure up. Slight  
770 temperature, treated with Paracetamol. Also has diarrhoea – for stool sample.  
771 **21:16** Bleeped for labour ward, mother at 20 weeks gestation to see.  
772 **21:20** SHO Anne gone to see a mother she has admitted a number of times with  
773 major social and psychological problems [asks researcher not to come with her]  
774 – to be admitted for “TLC” [tender loving care] and counselling.  
775 **22:00** See mother on labour ward at 20 weeks gestation. The personal hygiene of  
776 this mother is very, very poor and the staff midwife comments that the mother is  
777 “very thick.” Her diet is poor and she is constipated. SHO Anne orders an enema and  
778 the staff midwife goes off to get it. At this point I intervene and tell SHO Anne that  
779 we do not usually give enemas to mothers at this gestation. [this is one of the  
780 problems of admitting mothers who are essentially gynaecology patients to a labour  
781 ward]. The SHO cancels the order for the enema and prescribes Fibrogel. The mother  
782 is discharged home.  
783 **22:10** SHO Anne sites intravenous infusion in room 1 [twins].  
784 **22:50** SHO Anne bleeped to visit [ward] .  
785 **23:25** On [ward]. [Mother] has high blood pressure, no proteinuria, no visual  
786 disturbances. BP 160/100 – epigastric pain. Had Paracetamol for headache.  
787 **23:50** Mother examined – no ophthalmoscope – yet again. Mother to have  
788 Paracetamol and Codine phosphate. Her reflexes are brisk, clonus + +.  
789 SHO Anne checked mother’s ophthalmic nerve.  
790 Room 5C. Midwife asked SHO Anne to see mother who can hardly walk [we  
791 actually stopped and helped this mother to walk to the toilet earlier tonight].  
792 Midwife said mother incontinent of urine. It seems that she had passed urine earlier  
793 with some difficulty but the amount passed was not measured. This mother looks  
794 awful, she is ashen and clearly in pain. Her abdomen is very distended and she has  
795 pain in her back.  
796 SHO Anne recommends in and out catheter, Pethidine and Voltarol. Catheterised  
797 and 1000 mls of urine drained – needs a retaining catheter.  
798 **00:40** Back on the labour ward. SHO Anne visits mother with twins and phones  
799 Registrar to update him on the case. Registrar says to wait and see. A discussion then  
800 follows about the difficulty of examination of women in ? premature labour and  
801 balancing the need to know if labour has started with trying not to do a vaginal  
802 examination and the difficulty of calling paediatricians in view of the other night  
803 when there was little warning that delivery was imminent.  
804 **01:00** SHO Anne clerks mother with a small antepartum haemorrhage and sends to  
805 ward.  
806 **01:25** SHO Anne is updating the whiteboard. She makes enquiries to the MC but  
807 she is not up-to-date on the status of all the mothers.  
808 **01:30** CM Susan comes out and tells everyone sitting at the desk that [mother] is 9  
809 centimetres dilated.  
810 The mother in room 14 is crying and screaming.  
811 AM Kate asks MC Fiona to come and look at her trace. “Looks like she’s having  
812 slight decelerations [room 1]. I can hear them. Twin 2 is dipping.”  
813 AM Kate tells MC “It is very difficult with that CTG.”  
814 MC Fiona “Do you want me to have a look?”  
815 MC goes of with AM Kate to check the CTG.  
816 MC Fiona: “Those contractions are regular. She looks as though she means  
817 business.”  
818 Room 14: previous cardiac surgery, needs antibiotics. SHO Anne discusses with  
819 MC need for vaginal examination for mother [room 2] as she may be “doing things.”  
820 **01:10** AM Kate tells MC Fiona that mother [room 1] has had quite a heavy blood  
821 loss. MC Fiona goes to see the mother.  
822 SHO Anne is preparing intravenous antibiotics for the mother in room 14.  
823 **01:56** MC Fiona takes the scanner and puts it near room 1. AM Kate is looking for  
824 twin monitor electrode connector.  
825 **02:00** CM Susan asks auxiliary nurse to run a bath and asks for “cord results” for  
826 her delivery.  
827 **02:10** AM Val tells everyone at the workstation that room 14 has delivered – a baby  
828 boy.  
829 The auxiliary nurse takes the cord segment for analysis.  
830 **02:15** MC Fiona tells the SHO Anne about the mother in room 1. They have not  
831 performed a vaginal examination as the mother is bleeding. SHO Anne phones the  
832 Registrar. SHO Anne comments to a medical student “if the midwives don’t want  
833 you to do a vaginal examination, then don’t do it.”



834 **02:19** Registrar arrives to see mother. The SHO Anne accompanies the Registrar to  
835 see the mother in room 1  
836 **02:25** SHO Anne phones the anaesthetist for an epidural for the mother in room 1  
837 she is now 6 to 7 cms. SHO Anne rings the paediatrician to tell them about the twins.  
838 **02:29** SHO Anne bleeped. TCW phoned. They have a postnatal mother with high  
839 blood pressure. SHO Anne tells them to give her half an hour to let her calm down.  
840 To have Nifedipine if her blood pressure has not settled below /110.  
841 **03:00** Labour ward is busy, the twins are delivering in room 1. Researcher asked to  
842 collect a mother for room 5, who has just arrived and is having strong contractions.  
843 [Mother] - previous section, on anticoagulants for DVT [deep vein thrombosis].  
844 No staff are available and this mother is contracting 1: 2. CTG commenced, blood  
845 pressure, pulse, temp, notes reviewed, previous caesarean section. Mother has urge  
846 to push. Vaginal examination; the cervix is fully dilated. SHO Anne arrives and  
847 sites an intravenous Cannula and CM Susan is now available to take over. SHO Anne  
848 sites intravenous infusion and takes routine bloods.  
849 **03:20** SHO Anne goes into room 1 to help with the twin delivery. The researcher did  
850 not go in, as there was absolutely no room [two midwives, two paediatricians, and  
851 NICU nurse, Registrar and SHO crammed into a tiny room].  
852 **03.30** Room 1: The first twin delivered and is transferred to NICU but the second  
853 twin needs a caesarean section for a transverse lie.  
854 The MC helps prepare mother for theatre acting as a runner for attendant midwife.  
855 The SHO phones theatre and anaesthetist. SHO gives mother intravenous Ranitidine  
856 and Maxalon.  
857 **03:35** Mother transferred to theatre.  
858 **04:00** SHO returns from theatre.  
859 [Current status of labour ward]  
860 Whiteboard  
861 Room 1: 31 weeks Twins  
862 Room 3:  
863 Room 5: Del [delivered]  
864 Room 6: 1-2 cm dilated  
865 Room 12: TCI [to come in]  
866 Room 14: Del  
867 Room 15: Del  
868 **04:15** MC Fiona goes in to see mother in room 6 as AM Sally is busy.  
869 **04:18** SHO Anne and Registrar go to theatre to check on mother they have just  
870 delivered.  
871 **04:25** SHO Anne is going to bed now.  
872 **04:27** MC Fiona is trying to decipher the handwriting in a set of notes. She tells  
873 SHO Anne that [mother] needs intravenous antibiotics and she will need to give  
874 them before she goes to bed.  
875 **04:45** MC Fiona "If the anaesthetist comes don't let him go as I may have another  
876 customer for him."  
877 Anaesthetist sites epidural [room 6].  
878 **05:00** SHO Anne gives mother intravenous antibiotics and then goes to bed.  
879 Researcher remains on labour ward to do more observation at workstation.

Primary document 07: shadowing midwife coordinator

880 xx/xx/xx Following coordinator [MC]  
881 **07:00** Following MC Rhona for her shift today as coordinator.  
882 **07:15** Out-going MC gives a report to incoming MC and attendant midwives.  
883 The handover sequence is by room number. The handover is done from memory  
884 using the whiteboard. The information is usually brief, just the facts, name, parity,  
885 came in from home or ward, spontaneous or induced labour, risk factors, membranes  
886 intact or ruptured, progress of labour, Syntocinon use, epidural, last recorded  
887 dilation of the cervix, and any problems during labour. The sequence and details of  
888 this information varies with each mother. Any remaining tasks usually identified at  
889 the handover (pharmacy orders, checking of controlled drugs, equipment checks).  
890 [Current labour ward status]  
891 Whiteboard  
892 Room 1: 33 weeks sleeping  
893 Room 2: 3 cms dilated epidural  
894 Room 5: 40 weeks sleeping  
895 Room 6: Delivered to be warded  
896 Room 7: Water birth fully dilated

897 Room 12: 2-3cms dilated for epidural  
898 [all attendant midwives in with mothers]  
899 No community midwife on this morning. MC Rhona said she will phone manager  
900 and find out why. They should have one community midwife every day.  
901 MC Rhona then phones to check how many inductions there are. Phones antenatal  
902 ward to find out about an induction at 42 weeks gestation with an abnormal CTG.  
903 Bishop score is four and only had one Prostin pessary.  
904 MC Rhona assists mother from room 6 to bath.  
905 CM Celia asks MC Rhona about mother in room 5. Came in last night ? in labour.  
906 Cervical dilation 3 cms and has been sleeping most of the night.  
907 The mother's hygiene is poor and CM Celia complains about this and runs a bath  
908 for the mother. Discussion about what to do with mother.  
909 MC Rhona tells CM Celia that she needs to sort it out.  
910 07:30 Sister Pauline reports mother in room 7 has some urge to push.  
911 AM Lucy tells MC Rhona that two sets of case notes have been mixed up.  
912 08:00 SHO arrives on ward for doctors' handover at workstation using secret  
913 whiteboard. MC Rhona says allocation of staff to mothers based on experience.  
914 Off load demands by giving complex case to senior staff. Also needs to balance that  
915 out with a range of cases. MC Rhona tries to develop staff by giving cases which  
916 will stretch them - but she gives AM Edith as an example of one AM who will  
917 never develop - she can't cope with a simple case.  
918 AM Edith asks if it is 10 or 15 minutes for increasing Syntocinon. MC Rhona asks  
919 her what she thinks. Discusses why caput has formed early in this case.  
920 AM Edith has difficulty in answering the questions.  
921 [The way the questions were put made it very difficult for the AM to answer them]  
922 AM Lucy: asks MC when to do next vaginal examination. MC Rhona discusses the  
923 care of the mother : possibility of amniotomy, vaginal examination interval, and other  
924 means of pain relief rather than going straight for epidural. MC Rhona tells midwife  
925 to give mother a bath and support.  
926 Mother who delivered earlier now finished in bath and transferred to ward.  
927 08:35 MC Rhona notices that auxiliary nurse is in theatre but there are no  
928 caesareans and that she should be out here in the labour ward.  
929 MC Rhona phoned manager about lack of community midwife on for labour  
930 ward. Not expected in until 9 a.m. today.  
931 MC Rhona: "That women in room 7 has been fully a long time."  
932 AM Mary: comments that she does not like room 7 "Can't find anything in it."  
933 MC Rhona comments that CM Celia has not sorted out the mother that was  
934 discussed earlier and is now discussing it with the SHO who knows little about what  
935 to do.  
936 MC Rhona asks SHO if she knows about the patients, as "I will not be doing a ward  
937 round."  
938 MC Rhona phones medical ward to find out about a mother who needs a CTG.  
939 Mother in room 2 has a bradycardia. The midwife [AM Edith] asks the SHO to see  
940 the trace. The SHO then speaks to MC Rhona [who was not informed about  
941 the SHO being asked to see the trace]. MC Rhona tells the SHO to do a vaginal  
942 examination and consider the cause of the problem - hyperstimulation, supine  
943 hypotension [MC Rhona has not yet seen the trace]. MC Rhona goes into room 2  
944 and looks at the CTG. She tells me that it is poor CTG management with over  
945 reaction to short lived bradycardia. [the mother is flat on her back, no wedge in,  
946 oxygen mask on] The SHO is doing a vaginal examination: "She's fully." MC  
947 Rhona instructs the SHO on first line management and the importance of obtaining  
948 all the relevant facts.  
949 CM Celia speaks to MC Rhona about the CTG in room 5. MC tells the SHO to  
950 look at the CTG.  
951 09:05 AM Lucy tells MC Rhona she is going to "ARM" mother now.  
952 09:07 MC Rhona asks about mother in room 5 who CM Celia has been dealing  
953 with." Going to do a vaginal examination."  
954 "What are you going to do a vaginal examination for? The patient has not contracted  
955 all night."  
956 SHO "For experience or to see if any change in cervix."  
957 SHO and CM Celia now change their mind about doing a vaginal examination.  
958 Initially the mother was going to be sent home - but now feels sick. CM Celia asks  
959 about sending the mother to the ward to see her designated obstetric team [usually  
960 allocated in early pregnancy]. SHO suggest that she bleeps the designated Registrar.  
961 09:20 SR Simon arrives and SHO discusses mother with him - decides to send mother

962 to ward.

963 SR Norman arrives asks about having CTG teaching package put on a new computer

964 in the doctor's room when it arrives. Saves the doctors getting "nabbed" for other

965 things when they are trying to do the teaching package.

966 Sister Pauline [F-grade] asks for help in room 7. MC Rhona seems reluctant to do

967 anything at the moment. Tells Sister Pauline to carry on.

968 **10:10 AM** Edith discussed the case in room 2. AM Edith suggests passing a

969 catheter and comments that there is a fetal tachycardia. MC Rhona "organises" AM

970 Edith and tells her to "get her pushing."

971 MC Rhona goes into room 7 starts intravenous infusion and commences

972 Syntocinon. Mother pushing for two hours - wanted a water birth but no one trained

973 For water birth is on duty. Room 12, MC Rhona puts on fetal scalp electrode for

974 AM Lucy. Goes into room 2 checks on 'pushing' and encourages mother to push.

975 Helps SHO to sort out equipment for intravenous infusion.

976 **10:30** Mother who was in room 5 earlier [09:20] now returns from ward as 5 cms

977 dilated - this was the mother that CM Celia was attending to earlier.

978 MC Rhona tells the SHO to have a look at the mother's abdomen [occipito- posterior]

979 when she goes into room 1 to site the intravenous infusion.

980 **10:45** Room 2: mother delivered. SHO to suture. MC Rhona comments that when

981 she went into the room no packs were ready and nothing prepared.

982 Some midwives try to do as much in advance - paperwork, draw up Syntometrine

983 for third stage, have packs ready so that when they call for a midwife to "take the

984 baby" the midwife can just put on her gloves, give the injection and go.

985 [Current labour ward status]

986 Room 12: Epidural being sited

987 Room 7: Delivered

988 Room 14: Domino - 6 cms dilated-community midwife

989 Room 5: 8 cms dilated

990 Admission phone now in the communal office - used to be on desk at workstation

991 when I asked why MC Rhona says "Just to make us walk more."

992 **10:55** Sitting at workstation desk SHO, MC Rhona, anaesthetist.

993 Auxiliary nurse asks where Midwife Led Patients go - "Anywhere" replies MC

994 Rhona.

995 AM Edith now gets trolley out to clean up. Sister Pauline cleaning up trolley in

996 sluice. MC Rhona asks if AM Edith is OK.

997 AM Edith "Yes, second degree tear."

998 AM Edith says that she was not prepared for delivery. "It was all caput and then

999 suddenly it came up." AM Edith now looking for the scales to weigh baby.

1000 MC Rhona comments on the need to constantly check - no initiative for example,

1001 preparing stocking up of equipment.

1002 **11:10** CM Celia asks for keys to give some Pethidine to the mother in room 5.

1003 Room 14: the mother is screaming.

1004 Auxiliary nurse cleaning trolley.

1005 AM Lucy room 12: mother still in agony. MC Rhona says if the epidural needs

1006 re-sited the other anaesthetist can do it. AM Lucy gets trolley. MC Rhona asks

1007 AM Lucy to check that drugs are removed from the trolley as Fentanyl syringe left

1008 on and could have got lost or disposed.

1009 **11:30** [current labour ward status]

1010 Room 1: now in labour having epidural

1011 Room 2: delivered - being sutured

1012 Room 5: in labour

1013 Room 7: delivered

1014 Room 12: epidural

1015 Room 14: coming up to full dilation - 'Domino' [community midwife]

1016 **11:40** MC Rhona on phone about induction of labour from ward.

1017 Sister Pauline speaks to SHO - a mother needs suturing extended tear. There is a lot

1018 of banter between the SHO and Sister Pauline about "letting the patient tear."

1019 Midwife says not an extended tear, skin only.

1020 **11:41** Admission phone rings. Mother with a show, regular contractions.

1021 MC Rhona "What do you want to do?" Now asking about a water birth - told no

1022 trained staff available - will wait at home a bit longer.

1023 Room 14: Mother delivering. MC Rhona takes umbilical cord and passes it out of

1024 room for the auxiliary nurse to take blood.

1025 **12:00** Registrar Betty arrives and asks about mothers on labour ward. Asks AM

1026 Mary if any problems with mother in room 1.



1027 **12:03** MC Rhona goes into room 5 to 'take the baby'. CM Celia asks for  
1028 paediatrician as there is meconium stained liquor. MC Rhona switches the  
1029 resuscitation trolley on and prepares suction equipment. The head is crowned and  
1030 the mother pushing. The cord is round the baby's neck. MC Rhona clears the baby's  
1031 airway, calls out time of delivery  
1032 **12:05** Paediatrician arrives.  
1033 MC Rhona takes scalp clip off the baby's head. Baby being rubbed off and dried by  
1034 MC Rhona who tells the paediatrician "Not much meconium, Pethidine 3/4 of an  
1035 hour ago."  
1036 There now follows an argument between MC Rhona and the Registrar paediatrician  
1037 The doctor wants to visualise the cords to check for meconium. The baby is now  
1038 very blue and MC Rhona is concerned about oxygenation. MC Rhona tells the  
1039 doctor there was no meconium and to give oxygen. The doctor does not want to do  
1040 this. She tells MC Rhona "I am a Registrar." The argument gets very heated. The  
1041 baby is now very floppy. The doctor asks for the towel to be changed. MC Rhona  
1042 shouts at the doctor: "The towel is dry there is no need to change it - give the baby  
1043 oxygen." Doctor: "I'm going to speak to my Consultant about this."  
1044 MC Rhona "You do that. I'm not afraid of Consultants."  
1045 Now the baby is getting IPPV by mask and it starts to improve. They then do some  
1046 oral suction. The baby is wrapped up and given to the parents. The doctor asks to  
1047 see MC Rhona outside in private. Researcher leaves them to it and sits out at the  
1048 desk. [Researcher wonders what the parents thought of what just happened]  
1049 Room 5 - for perineal suturing. CM Celia phones SHO to come and suture  
1050 perineum. AM Mary is wandering around the workstation.  
1051 Auxiliary nurses are preparing to clean room 7.  
1052 CM Celia looks for lithotomy poles for room 5 as there are none in the usual  
1053 place. AM Edith now assists mother with bath.  
1054 MC Rhona now finishes her 'discussion' with paediatrician.  
1055 **12:55** AM Lucy informs MC Rhona about the mother in room 12. She has just  
1056 performed a vaginal examination, the mother's cervix is fully dilated and the head is  
1057 at the spines in an occipito-transverse position. She is not on Syntocinon and is  
1058 comfortable.[a later review of this cases found the CTG abnormal at this time]  
1059 MC Rhona tells AM Lucy to put up Syntocinon and reduce the epidural rate.  
1060 AM Edith allocated a mother to look after.  
1061 **13:15** AM Lucy to MC Rhona: "can you see my patient big dips and a  
1062 tachycardia" (room12).  
1063 MC Rhona tells the SHO to check the CTG - "don't do a vaginal examination just  
1064 look at the CTG."  
1065 MC Rhona checks CTG of mother in room 1 [not asked by AM to do so].  
1066 SHO returns from room 12 "early decelerations, quick recovery."  
1067 MC tells the SHO Syntocinon "will encourage rotation of the head."  
1068 MC Rhona tells the SHO: "I'll check the CTG [room 12]. I don't trust you."  
1069 The SHO told to check another CTG in room 1. Informs MC Rhona the trace is  
1070 satisfactory.  
1071 MC Rhona has already seen this trace and is happy with it.  
1072 **13:30** MC Rhona checks on the CTG in room 12. There are late decelerations, the  
1073 variability is reduced and there is a tachycardia.  
1074 MC Rhona points out to the SHO that the decelerations are late.  
1075 **13:45** MC Rhona gives a report to the late shift. A brief summary of the mothers is  
1076 given. Stage of labour, primigravida, multigravida, risk factors, onset of labour,  
1077 dilation of cervix, analgesia, current problems.  
1078 The focus of attention is the whiteboard  
1079 Incoming MC allocated staff to mothers.  
1080 When midwives take over the care of individual mothers they are given a detailed  
1081 report by the attendant midwife in the delivery room.  
1082 **14:00** I follow the new coordinator MC Lisa but nothing has been said at the  
1083 handover to indicate that there is a problem in room 12. MC Lisa sorting out off  
1084 duty. Mainly clearing up after deliveries now.  
1085 **14:30** [It seems the AM who was looking after the mother in room 12 asked  
1086 CM Celia what to do and she said to get the Registrar]  
1087 The mother was delivered by the Registrar.  
1088 **15:00** Observations completed for today.

1089 xx/xx/xx 07:00 Following midwife coordinator  
1090 07:15 Following MC Lisa, in office for shift handover.  
1091 The report is given in communal office. The night MC hands over to the day staff.  
1092 Whiteboard: There are two mothers on labour ward.  
1093 Room 1: Delivered,  
1094 Room 2: Epidural  
1095 Room 3: To come in [abbreviated to TCI] - previous CS [caesarean] for breech.  
1096 MC Lisa allocates the midwives to mothers. The staff sit round the workstation and  
1097 have some tea. MC sorts out off duty, orders pharmacy.  
1098 09:50 MC Lisa "takes the baby" in room 2 and brings out a segment of umbilical  
1099 cord for blood sampling and analysis and the birth registration form. Then she  
1100 phones the ward to arrange a postnatal bed for mother.  
1101 CM Lucy speaks with MC Lisa about a CTG, which was normal, but now she is  
1102 not sure where baseline is. CM Lucy says she is "just informing coordinator."  
1103 MC Lisa asks where the induction of labour came from. Updates admission book.  
1104 10:10 MC Lisa phones round wards looking for mothers to come down for  
1105 induction CM Lucy and student want to "take a patient."  
1106 CM Lucy comments on the CTG she had shown MC Lisa earlier - "sometimes  
1107 you need a second opinion."  
1108 MC Lisa comments to me that she did not know if CM Lucy was asking for her  
1109 opinion or if she wanted MC Lisa to tell her what to do.  
1110 Admission phone rings. MC Lisa takes details, phone reception to get notes ready  
1111 for mother to come in.  
1112 AM Linda asks for keys to pharmacy cupboard.  
1113 MC Lisa answers phone at workstation. Collect Mrs S who has just turned up  
1114 without phoning in first. Allocated to room 6. MC Lisa tells nursing auxiliary that it  
1115 is a "sheet on a bed job."  
1116 MC Lisa allocates a mother to AM Jane - 34 weeks with ruptured membranes in  
1117 room 5.  
1118 MC Lisa sorting out off-duty "need five members of staff and a good skill mix."  
1119 Problems getting people to do their own off duty.  
1120 CM Lucy tells student they have a "multip coming in." MC Lisa sorts through the  
1121 mail. The mother that CM Lucy had asked MC Lisa about has been sent to the  
1122 ward.  
1123 No inductions from wards - "just putting Prostins in at the moment."  
1124 SHO asks what "woman in room 6" is doing.  
1125 MC Lisa "She came in off the street with contractions." SHO goes in to see the  
1126 mother.  
1127 MC Lisa is asked to come and see a mother. AM Charlotte is concerned about the  
1128 CTG. MC Lisa says will come in a minute. Called into room 1 AM Charlotte [new  
1129 hospital midwife and community midwife Ann is helping].  
1130 Community midwife: "Blood pressure had dropped a bit. Syntocinon at 12  
1131 milliunits." MC Lisa asks mother if she had felt a bit faint.  
1132 Mother "Yes."  
1133 Mother already on left side. CTG some decelerations present, variability OK.  
1134 To observe, let MC Lisa know if it gets worse.  
1135 11:55 The mother for room 5 has arrived. MC Lisa sends auxiliary nurse up to  
1136 reception to escort mother to labour ward.  
1137 MC Lisa signs for controlled drugs from pharmacy.  
1138 SHO in room 6 has admitted the patient (23 weeks gestation). The mother is now  
1139 going up to the ward after having some Pethidine.  
1140 AM Linda tells MC Lisa that she is going to the ward with her lady and is taking  
1141 the auxiliary nurse with her.  
1142 We go back to room 1. AM Charlotte was about to come and get MC Lisa because  
1143 the CTG is becoming more abnormal; the last two dips have been late and  
1144 prolonged. MC Lisa asks AM what she is going to do "might be nice to see what is  
1145 going on." AM Charlotte decides to do a vaginal examination and let MC Lisa  
1146 know. MC comments that she gave the AM a big clue as to what she should do  
1147 12:13 Staff grade doctor [SG] Joanne arrives. MC Lisa informs SG about the  
1148 mother in room 1 with the abnormal CTG.  
1149 MC Lisa to SG Joanne " Will let you know."  
1150 12:18 AM Charlotte tells MC Lisa mother's cervix is 9 cms. MC Lisa tells her to  
1151 let SG Joanne know and she will be in to see the mother in a minute.  
1152 CM Lucy is telling SG Joanne about the mother in room 6.  
1153 MC Lisa is answering a telephone query about water birth room.



1154 Registrar Bob is sitting at the workstation he says "You mean my Ventouse room."  
1155 MC Lisa asks CM Lucy if she is going to induce her patient. This mother has a  
1156 great deal of ligament pain. Vaginal examination 4 cms dilated, for amniotomy.  
1157 A Consultant arrives. MC informs him of possible fetal blood sampling for mother  
1158 in room 1 but he is going off to a meeting so can't do it. This discussion take place  
1159 in the corridor outside the mother's room.  
1160 MC Lisa goes in to room 1 with SG Joanne and looks at CTG. The fetal blood  
1161 sample trolley is then placed outside the room.  
1162 SG Joanne looks at the CTG asks about dilation of cervix and station of the head.  
1163 SG Joanne then asks me what I think of the CTG and introduces me as an expert in  
1164 CTG interpretation – dilemma. I explain that I am doing research and not comments  
1165 on the CTG. The parents say "if she is an expert why is she not giving an opinion?"  
1166 I explain that I am not an expert in CTG interpretation, but that I am helping to  
1167 develop a system, which will help staff to use the information from the fetal recorder  
1168 better. I also explained that I was not refusing to offer an opinion and like any  
1169 midwife, if I was not happy with the care provided I would make my concerns  
1170 known. SG Joanne apologises for putting me in a difficult position. I am now  
1171 concerned that the parents will look to me for an opinion and this will place MC  
1172 Lisa and the midwife in a difficult position.  
1173 Outside the room SG Joanne and MC Lisa discuss the care. SG Joanne says wait  
1174 for 1/2 an hour and review. I explain my concerns to MC Lisa and tell her I will sit  
1175 outside for a while. I ask MC Lisa what she plans to do. The mother's cervix is  
1176 now fully dilated and MC Lisa tells the midwife to get the mother pushing.  
1177 **13:03** MC Lisa invites me to come in the room. The mother is pushing. MC Lisa  
1178 gets mother to put her legs up, supported by lithotomy poles. MC Lisa puts gloves  
1179 on and asks mother to push to where her fingers are (just inside the vagina).  
1180 [CTG: prolonged late decelerations; no variability; now develops a bradycardia.  
1181 The fetal heart rate is 61 b.p.m]  
1182 **13:05** MC Lisa setting up for forceps delivery. Calls SG Joanne who is still on the  
1183 labour ward. SG Joanne getting ready to deliver the baby, scrubs and drapes mother.  
1184 **13:07** [Fetal heart 110 - 93 b.p.m, no variability] MC Lisa sets up bed and puts  
1185 mother's legs in lithotomy position.  
1186 SG Joanne tells mother it won't take long. "You are going to have your baby now."  
1187 SG Joanne does a vaginal examination. MC Lisa tells mother to push. Staff  
1188 midwife puts on gloves. SG Joanne asks for the Ventouse. MC Lisa had put forceps  
1189 out but she goes to get the Ventouse. When she returns the fetal heart rate is 68-71  
1190 b.p.m. The scalp electrode is removed. SG Joanne puts on metal Ventouse cup.  
1191 **13:12** Cup on - pressure increased in Ventouse. The mother is catheterised.  
1192 Fetal heart rate monitored intermittently using external ultrasound 135 b.p.m.  
1193 Paediatric Registrar is called.  
1194 SG Joanne asks for the bed to be elevated.  
1195 The mother has another contraction. MC Lisa tells mother to "go for it" and SG  
1196 Joanne is pulling on the Ventouse. She tells mother to push again. MC Lisa tells  
1197 mother "one more" [push].  
1198 **13:15** The head is almost delivered. The contraction finishes and SG Joanne tells  
1199 mother to wait for the next contraction before starting to push.  
1200 MC Lisa listens to fetal heart rate by ultrasound 135 b.p.m.  
1201 **13:16** Head out. Cord round neck.  
1202 They clamp the cord. Baby begins to cry fairly quickly and is dried off and checked  
1203 over. MC Lisa takes segment of cord out of room and asks auxiliary nurse to let her  
1204 know the results.  
1205 The cord artery pH is 7.13.  
1206 After delivery MC Lisa comments that she cannot understand why SG Joanne did  
1207 not just use the forceps. MC Lisa said she "just wanted the baby out then."  
1208 MC Lisa arranges for a postnatal bed for the mother. AM Jane tells MC Lisa  
1209 about a mother with ruptured membranes for 24 hours and CM Rhona has sited an  
1210 intravenous line.  
1211 **13:45** MC Lisa hands over to the late shift. She provides a brief summary of each  
1212 case, mainly what is already recorded on the whiteboard, to all late shift staff.  
1213 The report is very brief, mothers' room number, blood group, primigravida,  
1214 multigravida, onset of labour, analgesia, cervical dilation, risk factors  
1215 The information is written on the whiteboard, but it is informal and the format is  
1216 unsystematic. Most of the information is from memory of the MC.  
1217 The incoming MC allocates midwives to rooms, checks the off-duty and then sits  
1218 at the workstation and has some tea.

- 1219 14:30 Auxiliary nurse runs bath for mother in room 1 and places a cot with sheets  
 1220 and equipment to re-stock the delivery room on the mother's departure.  
 1221 14:45 Mother from room 1 assisted into bath.  
 1222 The room is cleaned and restocked by the auxiliary nurse. No help is given from  
 1223 midwives who are sitting at the workstation  
 1224 15:00 Finish observations for today.

Primary document 09: shadowing midwife coordinator

- 1225 xx/xx/xx Following co-ordinator MC Lisa  
 1226 07:00 Night coordinator updating whiteboard. Day shift begins to arrive. Out-going  
 1227 MC gives report to incoming MC and attendant midwives.  
 1228 Report given:  
 1229 Room 1: 34 weeks in labour, 7 cms dilated  
 1230 Room 6: Delivered but retained placenta  
 1231 Room 7: Water birth, to come in  
 1232 Room 15: Para 1, 9 cms dilated  
 1233 MC reads information from board to incoming midwives  
 1234 Attendant midwives allocated to rooms by MC.  
 1235 07:30 MC Lisa checks off-duty to ensure all members of staff are present.  
 1236 07:35 Room 6: placenta has now delivered.  
 1237 07:55 Paediatrician called for room 1 by AM as 34-week gestation and has  
 1238 prolonged rupture of membranes [48 hours].  
 1239 08:00 Paediatrician arrives and asks how long delivery will take. MC Lisa goes  
 1240 into the delivery room to check. Tells paediatrician that the head is visible, but "it  
 1241 may be five or 10 minutes as she is a primip."  
 1242 MC Lisa "I haven't heard anything from room 15. At that moment a segment of  
 1243 cord is passed from the room and the auxiliary nurse takes it for analysis.  
 1244 MC Lisa asks the community midwife if "she would like a multip" to look after.  
 1245 The community midwife say yes OK.  
 1246 08:25 Mother from room 6 in bath. The room is cleaned and made ready by  
 1247 auxiliary nurses.  
 1248 08:30 Mother for induction of labour to come down. Allocated to room 6.  
 1249 08:35 CM Lucy has to take the baby from room 1 to [ward] immediately and  
 1250 asks MC Lisa to supervise the student midwife with the delivery of the placenta.  
 1251 The delivery of the placenta is complete and straightforward.  
 1252 08:50 Mother in room 2 is for induction of labour due to prolonged rupture of  
 1253 membranes.  
 1254 08:55 Community midwife looking after mother in room 2 asks MC Lisa to do the  
 1255 vaginal examination. Community midwife [to mother]: "Since you are in early  
 1256 labour I shall get an expert to examine you."  
 1257 MC Lisa performs a vaginal examination, applies a scalp electrode and then sites  
 1258 the intravenous infusion, labels the blood bottles and starts the Syntocinon infusion.  
 1259 09:10 Mother for induction of labour to come down. Allocated to room 5 and F-  
 1260 grade Sister Mary.  
 1261 09:15 Staff have a cup of tea at the workstation.  
 1262 10:00 MC Lisa goes off to talk to a member of staff in private.  
 1263 10:30 CM Rose [G-grade] tells MC Lisa there is a mother with twins at 32 weeks  
 1264 gestation and an antepartum haemorrhage coming in - allocated to room 7.  
 1265 MC Lisa tells me that she may need to rupture the membranes of the mother in  
 1266 room 5.  
 1267 Room 6 - the SHO goes into room 6 to site an intravenous infusion as mother is to  
 1268 have Syntocinon.  
 1269 10:37 The mother with twins and bleeding arrives with two staff from the ward.  
 1270 Admitted to room 7. MC Lisa and the SHO, Registrar and Senior Registrar go and  
 1271 see mother. CM Lucy is finishing her record keeping from her delivery this  
 1272 morning. I ask MC Lisa what she has done for the mother in room 7 [it is too  
 1273 crowded for researcher to go in, with 3 doctors, 2 midwives and MC Lisa].  
 1274 MC Lisa: "A rapid assessment."  
 1275 MC asked ward staff about blood loss - about 15 mls of fresh blood. MC Lisa tells  
 1276 me that if things are taking too long in room 7 she will go in and hurry them up.  
 1277 MC Lisa sends for a porter to take the bed up to ward and to find the twin monitor.  
 1278 10:50 Registrar returns to see mother in room 7 with antepartum haemorrhage.  
 1279 11:00 Mother in room 7 to go to theatre. Bleeding is getting worse.  
 1280 11:25 Mother in room 7 taken to theatre.  
 1281 Room 5 mother to have amniotomy (ARM) once epidural working but anaesthetist

1282 gone to theatre.  
 1283 Room 2 Community midwife asks MC Lisa to look at the CTG. MC Lisa says  
 1284 that the midwife just wants reassurance. Lisa also gives "advice" about when to do a  
 1285 vaginal examination and Syntocinon administration, 4 hours after start of  
 1286 Syntocinon for next vaginal examination and maintain Syntocinon at current level  
 1287 as contracting regularly. MC Lisa trying to get results of platelets for mother from  
 1288 room 7 who has gone to theatre but no success. They may not be available yet.  
 1289 **12:20** MC Lisa asks Sister Mary [F grade midwife] if "the dirty deed is done" -  
 1290 referring to the ARM in room 5. Sister Mary says yes but that she didn't see much  
 1291 liquor and the mother has oligohydramnios on scan.  
 1292 **13:00** Community midwife from room 2 asks MC about epidural dose and vaginal  
 1293 examination where there has been no change. MC Lisa advises maximum dose of  
 1294 Syntocinon as there has been "a long latent phase" and the cervix is unfavourable.  
 1295 **13:45** MC Lisa gives a report to the late shift. The ward is quiet. Four mothers all  
 1296 in early labour.  
 1297 Room 2: Epidural 13.00, 2 cms dilated, increased Syntocinon to maximum.  
 1298 Room 5: IUGR, less than 5th centile, 4 cms dilated  
 1299 Room 6: SRM and Syntocinon  
 1300 Room 14: Induction of labour P3 (previous stillbirth) 38 weeks, ARM and  
 1301 epidural.  
 1302 **14:10** Incoming MC allocates midwives to rooms. Junior midwife allocated to  
 1303 room 5, the most complicated case. MC checks off-duty to see if all staff are  
 1304 present. Checks drugs with another midwife, signs books that all drugs accounted  
 1305 for. Checks pharmacy order.  
 1306 **14:45** MC sits at workstation and has cup of tea. The ward is quiet all the midwives  
 1307 are in their allocated rooms.  
 1308 **15:00** Observations finished for today.

Primary document 10: shadowing midwife coordinator

1309 xx/xx/xx Following midwife coordinator.  
 1310 **14:00** Late shift handover.  
 1311 Out-going MC gives report to incoming MC and attendant midwives  
 1312 MC Susan coordinating but at a meeting. MC Brenda co-ordinating meantime.  
 1313 MC reads details from whiteboard to incoming shift.  
 1314 Whiteboard details  
 1315 Room 1: ?early labour, 36 weeks  
 1316 Room 2: 6cm, meconium, epidural  
 1317 Room 7: MLC, epidural, Syntocinon, fully 13.23  
 1318 Room 14: Delivered  
 1319 Room 15: Delivered  
 1320 Midwives allocated to rooms.  
 1321 SHO updates the secret whiteboard [asks midwives what is happening in the rooms]  
 1322 Researcher asks AM Jane if she can observe the admission procedure if they have a  
 1323 mother to look after, but AM feels it may put the student midwife off.  
 1324 **14:20** AM Sally, room 7, tells MC that contractions "going off" and mother is  
 1325 "making heavy weather of it." MC tells AM Sally that Registrar is expected on  
 1326 labour ward soon.  
 1327 **14:30** The Registrar arrives on labour ward and MC Brenda asks about increasing  
 1328 Syntocinon for mother in room 7, as cervix fully dilated and "contractions going off."  
 1329 Registrar: "Yes is she a primip? Is she fully?"  
 1330 Midwife: "Yes."  
 1331 Registrar: "Go for it."  
 1332 **14:45** A mother for elective C/S arrives from ward and walks through to theatre.  
 1333 AM Sally comes out of room 7 and begins to ask the same thing that MC Brenda  
 1334 has just asked the Registrar. He says: "MC Brenda just told me - go for it."  
 1335 SHO invited to assist at caesarean section.  
 1336 **14:55** SHO checks on room 15 who has now delivered. SHO then updates the  
 1337 whiteboard.  
 1338 **14:56** Umbilical cord segment and birth registration form are brought out of  
 1339 room 15 by midwife. Given to auxiliary nurse. Cord blood results placed on  
 1340 workstation shelf and baby's birth registered into hospital computer system.  
 1341 **15:00** SHO sitting at workstation. She tells me she has completed the computerised  
 1342 CTG teaching package and thinks its great - but she did it on someone else's  
 1343 identification number.  
 1344 Auxiliary nurse answers the security phone and used small whiteboard to check who



1345 needs to come into unit when answering security phone.  
1346 **15:15** AM Sally, room 7, informs MC Brenda that "we can just see the head but it  
1347 is hard work" - everything else is fine.  
1348 MC Susan arrives from meeting. CM Brenda gives a summary on each patient.  
1349 They are both standing at the workstation and looking at the small whiteboard  
1350 during this exchange.  
1351 **15:20** [ward] phone to ask for an escort nurse for a trip to another unit.  
1352 MC Susan tells them to phone the wards to get someone.  
1353 **15:30** Admission coming in 36 weeks gestation with ? contractions. Allocated to  
1354 room 14.  
1355 **16:00** Auxiliary nurse sent to collect mother for admission to room 14.  
1356 AM Mary allocated to room 14.  
1357 **16:30** MC Susan phones to inform SHO of admission [room14], 36 weeks and  
1358 now wants to go home as she is not in labour. AM Mary says no indication for vaginal  
1359 examination.  
1360 **16:34** AM Sally looks for CM Brenda to tell her baby in Room 7 has not yet  
1361 delivered. CM Brenda goes off to theatre to look for the Registrar. She returns and  
1362 bleeps the Registrar and then prepares the Ventouse equipment and places it outside  
1363 the door of room 7.  
1364 [It is not clear who is in charge of the labour ward, CM Brenda or MC Susan]  
1365 **16:44** CM Brenda bleeps Registrar again. Tells me "Should bleep SHO but  
1366 sometimes we don't." CM Brenda decides to bleep the SHO.  
1367 **17:00** MC Susan tells the incoming Registrar, Bob about the mothers on labour  
1368 ward again using the small whiteboard during this exchange. Out-going Registrar  
1369 arrives and asks where SHO is, as he wants to teach her how to conduct a Ventouse  
1370 delivery. The SHO has not answered her bleep. The Registrar visits the mother and  
1371 he has now decided to wait, as the delivery is imminent.  
1372 **17:10** The SHO arrives. MC Susan asks if SHO is free to see AM Lucy's allocated  
1373 mother. AM Lucy says to SHO: "I'll give you the low down."  
1374 MC Susan asks why the mother in room 7 has been so long in the second stage.  
1375 Registrar tells MC mother was very reluctant to have Syntocinon or any other  
1376 intervention, originally planned a water birth.  
1377 **17:20** Another two mothers coming in from home and one 'niggler' on [ward] .  
1378 **17:25** SHO and AM Lucy looking at CTG from mother with previous caesarean  
1379 section. The mother is to be sent to ward, as she is not in established labour.  
1380 **17:35** AM Lucy escorts mother up to ward. Auxiliary nurses clean room and make  
1381 bed.  
1382 **17:40** Mother in room 7 delivers without assistance.  
1383 **18:00** Not a lot of activity.  
1384 **18:30** MC Susan has supper break.  
1385 [Current status of labour ward]  
1386 **19:00** Whiteboard  
1387 Room 1: 36 weeks ? early labour  
1388 Room 2: Delivered  
1389 Room 5: 9cms dilated  
1390 Room 7: Delivered  
1391 Room 14: 36 weeks  
1392 **19:15** Room 14 Mother said to be getting "stropy" - says if you're not going to  
1393 induce me I want to go home.  
1394 MC Susan "Do you want me to go in and have a word with her?"  
1395 AM Mary says yes.  
1396 **19:35** Porters arrive to take mother from room 7 to ward.  
1397 **20:00** MC Susan tells me mother in room 14 is probably not doing much and the  
1398 SHO will come and see. She also tells me that she had to go in and support midwife  
1399 in room 14 as the mother was getting agitated that nothing was being done. It seems  
1400 the mother was keen to be induced.  
1401 MC Susan explained that induction of labour was not indicated and offered the  
1402 mother more analgesia. MC Susan commented that a lot of these mothers have  
1403 cottoned on to the fact that they will be induced for symphysis pubis pain,  
1404 prolonged rupture of membranes or reduced fetal movement.  
1405 **20:05** MC Susan answers the admission phone, and then the night shift midwife  
1406 coordinator arrives.  
1407 Some midwives start an hour earlier than the main unit, a legacy of a shift change  
1408 dispute many years ago.  
1409 Handover to the night coordinator MC Fiona in office using the whiteboard. The

1410 report is brief, as the labour ward is not too busy.  
1411 MC Susan tells the SHO about the mother in room 14. SHO asks: "as she is only 36  
1412 weeks do we need to do a vaginal examination?"  
1413 MC Susan says go and see mother first, vaginal examination not indicated.  
1414 AM Mary tells SHO: Mother in room 14. Problem with symphysis pubis  
1415 dysfunction. "Getting fed up. Itching for induction of labour." Came in before with  
1416 backache but the cervix was closed. Gave Pethidine, got "stroppey" wants epidural or  
1417 induction of labour. Needs to be reviewed before having more Pethidine.  
1418 MC Susan gives another handover to incoming midwives. Each case is described  
1419 in quite a bit of detail, with the focus on dilation of cervix, contractions, analgesia  
1420 and course of labour.  
1421 Room 5: Midwife passes cord segment and birth registration form out of room.  
1422 Auxiliary nurse attends to analysis and birth registration on computer system.  
1423 Room 6 cervix 3-4 cms dilated (at clinic this am). To come in (TCI) from home.  
1424 MC Susan goes home. MC Fiona taking over the shift but in a meeting now.  
1425 **20:35** AM Mary and SHO have seen mother in room 14 - for urine test and if that is  
1426 clear she can be discharged home.  
1427 **20:45** Auxiliary nurse completes the admissions book.  
1428 **21:15** MC Fiona returns from meeting.  
1429 **21:30** Remaining night staff arrive. MC Fiona gives handover to night staff and  
1430 allocates midwives to rooms. Only two mothers left on labour ward and both will  
1431 probably be transferred to ward.  
1432 **22:00** Finish observations for today.

Primary document 11 shadowing midwife coordinator

1433 xx/xx/xx  
1434 **14:00** Following coordinator MC Karen  
1435 Out-going MC gives handover to incoming shift. The MC says that it has been a  
1436 busy shift with only one delivery so far. The handover is very brief and only the  
1437 barest of details for each case is provided [mainly the details on the whiteboard  
1438 which has not been updated because it has been so busy].  
1439 Handover given at whiteboard.  
1440 Whiteboard details:  
1441 Room 1: Delivered  
1442 Room 2: 5cm dilated, epidural  
1443 Room 5: ? 7-8cm dilated  
1444 Room 6: 2 cm dilated  
1445 Room 11: 34 weeks, high BP [blood pressure]  
1446 Room 14: Trial of scar 6 cms dilated  
1447 Room 15: In labour 6 cms dilated  
1448 [all midwives in their allocated room]  
1449 **14:20** MC Karen checks in room 1 and asks if mother ready to be sutured. MC  
1450 Karen considers it too busy for her to suture mother as the attendant midwife is  
1451 not trained to suture yet. SHO Vera asked to suture mother in Room 1.  
1452 **14:25** [ward] phoned - want to send mother down to labour ward.  
1453 MC Karen asks midwife who is answering the phone "Is she in labour?" and tells  
1454 the midwife "Don't accept her unless it is definite."  
1455 MC Karen phones [ward] and asks them to send a midwife to labour ward.  
1456 MC Karen says she will need to inform supervisor of midwives about lack of cover  
1457 for labour ward.  
1458 MC Karen sitting at workstation with small whiteboard and counts up number of  
1459 mothers on labour ward while on the phone to the ward.  
1460 MC Karen is getting annoyed with the ward manager and her questions about how  
1461 many mothers they have in labour. "Are you trying to tell me my job [Sister]?"  
1462 MC Karen puts the phone down and is very annoyed that the ward manager is  
1463 questioning her as it is consuming her time when she is already very busy and she  
1464 would not ask for a midwife unless she really needed one.  
1465 **14:30** Mother in room 6 having epidural.  
1466 **14:30** Mother in room 5 delivers.  
1467 **14:40** Phone call from ambulance control. Mother coming in ? in labour ?  
1468 antepartum haemorrhage, second baby, 40 week gestation. Allocated to room 3.  
1469 AM Lucy, room 14 informs MC of abnormal presentation. MC Karen tells AM  
1470 Lucy to let the Registrar know.  
1471 **15:00** The Registrar visits the mother in room 14. The presentation is complicated  
1472 (shoulder - compound presentation) and the mother needs to have a caesarean. The



1473 Registrar phones the Consultant and tells him that the mother has a compound  
1474 presentation and he is taking her to theatre.  
1475 MC Karen phones theatre, the porters to take the mother to theatre and the  
1476 anaesthetist. She then prepares Ranitidine and Maxalon intravenous injection. MC  
1477 Karen then helps the AM in room 14 prepare the mother for theatre assisting with  
1478 shaving and catheterisation procedure.  
1479 MC Karen asks the SHO to obtain consent from mother for caesarean and to give  
1480 the injection of Ranitidine and Maxalon.  
1481 **15:10** Mother allocated to room 3 arrives. MC Karen admits the mother. Checks  
1482 blood loss "It's only a heavy show." She palpates the mother's abdomen and  
1483 commences a CTG. The mother is given a call bell and told to ring the bell if she  
1484 needs anything. The labour ward is busy and she will be allocated a midwife when  
1485 one is free.  
1486 **15:12** Room 14: mother transferred to theatre  
1487 [current labour ward status]  
1488 **15:30** Whiteboard  
1489 Room 1: Delivered  
1490 Room 2: Epidural  
1491 Room 3: ? labour ? APH [antepartum haemorrhage]  
1492 Room 5: Delivered  
1493 Room 6: 5 cms dilated, epidural  
1494 Room 11: 34 weeks, high BP  
1495 Room 15: Delivered  
1496 [all midwives in their allocated room]  
1497 **15:20** Umbilical cord segment and birth registration form are brought out of theatre  
1498 for blood sampling and registration onto the hospital computer system. Given to the  
1499 auxiliary nurse. Auxiliary nurse informs MC Karen the results are fine and places  
1500 print out of results on the workstation shelf.  
1501 **15:45** Mother from room 1 is transferred to ward. MC Karen tells AM Sally to tell  
1502 [ward] if they want an ARM done they will need to let their midwife stay  
1503 otherwise the ARM can't be done. Karen also tells AM Sally to look at the  
1504 whiteboard on the ward and see how busy they really are on [ward] as the ward  
1505 manager refused to send a midwife to labour ward.  
1506 **16:00** AM Sally returns. The ward will wait until later to send mother down for  
1507 ARM. The midwife from the ward can stay for as long as she is needed. Mother from  
1508 room 5 transferred to ward.  
1509 AM Sally is allocated mother in room 3 to look after.  
1510 **16:00** Anaesthetist looks at whiteboard.  
1511 **16:06** MC Karen tells Registrar Bob that the mother in room 11 is "having some  
1512 dips, but it is fine in between." Registrar: Wait and see how mother's blood pressure  
1513 settles. AM Sally tells MC Karen and Registrar about mother in room 3 who is  
1514 bleeding ?heavy show or antepartum haemorrhage. Registrar does not seem too  
1515 bothered about it. MC Karen tells Registrar that she has "had a look and it was a  
1516 heavy show." MC Karen takes another phone call (admission). Call bell rings for  
1517 room 11. MC Karen sends CM Susan into room 11.  
1518 **16:20** CM Susan asks the Registrar to look at the CTG in room 11. The SHO and  
1519 Registrar go into room 11.  
1520 MC Karen informs maternity reception that a mother is coming in later and gives  
1521 details of the mother's name and hospital number to the receptionist.  
1522 CM Susan now dealing with mother in room 11 as AM Lisa informed her that the  
1523 mother is becoming very frightened.  
1524 CM Susan tells me mother really wants a section now, as she is very worried  
1525 about her baby.  
1526 **16:50** Room 6: AM Chris informs MC Karen "just to let you know the patient in  
1527 room 6 is fully dilated and "she is a multip so she shouldn't be long."  
1528 MC Karen phones [ward] and tells them they can send down the mother for  
1529 ARM.  
1530 **16:55** Room 6 mother delivered.  
1531 **17:00** Registrar phones Consultant about [mother] in room 11 and her desire for  
1532 caesarean. Tells Consultant [mother] getting very panicky about the CTG which  
1533 was probably just some loss of contact, also a suspected bradycardia but recovered.  
1534 [mother] is not in labour. Consultant tells Registrar to do amniotomy if possible,  
1535 if not then [mother] to have caesarean section.  
1536 [current labour ward status]  
1537 **17:10** Whiteboard

1538 Room 2: 7cms dilated, epidural  
1539 Room 3: 7cms dilated  
1540 Room 6: Delivered  
1541 Room 11: 34 weeks  
1542 Room 15: IOL [Induction of labour] Term+  
1543 [all midwives in their allocated rooms]  
1544 17:15 Registrar to Registrar handover at workstation using small whiteboard.  
1545 AM Lucy asks SHO to look at a mother who has a rash.  
1546 MC Karen takes call from GP and arranges for mother to be admitted to [ward] .  
1547 17:20 [mother], room 11, is not happy for amniotomy to be done and is prepared for  
1548 theatre. Anaesthetist is on the way. MC Karen informs ward and 'books' a bed for  
1549 mother. The SHO is asked to give the mother intravenous Ranitidine and Maxalon  
1550 and obtain consent for theatre.  
1551 Further admission arrives.  
1552 Room 5: just admitted, ?premature labour32/40  
1553 Room 14: To come in  
1554 17:30 MC Karen escorts mother to theatre  
1555 17:32 SHO asked to site infusion as mother in bathroom is bleeding heavily(17.38)  
1556 17:35 CM Susan asks Registrar to "just write up Syntocinon" for mother who was  
1557 bleeding heavily in case she needs it. The mother is now ready for transfer to the  
1558 ward.  
1559 17:45 AM Sally reports mother in room 3 has had heavy show, may be fully dilated  
1560 [this is reported to anyone sitting at workstation]  
1561 18:00 Consultant visits mother in room 2. Midwives think mother is going to have a  
1562 caesarean. Mother "wants what is best for baby." Consultant asks the researcher  
1563 to tell the Registrar if fetal heart rate is very erratic, assess in 2 hours and if no  
1564 change commence Syntocinon.  
1565 If assisted delivery must assess very carefully.  
1566 Registrar can ring Consultant at home if worried.  
1567 18:20 Deliver message to Registrar.  
1568 Registrar asked if SHO is around. MC Karen also wants SHO to see a mother in  
1569 room 5 who is 32 weeks gestation.  
1570 Room 2 Registrar visits mother in room 2 - thinks the head won't come down.  
1571 Room 5 SHO visits mother, speculum examination shows the cervix closed. To  
1572 "wait and see."  
1573 Room 14 Mother delivers. MC Karen attends to take the baby and returns with cord  
1574 segment and birth registration form.  
1575 19:50 Registrar visits mother in room 2 tells MC Karen that the mother "wants a  
1576 section."  
1577 19:55 MC Karen informs theatre. Registrar said he had already made his mind up  
1578 and the mother had also reached the same conclusion.  
1579 20:00 MC Karen helps AM prepare mother for theatre. MC Karen and SHO  
1580 check intravenous injection of Ranitidine and Maxalon.  
1581 20:05 Mother transferred to theatre. Auxiliary nurses clean and prepare room.  
1582 20:10 Room 3 AM Sally reports to MC that mother is fully dilated and pushing.  
1583 MC Karen updates the small secret whiteboard.  
1584 20:12 Room 3, baby delivered. CM Susan brings out segment of cord and birth  
1585 registration form and gives to the auxiliary nurse.  
1586 20:25 AM Sally needs the Registrar to look at a tear [mother in room 3]. MC  
1587 Karen tells her she will need to wait as the Registrar is in theatre.  
1588 MC Fiona, the night MC arrives and phones the ward to find out availability of  
1589 staff, available beds and potential problems on the ward.  
1590 20:35 MC Karen sits at workstation and has a cup of tea.  
1591 The two coordinators sit at workstation (social talk).  
1592 21:10 Registrar returns from theatre and is asked to see mother in room 3 as she has  
1593 an extended tear.  
1594 21:15 Midwives for night shift begin to arrive.  
1595 MC Karen gives handover at whiteboard. It is very brief. Only two mothers on  
1596 labour ward.  
1597 Mother from room 5 will be sent to ward as not in labour and contractions  
1598 beginning to settle. Possible urinary infection.  
1599 Room 15 induction of labour, "multip", post mature, did not come down until late  
1600 this evening. Just beginning to contract now.  
1601 21:30 Observations finished for today.

Primary document 12 shadowing coordinator  
1602 xx/xx/xx following coordinator  
1603 13:30 Following MC Karen  
1604 13:45 Shift handover in office. Out-going MC handover to MC Karen and  
1605 attendant midwives  
1606 Whiteboard  
1607 Room 1: Para 0, 39+2 weeks, diabetic  
1608 Room 2: Delivered  
1609 Room 5: Para 1, 40+9 weeks, IOL, SRM 10.00, hind water rupture, Syntocinon,  
1610 meconium ++  
1611 Room 6: Para 0, 41weeks, IOL, ruptured membranes for over 46 hrs  
1612 Room 7: Delivered  
1613 Room 12: Delivered  
1614 Room 14: Delivered  
1615 Room 15: Para 0, 40+3 weeks, MLC, FD [fully dilated]  
1616 14:15 MC Karen allocates midwives to rooms. As each midwife allocated to room  
1617 she writes the midwife's first name on the whiteboard beside the allocated mother.  
1618 The midwife coordinator and G-grade midwife are allocated to the mothers that  
1619 have delivered. Room 1 allocated to F-grade and room 5 to most junior midwife.  
1620 14:20 MC Karen spends the next half an hour tidying up paperwork around the  
1621 workstation and organising the work for the patients who have delivered, the main  
1622 focus being allocating enough resources to "get rid of" the mothers who have  
1623 delivered from the labour ward, and get rid of the midwives from the early shift so  
1624 she can "see what she is doing."  
1625 I ask MC Karen if she has been in to see any of the patients in labour. She says  
1626 "That would look bad. I have just had a report so I know what is going on. The  
1627 midwives come and tell me, for example, if there is a problem with a CTG they will  
1628 ask me to come and have a look. They will introduce me as the labour ward sister  
1629 and that they have asked for a second opinion. Then it does not look bad."  
1630 MC Karen is trying to organise inductions to come down to labour ward.  
1631 [Ward] phone to say they have a mother demanding an induction of labour. She  
1632 has been induced over the past few days with Prostin pessaries and she now wants  
1633 an amniotomy or a caesarean section.  
1634 [Ward] have an induction of labour. There is meconium-stained liquor and the  
1635 ward can now provide a midwife.  
1636 CM Samantha will take mother from room 15 to ward and escort one of the  
1637 mothers for induction to the labour ward.  
1638 MC Karen decides to delay one of the admissions for induction, in case [ward]  
1639 complain as they have only 2 midwives to cover their own ward. When an attendant  
1640 midwife is free the next induction can come down.  
1641 Mother from [ward] arrives, she looks quite distressed. CM Samantha is going  
1642 to take over so the midwife can go back to [ward].  
1643 MC Karen is looking through the notes of the mother in room 7 who has delivered  
1644 "un-booked" but they know the mother has Hepatitis B so she must have had some  
1645 care. Looks on computer, but results not available. Phones laboratory but no blood  
1646 results available yet. CM Samantha tells them that bloods have been taken. They  
1647 will let MC Karen know.  
1648 15:10 MC Karen phones [ward] to collect mother from room 7.  
1649 Karen asks SHO if "we can take the IV out of [mother]." Mother has Hepatitis B.  
1650 SHO asks if they need to alert other areas - no one answers her.  
1651 15:20 AM Sally tells MC Karen that she is going to [ward].  
1652 15:25 MC Karen answers call bell from room 15.  
1653 We are not introduced to parents. MC does not introduce herself. AM asks MC if  
1654 she can have a look at the CTG as "baby's not very happy." MC Karen tells AM  
1655 that the trace is not too bad, she has just had an epidural and that can cause changes  
1656 to the blood pressure. She should give it a chance to recover.  
1657 15:48 CM Samantha comes out from room and asks MC Karen to call the  
1658 Registrar to see the trace of mother in room 12.  
1659 MC Karen bleeps Registrar. "Can you come and see a patient in room 12. She has  
1660 come down from the ward. Her membranes have ruptured and she has meconium  
1661 stained liquor. She's just had an epidural."  
1662 16:07 CM Samantha asks "Is he coming?"  
1663 16:08 The Registrar arrives. MC Karen tells him "I think you are wanted urgently".  
1664 CM Samantha comes out of room and prepares the equipment for a fetal blood  
1665 sample.



1666 **16:10** MC Karen says there is no need for an FBS, the results will be normal. [she  
1667 has not seen the trace, or the mother. Mother is being cared for by G-grade midwife]  
1668 **16:12** A visitor arrives to see mother in room 2. MC Karen tells him that we don't  
1669 usually have visitors on the labour ward. She goes to speak to [mother] and her  
1670 husband. MC Karen is annoyed that a midwife is suturing a mother, as this has left  
1671 MC Karen with mothers in labour who have no midwife to care for them. MC  
1672 Karen would have got the SHO to do the suturing.  
1673 [the SHO probably needs supervision and her learning opportunity for FBS would  
1674 have been missed or the mother would have had to wait until both the SHO and  
1675 Registrar were available]  
1676 Mother arrives for admission to room 2.  
1677 **16:20** CM Samantha brings out the fetal blood sample. MC Karen takes the blood  
1678 sample and it is analysed using the blood gas machine connected to the computer  
1679 system [Expert DataCare]. MC Karen informs the Registrar that the FBS results  
1680 were fine, pH 7.39.  
1681 MC Karen admits mother in room 2. Mother asked to get changed, MC Karen  
1682 takes the notes outside, sits at workstation, reads notes and has a cup of tea. We go  
1683 back into the room. She takes mother's blood pressure, pulse and temperature,  
1684 palpates abdomen and commences a CTG. We leave the room and MC documents  
1685 mother's case notes.  
1686 **17:00** AM Mary now free and allocated to room 2. MC Karen: at term, no  
1687 problems, contracting 1:4 moderate, observations normal, had an admission CTG.  
1688 **17:20** MC Karen has break and something to eat.  
1689 **17:30** AM Mary informs MC there is a mother coming in at term, SRM and  
1690 contractions. "Which room do you want her in?" MC Karen: "Room 14."  
1691 **18:00** Registrar arrives (change of Registrar occurs between 17:00 and 17:30) asks  
1692 MC Karen if there any problems. MC Karen: "Not at the moment."  
1693 **18:30** AM Mary informs MC Karen that mother in room 2 wants an epidural. MC  
1694 Karen: "What is she?" AM Mary: "Three centimetres."  
1695 MC Karen helps AM Mary and sets up intravenous infusion and checks stock on  
1696 epidural trolley.  
1697 **18:45** Anaesthetist called for epidural in room 2.  
1698 Room 14 Mother arrived from [ward] for induction of labour.  
1699 **19:15** AM Amanda, room 5, informs MC that there has been little change from the  
1700 last examination. The cervix is still thick, posterior and 2 cms dilated.  
1701 **19:45** CM Samantha asked for Registrar to review the trace in room 12.  
1702 MC Karen bleeps Registrar "Can you come and see [mother] in room 12. CM  
1703 Samantha is worried about the CTG."  
1704 **20:00** Registrar arrives and visits mother in room 12. Mother has a pyrexia and is to  
1705 commence antibiotics and to have some Paracetamol.  
1706 **20:15** AM Julie: mother in room 14 requesting epidural. MC Karen phones the  
1707 anaesthetist and prepares intravenous infusion and checks epidural trolley. Places  
1708 the trolley outside room 14.  
1709 The Registrar is due to visit [mother] in room 1 who is a diabetic and her progress in  
1710 labour has been slow  
1711 AM Amanda informs MC Karen that mother in room 5 is not progressing very  
1712 well. She is a "multip" and Syntocinon is in progress. They discuss her previous  
1713 delivery and look at the partogram from the mother's previous labour, which shows  
1714 slow progress.  
1715 **20:30** Registrar arrives and MC Karen informs him of slow progress of mother in  
1716 room 5 and she wants to increase the Syntocinon.  
1717 The Registrar says no to leave it as is, because he is worried about this mother. She  
1718 had a normal delivery last time but progress was slow and they were going to do a  
1719 section when she suddenly got to fully and delivered quickly.  
1720 Registrar visits mother in room 1 tells MC Karen that he thinks she will deliver  
1721 OK, just long latent phase.  
1722 **21:05** CM Samantha phones the Registrar: "Come and have a look at this trace. I  
1723 don't like it. There is not much beat to beat but her temperature has come down."  
1724 CM Samantha tells MC Karen "You know sometimes you just get a gut feeling  
1725 about a trace."  
1726 **21:10** MC Karen and AM Amanda are disappointed that the Registrar would  
1727 not increase the Syntocinon for mother in room 5. MC Karen tells AM Amanda  
1728 that it might be an idea to catheterise the mother.  
1729 **21:30** The Registrar and CM Samantha discuss the CTG from room 12. [the  
1730 terminology the CM is using to describe the trace is old-fashioned] "Type two, loss

1731 of beat-to-beat.”  
1732 **21:35** The night staff arrive. MC Karen updates the whiteboard as she is giving the  
1733 report, because it has been busy the whiteboard has not been updated.  
1734 Shift handover to incoming midwives and coordinator.  
1735 Whiteboard is updated as the report is given  
1736 Room 1: Diabetic mother, slow progress, epidural, on Syntocinon, for review  
1737 at 22:00 hrs.  
1738 Room 2: induction 3 cms dilated, epidural  
1739 Room 5: slow progress, on Syntocinon, for review at 23:00  
1740 Room 12: slow progress, had FBS, which was normal, the Registrar is just  
1741 reviewing her now  
1742 Room 14: 3cms dilated, just had an epidural  
1743 Observations finished for tonight

Primary document 13: observation at workstation

1744 xx/xx/xx Observation at workstation  
1745 **03:30** Sitting at the workstation. MC Fiona and AM Hanna having a discussion  
1746 about a patient. I can't hear what they are saying.  
1747 AM Alice says she does not think the patient is in labour and thinks the hour  
1748 observation unnecessary, sends the patient to the ward.  
1749 Room 1: Mother with a small vaginal bleed transferred to ward  
1750 Room 2: Cervix 3 cms dilated  
1751 Room 6: Delivered  
1752 Room 11: Preeclampsia and twins, for caesarean this morning  
1753 Room 14: Just admitted ? labour  
1754 CM Celia doing her knitting, AM Hanna having a cup of tea and a rest - says she  
1755 has not had a break tonight. Two auxiliary nurses sitting at the workstation. AM  
1756 Alice standing around. Took the opportunity to give out information sheets of  
1757 research work to midwives on duty.  
1758 **04:15** MC Fiona and CM Celia discussing an admission phone call but as there  
1759 are a number of conversations going on around the workstation and it is not  
1760 possible for me to determine the nature of their discussion.  
1761 **04:30** Admission phone rings - the admission phone used to be at the workstation  
1762 but it has been moved to the office. MC Fiona answers it and tells the staff there is  
1763 a mother coming in. The staff have a small 'portable' whiteboard and they write the  
1764 mother's details on it and leave it on a shelf near the security phone. The staff can  
1765 then let visitors in and direct them to the appropriate room. At night clinical details  
1766 are recorded on this whiteboard, but this does not always happen during the day.  
1767 During the day a large whiteboard in the office is used to record details of patient  
1768 progress, risk factors and procedures. Reversal of use of board at night. Round the  
1769 workstation two small bed tables are used to replace the small tables that used to be  
1770 located at the workstation. These are used as desks for completing paperwork after  
1771 delivery. This does not happen during the day as staff are encouraged to complete  
1772 the paperwork in the delivery room.  
1773 **04:35** Everyone having a cup of tea at the workstation.  
1774 Room 6 - delivered and sent to ward.  
1775 Room 14 - mother screaming and shouting.  
1776 **05:10** Phone call from ward midwife asking if they can give "unprescribed"  
1777 Pethidine -patient had some four hours ago - CM Celia says yes this is OK.  
1778 **05:55** Room 14 - delivering with AM Alice - MC Fiona tells CM Celia to go in  
1779 and take the baby. MC Fiona then tells me that she "can't stand" AM Alice.  
1780 **06:30** Phone call from [ward]. They can't call SHO Anne - bleep not answered -  
1781 they don't have the oral antibiotics that were prescribed for the patient with  
1782 pulmonary stenosis. Told it can wait as it was not necessary for mother to have  
1783 antibiotics in the first place as she did not have a prosthetic valve replacement and  
1784 she did not have history of endocarditis.  
1785 **07:00** Registrar Betty arrives and prepares the mother with preeclampsia for a  
1786 caesarean. Her blood pressure has settled to /90.  
1787 **07:00** MC Fiona updates the whiteboard.  
1788 Room 14 mother delivered and nearly ready to go to ward.  
1789 Mother in room 1 ready for a bath and to be sent to ward.  
1790 Mother in room 12 [for C/S] has been "specialied" [this term is used when the  
1791 mother's condition is such that she is allocated an experienced midwife and is not  
1792 left unattended]. An experienced midwife has been with the mother all night and her  
1793 condition seems to have stabilised.



1794 **07:45** SHO Anne arrives and prepares to hand over to the day shift SHO. Her bleep  
1795 batteries had ran out so she could not be contacted. I watched the midwives'  
1796 handover. It is a quick report only room 2 in labour, she is "all normal" and needs  
1797 to be assessed soon. The mother in room 12 with preeclampsia, who has been  
1798 "specialied" all night is allocated to AM Edith, the most inexperienced member of  
1799 staff. [There are five other members of staff on duty, three have over 10 years  
1800 experience] MC Lisa who is incoming coordinator justifies this by saying AM  
1801 Edith has previous intensive care experience.  
1802 Registrar Betty questions the suitability of this midwife for this patient and MC  
1803 Lisa repeats her reasoning for this and adds "Well she needs the experience."  
1804 **08:10** Observations finished.  
1805 Postscript  
1806 AM Alice is a young, newly qualified midwife. There have been a number of  
1807 comments made about her over confidence and inexperience. The senior midwives  
1808 in particular do not seem to like her and describe her as one of the "a la natural  
1809 brigade." The senior sister on nights sends someone else in for the delivery because  
1810 she "can't stand her." The mother with preeclampsia and twins was seen by the  
1811 Consultant and was sent back to the ward. The mother did have a caesarean but  
1812 about two weeks later and mother and twins are doing well.

Primary document 14: observation at workstation

1813 xx/xx/xx observations at workstation after SHO Vera went to bed.  
1814 I stay on the labour ward. It is not very busy now.  
1815 **03:30** AM Karen reports to MC Maggie that her patient's blood pressure is stable.  
1816 CM Sally tells me that SHO Vera is getting on her nerves. "She drives me mad."  
1817 Researcher ask why. "She never wants to do any of the mundane stuff, intravenous  
1818 infusions, intravenous antibiotics or taking blood."  
1819 MC Maggie comments that the SHOs are meant to be on night shift but they go to  
1820 bed. They complain about everything, taking blood, lack of sleep, but that's what  
1821 they are f\*\*\*ing well paid for. They sit around watching television, but they should  
1822 be here working and learning.  
1823 [I feel very surprised about this. I was impressed with SHO Vera's drive and work  
1824 practice. She had not stopped working from the minute she came on duty, but was  
1825 mainly up on the wards. I don't think the core midwives appreciate this.  
1826 It is interesting that at this point everyone was sitting around the work station, doing  
1827 knitting, reading magazines, drinking cups of tea. How is that different from the  
1828 SHO watching television?]  
1829 **05.00** The labour ward is quiet and I think that the staff are tired. I am also very  
1830 tired and decide to go home. The earlier start for the SHO at 18:00 is another thing  
1831 not appreciated by the midwives.

Primary document 15 observation at workstation

1832 xx/xx/xx observations at workstation  
1833 **08:00**  
1834 Whiteboard  
1835 Room 1: Para 0 in labour  
1836 Room 2: Para 0 in labour  
1837 Room 5: 25 weeks, previous IUD delivery imminent  
1838 Room 6: Transfer from ward for ARM (previous large baby)  
1839 Room 12: 35 weeks - for transfer to ward  
1840 All midwives in their allocated room  
1841 **08:15** MC Carol sitting at workstation. Checking duty rota to see if there is enough  
1842 cover for night shift as a midwife has called in sick. Phones round ward, trying to  
1843 get cover for tonight. No staff available. Starts ringing midwives at home to see if  
1844 any of them can work an extra night.  
1845 **08:50** Finds a midwife who will come in tonight for an extra shift.  
1846 **09:00** MC Carol asks to borrow a midwife from ward.  
1847 **09:15** CM Brenda informs MC that the mother in room 1 is "fully."  
1848 **09:30** Two midwives sit at workstation and have a cup of tea.  
1849 **10:15** CM Brenda informs MC Carol that there is no progress, the mother is not  
1850 pushing well and the head is not visible yet. MC Carol: "OK I'll let the Registrar  
1851 know."  
1852 **10:30** The Registrar is called by MC Carol to see the mother in room 1. Tells him  
1853 "she is a pathetic pusher."  
1854 MC Carol tells the auxiliary nurse to get reception to register babies as there is only

1855 one auxiliary nurse.  
 1856 **10:40** The Registrar [obstetrics] arrives and goes into room 1. MC Carol informs  
 1857 Sister Rose of this. MC Carol goes into room 5 with AM Edith.  
 1858 **10:45** SHO [paediatrics] arrives for imminent delivery in room 5. Paediatric  
 1859 Registrar asks auxiliary nurse to phone for the portable incubator to be brought to  
 1860 labour ward. The SHO paediatrician comes out of room 5 and goes into room 1. She  
 1861 then goes back into room 5.  
 1862 **11:00** Paediatricians having a cup of tea and waiting for [mother] in room 5 to deliver.  
 1863 AM Anne Marie informs MC Carol that the mother in room 2 is difficult to  
 1864 examine. The cervix was not reached, but the mother is now having regular  
 1865 contractions. AM Sharon from room 6 asks Sister Rose about induction of labour  
 1866 protocol and tells Sister Rose the mother is being induced because of a history of a  
 1867 previous large baby [weight not stated]. The mother has not had Prostin as she was  
 1868 suitable for an ARM, but is now beginning to get contractions.  
 1869 Sister Rose: "Give her an hour since she is beginning to contract and then see what  
 1870 you think."  
 1871 AM Sharon "What another vaginal examination?"  
 1872 Sister Rose: "No, from the contractions, you can then speak to the Registrar."  
 1873 Discussion follows about the Syntocinon regime, which has recently been changed.  
 1874 The regime is described as "homeopathic" Syntocinon.  
 1875 **11:10** Mother in room 1 delivers. CM Brenda brings out a segment of umbilical  
 1876 cord and gives it to the auxiliary nurse. The auxiliary nurse processes the samples  
 1877 and informs CM Brenda the results are fine. Sister Rose offers to register the  
 1878 baby's birth and collects the birth registration form and baby details from room 1.  
 1879 Mother in room 6 gets up to mobilise in the day room.  
 1880 MC Carol comes out and informs CM Brenda they will be the next to deliver  
 1881 "She is fully."  
 1882 **11:20** The auxiliary nurse begins to wash and clean the Ventouse equipment.  
 1883 **11:45** The auxiliary nurse is helping Sister Rose with the hospital computer to  
 1884 register the baby's birth.  
 1885 The paediatrician asks for someone to call the nurse from Neonatal Intensive Care.  
 1886 [Ward] phones and want to borrow a monitor.  
 1887 Sister Rose arranges a bed on [ward] for the mother in room 1 who had a Neville  
 1888 Barnes forceps for fetal distress.  
 1889 Discussion on Syntocinon guidelines between some staff. Why were they changed?  
 1890 The levels used now are inadequate. Midwives need to refer to Registrar now -  
 1891 where as before higher doses were discretionary for senior midwives.  
 1892 AM from room 12 ask Sister Rose to check some Pethidine. [Mother] will be  
 1893 reviewed by Registrar in one hour ? premature labour.  
 1894 **12:00** SHO and Registrar sitting at desk having a cup of tea. CM Brenda doing  
 1895 paperwork from delivery in room 1.  
 1896 The mother in room 5, who is 25 weeks, has delivered and the baby has been  
 1897 transferred to special care baby unit. Sister Rose checks vitamin K injection for  
 1898 baby in room 1.  
 1899 **13:00** Observation finished.

Primary document 16 observation at work station

1900 xx/xx/xx General observations at workstation  
 1901 **09:00** Midwives in their allocated rooms. MC Rose midwife coordinator.  
 1902 **09:15** MC having a cup of tea. SHO sitting at workstation.  
 1903 Room 6: mother delivered. Auxiliary nurse runs bath for mother and assist mother  
 1904 into bathroom. AM sitting at workstation completing paperwork from the delivery.  
 1905 [current labour ward status]  
 1906 **10.00** Whiteboard  
 1907 Room 1: 38 +5 weeks, 4cms, for epidural  
 1908 Room 2: 41 weeks, midwife led care - to come in  
 1909 Room 5: 41 weeks, spont. [spontaneous onset of labour] 08.00 = 4 cm  
 1910 Room 6: Delivered  
 1911 ELS: 1.5cm, Pethidine  
 1912 [all midwives in their allocated rooms]  
 1913 **10:10** CM Lucy phones anaesthetist to do an epidural. Prepares epidural trolley  
 1914 and places trolley outside door of room 1.  
 1915 **10:20** Mother from room 6 transferred to ward. Midwife does not complete details  
 1916 of discharge in the admissions book. The auxiliary nurse complains to the MC  
 1917 about it. Auxiliary nurse cleans and restocks room 6.

1918 **10:30** Admission phone: MC Rose answers. Mother coming in, contractions 1 in 10.  
1919 This is the second time the mother has phoned. To come in and get checked out.  
1920 Allocated to room 12.  
1921 **10:35** Anaesthetist arrives to site epidural in room 1, takes epidural trolley in.  
1922 **10:38** Mother arrives booked for midwife led care. Allocated to room 2. AM Sally  
1923 allocated to room.  
1924 **11:00** Consultant arrives on labour ward. MC Rose and the Consultant go into  
1925 the office. They both stand at the whiteboard. He asks MC Rose if there are any  
1926 problems. MC Rose tells him they are all early labourers. The Consultant leaves the  
1927 labour ward.  
1928 **11:10** Mother for room 6 arrives. Auxiliary nurse sent to collect mother from  
1929 reception. Auxiliary nurses shows mother to room 1. The auxiliary nurse tells MC  
1930 that she has "put a draw sheet on the bed." [this means that the mother is thought not  
1931 to be in labour and a draw sheet on the bed means the bed won't have to be  
1932 completely remade if the mother is discharged]  
1933 **11:20** A group of midwives arrive for teaching on resuscitation.  
1934 **11:34** AM Sally informs MC Rose that mother in room 2 is in established labour  
1935 cervix 4 cms dilated, has had a CTG, its fine. Now mobilising.  
1936 **12:00** Observations completed.

Primary document 17: observation at workstation

1937 **08:30** xx/xx/xx General observation at workstation  
1938 Room 1: for transfer to ward  
1939 Room 6: delivered for transfer to ward  
1940 Room 15: in labour, breech  
1941 Room 2: Para 0, in labour  
1942 Room 5: 38 weeks, ruptured membranes, APH  
1943 ELS: Para 0, niggles  
1944 Sister Karen midwife coordinator (MC).  
1945 **09:35** Mother coming in contracting strongly. MC Karen tells midwife to transfer  
1946 mother from room 1.  
1947 **09:40** AM Georgie [junior midwife, recently qualified] from room 15 asks MC  
1948 Karen to check the CTG trace - no description of the trace or reason for review is  
1949 given. The most junior midwife has been allocated the highest risk case [breech].  
1950 MC Karen checks the CTG and says the trace is fine.  
1951 CM Carol phones to find blood group of a mother who has just moved into the  
1952 area, but has had blood taken in this department.  
1953 The mother from room 1 was to go to [ward] but they have phoned to say she  
1954 must go to the other ward.  
1955 The auxiliary nurses are cleaning room 6.  
1956 Sister Marie asks MC Karen if the student can see the breech delivery.  
1957 **09:50** MC Karen tells the Registrar Betty that "the breech is 8 centimetres dilated  
1958 but high."  
1959 Registrar Betty asks about the mother's uterine activity. MC Karen says yes the  
1960 contractions are all right.  
1961 MC Karen asks if someone can take a mother up to the ward.  
1962 Sister Marie answers the phone - an enquiry about induction. It is the SHO from the  
1963 ward asking to do induction amniotomy, as she has previously met the mother.  
1964 Sister Marie advises AM Debbie about mother in room 2. AM Debbie asks if fetal  
1965 scalp electrode [FSE] or abdominal trace required. Sister Marie says it is not  
1966 mandatory, but the quality of the trace must be good and there should be progress in  
1967 labour. Sister Marie suggests putting a clip on top of trolley and if no progress to put  
1968 on FSE. Sister Marie adds that she would "go for an FSE."  
1969 MC Karen tells AM Bodmin [return to practice midwife] that a mother at 22  
1970 weeks gestation is coming in contracting strongly. Allocated to room 9.  
1971 **10:00** AM Carol is talking to SHO about a mother she is dealing with. The mother  
1972 has spontaneous rupture of membranes and a small antepartum haemorrhage. The  
1973 SHO called laboratory to get blood grouping for patient - Rhesus positive,  
1974 haemoglobin 12g/l.]  
1975 MC Karen tells the SHO that she is not to do a vaginal examination. Mother to be  
1976 transferred to antenatal ward.  
1977 MC Karen is talking to AM Carol and asking about the [ward] and how busy  
1978 they are [ward] sent mother to another ward).  
1979 MC Karen is asked by AM Debbie in room 2 to look at the CTG trace.  
1980 **10:25** AM Georgie (room 15) tells SHO the mother with the breech presentation



1981 has diminished uterine activity: "contractions have gone off 2:10 mild to moderate."  
1982 AM Georgie goes off to speak to Registrar Betty who is in the office.  
1983 AM Carol asks MC Karen about the mother in early labour suite. MC Karen says  
1984 she is not to do hourly observations. "Just let her mobilise. If she was at home we  
1985 would not be doing this for her."  
1986 MC Karen thinks that the patient in room 9 who is 22 weeks gestation has a urinary  
1987 tract infection.  
1988 AM Georgie tells MC Karen that she has discussed the management of the breech  
1989 with Registrar Betty and should just wait and see.  
1990 AM Bodmin tells MC Karen that the SHO wants the patient in room 9 (22 weeks  
1991 gestation) to have Pethidine.  
1992 SHO goes to see Registrar Betty and comes back and tells AM Bodmin that they  
1993 need to do a speculum examination.  
1994 MC Karen is thinking about taking a patient from the ward for induction of labour.  
1995 MC Karen tells AM Carol about the induction of labour coming from the ward.  
1996 Patient with second baby for amniotomy for high uric acid.  
1997 AM Bodmin comes out and asks for a light for room 9 and tells MC Karen that  
1998 the SHO wants patient to have Gaviscon.  
1999 AM Georgie (room 15) asks MC Karen to look at trace. MC Karen says trace is  
2000 fine. MC Karen asked by AM Debbie to see [mother] in Room 2 as her blood  
2001 pressure has "shot up."  
2002 The SHO goes to discuss [mother] in room 9 with Registrar Betty.  
2003 AM Bodmin goes to look for MC Karen. Tells her that [mother] in room 9 is not in  
2004 labour. Had a laparotomy before ? adhesions.  
2005 11:05 MC Karen checking top up with Sister Marie. MC Karen bleeps  
2006 anaesthetist. Asks about [mother] top-up. Still complaining of pain. BP /90 diastolic  
2007 but does not want to agitate situation. Anaesthetist to come and see mother.  
2008 11:10 [mother] arrives for induction of labour and is allocated to room 6.  
2009 AM Georgie informs MC Karen the contractions for [mother] with breech presentation  
2010 [room 15] are petering out. MC Karen tells AM to wait 20 minutes.  
2011 11:15 MC Karen goes in to see mother in room 6.  
2012 11:17 AM Carol asks SHO to prescribe Pethidine for [mother] who has been moved  
2013 to the Early Labour Suite. SHO complies but does not go to see the mother.  
2014 AM Carol will look after the mother in room 6. [Mother] for induction of labour.  
2015 11:20 Anaesthetist arrives looking for MC Karen.  
2016 MC Karen checking Pethidine with AM Carol.  
2017 MC Karen phones another SHO to perform amniotomy on [mother] in room 6 -  
2018 personal request of the SHO who knows the patient well.  
2019 11:27 MC Karen speaks to Sister Marie asks about student and if she "wants a  
2020 patient." MC Karen says that the mother sent to early labour suite wants to push.  
2021 11:30 MC Karen goes to early labour suite and returns a few minutes later and says  
2022 the mother is now fine.  
2023 11:31 SHO is told by AM Bodmin that the mother in room 9 is still getting a lot of  
2024 pain. SHO prescribes 50 mg of intramuscular Pethidine.  
2025 MC Karen tells the SHO "the breech is fully and down."  
2026 AM Bodmin asks the SHO if they can give Maxalon to [mother] in room 9 as the  
2027 mother feels very sick.  
2028 The SHO is using the small [secret] whiteboard and updating it. I asked her why she  
2029 is doing this. She sees it as a tool for transfer of information, keeping people  
2030 informed. She then knows what is going on otherwise she has to go and speak to  
2031 five different midwives.  
2032 MC Karen asks AM Bodmin to check if Pethidine has worked for [mother], room 9  
2033 12:05 SHO [room 6] can't do amniotomy so Registrar Betty has gone in to do it.  
2034 12:05 Consultant arrives and speaks to MC Karen about mothers in labour.  
2035 This exchange takes place in office with both Consultant and MC looking at the  
2036 whiteboard. Consultant asking why patient in room 6 has been induced. "Why are  
2037 we doing uric acids?" Consultant says the induction is for essential hypertension  
2038 not high uric acids.  
2039 AM Georgie (Room 15) "Just to keep you updated. Patient feels like pushing." MC  
2040 Karen says "Just let it come down."  
2041 12:30 Registrar Betty and SHO sitting at workstation - waiting for the breech in  
2042 room 15 to descend.  
2043 12:37 Sister Marie telling Registrar Betty about [mother] in room 5. Late  
2044 decelerations, 8 cms on vaginal examination at 12.05. Registrar Betty has already  
2045 seen CTG and is not going to take any action, just going to observe trace. Registrar

2046 Betty then tells me: "If you sit here they tell you about things that they would not  
2047 call you for." Registrar Betty views this as an issue of accountability where it is seen  
2048 as an opportunity to pass responsibility to the Registrar. Says she is concentrating  
2049 on mothers in room 5 and 15 at the moment.  
2050 CM Carol from room 6 speaks to Registrar Betty and asks her to write up the  
2051 findings of the vaginal examination from the amniotomy.  
2052 MC Karen goes to see Registrar Betty about mother in room 5. Not going to do  
2053 anything at the moment "wait and see."  
2054 AM Bodmin tells MC Karen that [mother] in room 9 is more settled.  
2055 MC Karen asks Sister Marie if the medical student can observe, but Sister Marie  
2056 thinks this is not a good idea as the mother is very nervous.  
2057 **13:05** The SHO visits the patient in room 9.  
2058 Registrar Betty is in labour ward office working on the computer.  
2059 MC Karen asked Registrar Betty if [mother] can go to the ward. Registrar Betty says  
2060 no, to stay until comfortable.  
2061 **13:05** Student midwife informs Sister Marie about mother in room 5. Thinks she  
2062 has some urge to push.  
2063 **13:13** Registrar Betty goes into room 5 and checks on the CTG. Sister Marie tells  
2064 everyone sitting at the workstation "fully in 5 going to start pushing."  
2065 **13:29** Midwives for late shift start appearing and are waiting round workstation.  
2066 **13:32** AM Georgie who is looking after [mother] with breech presentation) reports  
2067 to Registrar Betty that there is "a bit of a bradycardia."  
2068 MC Karen gives handover to late shift. It was hardly a handover at all - as midwives  
2069 came into the office, they were immediately sent into rooms to assist the out-going  
2070 midwives.  
2071 **13:35** Change of shift MC Susan coordinator now. Incoming midwives allocated  
2072 to rooms. CM Karen rushed off to assist AM Georgie with the breech delivery.  
2073 **14:00** [Mother] in room 15 has delivered her baby - breech delivery but the baby is  
2074 grunting slightly.  
2075 **14:10** [Mother] in room 5 has also delivered.  
2076 MC Susan has arranged for induction of labour to come down from the ward.  
2077 [Mother] blood pressure /100, cervical dilatation 2-3cm to come down for an  
2078 amniotomy. Allocated to room 1.  
2079 **14:12** CM Lucy wants an intravenous infusion for [mother] in room 6 who has  
2080 pregnancy induced hypertension and high uric acid.  
2081 AM Carol discussed [mother] in room 9 with MC Susan. MC Susan: "Keep in the  
2082 labour ward. If we transfer her the ward will be worrying if she still has pain."  
2083 The SHO goes into room 6 to site an intravenous infusion.  
2084 The SHO reviews the small secret whiteboard. She ask for information from any  
2085 one who is to hand about "what's happening in room X" so she can update the  
2086 board. She tells me " I feel I know what is going on then."  
2087 **15:20** [Mother] in room 2 is screaming.  
2088 [Mother] in room 6 is having an epidural.  
2089 **15:40** The SHO examines [mother] in room 1 who has come from the ward for  
2090 induction of labour. The SHO performed the amniotomy, the cervix is 3 centimetres  
2091 dilated and a fetal scalp electrode has been applied.  
2092 [Mother] in room 2 is still shouting, screaming and crying.  
2093 [Mother] in room 9 is sent to ward.  
2094 **15:45** [mother] in room 2 is has just delivered.  
2095 Observations finished for today.

Primary document 18: observation at workstation

2096 xx/xx/xx observation at workstation  
2097 Doctors gone to bed continue observation at workstation  
2098 **04:30** Most of mothers delivering normally. The midwives are mainly doing paper  
2099 work outside the delivery room. They bring out bedside tables and use them to  
2100 replace the small tables that have been removed from the workstation. The auxiliary  
2101 nurses prepare a trolley with bed sheets and stock ready to take into each room as  
2102 the parents leave the room after delivery.  
2103 The mother in room 15 has been screaming at the top of her voice for the past half  
2104 an hour. No one seems to notice this. The parents in the other delivery rooms can  
2105 hear this too.  
2106 I think the midwives are getting tired. MC Fiona decides to make a cup of tea. This  
2107 seems to revive everyone and the midwives start chatting about their night.  
2108 [current status of labour ward]



2109 **04:45**  
 2110 Whiteboard  
 2111 Room 1: Twins, 31 weeks  
 2112 Room 3: Delivered  
 2113 Room 5: 3-4 cms dilated  
 2114 Room 9: 2cms dilated, early labour  
 2115 Room 11: Delivered, PET [preeclampsia]  
 2116 Room 14: Delivered  
 2117 Room 15: NIL [not in labour], Pethidine  
 2118 Midwives sitting at workstation having tea.  
 2119 **05:15** The mother with twins seems to be settling a bit, but the midwives think that  
 2120 she will deliver. They discuss the problems of this particular type of case "creeping  
 2121 up to fully" and catching them unaware. They also talk about the problems of  
 2122 transfer of mothers in premature labour to other units because Neonatal Intensive  
 2123 Care is often closed to admissions.  
 2124 **06:10** AM Pat informs MC Fiona that the mother in room 5 has early decelerations  
 2125 and high blood pressure. MC Fiona: "Do you want me to have a look?"  
 2126 **06:12** MC Fiona thinks the CTG is OK need to "keep an eye" on mother's blood  
 2127 pressure and if it goes any higher she will "need to let them know about it."  
 2128 **06:20** MC Fiona orders pharmacy for the day.  
 2129 **06:30** Checks the main whiteboard to see it is up-to-date.  
 2130 **06:45** All midwives are in their allocated delivery rooms.  
 2131 **07:00** The day staff begin to arrive.  
 2132 **07:15** MC Fiona hands over to day staff. She provides a brief summary of each  
 2133 mother's condition, as on the whiteboard. The report for each mother is brief, mainly  
 2134 number of previous pregnancies, last know dilation of cervix, progress in labour  
 2135 (progress slow, good), early decelerations on a CTG and need to watch mother's  
 2136 blood pressure. For the mother's who have delivered, the report is of mode of  
 2137 delivery, blood loss, whether a bed has been arranged on a ward, and if the baby has  
 2138 fed or not.  
 2139 **07:30** Observations completed

Primary document 19: observation at workstation

2139 **04:00** Doctors gone to bed continue observation on labour ward  
 2140 **04:15** Mother in room 3 reported to be in established labour.  
 2141 **04:30** AM Val admitting a mother in strong labour into room 12.  
 2142 **05:20** Delivering in room 12. MC Fiona goes in to take the baby, umbilical cord  
 2143 segment handed to auxiliary nurse by MC.  
 2144 MC Fiona takes baby scales into room 12. Over the next hour there is little activity  
 2145 and little talk. I think every one is getting very tired - including me. There were  
 2146 some comments from MC Fiona - the SHO updating the whiteboard irritates  
 2147 her - because she is the focus of the enquiry not the midwives dealing with the case.  
 2148 Also the conflicts with intravenous antibiotics - the SHO wants to go to bed and  
 2149 MC thinks the SHO was hoping that one of the midwives would do it - but they  
 2150 were all busy and some of them won't do it even if they are not busy. There are  
 2151 general comments that the SHOs are here to work a night shift and that they should  
 2152 not go to bed. They are supposed to go home and sleep - but they don't. There is a  
 2153 general opinion that they should treat the night shift in the same manner as  
 2154 midwives. Work -go home - sleep - come to work and that is it. I ask CM Susan  
 2155 and MC Fiona if they ever get fed up with midwives asking them to look at their  
 2156 CTGs. They tell me that they would rather have that than not know what is going  
 2157 on. CM Susan tells me that there are some midwives who she finds it difficult to  
 2158 get in the room to find out what is going on. We usually find some excuse to get in  
 2159 and see what is going on. CM Susan tells me that the other night every midwife on  
 2160 the labour ward was junior and that this was chaos, as they need so much support  
 2161 and supervision [The night duty sister have no control over which particular  
 2162 midwife comes to labour ward and there were occasions when this caused problems  
 2163 for the core midwives]  
 2164 **06:30** MC Fiona updates the whiteboard  
 2165 Room 3: Para 0, 4 cms dilated, contractions 1 in 3  
 2166 Room 9: Para 0, 2 cms dilated, niggles  
 2167 Room 12: Delivered, to be transferred to ward  
 2168 Room 14: Delivered, to be transferred to ward  
 2169 Room 15: 2cms dilated, niggles  
 2170 **07:00** Day shift staff begin to arrive

2171 The report is brief, "she's fine, all normal" as the remaining mothers have no risk  
2172 factors. Cervical dilation was reported for all the cases but not the time of the last  
2173 vaginal examination. Sometimes this information is displayed on the whiteboard  
2174 **07:15** Incoming MC allocates midwives to mothers.  
2175 **07:30** Observation completed

Primary document 20 observation at workstation

2176 xx/xx/xx observation at workstation  
2177 **13.45** Shift handover  
2178 MC Rhona gives handover to incoming midwives  
2179 Room 1, midwife led care, was 4 cms to have epidural  
2180 Room 3, to come down for induction  
2181 Room 6, 28 weeks breech presentation, probably to have caesarean  
2182 Room 9, delivered at home, 20 weeks, non-viable fetus  
2183 Room 12, delivered  
2184 Attendant midwives allocated to rooms.  
2185 Whiteboard details:  
2186 Room 1: 40 weeks, MLC, Cont [contractions] 1:5, 4cms early decels for epidural  
2187 Room 3: for Synto [Syntocinon]  
2188 Room 6: 28+5 weeks, breech, 3cm dilated ? C/S  
2189 Room 9: 20/40 weeks, BBA [born before arrival], IUD [intrauterine death]  
2190 Room 12: 39+6 weeks, MLC, 5-6 cms, cont 1:5, ARM, delivered  
2191 The whiteboard is on the desk at the workstation, it does not tally with the number  
2192 of cases on the whiteboard in the office.  
2193 **14:15** MC Lisa wipes details of room 5 off the small whiteboard  
2194 The auxiliary nurse complains that the admission book is not being kept up-to-date.  
2195 She asks midwives to remember to complete the details at the time the mothers are  
2196 admitted and discharged.  
2197 AM Judith informs CM Brenda that her lady might be getting there. I ask CM  
2198 Brenda why Judith has told her this - "as a standby in case I need to run into the  
2199 room to help."  
2200 CM Susan and the SHO discuss the mother in room 6. The contractions have  
2201 stopped and they are wondering if the patient should still have a caesarean section.  
2202 MC Lisa tells the SHO that she should speak directly to the Consultant about the  
2203 case. [the SHO seemed reluctant to phone the Consultant direct]  
2204 The SHO phones the Registrar and tells her about the mother in room 6.  
2205 The Registrar will speak to the Consultant.  
2206 **14:45** CM Susan takes blood from the mother and labels the bottles, completes the  
2207 request forms and sends the bloods off to the laboratory.  
2208 The auxiliary nurse cleans and restocks room 12.  
2209 **14:50** SHO returns notes to room 6.  
2210 **15:00** Mother from room 12 is assisted to the bathroom by the auxiliary nurse.  
2211 **15:05** Consultant phones and speaks to MC Lisa about mother in room 6.  
2212 She can eat now and if she is still settled they can transfer her to the ward later this  
2213 evening.  
2214 **15:30** Mother from room 12 transferred to ward. Midwife escorts parents. Did not  
2215 fill in details in admission book.  
2216 Community midwife looking after midwife led care mother. The community  
2217 midwives now have to come in to the labour ward and look after a range of patients.  
2218 She tells me that she finds it very stressful looking after women with epidurals and  
2219 Syntocinon and that she finds CTG interpretation very difficult. They are trained in  
2220 "the normal" and she does not see the point of coming in to the unit to be allocated  
2221 complex cases.  
2222 **16:00** Finish observations to go to a meeting.

Primary document 21: observation of attendant midwife

2223 xx/xx/xx observation of attendant midwife  
2224 **13:30** Shadowing Sister (F) Marie and student midwife  
2225 **13:45** Change of shift (handover) - the staff go into office. Details of the mothers  
2226 are on the whiteboard. This includes name, hospital number, blood group, parity,  
2227 Consultant, risk factors, fetal scalp electrode application, fetal blood sampling,  
2228 dilation of cervix.  
2229 [current labour ward status]  
2230 Room 1: Delivered  
2231 Room 2: MLC [Midwife Led Care] - 7 cms dilated, Syntocinon

2232 Room 5: Delivered - for sutures  
2233 Room 6: 3 cms dilated, ARM, fetal heart rate shows ectopic beats.  
2234 The baby has suspected IUGR - estimated fetal weight 3 kilograms.  
2235 Room 12: 26 weeks ?? for caesarean  
2236 Room 15: Prolonged rupture of membranes - allocated to Sister Marie.  
2237 **14:20** Marie has not yet asked mother if she minds if I come in the room so sit at  
2238 workstation. Marie tells me about mother and what she has done so far. Abdominal  
2239 palpation and CTG, Blood pressure /92, urine test and temperature. The mother's  
2240 membranes ruptured 36 hours ago. Clear liquor - blood stained - slight. Marie says  
2241 blood staining from doing the vaginal examination. The mother had previously  
2242 planned a water birth but due to prolonged rupture of membranes was sent to labour  
2243 ward to have induction with Syntocinon. Marie intends to discuss the extensive and  
2244 detailed birth plan with the mother. The mother is in the bath at the moment.  
2245 **15:34** Mother still in bath. Marie has explained that I am following her about to find  
2246 out about the interaction between staff and between patients. [mother] agreeable and  
2247 has made it clear that when the midwife is not in the room that I won't be either.  
2248 Explain to mother about the study and she and her husband do not object.  
2249 **15:52** Marie asks mother how the contractions are.  
2250 [Mother] "About 1 in 4 minutes not too bad."  
2251 Marie asks about labour management and what [mother] has been told on ward.  
2252 [Mother] "Not a great deal. Just about the risk of infection."  
2253 Marie acknowledges that the membranes have been ruptured for 36 hours  
2254 Marie asks about parent craft classes.  
2255 [Mother] "Yes, but I didn't take much in." Now has a contraction.  
2256 Marie "What I feel we need to do is another vaginal examination. We need to see if  
2257 you have made progress. What would it mean if you hadn't made progress?  
2258 (directed at [mother]).  
2259 [Mother] "That would mean a drip I suppose."  
2260 Marie "Yes."  
2261 [Mother]: "Would that make the contractions more painful?"  
2262 Marie "That would mean you also have to consider your analgesia. The baby needs  
2263 to be monitored continuously."  
2264 [mother] "That means by scalp clip?"  
2265 Marie "Yes usually." A discussion then follows about epidurals and their risks-  
2266 headache, reduced mobility.  
2267 Marie then recounts all the positive features - normal temperature, baby's fine, but  
2268 that she is aware that "We are moving further away from your birth plan." [But  
2269 mother has not been examined yet to see if she has made progress]  
2270 Marie asks mother how she feels about the scalp clip.  
2271 [Mother] recounts a mother at parent craft who had five clips put on. Agrees to scalp  
2272 clip as long as it does not impair mobility.  
2273 Marie comments that she wants to minimise vaginal examinations so the student is  
2274 not allowed to do a vaginal examination.  
2275 The student midwife has not said anything yet but is now going to put the monitor  
2276 on the mother.  
2277 Marie to mother "I don't know if you want to wee or not?"  
2278 Patient goes to toilet. When she returns they discuss anecdotes of horror stories  
2279 regarding birth. [mother] gets into bed.  
2280 **16:02** Marie prepares to start the vaginal examination but waits while [mother] has  
2281 contraction - no one speaks. [mother] breathing quite audible while she has a  
2282 contraction. The monitor is not switched on, but there is some earlier trace recorded.  
2283 An abdominal palpation is done. Student asks mother to lift her nightdress up so  
2284 she can place the monitor belt on the mother's abdomen. Marie gets a trolley to do a  
2285 vaginal examination. Goes out to get some water. Goes out to get some gloves from  
2286 the cupboard.  
2287 Student midwife obtains a recording of the fetal heart rate.  
2288 Student asks "Do you want me to write the time on the CTG."  
2289 Marie "No the time comes up by itself".  
2290 Student unsure which button starts the CTG printing. Marie shows her which one it  
2291 is. Marie to patient: "Was the last examination painful?"  
2292 [Mother] "Yes."  
2293 Marie "Could anything have been done to help with that?"  
2294 [Mother] "No it's probably just me. It was the first exam."  
2295 Student asks how to calibrate the CTG tocograph.  
2296 Marie performs a vaginal examination "5 cms - I think you do need a little bit of

2297 assistance.  
2298 Marie: "May I put a clip on?"  
2299 [Mother] says she can't feel the scalp clip at all.  
2300 They make [mother] comfortable and put fresh sheets on the bed after the vaginal  
2301 examination is finished.  
2302 Marie stands at the monitor. "Baby's heart rate pattern is lovely there.  
2303 Nice and accelerative and quick. I'll just get an attachment for the monitor and then  
2304 get a doctor to put up a drip."  
2305 **16:15** Contraction. Marie: "I think I was just going to sell you an epidural." Begins  
2306 to explain the range of analgesia on offer. Gas and air, Pethidine, may make the  
2307 baby sleepy, epidural - need to keep very still that may be difficult. Marie says she  
2308 is going to get a doctor to site a "drip."  
2309 [mother] says she will try the gas and air - "see if I can manage."  
2310 Marie: Advises mother on how to use the gas and air.  
2311 Marie: "Going to grab a doctor." MC Rhona tells Marie she will site the infusion.  
2312 Marie then sets up the equipment for an intravenous infusion. MC Rhona comes  
2313 in to the room.  
2314 MC Rhona "Lots of faces in here but I've got the best looking."  
2315 Proceeds to put Cannula in, but only puts it half way in and then says "Right Marie  
2316 you can finish this." Marie is now thrown into finishing the Venflon Cannula and  
2317 taking bloods with MC Rhona instructing.  
2318 MC Rhona: "Going to give you a little joy juice to get you on your way. Wasn't too  
2319 bad? [referring to the infusion] First one I've done you know. I shall leave you to  
2320 label the blood bottles [to Marie].  
2321 Marie and the student midwife check the Syntocinon infusion. Marie to mother:  
2322 "That's just sugar and water - Hartmann's." [referring to the infusion]  
2323 "We have a regime to titre the hormone."  
2324 **16:35** The Syntocinon is commenced.  
2325 Marie "Most women have an epidural with this stuff." [Syntocinon]  
2326 Marie prepares a 'gas and air' mouthpiece.  
2327 We go out and leave [mother] with the student midwife.  
2328 Marie says she believes that women having Syntocinon should have an epidural.  
2329 We go back into room. Marie asks the student to fill in the partogram and she  
2330 will get up to date with the labour summary.  
2331 Mr X returns with a cassette player and puts on some classical music. Student  
2332 palpates contractions.  
2333 **16:40** Marie now documents the vaginal examination details.  
2334 Mother is a nurse so there is a discussion about being on "the receiving end".  
2335 Discusses her job before she moved.  
2336 **16:46** Marie still writing in notes.  
2337 **16:47** Marie now standing at bottom of bed writing in the notes.  
2338 Husband returns again.  
2339 Marie: "How are you doing?" [to mother]  
2340 Marie asks student about contractions and to check blood pressure and temperature -  
2341 "That's quite important." Temperature 37.2 Pulse 96  
2342 Fan not working - Marie finds another fan for the mother.  
2343 **16:55** [Mother] breathing harder and more noticeable - giving a slight moan with  
2344 contractions now.  
2345 Marie: "The hormone is quite potent."  
2346 Marie asks student when she is going to do the patient's temperature again.  
2347 Student: "Two hourly."  
2348 Marie: "Yes - because it is slightly raised. What is the CTG like?"  
2349 Student: Baseline 120-130, variability ++, accelerations present, no decelerations,  
2350 uterine activity - two contractions in 10 minutes.  
2351 They turn the Syntocinon up to the next level.  
2352 Marie: "Heart rate trace is fine."  
2353 Marie instructs [mother] on how to use the gas and air.  
2354 **17:00** Syntocinon increased, Marie ask student to write this in the notes.  
2355 [Mother] asks if she will need to use the gas and air before she feels the contractions.  
2356 Marie: "Yes."  
2357 Marie sits [mother] up, tells her to move around so she does not get pressure sores.  
2358 **17:01** [Mother] starts using the gas and air.  
2359 The student does not say a great deal.  
2360 Marie is palpating the mother's contraction. Marie swaps places with the student and  
2361 sits down to palpate contraction. Marie and the student midwife begin talking in low



2362 voice - technical scenarios - about scalp clips and Syntocinon. Discuss various scenario  
2363 of "fetal distress" and first line management.

2364 **18:00** Break to let staff have supper and to spend some time without me observing  
2365 them.

2366 **18:30** Mother wants an epidural. Researcher waits outside as it would be a bit  
2367 crowded with researcher present.

2368 The rest of the labour ward is quiet.

2369 Room 1: The mother has been waiting 2 hours to be sutured.

2370 Room 2: 5 cms dilated

2371 Room 6: Mother with fetal arrhythmia who is about to deliver.

2372 CM Lucy asks for a paediatrician but does not say why. The paediatrician arrives.

2373 Told by CM Rhona that the delivery is not imminent. The paediatrician goes away  
2374 again as he is busy.

2375 Room 14: just delivered

2376 Room 15: [mother] having an epidural.

2377 CM Rhona has gone to take a baby in room 6 she said a paediatrician is not  
2378 required.

2379 SHO and Registrar are now in room 1 suturing.

2380 **20:00** Epidural sited for [mother] - now more comfortable and lying on her right side  
2381 facing away from the monitor. It has taken a long time to site the epidural; the  
2382 anaesthetist is new. [mother] then has some tea and toast. An intravenous infusion is in  
2383 progress and the CTG is recording. Marie and the student move [mother] to sit up a bit  
2384 more.

2385 Marie checks the sheet and smooths it. She then checks [mother] pad. The bins is sat  
2386 at the bottom of the bed and is quite full. Mr X having a cup of tea. [mother] sat up a  
2387 bit more. The fluid infusion begins to alarm. The power connection had come loose.  
2388 [mother] now eating glucose sweet.

2389 Marie asks [mother] about the names for the baby.

2390 The student asks about the infusion rate. Marie checks [mother] blood pressure.

2391 Student (palpating a contraction) to patient "Can't feel anything at all?"

2392 [Mother] "No I'd have to put my hand on it."

2393 [Partner] "How would you know is anything is happening?"

2394 Marie: "You'd need to do a vaginal examination. When is the next one due - good  
2395 question. About 9 pm. We had the Syntocinon off for an hour for the epidural as  
2396 there was a delay with the anaesthetist."

2397 Marie: "Baby's heart trace has been really constant. The baseline is 120-130."

2398 Mr X asks if the baby is sleeping.

2399 Marie: "Yes this is a sleep pattern."

2400 Marie asks student how the partogram is getting on. Checks temperature and pulse  
2401 again.

2402 Marie tells [mother] her temperature was fine "so that was good."

2403 A discussion follows on the epidural and how the delay was unavoidable.

2404 **20:25** Contractions described by [mother] as tightness.

2405 Comment on "youth" of anaesthetist.

2406 Marie: "Have you got a long time off work?"

2407 [Mother]: "I have 29 weeks leave - but only 16 weeks will be paid."

2408 Talk of childcare follows.

2409 **20:30** Student midwife documents observations in case notes. Marie is palpating  
2410 contractions, doing epidural check, pressure area check.

2411 Marie "Baby's fine" Do you prefer to look at the monitor?"

2412 [Mother]: "Yes only for a sideways glance."

2413 The monitor is turned so that [mother] can see it.

2414 Marie explains which is the heart rate and contractions pattern.

2415 [Mother] "I did use the monitor to help me when I was taking the gas and air."

2416 [Partner]. "It's quite nice to see that, it's reassuring to see with all that stuff going in  
2417 her, that the baby's stable."

2418 Student midwife asks about Syntocinon rate and if it has been turned up.

2419 Marie "At the next examination we will examine the dilation of the cervix and the  
2420 position and the height."

2421 A discussion on pushing follows. Marie asks if it has answered their question.

2422 [Mother] "I think epidurals have had a bad press."

2423 Marie: "Sometimes there are complications, headache, backache, its difficult to  
2424 know if they would have had backache anyway."

2425 [Mother] tells Marie she went to aquanatal classes.

2426 Marie explains change over of staff is at 21:45.



2427 **21:10** Marie explains to [mother] that another vaginal examination is required.  
2428 Marie gets some warm water and the trolley for vaginal examination.  
2429 The student midwife brings some fresh drinking water in for [mother].  
2430 Student midwife palpates mother's abdomen and recounts her findings.  
2431 **21:15** Marie cleans [mother] and passes a catheter "to drain the urine from the  
2432 bladder." [mother] seems a bit tense. Marie asks if it is uncomfortable.  
2433 Marie "Fluid around baby is quite clear. I can see that. Is that too uncomfortable?"  
2434 [Mother] "No it's just me."  
2435 Marie "Just feeling around the cervix. There is still some cervix left there. That's  
2436 fine. I'll just take my hand out."  
2437 Student midwife: "Do you want to look at pressure areas while you are here?"  
2438 [mother] sheet is changes and position changed. [mother] helped into a more  
2439 comfortable position.  
2440 Marie gets a plastic model of cervical dilation and shows [mother] how dilated the  
2441 cervix is [7-8 cms].  
2442 Marie: "The head has come down a bit. Taking the whole picture progress has been  
2443 made."  
2444 Marie increases the Syntocinon. Explains to [mother] about the importance of resting  
2445 tone of the uterus between contractions.  
2446 Marie empties the bin. The night duty midwife comes in and the student midwife  
2447 presents the case. She seems a little nervous. SM Nicola the night staff midwife  
2448 tells her to take her time.  
2449 The student speaks softly and we all have our back turned away from [mother] to look  
2450 at the notes. The student provides details of events in labour so far.  
2451 Prolonged rupture of membranes, temperature has been fine so far, continuous  
2452 monitoring in progress and an epidural has been sited.  
2453 Good progress had been made. There is no reference to the partogram or Syntocinon  
2454 during this handover.  
2455 **22:00** I thank the staff and parents before leaving.

Primary document 22: observation of attendant midwife

2456 xx/xx/xx Observations of CM Samantha [core midwife]  
2457 **07:00** Handover in communal office. No one in labour at the moment  
2458 **07:30** Staff having cup of tea. Waiting for mother to come in. [mother], last baby  
2459 born 10 years ago. Mother informed that I am following CM Samantha (G) - no  
2460 objections to this.  
2461 CM Samantha takes mother's blood pressure, pulse, temperature, does an  
2462 abdominal palpation. A CTG is commenced.  
2463 CM Samantha explains the CTG recording to mother. The bottom line is the  
2464 contraction pattern but that the increase in baseline does not show the strength of the  
2465 contractions - she would rather listen to the mother to find out about that. The  
2466 normal range for the baby heart rate is 110 - 160. "I don't want to see any drops down  
2467 or a straight line, but some nice accelerations."  
2468 CM Samantha goes to the office and starts to complete some of the paperwork in  
2469 advance of the delivery e.g. discharge form, blood group entered, baby notes  
2470 completed as much as possible. CM Samantha comments on the amount of  
2471 redundant data. Takes new staff a long time to complete it and to learn it. CM  
2472 Samantha does not do the postnatal care plan.  
2473 AM Edith is also in the office going through the CTG teaching package.  
2474 [The one thing about going through the notes and duplicating a lot of things is that  
2475 is forces you to find out the information and I suppose to remember the data]  
2476 **09:00** Now going to do a vaginal examination. CM Samantha looks at the CTG,  
2477 "The baby is a bit sleepy so I think we will leave you on there a little bit longer."  
2478 Mother gets up and goes to toilet.  
2479 After the vaginal examination CM Samantha tells the patient she is not in labour,  
2480 but the cervix is soft. CM wants to keep the monitor on so that she can see some  
2481 accelerations.  
2482 "There is nothing the matter with the trace but the beat to beat variability is reduced  
2483 so we need to keep an eye on that. The cervix is a multips os, when you have had a  
2484 baby the cervix lies open a bit. When are you due to be induced?"  
2485 Mother "Next Thursday."  
2486 CM Samantha "I don't think you will go that far."  
2487 CM Samantha tells mother that the trace will remain on to see if the baby wakes  
2488 up a bit. Depending on the results of that the mother can make her mind up what to  
2489 do. CM Samantha cleans up the examination trolley. We leave the room and CM

2490 Samantha writes up the notes. The CTG is described as "lack of variability or  
2491 accelerations."  
2492 CM Samantha goes into room 6 to take a baby.  
2493 Senior Registrar Norman asks if any problems - no response from staff.  
2494 **10:05** CM Samantha returns to see mother - looks at CTG.  
2495 CM Samantha "That's fine now. What do you want to do?"  
2496 Mother "I think I'll go home."  
2497 Senior Registrar (SR) Allen has just come out of theatre.  
2498 We go out to the workstation. Samantha is writing up the notes. She shows SR  
2499 Allen the CTG and asks "What do you think?"  
2500 SR Allen "Lovely."  
2501 CM Samantha "That's good cause I was going to send her home."  
2502 SR Allen "Good."  
2503 The SR signs the CTG trace.  
2504 [Later on I asked CM Samantha if she would have called the doctor to look at the  
2505 CTG. She said she would not have done so, but as the SR was around she wanted  
2506 him to confirm that the trace was OK]  
2507 She then made a comment but asked me not to write it down.  
2508 ["I got his signature because of anything happened I have proof that it was seen by  
2509 him. They would lie to protect their career"]  
2510 **11:00** CM Samantha does not have a mother to look after at the moment. There  
2511 are three mothers in labour ward. MC Lisa is the coordinator today. She is  
2512 checking where mothers have sent so that their blood results can be sent to ward.  
2513 Room 2: high head  
2514 Room 6: high BP IOL 39+3 weeks  
2515 Room 15: 21 weeks gestation  
2516 **11:10** There is a mother coming in Para 2 - room 1, CM Samantha (G grade)  
2517 [Researcher ask the staff on duty about high risk and low risk rooms which they are  
2518 trying to adopt but without much success. Room 1,2,5,6 = high risk. Risk is assessed  
2519 on phone at admission call. Most staff seem to be of the opinion that it does not work  
2520 and is impractical]  
2521 Community midwife on duty as well - mainly for low risk and water birth - comes  
2522 in a couple of times a month. The community midwife tells me that she dislikes  
2523 coming to labour ward as she is given complex cases, when the aim of the allocation  
2524 was to promote "normality" and reduce the amount of intervention in normal cases.  
2525 **12:00** Mother admitted by CM Samantha who informs mother about the study.  
2526 The mother is contracting strongly. A CTG is commenced and gas and air given to  
2527 mother.  
2528 **12:04** Vaginal examination done. CM Samantha tells the mother that the cervix is  
2529 four cms dilated.  
2530 CM Samantha "Your waters are still intact. Do you want me to break them for you  
2531 or do you want to keep them?"  
2532 Mother "Its up to you."  
2533 CM Samantha "If I break them the contractions will probably become stronger."  
2534 Mother "Go on then."  
2535 CM Samantha ruptures the mother's membranes. The bed linen is changed.  
2536 The mother is getting contractions about every 3 minutes. She is sitting up and her  
2537 husband is sitting beside her.  
2538 CM Samantha is writing in the notes in the room. Documents details of admission  
2539 and vaginal examination details. [at work surface - back turned to parents]  
2540 The abdominal trace is on and the heart rate is quite loud.  
2541 **12:11** CM Samantha is writing details on the partogram.  
2542 The mother and her husband say nothing.  
2543 The mother asks for a drink of water, her husband gets it for her.  
2544 The husband tells CM Samantha the name of the baby - Tommy Lee for either a  
2545 baby or a girl. The mother tells CM Samantha she has still stopped smoking. The  
2546 husband says he is very hot. [CM does not respond to mother or father]  
2547 The mother is using Entonox, the CTG is in progress; the FH sounds as if it is  
2548 slowing a little with contractions. CM Samantha is still doing her paperwork  
2549 **12:18** CM Samantha places a hand on the mother's abdomen. The mother is lying  
2550 fairly flat in the bed. The contractions are coming closer together. Samantha tells  
2551 [Mother] to use the gas and air.  
2552 [Mother] is crying out in pain. She is told to breath on the gas.  
2553 CM Samantha "Have a drink - it makes you dry" (the gas). Did you feel you  
2554 wanted to push with that one?"

2555 [Mother]: "A bit"  
2556 CM Samantha goes out to get some fluids to prepare for delivery. While she is out  
2557 the mother has a strong urge to push.  
2558 **12:25** CM Samantha begins to bring out a trolley and begins to prepare for  
2559 delivery. She also checks the neonatal resuscitation trolley and draws up  
2560 Syntometrine injection for the third stage of labour. The curtain is drawn back as it  
2561 is obscuring the clock. At this point CM Samantha does a vaginal examination but  
2562 asks me not to record this.  
2563 [There is no real indication to do a vaginal examination at this point so it is  
2564 considered illicit by AM].  
2565 The mother cries out with a contraction. Samantha opens up the delivery pack and  
2566 washes her hands. The mother's partner has removed her nightgown. The mother is  
2567 now completely naked apart from two CTG belts. She has lots of very large and  
2568 intricate tattoos. They cover most of her body.  
2569 CM Samantha "Do what your body tells you to do."  
2570 The mother cries out.  
2571 CM Samantha tells the mother not to panic.  
2572 CM Samantha "The baby will soon be here. Put your chin forward if you can. Put  
2573 your hands behind your legs."  
2574 Mother "I want to go home."  
2575 "Come on don't lose control. You have done brilliantly. Go on push. Keep it  
2576 coming. Go on that's brilliant. Little push – pant, pant, pant."  
2577 CM Samantha rings the call bell.  
2578 Another midwife comes in to take the baby. She puts on gloves, takes the  
2579 Syntometrine injection from the bottom of the delivery trolley. "Hi I'm Mary."  
2580 **12:40** At this point the head is delivered.  
2581 Mary "Do you want it on you tummy?"  
2582 Samantha: "When you get the next pain give a push."  
2583 The baby is born with the next contraction. The parents embrace.  
2584 Samantha "What have you got?"  
2585 Mother: "Is it alright?"  
2586 CM Samantha "Yes."  
2587 It's a boy. He is crying loudly. The cord is clamped and cut. Mary takes the cord  
2588 segment and the birth registration form out of the room. The placenta is delivered  
2589 and the bed sheet changed.  
2590 **12:43** CM Samantha takes mother's blood pressure, pulse and temperature. The  
2591 mother is offered a cup of tea.  
2592 **13:10** The baby is weighed and bathed, an injection of Vitamin K is given, head  
2593 circumference measured and temperature taken. The baby is dressed. Samantha  
2594 instructs the mother to keep the baby cord above the nappy to stop infection. Labels  
2595 for the baby are done and checked with mother. The labels remain on until mother  
2596 and baby are at home and the community midwives checks and removes them.  
2597 **13:15** The baby has a feed at the breast. Mother asks for Paracetamol.  
2598 We leave them alone. Sitting out at desk, CM Samantha completes her paperwork  
2599 and asks if pharmacy has been done. The other midwives are sitting at the  
2600 workstation talking about the "Early Learning Centre" which is a reference to the  
2601 Early Labour Suite - it does not seem to be working well "Never used" comment by  
2602 CM Samantha.  
2603 **13:20** CM Samantha still doing the paperwork for the delivery. Asks to read what  
2604 I have written - I give her the notes to read. She asks me to write that she instructed  
2605 the patient about pelvic floor exercises. She makes a comment on the diagram the  
2606 researcher has drawn.  
2607 "Does that mean that I am focusing too much on the paperwork and not enough on  
2608 the patient". I tell her I do this for all the cases when I can and it is to help to  
2609 develop an observation schedule.  
2610 **13:45** Late shift midwives arrive and go into office for handover.  
2611 **14:00** CM Samantha finished her paperwork.  
2612 Records birth in birth register.  
2613 **14:15** Auxiliary nurse helps mother into the bath and cleans the room.  
2614 **14:30** CM Samantha orders pharmacy for tomorrow and checks controlled drugs  
2615 with MC.  
2616 **15:00** CM Samantha goes home. Observations completed for today.

Primary document 23: observation of attendant midwife

2617 xx/xx/xx 13:30 Arranged to observe direct care with AM Rhona [core midwife]



2618 13:45 Handover in office with incoming late shift.  
2619 AM Rhona cares for mother in room 14 and is also midwife co-ordinator until  
2620 MC Val comes in. Another mother has arrived. AM Edith informs AM Rhona  
2621 that the patient is 33 weeks with bleeding and contractions.  
2622 Mother in room 2 has delivered.  
2623 Mother in room 6 is delivering and the paediatric registrar is in attendance.  
2624 AM Rhona tells [mother] that a vaginal examination will be done at 14:30.  
2625 There is a monitor in the room with some previous CTG on it. The mother is having  
2626 contractions 1:2 to 3 minutes.  
2627 14:00 AM Rhona takes [mother] blood pressure, pulse, temperature, fetal heart rate  
2628 and abdominal palpation performed.  
2629 14:30 Vaginal examination performed.  
2630 AM Rhona: "Not an awful lot you have done."  
2631 [mother]: "What is it now?"  
2632 AM Rhona: "5 cms, its thick."  
2633 AM Rhona: "I'll wait and see what happens with the next contraction. Some times  
2634 we can make it a bit more at no extra cost. The cervix is loosely applied. It's as well  
2635 you are up and about to help that head come down. Got a pain now and the head's  
2636 coming down like a bullet. You are now 8 centimetres dilated."  
2637 [mother] "That's better."  
2638 AM Rhona: "Lovely, lets clean you up. Fairly thick but its coming down now."  
2639 14:35 AM Rhona listens to the fetal heart (FH).  
2640 [mother] asks if she will need Syntocinon.  
2641 AM Rhona: "No."  
2642 AM Rhona makes mother comfortable and clears up the trolley.  
2643 [mother] gets up to walk around.  
2644 14:38 AM Rhona completes the partogram and writes in the case notes.  
2645 14:39 Documents findings from vaginal examination.  
2646 14:50 AM Rhona listens to the fetal heart again [using the monitor].  
2647 14:54 AM Rhona "You are breathing heavier, things are happening now."  
2648 [mother]: "Yes."  
2649 14:55 [mother] is standing up. AM Rhona is palpating a contraction. After the  
2650 contraction is finished AM Rhona says "I am going to get my trolley soon."  
2651 [mother]: "There is another contraction coming."  
2652 15:02 AM Rhona leaves the room to get some water for the delivery.  
2653 15:06 AM Rhona prepares Syntometrine injection for third stage and  
2654 brings delivery trolley into delivery room.  
2655 Records fetal heart rate on the partogram. Documents notes.  
2656 [mother] said she is feeling things more in her back.  
2657 15:08 [mother] thinks she may need to get into bed soon.  
2658 15:10 CM Lisa comes in and tells AM Rhona about what is happening in the  
2659 labour ward. AM Rhona says MC Val is coming in.  
2660 15:13 AM Rhona goes out to check what is happening with the mother in Room 2.  
2661 15:15 AM Rhona returns. Writes in notes, then listens to the FH and takes pulse.  
2662 15:18 [mother]: "I really feel like pushing down now." Mother sitting on edge of bed.  
2663 AM Rhona talks to the patient, tells her to breath through the contraction.  
2664 15:20 [Mother] "That was a pushy one."  
2665 [Mother] gets back into bed.  
2666 AM Rhona elevates the bed. Asks mother to remove her underwear.  
2667 15:22 Another contraction.  
2668 [mother]: "Should I be pushing?"  
2669 AM Rhona: "If you want. Do what your body wants you to do."  
2670 15:23 AM Rhona listens to the fetal heart. Brings notes over to mother, pulls out  
2671 trolley, puts notes on trolley and records the fetal heart on the partogram. The  
2672 husband is holding the external probe on his wife's abdomen.  
2673 15:24 [mother] beginning to push. AM Rhona opens up her delivery pack and puts  
2674 gloves on to trolley.  
2675 "Would you like the baby dried off?"  
2676 [mother] is crying out.  
2677 AM Rhona: "It's nearly there. You're doing fine."  
2678 15:25 CM Rhona: "It's there. Don't panic."  
2679 [mother] crying out. AM Rhona tells [mother] not to panic, just push.  
2680 15:27 AM Rhona: "Your doing fine now." AM Rhona prepares delivery trolley.  
2681 15:28 AM Rhona is standing at the bedside "I can see the head now" She tells the  
2682 patient to push. The mother cries out.



2683 AM Rhona cleans and drapes [mother] ready for delivery.  
2684 15:30 If you give me 2 good pushes we will have this baby."  
2685 [mother] screams. The head is visible i.e. crowned +.  
2686 15:36 Baby delivered, cord round neck x 1 tight. He is taken to the resuscitation  
2687 trolley and his airways are cleared and he is given some oxygen.  
2688 15:38 The baby screams loudly.  
2689 The umbilical cord segment is taken out and given to the auxiliary nurse for  
2690 analysis. AM Rhona bathes and weighs the baby, puts on the baby labels and helps  
2691 [mother] to feed the baby.  
2692 AM Rhona completes the delivery notes and paperwork in the room after she has  
2693 attended to [mother].  
2694 [The delivery was very tidy and efficient, the sequencing of the process after  
2695 delivery was organised so the paperwork was completed as quickly as possible]  
2696 16:30 AM Rhona leaves the room and the details of the birth are entered into the  
2697 birth register. The ward is phoned to arrange a bed for [mother].  
2698 [Researcher noticed that the baby was given Apgar 9/1 and that there is no  
2699 documentation of resuscitation details]  
2700 17:00 AM Rhona sits at work station and has a cup of tea.  
2701 17:20 AM Rhona tells auxiliary nurses to run a bath for mother.  
2702 17:30 We go back into room. AM Rhona checks mothers abdomen to ensure  
2703 uterus contracted and checks vaginal loss. Mother helped out of bed  
2704 and escorted to bathroom. Husband follows behind with baby cot and  
2705 luggage. The mother is helped into bath and given the emergency buzzer in case she  
2706 feels faint. The mother's room is now being cleaned by two auxiliary nurses.  
2707 18:00 Mother now ready to go to ward. AM Rhona completes the admission book  
2708 and logs the time of departure against [mother] admission details.  
2709 18:12 Arrive on [ward]. Greeted by SM who shows [mother] to her room.  
2710 The bed has been prepared and a jug of water and glass placed on the locker.  
2711 AM Rhona gives a brief summary of the labour.  
2712 Came in from home, all normal, no monitoring, minimal blood loss, baby's been to  
2713 the breast and had a good feed. AM Rhona says goodbye to mother and father.  
2714 18:35 Back on labour ward.  
2715 AM Rhona asks MC Val what is happening on labour ward. All quiet at the  
2716 moment. MC Val suggests AM Rhona has something to eat.  
2717 18:45 We go into staff sitting room. The staff have a microwave and tend have their  
2718 food on labour ward rather than go to the staff canteen.  
2719 19:30 AM Rhona finishes her meal and we go to sit at the workstation.  
2720 20:00 The labour ward is quiet. AM Rhona usually acts as midwife coordinator  
2721 when she is on duty. I have observed that even when AM Rhona is not allocated  
2722 as midwife coordinator most of the midwives and doctors refer to her.  
2723 From 20:00 to 21:30 AM Rhona drinks tea and reads magazines at the work  
2724 station. AM Rhona is not feeling very well.  
2725 21:30 The night staff arrive and the handover takes place in the office.  
2726 AM Rhona is not involved with this. She checks the off duty to see who she  
2727 is working with tomorrow.  
2728 22:00 AM Rhona goes off duty.  
2729 Observations completed.

Primary document 24: observation of attendant midwife

2730 xx/xx/xx observation of attendant midwife  
2731 09:45 Mother admitted by Sister Abby (F-grade midwife). Mother has come from  
2732 the ward for an amniotomy. Second baby, now at 41 weeks gestation. Prostin  
2733 induction. Routine observations taken (temperature and blood pressure).  
2734 10:30 Record keeping.  
2735 AM asks mother about fetal movement. Mother says baby moving OK. CTG  
2736 commenced.  
2737 Midwife explains CTG to mother, accelerations good sign.  
2738 AM "Happy for Vitamin K and injection for placenta?"  
2739 10:40 Vaginal examination performed, membranes ruptured, meconium stained  
2740 liquor. Fetal heart checked after vaginal examination. Sometimes this starts labour  
2741 or we have to put up a synthetic hormone. Meconium liquor explained baby's  
2742 bowels have opened inside. Nothing to worry about, just need to have baby doctor  
2743 present to make sure baby does not swallow any of it because it can be irritant.  
2744 11:00 MC sites intravenous Cannula in anticipation of Syntocinon.  
2745 11:15 Mother mobilises.

2746 12:00 External monitoring commenced.  
2747 12:15 Midwife record keeping.  
2748 12:30 Blood pressure taken.  
2749 13:00 Mother changes pad.  
2750 13:45 Change of shift. Midwife and medical student take over (mother not asked if  
2751 she wants medical student in room). Handover at workbench with backs turned to  
2752 mother. Second baby, induced for post maturity, beginning to contract. Haven't  
2753 started Syntocinon just yet thought I'd give her a chance.  
2754 14:00 Midwife tells mother that it is time for another vaginal examination. About  
2755 four cms dilated, head could do with coming down a bit more.  
2756 14:30 Contractions not getting any stronger. Will talk to MC.  
2757 14:45 MC suggests mobilisation.  
2758 15:00 Mother up walking around.  
2759 Midwife sits at workstation has a cup of tea.  
2760 15:45 CTG commenced. Contractions getting a bit stronger.  
2761 16:30 Midwife tells mother time for another vaginal examination. Not a lot of  
2762 change in the cervix, a bit thinner. Thinks mother needs Syntocinon.  
2763 17:00 Reports findings to MC who tells AM to start Syntocinon.  
2764 17:15 Syntocinon commenced.  
2765 17:30 Blood pressure recorded.  
2766 17:30 Record keeping.  
2767 17:35 Syntocinon increased.  
2768 17:45 Syntocinon increased.  
2769 18:00 Contractions getting stronger and more regular.  
2770 18:27 Mother feels "pressure" but it is constant rather than with each contraction.  
2771 Now wants to go to toilet. CTG [external] switched off and belts and lead removed  
2772 from mother. Midwife disconnects the infusion pump to allow the mother to get up.  
2773 18:28 Mother has contraction, breathing through them - not lasting long. There is a  
2774 resuscitation trolley in the room and a cot prepared for the baby. Medical student  
2775 asks AM if this is failure to progress in the first stage. [The usual regime for  
2776 induction is amniotomy and then Syntocinon infusion within two hours but this  
2777 mother did not have Syntocinon until about 17,00]  
2778 The Registrar (Betty) said earlier when the researcher was sitting at the workstation  
2779 that Syntocinon should have been started as soon as the mother came to labour ward -  
2780 which was this morning.  
2781 18:33 Mother returned for toilet, given a clean pad. The Syntocinon infusion is  
2782 bleeping [running on battery alert]. Midwife looks at the pump and switches it on  
2783 again at the main power socket.  
2784 18:35 Midwife was about to put the CTG on again but is waiting for a contraction to  
2785 finish.  
2786 18:36 CTG recommenced [external]. Midwife completes her notes.  
2787 18:45 Syntocinon increased again, annotated on paper CTG recording.  
2788 18:49 Mother has to twist round to see the clock, which is at the back of the bed.  
2789 Mother feels cold and shivery - temperature taken.  
2790 19:00 AM sits out at workstation and has a cup of tea.  
2791 19:15 Medical student comes out and informs AM that the mother finding pain  
2792 difficult to cope with.  
2793 19:20 Mother now on bed and on her knees, but then turns to sit with her legs on the  
2794 edge of the bed. Mother says she might need the gas and air.  
2795 19:22 Not really able to pick up the fetal heart very well when mother sitting on  
2796 bed. Midwife seems to be making no effort to reacquire the fetal heart rate. [There  
2797 has been loss of contact with the fetal heart for 25 minutes. [Researcher asks midwife  
2798 to check the fetal heart]  
2799 Once back in bed the monitor picks up the fetal heart rate at 130 b.p.m.  
2800 19:27 Prepares for vaginal examination. Brings out trolley, swabs and drapes.  
2801 Vaginal examination performed and FSE applied. "Ping-pong balls instead of  
2802 galloping horses." [reference to change in tone from monitor]  
2803 Definite progress 6-7 cms. Application of scalp electrode. Changes pad and puts  
2804 on leg band to hold monitor connector in place.  
2805 19:33 Mother becoming restless, using gas and air.  
2806 Mother asks to stand up; she is upright, leaning on the bed and breathing through  
2807 the contractions.  
2808 Mother says she feels like it is coming [the baby].  
2809 Midwife asks medical student to get some water. The bottles of water are placed on  
2810 the resuscitation trolley. Midwife puts on her apron. Mother finds it hard to stand,

2811 getting back into bed. Mother crying out now "Oh GOD." The fetal heart rate begins  
2812 to slow. Mother in bed on her side.  
2813 19:42 Midwife starts to prepare delivery trolley. Mother wanting to push. Crying  
2814 out. Fetal heart – 119 b.p.m.  
2815 19:44 Mother crying. "Can I push now?" Fetal heart begins to slow. Asks medical  
2816 student to tell MC that she is "fully and pushing" and will need a paediatrician for  
2817 delivery.  
2818 CM Samantha comes into the room asks midwife to turn mother onto her back  
2819 so she can "suck the baby out." [clear the air passages] CM Samantha asks if  
2820 paediatrician has been called. Medical student says yes.  
2821 Samantha puts light on. Prepares injection of Syntocinon for third stage.  
2822 19:53 Paediatrician arrives and checks equipment. CM Samantha informs the  
2823 paediatrician that this is a post-mature pregnancy and that there is meconium  
2824 stained liquor. The paediatrician is not introduced to the parents.  
2825 CM Samantha comes over to bed and tells mother to push and sit up and pull on  
2826 her legs. [CM Samantha now in command]  
2827 CM Samantha says baby is getting tired and needs out. FH 70. The suction  
2828 machine is on and making a lot of noise.  
2829 19:55 Can see the top of baby's head. Encouraged to push.  
2830 19:57 Head crowned fetal heart rate 78 b.p.m.  
2831 19:59 The baby's head is delivered, the baby's air passages are cleared with suction.  
2832 The head looks quite big, the midwives look at each other. [? worried about  
2833 shoulder dystocia]  
2834 20:01 Delivered - large baby boy. Cord clamped and cut and baby handed to  
2835 paediatrician. The baby is fine.  
2836 20:05 Placenta delivered.  
2837 Medical student takes out segment of cord segment and birth registration form to give to  
2838 auxiliary nurse, CM Samantha helps AM to change mothers bedding.  
2839 20:10 CM Samantha leaves the room.  
2840 20:12 The baby is given a breast feed.  
2841 20:15 AM brings out delivery trolley and inspects with placenta with the medical  
2842 student. It appears complete. The placenta is wrapped in paper, placed inside two  
2843 plastic bags and placed in a freezer.  
2844 20:25 AM sits out at workstation and begins the paperwork.  
2845 20:30 The medical student is sent to have something to eat.  
2846 21:05 Paperwork completed. Details of birth registered in book. Cord blood gases  
2847 normal.  
2848 21:13 AM asks auxiliary nurse to "run a bath for my lady."  
2849 21:15 We return to room to see mother. AM checks mother's blood pressure, pulse  
2850 and temperature. The observations are all normal. AM checks the mother's abdomen,  
2851 and tells the mother her uterus is nice and tight. Checks for bleeding and then takes  
2852 mother to have a bath. Baby is in a cot and is wheeled though to bathroom by father.  
2853 Parents are given the emergency buzzer in case the mother "has a funny turn."  
2854 21:30 Night staff begin to arrive.  
2855 21:30 AM helps auxiliary nurse to clean the room and restock equipment in the  
2856 delivery room.  
2857 21:45 Observations complete.

## 7. Summary tables of external site visits

The external sites	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Number of deliveries	4527	~ 5,000 – 5,200	6,200	6,000	~5,300 – 5,400
Number of delivery rooms	13	14	15	23	11
Number and type of monitors	Number of monitors unknown Hewlett Packard 8040 (about to change)	Enough for all delivery rooms. Corometric and Hewlett Packard	11 Sonicaid and Corometric	Enough for each delivery room Sonicaid and Corometric	Unknown Sonicaid and Corometric
Central fetal monitoring system	No	No	No	Yes	Would like
Fetal monitoring rates	Unknown	Unknown	Unknown	Unknown	Unknown
Fetal monitoring modes by ultrasound or scalp electrode	Unknown	Unknown	Unknown	Unknown	Unknown
Fetal blood sampling rates	Unknown	Unknown	Unknown	Unknown	Unknown

**Table B: General description of the external sites**



Information technology	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Computerised CTG teaching package	No	No	Yes	Yes	No
Maternity information system (current)	STORK	STORK	Hospital information system	Unknown	Hospital information system
Information system (future)	? PROTOS	ACIS	-	-	-
Blood gas machine	Ciba 248	Ciba 248 (pH only)	Ciba 248	Ciba 860, 865 and 248	Ciba 845
Expert DataCare	Yes	No	Yes [not observed by researchers]	No	No
Cord blood sampling	Ad hoc	Ad hoc. Machine only measures pH	Ad hoc based on risk criteria / adverse outcome	Mainly venous samples – see randomised trial as change model	Ad hoc. Would like routine
Validation procedures	No one looking at data	Not applicable	No one looking at data	Unknown	Unknown

**Table C: Information technology**

Communication and information	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Ward Rounds	8.30; 13.00; 17.00; 22.00. Takes place outside of room. Attendant midwife presents case. Medical staff go into delivery room if requested	17.00 Takes place outside of room. Midwife-in-charge presents information Medical staff go into delivery room if requested	08.30;14.00;17.00 Senior Registrar 22.00. Takes place outside of room. Attendant midwife presents case. Medical staff go into delivery room if requested	09.15; 12.30; 17:00-18.00 Takes place outside of room. Attendant midwife presents case. Medical staff go into delivery room if requested	09.00; 13.00; 17.00; 22.00. Takes place inside delivery room with coordinating midwife and doctors present.
Shift Change	7.30; 14.00; 21.15	7.30; 13.45; 21.30	7.30; 13.30; 21.15	7.30; 13.15; 21.30	7.20; 13.40; 21.25
Chalkboards / Whiteboards	In room away from public view (on wheels) – where staff have their coffee	In middle of work station (on wheels)	At work station on wall List of staff on duty	At work station on wall List of staff on duty	At work station List of staff on duty Named midwife board
Documentation	Same as local site	Same as local site	National records	Own model	National records
Partogram	About the same as local site	About the same as local site	Partogram starts at 4 centimetres and ends at 12 hours.	Includes latent phase	14 hours, includes alert line
Labour ward guidelines	Paper copy – book form	On computer	On computer	On computer	In two large filing cabinets

**Table D: Communication process and structures**

Staffing	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Staffing levels Patient to midwife ratio	2:1 or 3:1 Try to give 1:1 care to mothers with epidural or Syntocinon	2:1	2:1	2:1	2:1 but often 1:1
Midwife in charge	Coordinator (G-Grade)	Shift leader / team leader (G-Grade)	Shift leader (G-Grade)	Shift leader / team leader (G-Grade)	Coordinator(G-Grade)
Sickness rates	High	Not thought to be high	Not sure	Not considered a problem	Not considered a problem
Staff turnover	High	Not sure	Tend to retain staff	Not thought to be high	Not thought to be high
Bank staff	Yes	No	Yes – own staff	No	No
Obstetric team	Unable to assess – unit busy at time of visit	Unable to assess – unit busy at time of visit	G-grade triage Midwives and doctors work closely together	G-grade and Registrar No patient or midwife choice	G-grade and Consultant
Team midwifery	No	No	No	No – designated midwife unit for low risk	No

**Table E: Staffing and coordination**

## 8. Summary tables of audio video recordings

Case No	Age	Parity	Gestation (weeks)	Antenatal risk	Labour Onset	Syntocinon use	Analgesia	Fetal monitoring	1st stage (hrs: mins)	2nd stage mins (active)	Delivery Mode / Indication
1*	28	2	36+6	Pre-labour rupture of membranes	Induced Syntocinon	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Epidural	Continuous electronic	05:07	11	Normal delivery
2	20	1	38+5	Breech Pre-labour rupture of membranes	Induced Prostin pessary	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Entonox Epidural	Continuous electronic	08:45	21	Assisted breech
3	28	0	38+3	Preeclampsia	Induced Prostin pessary	1 <sup>st</sup> and 2 <sup>nd</sup> stage	TENS Entonox Epidural	Continuous electronic	05:40	70	Normal delivery
4	31	2	39+1	Suspected macrosomia [large baby]	Induced Prostin pessary  Amniotomy	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Entonox	Continuous electronic	02:25	3	Normal delivery
5	22	1	37+0	Gestational diabetic diet controlled	Induced Prostin pessary Amniotomy	None	Entonox Spinal	Continuous electronic	04:00	50	Ventouse delivery [in theatre]  Delay in 2 <sup>nd</sup> stage



6	29	0	41+1	None	Spontaneous	None	Pethidine Entonox Epidural	Continuous electronic	09:30	43	Ventouse delivery Abnormal CTG
7	25	2	35+5	Previous neonatal death Irregular contractions	Induced Amniotomy	None	Entonox	Continuous electronic	03:10	5	Normal delivery
8	23	0	36+6	Pre-labour rupture of membranes  High vaginal swab positive for Haemolytic Streptococcus	Induced Syntocinon	1st and 2nd stage	Entonox	Continuous electronic	01:17	22	Normal delivery
9	29	0	41+2	Pre-labour rupture of membranes  Post-dates	Induced Prostin pessary Syntocinon	1st and 2nd stage	Epidural	Continuous electronic	14:00	—	Caesarean section  Failed induction of labour
10	18	0	41+5	Post-dates	Induced Prostin pessary	None	Epidural	Continuous electronic FBS in labour (pH 7.28)	05:55	12	Normal delivery

11	28	3	39+3	Small antepartum haemorrhage [39+3 weeks]	Induced Syntocinon	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Entonox	Continuous electronic	03:45	5	Normal delivery
12	30	1	39+4	Previous elective caesarean  Antepartum haemorrhage at 37 weeks	Spontaneous	1st and 2nd stage	Entonox  Epidural	Continuous electronic	05:35	17	Normal delivery
13	29	2	41+4	Post-dates	Induced Prostin pessary Amniotomy	None	None	Continuous electronic	04:35	7	Normal delivery
14	35	1	38+3	Preeclampsia  Poor fetal growth	Induced Prostin pessary Amniotomy	1st and 2nd stage	Epidural	Continuous electronic	10:35	73	Ventouse delivery  Suboptimal CTG  Delay in 2 <sup>nd</sup> stage
15	28	1+SB	39+5	Intestinal disease Previous still birth	Induced Prostin pessary Amniotomy	1st and 2nd stage	Epidural	Continuous electronic	06:55	82	Normal delivery

16	26	0	40+5	Induced because of discomfort	Induced Amniotomy	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Epidural	Continuous electronic	06:45	77	Neville Barnes forceps Delay in 2 <sup>nd</sup> stage
17	18	0	40+0	Intrauterine growth retardation	Induced Prostin pessary Amniotomy	2 <sup>nd</sup> stage	Entonox	Continuous electronic	07:40	101	Normal delivery
18	35	5	40+6	None	Spontaneous	None	Entonox	Continuous electronic	04:10	13	Normal delivery
19	20	0	41+3	Hypertension [Labile blood pressure]	Induced Prostin pessary Amniotomy	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Entonox Epidural	Continuous electronic	11:00	57	Neville Barnes forceps Delay in 2 <sup>nd</sup> stage [Labetalol infusion in labour]
20	20	0	41+6	Post-dates	Induced Amniotomy	1 <sup>st</sup> and 2 <sup>nd</sup> stage	Entonox Epidural	Continuous electronic	05:15	57	Normal delivery Moderate shoulder dystocia
21	28	1	41+3	Post-dates	Induced Amniotomy	None	Entonox	Continuous electronic	01:35	33	Normal delivery

**Table F: Characteristics of audio-video cases**

\*Case 1 was a pilot study case and was not included in analysis

2<sup>nd</sup> stage active = length of time pushing

Case	Attendant midwife	Midwife coordinator	Core midwife	Temporary carer	SHO	Anaesthetist	Registrar	Senior Registrar	Staff grade	Paed	Consultant	Total
2	2	0	0	0	1	1	1	0	0	1	0	6
3	2	2	1	0	0	1	1	0	0	0	0	7
4	2	0	0	1	1	0	0	0	0	0	0	4
5	2	0	0	1	1	0	0	1	0	0	0	5
6	1	0	0	0	1	1	0	0	1	1	0	5
7	2	1	0	0	0	0	0	0	0	1	1	5
8	1	1	0	1	0	0	0	0	1	1	0	5
9	2	1	0	1	0	1	0	1	0	0	0	6
10	1	0	0	0	0	1	0	2	0	0	0	4
11	2	0	0	1	0	0	0	0	0	0	1	4
12	1	1	0	1	0	0	0	0	0	0	0	3
13	2	2	0	0	1	0	0	0	0	0	0	5
14	3	2	2	0	1	1	0	1	1	0	0	11
15	2	0	0	2	0	1	0	0	0	0	0	5
16	2	1	0	0	0	0	1	1	0	0	0	5
17	2	0	0	0	1	0	0	0	0	0	0	3
18	1	0	0	0	0	0	0	1	0	0	0	2
19	3	1	0	0	1	1	1	0	1	0	1	9
20	2	0	0	1	0	2	0	0	0	0	0	5
21	1	1	0	0	1	0	0	0	0	0	0	3
Total	36	13	3	9	9	10	4	7	4	4	3	102

**Table G: Number and grade of staff involved in care of 20 mothers**

(Observers: three medical student, two student midwives and one general practitioner)



Case no.	Mode of monitoring	Method & time	Start time	Breaks in monitoring / signal loss	Overall quality	Comments
1	Continuous monitoring	External 15:06 Internal 20:16	15:06	Break 15:23 to 15:59	Quality good	Early and variable decelerations post epidural 01:20  Full dilation of cervix shortly after epidural sited 02:00
2	Continuous monitoring	External 17:32	17.32	Break 18:15 to 18:10 [epidural] Break 18:25 to 18:32 Break 23:18 to 00:05 [epidural]	Quality good	Second stage: reduced variability, tachycardia, mild variable decelerations, accelerations present Not adequately monitored for 46 minutes during epidural procedure
3	Continuous monitoring	External 18:40 Internal 19:20	18:40	Break 19:02 to 19:20 Break 21:30 to 21:35	Good quality 1 <sup>st</sup> stage	Variable decelerations Second stage trace normal, episodes of signal loss throughout second stage.
4	Continuous monitoring	External 09:48	09:48	Break 11:34 [mobilising] Recommended 11:52	Quality good	Normal CTG
5	Continuous monitoring	Internal 09:38	09:38	No breaks	Quality good	Normal CTG first stage  Second stage mild decelerations, rising baseline
6	Continuous monitoring	Internal 22:11	22:11	No breaks	Quality good	00:30 Reactive bradycardia, 00:57 baseline 130 b.p.m. severe variable decelerations, variability maintained

7	Continuous monitoring	External 12:12	12:12	Break 12:50 Recommended 13:06 Break 13:09 Recommended 13:56	Good quality 15:50 Signal loss for eight mins	Normal CTG
8	Continuous Monitoring	External 14:28 Internal 17:17	14:28	Signal loss 17:10 for 7 mins [FSE then applied]	Good quality	Reactive tachycardia until 15:40 then normal CTG
9	Continuous monitoring	External 16:11 Internal 18:49	16:11	Signal loss 17:31 to 17:45	Good quality	Normal CTG
10	Continuous monitoring	External 14:53 Internal 15:06	14:53	Monitoring not commenced before epidural	Good quality, FH but tocograph poor quality	Not monitored during epidural. Decelerations after epidural, reactive but beyond the timescale for epidural to account for changes  FBS performed at 17:09 - not annotated on CTG
11	Continuous monitoring	External 05:08 Internal 08:54	05:08	05:50 Out to toilet 06:50 to 7:08 loss of contact 07:21 to 08:30 break	Good quality, recording stopped 14:25	Normal CTG

12	Continuous monitoring	External 06:22 Internal 08:02	06:22	06:40 to 07:00 maternal pulse	Poor quality until 07:50	? Maternal pulse during epidural Normal CTG
13	Continuous monitoring	External 10:18 Internal 10:51	10:18	14:08 loss of signal 14:20 changed to external monitoring	Episodes of artefact with FSE monitoring	Good quality external CTG Normal
14	Continuous monitoring	External 11:27 Internal 12:30	11:22	22:06 break 6 mins	Good quality	Variable decelerations, reduced variability, tachycardia
15	Continuous monitoring	External 09:13 Internal 09:33	09:13	No breaks	Good quality	Normal CTG
16	Continuous monitoring	External 09:25 Internal 10:23	09:25	Break from 10:53 to 10:55 19:13 external monitoring prior to delivery	Good quality	09:35 ? maternal signal for 16 mins during epidural 19:17 delivery but recording of maternal signal for 10 mins after delivery

17	Continuous monitoring	Internal 10:42	10:42	No breaks. Episodes of signal loss from 13:20 onwards. Occurred with decelerations.	Good quality 1 <sup>st</sup> stage Intermediate quality 2 <sup>nd</sup> stage	Severe variable decelerations late recovery at end of second stage
18	Continuous monitoring	Internal 16:21 External 18:06 Internal 19:13	16:21	17:12 break – up to toilet 17:16 recommenced 17:35 break – up to toilet 17:45 break up to toilet 18:04 signal loss 18:06 external 19:13 Internal	Intermediate quality Poor quality second stage	Tachycardia 180 b.p.m at onset of recording, variable decelerations ? episodes of maternal signal 18:40 to 19:00 19:13 FSE reapplied
19	Continuous monitoring	External 11:47 Internal 12:43 External 03:47	11:47	12:50 Break – out to toilet 13:01 recommenced	Good quality	01:40 to 02:30 episode of reduced variability
20	Continuous monitoring	External 11:41	11:41	12:32 break – out to toilet 12:43 recommenced 14:01 internal 18:34 external	Good quality 1 <sup>st</sup> stage. FSE removed late second stage	Normal first stage Second stage ‘post dip’ accelerations, reduced variability
21	Continuous monitoring	External 10:20 Internal 12:30	10:20	Loss of signal from 11:00 up to 40% missing Quality improved 11:30 12:00 FSE applied	Intermediate quality 1 <sup>st</sup> stage Good quality 2 <sup>nd</sup> stage	Bradycardia at onset of full dilation – then change in baseline with variable decelerations and increased variability

**Table H: Characteristics of electronic fetal monitoring**

Case number	Time pushing commenced	Time delivered	Duration of second stage (minutes)
2	00:54:00	01:15:00	21
3	00:03:00	01:13:00	70
4	13:04:00	13:07:00	3
5	13:58:00	14:48:00	50
6	00:42:00	01:25:00	43
7	16:25:00	16:30:00	5
8	17:54:00	18:16:00	22
10	17:30:00	17:42:00	12
11	14:24:00	14:29:00	5
12	12:00:00	12:17:00	17
13	15:37:00	15:44:00	7
14	01:03:00	02:16:00	73
15	20:12:00	21:34:00	82
16	18:00:00	19:17:00	77
17	13:05:00	14:46:00	101
18	19:10:00	19:23:00	13
19	02:56:00	03:53:00	57
20	18:01:00	18:58:00	57
21	12:31:00	13:04:00	33
Total			748

(12 hours 28 minutes)

**Table I: Duration of recorded second stage**

From onset of active pushing to time of delivery / transfer to theatre recorded on video camera.

Note: Case 6 video clock inadvertently set 1 hour behind actual time

(Case 9: Caesarean section in first stage of labour, Case 5: Ventouse in theatre)



## 9. Data used to derive figures 7.2, 7.3, 7.6 and 7.7.

Case number	Recorded first stage (minutes)	Record keeping (minutes)	%	In delivery room (minutes)	%
2	436	93	21	362	83
3	322	88	27	272	84
4	162	33	20	133	82
5	273	38	14	226	83
6	220	38	17	150	68
7	250	43	17	235	94
8	135	30	22	120	89
9	589	48	8	342	58
10	161	7	4	96	60
11	278	56	20	221	79
12	121	23	19	106	88
13	288	46	16	222	77
14	842	101	12	545	65
15	627	184	29	480	77
16	395	103	26	278	70
17	120	25	21	97	81
18	160	47	29	120	75
19	796	136	17	428	54
20	351	49	14	297	85
21	108	39	36	103	95
Total	6634	1255	19	4833	73

**Table J: Data used to derive 7.2 and 7.3**

Figure 7.2: time midwives spent record keeping for each recorded first stage of labour

Figure 7.3: time midwives spent in room for each recorded first stage of labour

Case number	Carer	Midwife grade	Recorded first stage (minutes)	Bedside sitting (minutes)	%
2	AM1	F-grade ward midwife	252	75	30
9	AM1	F-grade ward midwife	269	59	22
11	AM1	F-grade ward midwife	278	151	54
14	AM1	F-grade ward midwife	182	38	21
15	AM1	F-grade ward midwife	265	121	46
21	AM1	F-grade ward midwife	108	48	44
Subtotal			1354	492	36
4	StM	Student midwife	137	49	36
16	StM	Student midwife	154	16	10
Subtotal			291	65	22
3	AM1	E-grade ward midwife	204	7	3
3	AM2	E-grade ward midwife	118	20	17
7	AM2	E-grade ward midwife	154	23	15
8	AM1	E-grade ward midwife	135	34	25
9	AM2	E-grade ward midwife	320	0	0
13	AM2	E-grade ward midwife	95	29	31
13	AM1	E-grade ward midwife	193	0	0
14	AM2	E-grade ward midwife	455	46	10
14	AM3	E-grade ward midwife	205	0	0
15	AM2	E-grade ward midwife	362	16	4
17	AM2	E-grade ward midwife	40	1	3
19	AM3	E-grade ward midwife	306	56	18
20	AM1	E-grade ward midwife	160	11	7
Subtotal			2747	243	9
7	AM1	Community midwife	96	0	0
12	AM1	Community midwife	121	0	0
Subtotal			217	0	0
2	AM2	Core midwife	184	0	0
4	AM1	Core midwife	25	0	0
5	AM1	Core midwife	273	5	2
6	AM1	Core midwife	220	10	5
10	AM1	Core midwife	161	0	0
16	AM2	Core midwife	241	35	15
17	AM1	Core midwife	80	0	0
18	AM1	Core midwife	160	28	18
19	AM1	Core midwife	48	6	13
19	AM2	Core midwife	442	0	0
20	AM2	Core midwife	191	91	48
Subtotal			2025	175	9

**Table K: Data used to derive figures 7.6 and 7.7**

Figure 7.6: time midwives spent sitting at the bedside for each recorded labour

Figure 7.7: percentage of time spent sitting at bedside by grade of midwife

**10. Individual clinical review forms for each audio-video recording**

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Maternal History

Case No:  Age:  Parity:  Smoking:

Medical Problems

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Obstetric History

<u>19XX</u> 42 + 0 weeks	Normal delivery	live female	8lb 11oz
<u>19XX</u> 41 + 3 weeks	Normal delivery	live male	8lb 3 oz

Antenatal Problems

<u>31 + 0 weeks</u>	Ward admission headache ? migraine
<u>32 + 3 weeks</u>	Ward admission abdominal pain ? urinary infection, treated with antibiotics
<u>36 + 4 weeks</u>	Ward admission pre-labour rupture of membranes
<u>36 + 5 weeks</u>	To labour wad for induction

Labour and delivery

Gestation (weeks+days)	<input type="text" value="36+6"/>	Time delivered	<input type="text" value="02:21"/>
Onset of labour	<input type="text" value="Induced = Syntocinon"/>	Mode of delivery	<input type="text" value="Normal delivery"/>
Indication for induction	<input type="text" value="Pre-labour rupture of membranes"/>	Indication for delivery	<input type="text" value="None"/>
Syntocinon use	<input type="text" value="1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; stage"/>	Delivered by	<input type="text" value="E-grade midwife"/>
Analgesia (labour)	<input type="text" value="Epidural"/>	Present	<input type="text" value="Core midwife"/>
Analgesia (delivery)	<input type="text" value="Epidural"/>		
Comments:	<input type="text" value="None"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Male"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="3140"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="Not recorded"/>
Arterial pH	<input type="text" value="7.40"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.50"/>	NICU/TCW	<input type="text" value="Yes"/>
Arterial Base Deficit	<input type="text" value="-1.2"/> m.mol/l	Paediatrician present	<input type="text" value="No"/>
Venous Base Deficit	<input type="text" value="-0.3"/> m.mol/l		
Neonatal problems	<input type="text" value="Admitted to XXX for infection screening"/>		
Maternal Problems	<input type="text" value="None"/>		

## Maternal History

Case No:

Age:

Parity:

Smoking:

## Medical Problems

## Obstetric History

## Antenatal Problems

## Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments:

## Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m.mol/l

Neonatal problems

Maternal problems



Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

Antenatal Problems

35 + 5 weeks Ward admission. Blood pressure 120/95, trace of proteinuria. Seen by SHO & Registrar. Commenced Labetalol 100 mg twice daily. Discharged 36+6

37 + 2 weeks Admitted to ward. Blood pressure /100, oedema ++, proteinuria +, uric acid 0.43 m.mol/l.

37 + 6 weeks Uric acid 0.45 m.mol/l, Proteinuria +++, 24 hour urine 0.12 m.mol/l. Review by SHO, repeat blood tests: uric acid 0.51m.mol/l, Creatinine 7.8 m.mol/l. Registrar review: for induction of labour, 3 mg Prostin pessary X 2.

38 + 2 weeks 14:30 p.m. Review by SHO; Vaginal examination, 2-3 cms dilated. Transfer to labour ward for ARM and Syntocinon. Admitted to labour ward 18:30 p.m.

Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m/mol/l

Neonatal problems

Maternal Problems

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

<u>19XX 39 weeks</u>	Normal delivery	live female	8lb 3oz
<u>19XX 38 weeks</u>	Norma delivery	live female	8lb 10oz

Antenatal Problems

Scan shows fetus above 95<sup>th</sup> centile  
For induction of labour between 39 to 40 weeks gestation

Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit

Neonatal problems

Maternal Problems

Maternal History

Case No: 5

Age: 22

Parity: 1

Smoking: 0

Medical Problems

Obstetric History

19XX 38 weeks Ventouse live male 7lb 4oz

Antenatal Problems

Gestational diabetic – diet controlled  
Scan shows abdominal circumference close to 95<sup>th</sup> centile

Labour and delivery

Gestation (weeks+days) 37+0

Time delivered 15:22

Onset of labour Induced = Prostin & ARM

Mode of delivery Ventouse (theatre)

Indication for induction Gestational diabetes

Indication for delivery Delay in 2<sup>nd</sup> stage

Syntocinon use None

Delivered by Senior Registrar

Analgesia (labour) Entonox

Present Core midwife

Analgesia (delivery) Spinal

Comments None

Neonatal Outcome

Apgar at 1 min 9

Sex Female

Apgar at 5 min 9

Birth weight (grams) 3350

Late Apgar 1

Head circumference 36 cm

Arterial pH 7.24

Resuscitation None

Venous pH 7.35

NICU / TCW No

Arterial Base Deficit 3.3 m.mol/l

Paediatrician present No

Venous Base Deficit 5.4 m.mol/l

Neonatal problems None

Maternal Problems None

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

Antenatal Problems

Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m.mol/l

Neonatal problems

Maternal Problems

Maternal History

Case No:  Age:  Parity:  Smoking:

Medical Problems

Obstetric History

<u>19XX 34 weeks</u>	Normal delivery	neonatal death	male	5lb 3 oz
<u>19XX 37 weeks</u>	Normal delivery	live	female	5lb 8 oz

Antenatal Problems

35 + 4 weeks      Ward admission possible premature labour  
35 + 5 weeks      Seen by consultant "in view of cervical dilatation / gestation for ARM"  
  
12:00 transferred to labour ward for amniotomy.

Labour and delivery

Gestation (weeks+days)	<input type="text" value="35+5"/>	Time delivered	<input type="text" value="16:29"/>
Onset of labour	<input type="text" value="Induced = ARM"/>	Mode of delivery	<input type="text" value="Normal delivery"/>
Indication for induction	<input type="text" value="Irregular contractions"/>	Indication for delivery	<input type="text" value="None"/>
Syntocinon use	<input type="text" value="None"/>	Delivered by	<input type="text" value="E-grade midwife"/>
Analgesia (labour)	<input type="text" value="Entonox"/>	Present	<input type="text" value="Mid. coordinator"/>
Analgesia (delivery)	<input type="text" value="None"/>		
Comments	<input type="text" value="none"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Female"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="2955"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="34 cm"/>
Arterial pH	<input type="text" value="7.37"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.46"/>	NICU / TCW	<input type="text" value="No"/>
Arterial Base Deficit	<input type="text" value="-2.8"/> m.mol/l	Paediatrician present	<input type="text" value="Yes"/>
Venous Base Deficit	<input type="text" value="-0.9"/> m.mol/l		
Neonatal problems	<input type="text" value="None"/>		
Maternal Problems	<input type="text" value="None"/>		



Maternal History

Case No:  Age:  Parity:  Smoking:

Medical Problems

Obstetric History

Antenatal Problems

Ward admission: premature rupture of membranes, diarrhoea and vomiting  
 Vaginal swab shows group B Haemolytic Streptococcus. Oral antibiotics commenced.  
Vaginal examination: Cervix 3 to 4 cms dilated, no forewaters, for augmentation.

Labour and delivery

Gestation (weeks+days)	<input type="text" value="36+6"/>	Time delivered	<input type="text" value="18:15"/>
Onset of labour	<input type="text" value="Induced = Syntocinon"/>	Mode of delivery	<input type="text" value="Normal delivery"/>
Indication for induction	<input type="text" value="Pre-labour rupture of membranes"/>	Indication for delivery	<input type="text" value="None"/>
Syntocinon use	<input type="text" value="1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; stage"/>	Delivered by	<input type="text" value="E-grade midwife"/>
Analgesia (labour)	<input type="text" value="Entonox"/>	Present	<input type="text" value="F-grade midwife"/>
Analgesia (delivery)	<input type="text" value="None"/>		
Comments	<input type="text" value="none"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Male"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="3240"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="34 cm"/>
Arterial pH	<input type="text" value="7.31"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.40"/>	NICU / TCW	<input type="text" value="No"/>
Arterial Base Deficit	<input type="text" value="-1.3"/> m.mol/l	Paediatrician present	<input type="text" value="Yes"/>
Venous Base Deficit	<input type="text" value="0.5"/> m.mol/l		
Neonatal problems	<input type="text" value="None"/>		
Maternal Problems	<input type="text" value="None"/>		

## Maternal History

Case No:

Age:

Parity:

Smoking:

## Medical Problems

## Obstetric History

## Antenatal Problems

## Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

## Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m.mol/l

Neonatal problems

Maternal Problems

## Maternal History

Case No:

Age:

Parity:

Smoking:

## Medical Problems

## Obstetric History

## Antenatal Problems

## Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

## Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m/mol/l

Neonatal problems

Maternal Problems

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

<u>19XX 40 weeks</u>	Normal delivery	live	male	8lb 13oz
<u>19XX 40 weeks</u>	Normal delivery	live	female	7lb 5oz
<u>19XX 42 weeks</u>	Ventouse (cord prolapse)	live	female	9lb 13oz

Antenatal Problems

39+ 3 weeks 05:10 Admitted from home with antepartum haemorrhage (1/2 egg cup full) and ? spontaneous rupture of membranes Seen by SHO intravenous infusion commenced; bloods taken  
 06:00 SHO review: Discussed with Registrar. Continue to observe.  
 08:45 Consultant review: vaginal examination cervix 3-4 cms dilated. For induction.

Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU/TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m/mol/l

Neonatal problems

Maternal Problems

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

19XX 38 weeks elective C/S for breech presentation live female 6lb 8oz

Antenatal Problems

<u>25 + 0 weeks</u>	Day assessment	Possible renal colic	no abnormalities detected
<u>37 + 0 weeks</u>	Labour ward	Antepartum haemorrhage,	conservative
management			
<u>39 + 3 weeks</u>	Labour ward	On early labour unit to establish in labour	

Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

Neonatal Outcome

Apgar at 1min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU/TCW

Arterial Base Deficit

Paediatrician present

Venous Base Deficit

Neonatal problems

Maternal Problems



Maternal History

Case No:  Age:  Parity:  Smoking:

Medical Problems

Obstetric History

<u>19XX 40 weeks</u>	Normal delivery	live	male	7lb 7oz
<u>19XX 40 weeks</u>	Normal delivery	live	male	6lb 12 oz

Antenatal Problems

<u>40 + 0 weeks</u>	Respiratory infection treated with Amoxil 5/7 days and Prednisolone 5mg x 6 a day
<u>41 + 3 weeks</u>	Ward admission for induction of labour – Erythromycin for respiratory infection. Prostin 3 mg

Labour and delivery

Gestation (weeks+days)	<input type="text" value="41+4"/>	Time delivered	<input type="text" value="15:43"/>
Onset of labour	<input type="text" value="Induced = Prostin &amp; ARM"/>	Mode of delivery	<input type="text" value="Normal delivery"/>
Indication for induction	<input type="text" value="Post-dates"/>	Indication for delivery	<input type="text" value="None"/>
Syntocinon use	<input type="text" value="None"/>	Delivered by	<input type="text" value="E-grade midwife"/>
Analgesia (labour)	<input type="text" value="None"/>	Present	<input type="text" value="Core midwife"/>
Analgesia (delivery)	<input type="text" value="None"/>		
Comments	<input type="text" value="None"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Female"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="3350"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="36 cm"/>
Arterial pH	<input type="text" value="Not obtained"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.44"/>	NICU/TCW	<input type="text" value="No"/>
Arterial Base Deficit	<input type="text" value="Not obtained"/>	Paediatrician present	<input type="text" value="No"/>
Venous Base Deficit	<input type="text" value="1.0"/> m.mol/l		
Neonatal problems	<input type="text" value="None"/>		
Maternal Problems	<input type="text" value="None"/>		

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

Antenatal Problems

37+ 5 weeks Ward admission. Suspected breech presentation; Blood pressure 160/90; proteinuria +. Ultrasound: cephalic presentation; reduced growth. Doppler flow normal. Uric acid 0.40 m.mol/l.

37+ 6 weeks Blood pressure /90 -100, headache, trace of proteinuria. If BP persistently > /100 consider induction of labour. Reviewed by SHO and Registrar 21:45 Blood pressure /100-120 proteinuria ++ for induction of labour.

38 + 0 weeks Prostin pessary 3 mg x 3

Registrar review: BP 150/84, headache, oedema of lower abdomen, Bishop score 6 – for amniotomy.

Labour and delivery

Gestation (weeks+days)	<input type="text" value="38+3"/>	Time delivered	<input type="text" value="02:14"/>
Onset of labour	<input type="text" value="Induced = Prostin &amp; ARM"/>	Mode of delivery	<input type="text" value="Ventouse delivery"/>
Indication for induction	<input type="text" value="Preeclampsia"/>	Indication for delivery	<input type="text" value="CTG; delay"/>
Syntocinon use	<input type="text" value="1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; stage"/>	Delivered by	<input type="text" value="Senior Registrar"/>
Analgesia (labour)	<input type="text" value="Epidural"/>	Present	<input type="text" value="Core midwife"/>
Analgesia (delivery)	<input type="text" value="Epidural"/>		
Comments	<input type="text" value="None"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Female"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="2300"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="33 cm"/>
Arterial pH	<input type="text" value="7.29"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.31"/>	NICU/TCW	<input type="text" value="No"/>
Arterial Base Deficit	<input type="text" value="6.5"/> m.mol/l	Paediatrician present	<input type="text" value="No"/>
Venous Base Deficit	<input type="text" value="7.0"/> m.mol/l		
Neonatal problems	<input type="text" value="None"/>		
Maternal Problems	<input type="text" value="None"/>		

Maternal History

Case No: 15

Age: 28

Parity: 1+1SB

Smoking: 0

Medical Problems

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Obstetric History

<u>19XX 28 weeks</u>	Normal delivery	preeclampsia	stillbirth	female	N/K
<u>19XX 37 weeks</u>	Normal delivery	preeclampsia	live	female	5lb 4 oz

Antenatal Problems

<u>31 + 0 weeks</u>	Day assessment ward after a fall at home CTG satisfactory
<u>33 + 6 weeks</u>	Ward admission with reduced fetal movement, increase in blood pressure – sent home
<u>36 + 1 weeks</u>	Admitted to ward feeling unwell; related to intestinal disease; sent home
<u>39 + 1 weeks</u>	Day assessment review by Consultant – for induction of labour. Prostin pessary 3 mg x 2

Labour and delivery

Gestation (weeks+days)	<u>39+5</u>	Time delivered	<u>21:30</u>
Onset of labour	<u>Induced Prostin x 2 &amp; ARM</u>	Mode of delivery	<u>Normal delivery</u>
Indication for induction	<u>Intestinal disease</u>	Indication for delivery	<u>None</u>
Syntocinon use	<u>1<sup>st</sup> and 2<sup>nd</sup> stage</u>	Delivered by	<u>E-grade midwife</u>
Analgesia (labour)	<u>Epidural</u>	Present	<u>E-grade midwife</u>
Analgesia (delivery)	<u>Epidural</u>		
Comments	<u>None</u>		

Neonatal Outcome

Apgar at 1 min	<u>9</u>	Sex	<u>Female</u>
Apgar at 5 min	<u>9</u>	Birth weight (grams)	<u>3470</u>
Late Apgar	<u>□</u>	Head circumference	<u>36.5 cm</u>
Arterial pH	<u>7.19</u>	Resuscitation	<u>None</u>
Venous pH	<u>7.27</u>	NICU/TCW	<u>No</u>
Arterial Base Deficit	<u>0.6</u> m.mol/l	Paediatrician present	<u>No</u>
Venous Base Deficit	<u>2.7</u> m.mol/l		
Neonatal problems	<u>None</u>		
Maternal Problems	<u>None</u>		

Maternal History

Case No:

Age:

Parity:

Smoking:

Medical Problems

Obstetric History

Antenatal Problems

<u>40 + 4 weeks</u>	Admitted 'niggling', not in established labour - to ward; patient request
<u>40 + 5 weeks</u>	Seen by ? SHO for induction if not contracting regularly

Labour and delivery

Gestation (weeks+days)	<input type="text" value="40+5"/>	Time delivered	<input type="text" value="19:17"/>
Onset of labour	<input type="text" value="Induced = ARM"/>	Mode of delivery	<input type="text" value="Forceps"/>
Indication for induction	<input type="text" value="Uncomfortable"/>	Indication for delivery	<input type="text" value="Delay in 2&lt;sup&gt;nd&lt;/sup&gt; stage"/>
Syntocinon use	<input type="text" value="1&lt;sup&gt;st&lt;/sup&gt; and 2&lt;sup&gt;nd&lt;/sup&gt; stage"/>	Delivered	<input type="text" value="Senior Registrar"/>
Analgesia (labour)	<input type="text" value="Epidural"/>	Present	<input type="text" value="Core midwife"/>
Analgesia (delivery)	<input type="text" value="Epidural"/>		
Comments	<input type="text" value="Postpartum haemorrhage 1,000 mls"/>		

Neonatal Outcome

Apgar at 1 min	<input type="text" value="9"/>	Sex	<input type="text" value="Male"/>
Apgar at 5 min	<input type="text" value="9"/>	Birth weight (grams)	<input type="text" value="4260"/>
Late Apgar	<input type="text" value=""/>	Head circumference	<input type="text" value="39 cm"/>
Arterial pH	<input type="text" value="7.31"/>	Resuscitation	<input type="text" value="None"/>
Venous pH	<input type="text" value="7.44"/>	NICU / TCW	<input type="text" value="No"/>
Arterial Base Deficit	<input type="text" value="-0.9"/> m.mol/l	Paediatrician present	<input type="text" value="No"/>
Venous Base Deficit	<input type="text" value="0.2"/> m.mol/l		
Neonatal problems	<input type="text" value="None"/>		
Maternal Problems	<input type="text" value="None"/>		

Maternal History

Case No: 17

Age: 18

Parity: 0

Smoking: 0

Medical Problems

Obstetric History

None

Antenatal Problems

Growth scan: AC on 50<sup>th</sup> centile  
39 + 6 weeks Admitted for induction of labour

Labour and delivery

Gestation (weeks+days) 40+ 0

Time delivered 14:35

Onset of labour Induced = Prostin & ARM

Mode of delivery Normal delivery

Syntocinon use 2<sup>nd</sup> stage

Indication for delivery None

Indication for induction IUGR

Delivered by SHO

Analgesia (labour) Entonox

Present E-grade midwife

Analgesia (delivery) None

Comments Midwife documented as present and in-charge of delivery was not in attendance

Neonatal Outcome

Apgar at 1 min 9

Sex Male

Apgar at 5 min 9

Birth weight (grams) 2640

Late Apgar 1

Head circumference 33 cm

Arterial pH 7.23

Resuscitation None

Venous pH 7.33

NICU/TCW No

Arterial Base Deficit 0.9 m.mol/l

Paediatrician present No

Venous Base Deficit 3.2 m.mol/l

Neonatal problems None

Maternal Problems None



## Maternal History

Case No: 18

Age: 35

Parity: 5

Smoking: 30 a day

## Medical Problems

## Obstetric History

19XX 42 weeks	Normal delivery	live male	5lb 9oz
19XX 40 weeks	Normal delivery	live male	6lb 9oz
19XX 40 weeks	Normal delivery	live female	6lb 13 oz
19XX 40 weeks	Normal delivery	live female	6lb 12oz
19XX 40 weeks	Normal delivery	live female	6lb 3 oz

## Antenatal Problems

## Labour and delivery

Gestation (weeks+days) 40+6

Time delivered 19:20

Onset of labour Spontaneous

Mode of delivery Normal delivery

Indication for induction None

Indication for delivery None

Syntocinon use None

Delivered by Student midwife

Analgesia (labour) Entonox

Present Core midwife

Analgesia (delivery) None

Comments None

## Neonatal Outcome

Apgar at 1 min 9

Sex Male

Apgar at 5 min 9

Birth weight (grams) 3080

Late Apgar

Head circumference 33.5 cm

Arterial pH 7.28

Resuscitation None

Venous pH 7.37

NICU/TCW No

Arterial Base Deficit -0.8 m.mol/l

Paediatrician present No

Venous Base Deficit 0.7 m.mol/l

Neonatal problems None

Maternal Problems None

## Maternal History

Case No:

Age:

Parity:

Smoking:

## Medical Problems

## Obstetric History

## Antenatal Problems

37 + 6 weeks ? Spontaneous rupture of membranes admitted for 'pad checks' assessment of blood pressure. Home after three days  
40 + 4 weeks Hypertension admitted for one day  
41 + 2 weeks Admitted for induction of labour

## Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

## Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU/TCW

Arterial Base Deficit  m/mol/l

Paediatrician present

Venous Base Deficit  m.mol/l

Neonatal problems

Maternal Problems

Maternal History

Case No: 20

Age: 20

Parity: 1

Smoking: 0

Medical Problems

Obstetric History

None

Antenatal Problems

41+ 5 weeks Admitted for induction of labour

Labour and delivery

Gestation (weeks+days) 41+ 6

Time delivered 19:05

Onset of labour Induced = ARM

Mode of delivery Normal delivery

Indication for induction Post-dates

Indication for delivery None

Syntocinon use 1<sup>st</sup> and 2<sup>nd</sup> stage

Delivered by Core midwife

Analgesia (labour) Entonox & Epidural

Present Medical student

Analgesia (delivery) Epidural

Comments None

Neonatal Outcome

Apgar at 1 min 9

Sex Male

Apgar at 5 min 9

Birth weight (grams) 4760

Late Apgar 1

Head circumference 37 cm

Arterial pH 7.25

Resuscitation None

Venous pH 7.33

NICU / TCW No

Arterial Base Deficit Not obtained

Paediatrician present No

Venous Base Deficit 4.5 m.mol/l

Neonatal Problems None

Maternal Problems None

Comments Paediatrician arrived 1 minute after delivery

## Maternal History

Case No:

Age:

Parity:

Smoking:

## Medical Problems

## Obstetric History

## Antenatal Problems

## Labour and delivery

Gestation (weeks+days)

Time delivered

Onset of labour

Mode of delivery

Indication for induction

Indication for delivery

Syntocinon use

Delivered by

Analgesia (labour)

Present

Analgesia (delivery)

Comments

## Neonatal Outcome

Apgar at 1 min

Sex

Apgar at 5 min

Birth weight (grams)

Late Apgar

Head circumference

Arterial pH

Resuscitation

Venous pH

NICU / TCW

Arterial Base Deficit  m.mol/l

Paediatrician present

Venous Base Deficit  m.mol/l

Neonatal problems

Maternal Problems

## 11. Transcripts of documented care in labour

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A guide to the transcripts of midwives' and doctors' labour documentation of care in labour for the 20 recorded labours.

Clinical record keeping is often heavily abbreviated. This has been preserved in the transcripts. Researchers explanatory notes are provided in square brackets and a glossary of abbreviations and terminology is provided (page xiv-xv) . The transcripts of the documented care in labour represent a small amount of the paperwork involved as there are various observations charts, forms and baby notes which are also documented over the course of labour.

Midwives annotated the labour record in red ink and doctors in black ink. To represent this, doctors' entries into the record were formatted in italics.

References to mother and members of staff by name have been anonymised.

Illegible documentation is represented by parenthesis ( )



**Case Pilot study: Transcription of labour events documented in the case notes by midwifery and medical staff**

---

- 15:15 Transferred to labour ward for Syntocinon regime following prolonged rupture of membranes  
O/A [on admission] temp [temperature] 36.5  
P. [pulse] 86  
BP. [blood pressure] 110/60  
O/P [on palpation] fundus = dates, long lie, cephalic presentation 2/5<sup>th</sup> palpable,  
FH reg [fetal heart regular]. [Mother] is happy to have Syntometrine and for baby to have Konakion. [Mother] wishes to bottle feed, it will be better for her. The advantages of breast-feeding discussed.
- 15:30 IVI [intravenous infusion] sited after discussion with [MC1]. Syntocinon commenced
- 16:00 [Mother] is comfortable FH 132
- 16:30 No conts [contractions] FH reg
- 17:00 [Mother] is comfortable FH reg
- 17:15 [Mother] c/o [complaining of] backache  
Some irregular cont FH reg
- 18:00 [Mother] is comfortable cont irregular  
3-4 in 10 FH regular  
*Senior registrar [SR1]  
ROM [rupture of membranes] for 48 hours at 36+5 [weeks gestation]  
Bishop score 7 today Minimal response to Syntocinon at maximal setting of 7.5 mu [milliunits] – no contractions felt  
Plan – increase Syntocinon up to a maximum of 16 mu  
Watch for hyperstimulation  
Assess progress in two hours  
[Mother] is comfortable – out to toilet  
Syntocinon to 16 mu*
- 19:30 Care taken over by [AM2]  
Has now started to feel a few contractions, mostly back pain
- 20:00 VE [vaginal examination] to assess progress see over  
see over = cervix partly effaced, thick, 3 cm [centimetres] dilated,  
poorly applied to presenting part. Membranes intact, cephalic – 2 [station]  
for ARM [amniotomy] FSE [fetal scalp electrode] applied,  
no PV [per vaginum] loss noted
- 20:30 IV [intravenous] Augmentin 1.2g. [antibiotic] given by [SHO1]  
Apyrexial
- 20:45 SRM [spontaneous rupture of membranes] large gush of liquor.  
FH within normal parameters
- 21:00 Beginning to contract 4 in 10 again getting a lot of backache
- 21:20 Temp [temperature] 37.3 C: appears flushed
- 21:30 Care taken over by [AM3] FH 140 – 150 b.p.m baseline.  
Good long-term variability and accelerations recording.  
Contractions moderate 4 in 10 [mother] experiencing backache.  
Syntocinon running as 16 mls/hr = 10.6 mu
- 21:50 Clear gush of fluid PV [per vaginum] – [mother] asked to stand whilst bed changed
- 22:00 FH = 140 – 150 b.p.m [beats per minute] baseline.  
Good long-term variability and accelerations recording.  
Contractions and backache have eased since standing

- 22:10 [Mother] now tired wanting to get back into bed
- 22:30 FH 130 – 140 b.p.m baseline. Good long-term variability and accelerations recording.  
Contractions moderate on palpation 3 in 10  
Clear liquor draining PV  
[Mother] aware of contractions and coping well
- 23:00 FH 130 – 140 b.p.m baseline. Good long term variability and accelerations recording.  
Contractions moderate strong 3 in 10  
[Mother] experiencing backache and feels very tired.  
Coping well at the moment  
Pad changed – clear liquor PV large amount  
[Mother] and her partner are aware of TCW and that a paed [paediatrician] will be present for delivery due to gestational age of baby  
[Mother] and baby may go the main ward if all well with baby.
- 23:10 Temp 36.6 P 88 BP 110/55
- 23:30 FH 124 – 135 b.p.m baseline.  
Good long-term variability and accelerations recording  
Contractions recording 3 in 10 strong on palpation  
[Mother] appears to be coping well. Appears calm
- 00:001 FH 130 – 140 b.p.m baseline.  
Good long-term variability and accelerations recording  
Contractions stronger on palpation 3 in 10  
[mother] experiencing low abdominal pain  
She says she is very tired. Breathing through contractions. Coping very well
- 00:30 FH 130 – 140 b.p.m baseline. Good long-term variability and accelerations recording.  
Contractions remain strong 3 in 10.
- 00:45 VE to assess – please see over  
See over = Cervix fully effaced 5 cm dilated loose application to presenting part, membranes absent, liquor clear, cephalic presentation – 2 spines presentation not defined  
Findings discussed with [mother]. She is thinking about having pain relief? what
- 00:55 Discussed findings with Registrar [REG1]  
To increase Syntocinon to 16 mu/min 24ml/hr  
VE in 2 hour to assess
- 01:00 FH 130 – 140 b.p.m baseline. Good long-term variability and accelerations recording  
Contractions moderate – strong 3 in 10  
[Mother] would like an epidural  
Anaesthetist bleeped  
Syntocinon increased to 16 mu = 24 ml/hr
- 01:10 Anaesthetist in room. Epidural procedure explained to [mother]  
[Mother] prepared for epidural
- 01:30 Epidural sited – test dose given. BP 110/45  
Main dose given BP 120/65
- 01:35 FH 130 – 140 b.p.m baseline. Good long-term variability recording FH 100 b.p.m with contraction. Good recording back to baseline  
Contractions strong 4 in 10  
[Mother] tired, breathing through contractions  
Coping very well as contractions become more intense
- 01:40 Main dose given  
Contractions strong 4 in 10  
Anaesthetist awaiting effect of epidural before commencing infusion
- 01:52 FH 70 b.p.m – slow recovering back to baseline. Syntocinon turned off

01:54 [Mother] turned onto her left side

01:56 [MC1] asked to review

02:00 VE to assess – fully FH 140 b.p.m

02:05 Active pushing commenced – FH 80 b.p.m with contraction. Good recovery back to baseline

02:10 Vertex visible and advancing

02:12 FH 60 b.p.m fair recovery back to 100 b.p.m

02:15 Pushing well – vertex advancing

02:18 FH 130 b.p.m

02:21 Delivery of live male infant – cord clamped and cut and baby wrapped

02:22 Heavy PV loss – quick gush

02:23 Placenta and membranes delivered by CCT [controlled cord traction]

02:25 2<sup>nd</sup> heavy gush PV fundus firm and well contracted

02:30 Perineum inspected. Intact. Paed in room seeing baby baby to TCW [transitional care ward].

## Case 2: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 17:20 Transferred to labour ward care of midwife [AM1 = F-grade ward midwife]  
Abdominal palpation: Fundus = term; Lie long  
Presentation breech – engaged  
SRM xx/xx/xx at 01:00  
[Mother] has been contracting since Prostin pessary this morning  
Observations: Temperature 37 C. Pulse BP 108/75  
CTG commenced and appears satisfactory  
Having fairly frequent irregular contractions  
Discussed with [REG1] re [mother] management  
For VE and epidural if in established labour
- 17:55 Cervix 4 cm = see over  
Epidural has already been discussed with [mother] and she is happy to proceed with it  
Seen by anaesthetist IVI sited, bloods in fridge. Hartmann's solution in progress  
On left side prepared for epidural
- 18:25 Epidural sited
- 18:27 Test dose given
- 18:37 Main dose given
- 18:55 Epidural working well, drop in BP earlier but now satisfactory
- 19:20 Waterlow assessment – 13 [scoring system for risk of pressure sores]  
[mother] informed of the importance of regularly moving and turning
- 19:30 Epidural assessed and numb around the umbilicus so infusion down to 6 mls / hr.
- 20:00 Augmentin 625 mg. given orally
- 20:10 VE Cervix 4 – 5 cm, little change from earlier  
[REG1] contacted for Syntocinon and assess in 2 hours
- 20:25 Syntocinon commenced at 2 mu / min
- 20:35 *No progress*  
*Needs Syntocinon please.*  
*Registrar [REG1]*
- 20:55 Syntocinon up to 4 mu
- 21:25 Syntocinon up to 6 mu  
CTG satisfactory  
Still having frequent moderate contractions
- 21:40 Care taken over by me = [AM2 core midwife]  
[mother] is comfortable with an effective epidural  
Moderate contractions felt  
CTG reactive trace with baseline about 135 b.p.m.  
[mother] is aware that [REG1] will be carrying out the next VE
- 22:15 *Reviewed CTG reactive*  
*VE: Cervix effaced 4-5 cm*  
*Membranes bulging*  
*ARM clear liquor – frank breech at -1*  
*Plan – caution Syntocinon*  
*Reassess 2 hours*  
*Registrar [REG1]*

22:20 [Mother] c/o slight discomfort – requesting epidural to be increased to 9.9 ml  
Same carried out.  
Temp 37.2

22:40 [Mother] c/o lower abdominal discomfort – requesting top up  
BP 110/60

22:47 Top up of 10 mls Marcain 0.25 % given with [mother] sat up

23:02 [Mother] still feeling uncomfortable with contractions  
Syntocinon infusion down to 3 mls

23:12 Vomited moderate amount of clear fluids.

23:15 BP 120/80

23:20 [Mother] is still very uncomfortable – despite of changing position.  
Epidural dressing checked no leakage felt.

23:21 Anaesthetist called

23:22 [Mother] now using Entonox

23:27 Anaesthetist present – epidural site inspected – catheter found to have moved. The need for  
catheter to be re-sited explained to [mother] and agreed.  
[Mother] turned to left lateral and prepared for epidural

23:40 Syntocinon infusion turned off as [mother] very uncomfortable

23:45 Unable to monitor fetal heart at the moment with [mother] on her side

23:48 Test dose given

23:54 BP 120/60 – main dose given

00:01 [Mother] turned onto R lateral  
Epidural infusion recommenced at 9.9

00:05 Epidural beginning to take effect

00:15 [Mother] now comfortable  
Syntocinon infusion recommenced at 3 mls

00:25 [Mother] now beginning to feel some pressure in her vagina

00:45 VE catheterised – 50 mls urine  
Cervix fully dilated  
Breech visible on attempted pushing

00:50 CTG baseline noted to be 160 b.p.m. with some early decelerations  
[REG1] informed of progress – by [SHO1]

00:55 Registrar present [REG1]

00:56 Pushing attempted breech advancing  
Prepared for delivery

01:02 Syntocinon infusion up to 5mu

01:10 Assisted breech delivery – male infant



### Case 3: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 18.30 Admitted to labour ward care by [AM1 E-grade midwife]  
For IOL [induction of labour] for high BP. Uric acid 0.55m.mol/l.  
On arrival procedure explained. For ARM ? FSE and probably an epidural. [mother] happy for this.
- 18.40 O/E [on examination] 108 BP 140/98 Large cuff. Urine prot ++  
O/P Difficult to palpate  
Fundus = term  
Pres = cephalic  
Pos = OP [occipito-posterior]  
Lie = long  
CTG commenced FH 152 b.p.m very difficult to pick up FH so for ARM & FSE [fetal scalp electrode]  
VE performed – see over  
See over = VE cervix 50% effaced, soft, 2 to 3 cms dilated. ARM clear liquor. Ceph [cephalic] presentation –3 ARM performed FSE applied – fell off FSE applied by MC. For epidural and Syntocinon.  
ARM & FSE applied worked for 5 mins & then fell off when [mother] stood up. Draining lots of clear liquor +++.  
Labetalol 100 mg given as prescribed.
- 19:20 2nd FSE applied by [MC1]. CTG [cardiotocograph] commenced.
- 19:30 Anaesthetist requested – busy in room X
- 19:30 Commenced using Entonox. Cont. 3-4:10.
- 19:45 Anaesthetist arrived [A] risks etc. explained.
- 19:50 Venflon being sited blood taken – fridge.
- 19:55 Sitting on edge of bed  
Epidural being sited FH 125. b.p.m.
- 20:06 Test dose given BP 130/90
- 20:10 Main dose given. FH 132 b.p.m. On left side. Epidural running @ 9.9 ml/hr  
[Mother] still feeling contractions in her back.
- 20:22 BP 120/70 Rolled onto R. side
- 20:28 BP 130/70
- 20:40 Beginning to feel completely comfortable, a bit shaky.
- 20:40 To start Syntocinon  
CTG baseline 125/130 b.p.m. Excellent variability and accelerations.  
Cont approx. 3-4:10 mild. Clear liquor.
- 20:55 Syntocinon commenced @ 3 mls/hr (2mu) as per primip regime.  
Decelerations down to 90 b.p.m with good recovery.  
Still difficult to pick up contractions.
- 21:00 Rolled onto back and sat up.  
Decelerations to 70 b.p.m. for approx. 40 seconds.  
Rolled onto L side. [CM1] in the room  
Not concerned as rest of CTG excellent.  
Clear liquor and BS [blood stained] show on pad.
- 21:14 Syntocinon up to 6 mls/hr (4MU) still unable to record conts.

- 21:22 Further decelerations to 70/75 b.p.m. [mother] reassured as anxious.
- 21:32 Further decelerations to 70/75 b.p.m. Also LOC on FSE.  
Rolled onto R. Side. [MC1] called. Syntocinon left at 6 mls/hr. Fetal movements felt.
- 21:40 FSE working again although still some LOC.  
Onto left side. Decelerations to 76 b.p.m.
- 21:43 VE by [MC1] – see over. 9cms dilated.  
[VE cervix soft, 9 cms dilated, liquor clear + show OP, at spines]  
Care handed over to [AM2]
- 21:24 Care taken over by [AM2]  
[mother] is currently comfortable lying on her L Side, epidural is effective.  
FH via FSE – 130 b.p.m base line with early decelerations to 90 b.p.m. with good recovery to baseline. Slightly reduced variability.  
Contractions difficult to pick up – toco. [contraction monitor] adjusted now just picking up irreg. 3 in 10. Syntocinon running at 6 mls/hr 4 mu. MC2 asked to review CTG.
- 21:55 CTG reviewed by [MC2] – to continue to observe.
- 22:00 BP 110/60            T. 36.0            P. 70
- 22:20 FH baseline 130 b.p.m. – good variability now  
early decelerations continue with every contraction to 90-100 b.p.m with good recovery to base line.  
Contractions irregular 3 in 10 moderate  
[mother] not feeling contractions = very comfortable
- 22:35 Pad checked: liquor clear. Little on the pad.  
Early decelerations continue – of varying amplitude from baseline of 130 b.p.m to 90 – 110 b.p.m.  
Always good recovery.  
Conts. irreg. 3 in 10.  
PLAN – following discussion with [MC2] for VE at 23:40 (2 hrs after previous VE) to allow for descent at the ( ) [mother] and husband informed and happy with this.
- 23:00 FH 140 baseline – reactive.  
Early decelerations with occasional late decelerations  
To 90 b.p.m. – 110 b.p.m. with good recovery to baseline.  
Cont. 3 in 10 moderate.  
[mother] feeling contractions now supra-pubically.  
Not painful just aware of tightening  
No feeling of pressure.
- 23:20 IV changed – 1000 mls. Hartmann's commenced  
FH baseline 140 b.p.m. showing good variability.  
Variable decelerations continue – shallow in nature now to 110 b.p.m with good recovery.
- 23:30 Pad changed – slight blood stained mucousy show.  
FH 130 b.p.m – decels. variable however predominantly late to 70 b.p.m. lasting 45 – 60 secs. with recovery to baseline.  
No feeling of pressure felt by [mother] yet, no visible signs (external) of full dilation
- 23:40 VE performed with consent to assess progress.  
See over  
See over = Cervix fully dilated, liquor clear. Cephalic presentation, OA, caput ++, moulding nil.  
To commence pushing.  
Catheterisation attempted prior to VE  
Unable to catheterise after multiple attempts as fetal head blocking the passing of catheter.  
FH post VE 135 b.p.m. reactive.  
To commence pushing.
- 23:59 Commenced pushing – instructions given.  
Sat up  
Pushing well – loaded bowel

- Vertex not visible – Syntocinon increased to 12 mls/hr.
- 00:10 Pushing well. Vertex not visible.  
FH baseline 130 b.p.m. Reactive, early decelerations. with pushing.
- 00:20 Pushing well, vertex not visible  
Catheterised – 100 mls urine drained Prot ++ ketones + blood +
- 00:30 FH 120 b.p.m. reactive  
Syntocinon increased to 24 ml/hr  
Stirrups used as foot rests, continues to push well.  
FH 120 b.p.m. – reactive.
- 00:40 Pushing well Vertex not visible.
- 00:50 FH 115 b.p.m. baseline – good variability. Pushing well. MC2 present in room.
- 00:55 Legs up in lithotomy – pushing well  
Vertex still not visible.
- 01:00 Continues to push well – in view of progress for medical review.
- 01:05 *[REG1] Asked to review – second stage.  
Per Abdomen: Head not felt. Contracting 1:3 moderate  
VE: NAD [no abnormality detected], perineum very thin. Vertex at +2 station  
Caput +++  
? ROP position. ? LOA position – good advancement with pushing.  
Plan: continue pushing, for episiotomy.*
- 01:10 Episiotomy performed with next contraction – analgesia very good from epidural.
- 01:12 SVD live male infant Apgars 9/1 and 9/5  
IM Syntocinon 10 units with anterior shoulder.
- 00:20 Placenta delivered by CCT.  
Blood loss = 800 mls immediately  
post delivery.  
Fundus slightly boggy.  
40 mu Syntocinon in 500 mls N. Saline commenced.  
Perineum inspected by [MC2].  
Third degree tear despite episiotomy.  
[SHO1] informed, perineum inspected & [REG1] called to suture.
- 01:45 Epidural top up given by [MC2] 10 mls 5% Marcain.

#### Case 4: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 09:30 Admitted for IOL for large baby. Palpation: lie longitudinal  
Pres ceph 2/5. Pos: ROA [right occipito-anterior]
- 09:45 VE see over CTG reactive  
See over = VE: Cervix effaced, soft, 3cm dilated, loose application, posterior,  
ARM – clear liquor. Ceph, -2 position not defined
- 10:30 Beginning to contract moderately, not requiring any analgesia as yet.
- 11:00 [Mother] coping well at present with no pain relief.  
Contraction becoming more regular 3:10 mins, lasting approximately 1 min, moderate to strong on  
palpation. CTG baseline 145-150 b.p.m good variability and reactivity.
- 11:20 Commenced Entonox at maternal request
- 11:30 Contractions slightly irregular in length, strength and regularity but remain approx. 3:10 mins.  
CTG satisfactory.
- 11:35 CTG discontinued, [mother] up to mobilise and to the toilet.
- 11:52 Back to bed, CTG recommenced FH – 140 b.p.m.
- 12:00 Vaginal examination with [mother] consent, see over the page.  
See over =VE: Cervix fully effaced, soft, 3 to 4 cms dilated application loose, cervix posterior,  
liquor clear, cephalic – 2 above spines
- 12:20 Venflon inserted as need for Syntocinon – same discussed.
- 12:25 Syntocinon commenced at 2 mu/hr. [mother] coping well with Entonox, sitting upright in bed,  
CTG baseline 140-145 b.p.m, good variability and reactivity.
- 12:40 Syntocinon increased 3 mu/hr, CTG satisfactory, FH – 132 b.p.m.
- 12:52 Onto left lateral as feeling some ? rectal pressure. FH – 135 b.p.m.
- 12:55 Wanting to push, back into semi-recumbent, vertex visible.
- 13:00 Vertex advancing well. FH = 110 recovery after early deceleration
- 13:06 Spontaneous vaginal delivery of live male infant, who cried at birth.  
Apgar 9/1/ and 9/5.  
Syntometrine given with anterior shoulder.
- 13:11 Membranes and placenta delivered complete and healthy – EBL 400 ml  
perineum, slight graze to labia and fourchette.  
For tea and toast and bath and transfer to [ward].

## Case 5: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 09:30 Transferred to labour ward for augmentation  
On admission T 36 P 80 BP 130/75  
On palpation Fundus = large, cephalic presentation 2/5<sup>th</sup> FH regular.
- 09:40 VE see over  
See over = VE: Cervix 75% effaced, soft 4-5cms dilated, position ROL, membranes felt, clear liquor, cephalic, -1 no caput or moulding. Fetal scalp electrode applied  
[Mother] is happy to have Syntometrine and for baby to have IM Konakion.  
Blood sugar 4.5 breakfast offered  
[Mother] would like to bottle feed advantages of breast feeding discussed
- 10:00 Conts 3:4:10 FH 133 reg [regular]
- 10:30 Conts 4:10 FH 134 reg. [mother] is comfortable
- 11:00 Conts 4:10 FH 145 reg 120/70
- 11:30 [Mother] is coping well Cont 3:10 strong short duration FH regular draining clear liquor ++
- 12:00 Conts 3:10 FH regular [mother] out of bed  
VE: see over  
See over =cervix fully effaced, thick 7-8 cm application poor, position central, liquor clear, cephalic -2
- 12:10 [Mother] use of Entonox at request
- 12:30 Conts 3:10 [mother] is feeling some rectal pressure and some urge to push FH 136 reg.
- 13:00 Conts 3 to 4:10 [mother] has some urge to push
- 13:30 Conts 3 to 4:10 FH 130 reg. Blood stained show
- 13:35 Some external signs of full dilation FH 138 regular
- 13:40 Conts 3 to10 FH 130 reg
- 13:50 Conts 3 to 4:10 [mother] is pushing fairly well. FH regular
- 14:00 VE see overleaf  
[VE: not recorded in notes]  
Squatting to push. Very reluctant. Very distressed. Would not push. Asking for a Ventouse or forceps.
- 14:10 Still distressed when she does push it is very effective but patient only pushed once and then started to get argumentative
- 14:20 Informed patient of situation. Allowed husband and patient to discuss and get their act together
- 14:25 Reviewed the situation  
Patient still reluctant to push and has categorically refused to push
- 14:28 Registrar informed [SR1]
- 14:35 Patient in the lithotomy position. Re-examination by Registrar [SR1]  
(see obstetrician's notes). For Ventouse in theatre. Consented
- 14:40 Wheeled into theatre in a wheelchair  
IV sited. Pre-med sodium Citrate 30 mls. Spinal
- 14:45 [SR1]Review c/o failure to progress  
*Multip, gestation diabetes – no macrosomia  
37+ spontaneous labour uneventful first stage pushing 40-50 mins no progress*



*mother distressed. CTG satisfactory*  
*On examination ? 1/5th palpable – v. obese*  
*VE: Direct OP, Caput + moulding +, at spines*  
*No descent with pushing*  
*No analgesia – not pushing well*  
*In view of malposition, station and multiparity trial in theatre under spinal*  
*Consent for trial of Ventouse*  
*FBC, Group and save*  
*Transferred to mat. Theatre at 14:55*

- 15:00 CTG in theatre. Difficult to monitor due to patient's obesity and curled position
- 15:05 Ventouse applied (see obstetrician's notes)
- 15:22 Ventouse delivery of a live female infant  
Placenta and membranes delivered complete by controlled cord traction

## Case 6: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 14:00 Admitted to labour ward in ? early labour
- 16:00 Pethidine 100 mg advised to rest
- 20:20 [Mother] has had some rest but now complaining of painful contractions again.  
CTG commenced. Appears to be contracting 2 – 3 in 10 minutes  
CTG satisfactory
- 20:45 Contractions now stronger 3:10 lasting 1 minute. FHR 140 b.p.m  
good variability with accelerations – requesting analgesia
- 21:00 [Mother] is going to have a bath and then will be reassessed by the next shift of midwives she is happy with this discussion CTG discontinued [on early labour suite]
- 21:30 Care taken over by [AM2 core midwife]  
Discussed request further analgesia  
FH 140
- 22:00 VE: 5 cms ARM & FSE thin mec liquor. FH 130  
Discussed would like epidural  
Entonox commenced distressed with contractions
- 22:10 Epidural arranged  
I/V Hartmann's  
Pressure felt no signs of second stage  
Epidural procedure commenced  
CTG reactive trace
- 23:20 One late deceleration 120 to 80  
Return to baseline with variability and accelerations
- 23:30 FH 140
- 23:30 [Mother] is sleeping is aware of the need to move at least every hour to prevent pressure sores while epidural in situ  
sitting up position now
- 00:05 FH 139 contraction 4/10 reactive CTG  
[Mother] still sleeping
- 00:35 Anterior lip felt. Good progress
- 00:40 FH down to 90 after VE slow to recover  
Turned to right side and FH slowly recovered to 112
- 00:50 Oxygen given  
FH 108  
[SHO1] informed
- 01:00 [SHO 1]  
*CTG review – drop of baseline to 80 b.p.m for about 12 mins with slow recovery, but recovery transient. After change of position baseline reverted to 135 b.p.m. Variability preserved throughout*  
*PLAN continue monitoring*
- 01:15 Now tends to get late deceleration of FH Baseline 127
- 01:30 VE Cervix fully  
FH deep FH deceleration to 80. Pushing commenced 01:40 I/V Syntocinon infusion ready in case needed for 2nd stage  
FH 90-110
- 01:43 FH 109

01:44 FH 123  
01:45 [SG1] called FH decelerations  
01:50 [SG1] present  
02:00 [SG1]  
*Fetal tachycardia in 2nd stage of labour*  
*150 b.p.m no accelerations and late decelerations*  
*For assisted delivery*  
*VE Cx fully Vx =2 DOA min – caput /*  
*Clear liquor*  
*Prepared for Ventouse see Dr. notes*  
02:25 Live male

## Case 7: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 12:05 Transferred to labour ward from [ward]  
O/A contracting 1:10 mild – moderate, feels like pushing – nil visible  
On palpation Fundus = 35 weeks  
Longitudinal lie cephalic presentation, LOL [left occipito-lateral] 2/5th palpable  
Obs: BP 110/70 Temp 37.2 Pulse 80
- 12:50 Monitoring discontinued CTG satisfactory  
up to mobilise out to toilet
- 13:10 Back on CTG prior to ARM
- 13:15 VE prior to ARM unchanged from previous findings ARM performed clear liquor
- 13:15 VE: cx [cervix] partially effaced, soft 5cm dilated, application moderate, posterior, ARM, clear liquor, station –2 to –1 OA. 1/2 hr CTG. Up to mobilise
- 13:45 Monitoring discontinued [mother] changed sheets wishes to stand by bed.
- 13:55 Monitoring recommenced. Care handed over to [AM2]
- 14:00 Care taken over by [AM2]  
[Mother] stood up at present. CTG commenced as continuous monitoring is policy for preterm. Contractions are building up and are now 1:2 lasting 40 – 50 seconds on palpation. Clear liquor draining. [mother] using Entonox.
- 14:20 Feeling some urge to push. CTG shows sleep trace.  
Contracting 1:2 strong [mother] coping well.
- 14:30 [Mother] continues to contract 1:2 lasting 50 – 60 seconds on palpation. CTG remains unreactive. ‘? Sleep trace’ No liquor seen. [mother] coping well with Entonox.
- 15:00 [Mother] requesting further pain relief. VE performed with consent see over. Experiencing rectal pressure.
- 15:00 VE fully effaced, cervix soft, 7 cms dilated, application good, clear liquor, cephalic, spines. Position not defined. Using Entonox.
- 15:30 [Mother] coping well. FH reactive. Clear liquor draining. Contracting 4: 10 strong, [mother] feeling rectal pressure.
- 16:00 [Mother] feeling desperate urge to push. Encouraged to breath through. FH reactive throughout. Contracting 4:10 strong. Clear liquor draining. Nil visible.
- 16:25 Strong urge to push. PP [presenting part] visible. Paediatrician informed. FH reactive throughout. Liquor remains clear [mother] coping well.
- 16:29 Live female infant delivered. ROA, no cord involvement.

## Case 8: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 14:15 [Mother] to labour ward for IOL due to Haemolytic Strep [Streptococcus]. NICU informed, paediatricians will liaise with microbiology and will come and discuss baby's care. I have not started Syntocinon yet as no plan of action has been documented and [mother] very distressed  
BP 140/90 P 100 T 37.0  
Abdominal palpation Fundus = dates. Longitudinal lie, cephalic, engaged  
CTG commenced FHH reg 170 b.p.m. SHO informed of admission [mother] aware of delay in plans.
- 15:25 Syntocinon commenced as 3 ml/ hr 2 mu. CTG reactive. No contractions palpated.
- 16:00 CTG reactive, occasional loss of contact noted.  
[mother] feeling tightenings only. Syntocinon up to 4 mu. Observations stable.  
PLAN: Increase Syntocinon as per protocol  
Reassess 18:15 hours. Hourly temp
- 16:55 IVABs [intravenous antibiotics]
- 16:15 Syntocinon up to 8 mu. Venflon re-sited, left hand blood taken for group and save
- 16:30 Syntocinon now 16 mu tightenings becoming stronger [mother] coping well and not requesting any pain relief at present. CTG reactive.
- 16:45 [Mother] becoming distressed contracting 1:2 strong. Syntocinon down to 8 mu. Commenced using the Entonox. FH reactive throughout.
- 17:00 [Mother] contracting 4-5:10 lasting 30 seconds. Coping well at present using Entonox. CTG shows evidence of sleep trace. Observations remain stable
- 17:15 [Mother] feeling the urge to push. Unable to monitor FH with external monitoring: VE performed with consent to assess cervical dilation and to apply FSE. Consent given. Findings explained to [mother] and partner.  
VE: Cervix fully effaced, soft, rim anterior, application good, position central, membranes ruptured, no liquor seen, cephalic, spines ? OP OA. continue Syntocinon, FSE, encourage to breath
- 17:30 Shallow early deceleration noted on CTG. Reduced variability continues. [Mother] coping well and breathing through with each contraction. Contracting 4-5:10 strong.
- 17:45 [Mother] feeling the urge to push with each contraction. Encouraged to breathe through if possible
- 17:47 [Mother] pushing with the height of contraction ? pp visible when pushed
- 18:00 pp [presenting part] visible when pushing. [Mother] pushing well. FH recovered well following pushing episode.
- 18:15 Live male infant delivered LOA, no cord involvement.



## Case 9: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 16:00 Transferred to labour ward  
T 36 P 104 BP 120/88  
Palpation fundus term, lie long  
Pres ceph 1-2/5th palpable  
Good size fetus  
[Mother] is contracting fairly regularly approx 3 in 10 minutes moderate in strength  
[Mother] would like an epidural. Anaesthetist contacted to site it  
Syntocinon prescribed by MC to commence once epidural in progress  
[Mother] wishes to breast-feed and baby to have IM Vit K 1 mg  
[Mother] consents to IM Syntometrine
- 16:35 Anaesthetist delayed at present as may be needed to attend a CS
- 16:55 CTG satisfactory, discontinued for a while.  
Anaesthetist called away to do CS – suggests bleeping 3<sup>rd</sup> on call
- 17:00 [A] bleeped
- 17:15 Seen by anaesthetist to site epidural
- 17:31 Prepared for epidural  
Sat up – Venflon sited bloods in fridge
- 17:49 Main dose given  
BP satisfactory  
CTG satisfactory
- 17:53 Syntocinon commenced at 2 mu
- 18:00 Turned onto right side
- 18:10 Epidural infusion commenced
- 18:30 Epidural working well  
BP stable
- 18:50 VE cervix 1.5 cm FSE applied  
VE: Cx 1 cm thick, moderate consistency, 1.5 cm dilated, moderate application, mid to posterior position, membranes ruptured, liquor clear, presentation cephalic, no caput or moulding FSE, catheterised  
On palpation head 3/5 palpable
- 19:00 Syntocinon up to 16 mu
- 19:30 Contracting moderately 3:10  
CTG satisfactory
- 20:00 Syntocinon remains on 16 mu  
Contractions becoming stronger and more regular  
CTG small early decelerations earlier now satisfactory
- 21:50 Slight twinge on R [right] side so turned down and now seems better
- 21:09 Pain on R side increasing again  
TOP UP 10 mls 0.25% Marcain given
- 21:30 Care taken over by [AM2]  
CTG some early decelerations noted – improving now – good variability with accelerations.  
Contracting 3:10 moderate on palpation. Liquor clear.  
Discussed with [REG1] VE at 23:00

21:40 T 37.3 Augmentin now prescribed IV  
Ranitidine 150 mg given as per hospital policy

22:00 Augmentin 1.2 g IV as prescribed  
Contracting well 3 to 4: 10 Syntocinon remains on 16 mu

22:15 [Mother] turned to left side – now trying to sleep  
CTG satisfactory. Contracting 3 to 4 in 10

22:30 [Mother] asleep. CTG satisfactory

22:45 Syntocinon syringe renewed T 37.5

23:00 Abdominal palpation – long lie, cephalic, 3/5th palpable  
VE to assess (see over) with consent  
Discussed with [REG1] informed will come and review

23:00 Observations all satisfactory  
Synto increased to 32mu as instructed by [REG1]  
VE: Cervix 1 cm thick, moderate consistency, 2 cm dilated, application fair, posterior position, liquor clear, cephalic, -3 bladder emptied, to assess progress after 4 hours of Synto. Inform Registrar [REG1]

23:45 *REG1 review – not yet in established labour  
Increase Syntocinon to 32 mu  
Reassess 02:00 if not in established labour ring me  
CTG satisfactory. NB maternal pyrexia 37.5*

23:50 [Mother] and husband aware of above plan. Now resting

00:00 CTG remains satisfactory T 37.5  
Contracting 3:4:10 strong. Synto continues on 32 mu  
[Mother] experiencing pain on R hand side

00:10 Top up Marcain 0.25% given lying position

00:25 BP satisfactory – [mother] much more comfortable now. CTG satisfactory. Cont irregular 3 to 4: 10. Left to rest

00:30 Contracting 5:10 at present – FH satisfactory  
[mother] sleeping

01:00 FH previously satisfactory – good variability with accelerations  
Contractions irregular 2 –4 in 10 palpate strong  
[Mother] asleep

01:20 Syntocinon infusion ( )

01:30 Feeling nauseous

01:40 Vomiting ++ feeling unwell

02:00 VE to assess with consent (see over) T37.7  
See over = Cx 1 cm thick / swollen, consistency softer, 3cm dilated, fair, posterior position, liquor blood stained, cephalic presentation, inform registrar  
[REG1] informed

02:15 *[REG1] review  
head still 3/5th palpable  
no descent  
therefore failed induction  
CTG satisfactory  
For C/S discussed with consultant – agrees*

02:50 Care handed over to theatre staff.

## Case 10: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 14:00 Received onto labour ward waiting for epidural  
Discussed with patient and agrees to have the epidural prior to VE.
- 14:15 IV sited
- 14:30 Epidural sited with good effect. BP 90/60
- 14:45 VE performed
- 14:45 Cx fully effaced, thin, 4 cm dilated, application fair, position: mid, ARM clear liquor, cephalic, 1 cm above spines.
- 14:50 Fetal heart down 90 b.p.m > patient in the left lateral  
Fetal heart not recovering, IVI increased.
- 14:55 Encouraged patient to turn over to R lateral. Immediate recovery of FH to 125 b.p.m baseline.  
Good reactive trace with good variability.
- 15:30 Comfortable – tea and toast.  
Fetal heart having shallow early decelerations down 100 b.p.m
- 16:00 Fetal heart baseline 120 b.p.m
- 16:10 Baseline down 90 b.p.m. Slow to recover. [REG1] informed.
- 16:15 *T + 12 IOL*  
*Asked to review CTG*  
*Baseline 130, reduced variability, recurrent variable decelerations*  
*Advised – repeat VE and position change*  
*[REG1]*
- 16:20 VE see over  
see over = Cervix fully effaced, thin and stretchy, 7 cm dilated, application good, liquor clear, cephalic, 1 cm above spines.
- 16:30 CTG baseline improved 125 b.p.m reasonable variability and reactivity. Contractions 3:10 strong.
- 17:15 Cx fully dilated, cephalic at plus one, ROT, adequate pelvis, allow pushing, anticipate normal vaginal delivery.
- 17:25 *FBS performed in view of continuous CTG abnormality. See VE as charted*  
*Commence pushing*  
*[REG1]*
- 17:30 Commenced pushing in squatting position. Good descent – crowning
- 17:40 Normal delivery of a live female infant.  
Syntometrine post delivery of infant.
- 17:45 Placenta and membranes delivered complete by CCT.

## Case 11: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 05:30 Admitted to labour ward via ambulance with PV bleed at least ½ egg cup with spontaneous rupture of membranes
- O/A abdomen soft, long lie, cephalic presentation,  
2/5th engaged. G4 P3. 39+2 weeks  
BP 100/60 P 90 Temp 36.8  
PV frank blood loss on pad  
CTG commenced FH 143  
Since blood loss, SRM 1:10 painful  
SHO contacted for Venflon and bloods  
CTG baseline 140 b.p.m variability satisfactory  
Early decels 130 shallow
- 05:40 Venflon sited and blood taken and sent. Out to toilet
- 06:00 Reviewed by [SHO1] APH starting early labour  
Discussed with REG1], continue to observe for review at 08.00
- 08:45 *Reviewed by [Consultant]*  
*Multip 39+ para 3, 3 x vag dels [vaginal deliveries] [max. 4.4 kg]*  
*APH early this am*  
*Contracting mildly*  
*No uterine pain between contractions*  
*FMs ++ [fetal movements]*  
*CTG satisfactory*  
*O/E uterus – non tender*  
*Does not feel macrosomic*  
*Ceph 3/5th*  
*VE 3-4 cm, 1 cm thick, soft and stretchy*  
*Poorly applied to pp*  
*OT –2 above spines*  
*No membranes felt.*  
*FSE applied*  
*Blood clot = 30 mls at time of VE*  
*Plan for active management of labour with Syntocinon*  
*titre to achieve contractions 3 – 4 in 10 regularly*  
*Once established stop Syntocinon*
- 09:10 [Mother] happy with plan
- 09:10 Commenced Syntocinon 3ml/hr = 2mu/min
- 09:20 FH baseline 145 b.p.m. good variability  
Very reactive  
Contracting 1:10 palpating mildly
- 09:30 IV Syntocinon 4,5 ml/hr = 3mu/min  
contracting irregularly 1-2 palpating mild to moderate
- 09:50 IV Syntocinon 6 ml/hr = 4mu/min  
FH 140 b.p.m. variability good, reactive contracting 2 in 10 palpating moderately
- 10:15 IV Syntocinon 7.5 mls/hr 5 mu/min
- 10:30 No PV loss seen
- 10:45 Contractions becoming more regular 3 in 10 palpating moderately  
[mother] using Entonox and coping well.  
FH baseline 150 b.p.m. good variability, very reactive
- 11:00 Out to toilet

- 11:05      Positioned on L lateral as sacrum feeling sore, no pressure sores seen
- Consultant visit
- 11:05      *Contractions irregular 3 in 10 at present CTG satisfactory*
- 11:30      FH 140 b.p.m. very reactive. Good fetal moment
- 11:45      No PV loss seen  
[Mother] coping well using Entonox
- 12:10      FH 145 b.p.m. good variability, very reactive  
contracting 3 in 10 palpating moderate  
IV Syntocinon continued at 7.5 ml/hr
- 12:30      Contractions becoming more painful and regular  
Contracting 3 – 4 palpating moderate / strong  
FH baseline 145 b.p.m. good variability very reactive fetal movement ++  
[Mother] continues to cope well using Entonox
- 12:45      FH baseline 140 b.p.m good variability  
Early deceleration to 100 b.p.m. returns well to baseline  
[Mother] repositioned sitting upright  
Pressure areas intact  
Coping well using Entonox
- 12:55      VE performed to assess progress please see over  
See over = cervix fully effaced, stretchy. 6 – 7 cm dilated, fair application to presenting part, no liquor see, cephalic presentation, station –2
- 13:00      [Mother] out to toilet
- 13:15      FH 145 b.p.m.
- 13:45      FH 145 b.p.m., good variability, very reactive
- 14:00      Sacrum feeling numb therefore positioned on L lateral, pressure areas intact
- 14:05      Care continued by [AM2]  
[Mother] on her L side using Entonox effectively  
Syntocinon at 7.5 / hr via pump  
Contraction 4 in 10 mins  
FH 145 – 150 good variability. Accelerations noted
- 14:10      Observation stable. BP 110/60
- 14:15      [Mother] has 'urge to push' at height of contraction  
FH 138 b.p.m. [AM] now present for delivery
- 14:20      Contractions expulsive. Actively pushing, anal dilation
- FH 135 b.p.m.  
            Contraction 5 in 10 mins
- 14:25      FH 130
- 14:27      SVD live male infant. [Mother] in left lateral position  
Cord round neck x 1 easily slipped over head
- 14:29      Placenta delivered by CCT  
Perineum viewed – small graze at fourchette – not bleeding – not sutured  
Skin to skin



**Case 12: Transcription of labour events documented in the case notes by midwifery and medical staff**

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- 06:15 To labour ward for epidural
- 7:00 Epidural sited
- 7:30 Remains pain free and comfortable – reasonable abdominal trace
- 7:40 Clear liquor draining and show. No big urge to push at present
- 07:15 Contracting 2:10 for approx. 50 to 60 seconds. Comfortable on side ( )
- 08:00 VE to assess and apply FSE with discussion and consent. Cervix 6 cm up to 8 cm with contractions cervix soft Cephalic ROT[right occipito transverse] at spines but not well applied to cervix. FSE applied FHR 134 b.p.m with accelerations
- 08:15 Feeling sick
- 08:30 Remains upright – comfortable FH 133 b.p.m.
- 09:00 Beginning to feel contractions, not too uncomfortable and feeling a little pressure in rectum – no external signs of FD [full dilation] as yet. Reassured ++
- 09:15 Still feeling pressure. Sat up as no external signs
- 09:45 Have discussion to report cervical assessment to be able to give appropriate pain relief or be more proactive with pushing. D/W anaesthetist re ( ) ?? dural tap, if remains symptomatic to carry on
- 10:00 VE 7 cms pp ceph, poorly applied, some rotation but descent still at spines. For epidural top up. D/W core midwife and [consultant] on call. For mutips Syntocinon regime as contractions probably need to be more effective
- 10:20 Syntocinon 3 mls / hr commenced Contractions regular but short and sharp. FH reactive coping well
- 10:40 [Mother] managing to rest, dosing – comfortable FH 142 b.p.m
- 11:00 Syntocinon 4.5 ml/hr. Changed sheets on bed – fetal heart erratic for 2 minutes now settled and reactive
- 11:15 [Mother] feeling some break through pain – using Entonox to cope – no evidence externally of fully dilation 145 b.p.m
- 11:45 Discussed with [MC1] to top up epidural
- 11:50 Wanting to push – show ++. VE fully dilated, head advancing with pushed Bowel full ++ FH 152 b.p.m
- 12:00 Pushing well head descending with contractions 128 b.p.m.
- 12:15 Normal delivery of live female  
Apgar 9/1 and 9/5

**Case 13: Transcription of labour events documented in the case notes by midwifery and medical staff**

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- 10:15 Transferred to labour ward for ARM  
Care undertaken by [AM1]  
  
History G3 P2 Well during pregnancy  
Maternal observation 120/70 P 80  
Temp 36.4  
  
OP Fundus – dates  
Lie long  
Pres ceph  
Head 2/5<sup>th</sup> palpable  
Position ROA  
  
CTG commenced with [mother] consent
- 10:40 [Mother] happy for baby to have IM Vit K and for Syntometrine IM to aid delivery of placenta  
[Mother] is asthmatic and had been on Prednisolone and antibiotics for a week prior to admission
- 10:55 VE performed with consent  
Cx 2-3 cm ARM with consent. Clear liquor drained FSE applied to baby's head  
Review in 2 hours if not contacting well  
Cx soft, 2-3, fair application, ARM, clear liquor, ceph –1
- 11:00 FHR 146 b.p.m good variability and accelerations. Now contracting 3:10 moderate
- 11:30 FHR 135 b.p.m good variability and accelerations. Antibiotics given as per chart
- 12:00 FHR 130 b.p.m, good variability and accelerations  
Contractions 3-4 :10 strong
- 12:30 FHR 135 b.p.m, good variability and accelerations  
contracting 4:10 strong LOC due to movement of baby.
- 13:00 [Mother] disconnected from monitor in order to go to toilet
- 13:05 Monitor reconnected FHR 148 b.p.m contracting well I will leave examining [Mother] until 14:00  
unless shows signs of full dilation
- 13:10 Maternal observation BP 110/70 Pulse 80 b.p.m
- 13:20 [Mother] has pressure and feels like she wants to push
- 13:20 VE performed with consent to ascertain progress  
Cx 5-6cm  
Cx fully effaced, soft, 5-6 cm dilated, well applied, liquor clear, ceph.
- 13:30 [Mother] asked if wanted to stand up and to lean over bed. [Mother] happier in bed at the  
moment. Some loss of contact on trace due to fetal movement
- 14:00 Care handed over to [AM2]
- 14:00 FH 130 b.p.m Good reactivity and variability  
Early decelerations noted to 120 b.p.m prior to care being taken over  
Toco [contractions monitor] not picking up contractions
- 14:10 FSE working intermittently  
Abdominal US [ultrasound] used in between  
Fetal movements ++  
FH 146 b.p.m
- 14:20 Abdominal US now in use as loss of contact with FSE  
FH 177 b.p.m – mucousy show  
[Mother] beginning to feel urge to push Nil visible – to observe heartbeat as up

- Offered Entonox, declined, coping excellently
- 14:45 FSE now working. FH 140 – 160 b.p.m  
Commenced Entonox but [mother] does not like it. FH much better now
- 15:00 FH 140 b.p.m – good reactivity and variability feeling in bottom (pain) worse but no urge to push any stronger  
Early decelerations noted to 120 b.p.m  
Recovered well to baseline
- 15:20 VE to assess with consent  
VE fully effaced, 8-9 cm application good, liquor clear, ceph, spines,  
? Syntocinon as contractions irregular  
8-9 cm anterior lip onto right lateral
- 15:25 FH 130 b.p.m Good reactivity and variability.
- 15:30 Anal dilation ++ and [mother] feeling urge to have bowels open
- 15:35 Vertex visible and [mother] on back
- 15:37 FSE has come off FH 140 b.p.m  
Good variability and reactivity
- 15:43 SVD female

**Case 14: Transcription of labour events documented in the case notes by midwifery and medical staff**

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- 10:50 Care by Sister [AM1 senior ward midwife]  
Arrived on CDS [labour ward] for augmentation
- 11:20 Ceph 3/5<sup>th</sup> CTG good  
PV Cervix central, partly effaced (multips os)  
2cm dilated  
Cephalic, well above mid-cavity  
Intact membranes  
No cord felt  
ARM – copious clear liquor  
No cord felt  
FSE could not be applied  
For Syntocinon
- 10:50 Prostin x 3 previously.  
For ARM & augmentation  
On arrival, not contracting, comfortable.  
Full explanation given re induction,  
Agrees to ARM, FSE & Syntocinon.  
On palpation, long lie, cephalic presentation, free ? position  
Known IUGR 5<sup>th</sup> centile on xx/xx/xx  
Out to toilet      BP 160/100      P. 80      T 36.5
- 11:10 VE see over  
ARM not performed  
For review by [SG1]. Explanations given. Seen by [SG1]. ARM performed, clear liquor draining, unable to apply FSE therefore abdominal monitoring used with some loss of contact. Maternal adipose tissue noted. FH 142 b.p.m.
- 11:35 Syntocinon commenced as per regime 2 mu/min  
Discussed analgesia open minded will see how events occur
- 12:00 Loss of contact on CTG. Held in place by [mother] and myself. Declined to go on l. lateral.
- 12:05 Synto 4 mu/m cont 1:8 mod  
Discussed with [mother] happy for attempt to apply FSE, FH 130 b.p.m reduced variability  
FSE applied, no change in cervix. Head 2-3 above
- 12:35 Synto 6 mls/hr (4 mu/min)  
FH 150 b.p.m.
- 12:47 Cont 1:7-10 moderate FH 145 b.p.m  
good variability
- 13:06 Syntocinon up 7.5 mls/hr (5mu/min)
- 13:23 D/W [SG1] to increase Syntocinon as required  
FH 150 b.p.m cont irregular
- 13:30 BP 194/111 with Dynamap big cuff
- 13:38 Nifedipine 10 mg capsule stat dose as verbal orders from [SG1]
- 13:44 BP rechecked 198/106  
Cont 1:6
- 13:46 Syntocinon up 12 mls/hr (8 mu/min)  
Draining liquor ++
- 13:30 Increase Syntocinon till good uterine contraction or to a max of 32 mu/min

13:56 Care handed over to [AM2]

14:00 BP 182/85 FH 135 b.p.m some reduced variability.

14:15 IVI bag changed and running 4 hourly

14:20 Contraction palpated and lasting 45 seconds but are 2:10  
Syntocinon increased to 18 mls/12 mu

14:30 FHR 143 b.p.m good variability and accelerations.

14:45 [Mother] feels very uncomfortable and would like an epidural. Anaesthetist contacted and in theatre at present. [mother] informed of this and will continue to use Entonox at present

14:50 Blood results obtained see chart.

15:00 BP 180/100 FHR 135 b.p.m reactive trace

15:15 Anaesthetist present. Epidural explained. Set up for procedure

15:24 BP 160/100, test dose given. Turned onto R [right] side

15:34 BP 160/100 main dose given

15:35 Infusion commenced at 9.9 mls/hr.

15:40 BP 150/90

15:45 BP 150/85 FHR 141 b.p.m good variability and accelerations. Toco applied to record contractions  
Syntocinon increased to 24 mls/16mu

16:10 Plan discussed with [mother] for examination to check progress at 16:30. [mother] happy with this  
Pressure area risk score = 17  
[Mother] aware that we require to turn her regularly in order to avoid tissue damage

16:35 VE performed with consent see over  
Due to high head and user of dilation ask [MC1] to check findings  
FHR 145 b.p.m.

16:40 Asked to check VE as [AM2] unsure of findings  
Cx 5cm, effaced but high head -3 to 4 spines, malposition not identified

16:45 Pressure area checked marking on L hip. [mother] now sat up for a short time

17:00 [Mother] requires top-up to epidural. FHR 140 b.p.m good variability and accelerations.

17:28 BP 170/70 4 ml top-up given

17:30 No effect to top up. Remainder of 6 mls given. FHR 150 b.p.m. Contractions 3:10 strong

18:00 FHR 145 b.p.m good variability and accelerations. Contractions 3:10 moderate

18:35 Care discussed with [SHO1] to increase Syntocinon infusion to 32 mu now. [mother] aware and happy with this.

18:40 *[REG1] review*  
*P1 PET & IUGR*  
*IOL 16 mu/m*  
*On Synto + contracting 3 in 10 mild lasting 40 secs*  
*CTG 140 b.p.m good variability, accelerations + no decelerations*  
*P = increase Syntocinon to 32 mu/min + observe*

18:45 [Mother] turned onto L side. Pressure areas marked but intact

19:00 FHR 143 b.p.m good variability and acceleration BP 130/70



19:25 Syntocinon infusion syringe changed

19:30 FHR 140 b.p.m good variability and accelerations contracting 3:10

19:45 VE performed with consent, see over

20:00 FHR 140 b.p.m good variability and accelerations. Loss of contact due to FM's BP 150/85

20:30 FHR 148 b.p.m reactive trace

20:40 [Mother] very uncomfortable. Top up given by [CM1]

20:45 BP 140/90

20:50 BP140/90

20:55 BP150/90

21:00 FH 144 b.p.m good variability and accelerations

21:10 BP 160/90

21:30 FHR 156 b.p.m good variability and accelerations

21:50 Care taken over by [AM3]

22:00 *[REG1] review*  
*CTG 155 b.p.m baseline with variability 10 b.p.m with early decelerations*  
*On Syntocinon 32 mu/m*  
*Contracting 3 to 4/10 moderate*  
*Feeling pressure down below*  
*Cx 7 to 8 cm at 19:45 pm*  
*VE P/abdomen: Difficult to feel head abdominally*  
*P/V Bladder empties ~ 100 mls urine*  
*V/V NAD Cx 7 to 8 cms dilated*  
*Cephalic Vx -1 station*  
*ROA position caput + moulding*  
*FSE re-applied - accelerations with VE +*  
*Plan: reassess at midnight*

22:30 Contracting 4:10 strong  
 Synto on 32 mu  
 FHR 152 - shallow early decelerations with each contraction  
 Blood stained liquor draining

23:00 Contracting 3-4 : 10 strong  
 Synto on 32 mu  
 FHR 147 b.p.m  
 [mother] using Entonox with good effect - epidural still in progress and [mother] is happy to use the Entonox instead of having further top-ups. [mother] remains relaxed and coping well.

23:30 Contracting 3:10 strong  
 Syntocinon on 32 mu / 48 mls/ hr  
 FHR 160 b.p.m

00:05 *Midnight [REG1] Review*  
*CTG: 155 - 160 b.p.m baseline, good variability, few early decelerations with good recovery.*  
*Accelerations + on VE*  
*P/Abd: ? cephalic o/5*  
*P/V: V/V NAD*  
*Cx fully dilated, clear liquor +*  
*Vx at spines, caput ++, moulding 1+*  
*? ROA position*  
*Plan: await descent for 1 hour and then commenced active pushing*

00:15 Top up Marcain 0.25% 10 mls given  
Contracting 3:10 strong  
Syntocinon 3:10 strong  
Syntocinon on 32 / 48 ml per hour.  
FHR 154 b.p.m

00:30 Contracting 3:10  
FHR 160 b.p.m  
Synto on 32 mu/ 48 mls per hour

01:00 Contracting 3:10  
FHR 160 deceleration to 100 with good recovery

01:15 Commenced pushing

01:30 Pushing well but no visible descent.

01:40 [Mother] has been pushing for 25 minutes  
But nothing visible  
Variable decelerations. Baseline now about 160 to 170  
[Mother] getting distressed – requesting medical assistance

01:45 [SR1] informed and will visit.

01:50 BP now 180/110 [mother] appeared distressed  
Top up of 10 mls Marcain 0.5% given

01:55 170/100

01:58 [SR1] present

01:58 *Asked to see*  
*Pushing 45 minutes*  
*Variable decelerations with fetal bradycardia 160 to 170 b.p.m good b.t.b.v.*  
*VE – fully dilated, clear liquor*  
*- direct OA*  
*pp 0+1 below, +2 with pushed*  
*Plan – for assisted delivery*  
*Pt and partner happy with decision*

## Case 15: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 09:10 Care by [AM1 senior ward midwife]  
Transferred to labour ward from [ward] for induction of labour for severe inflammatory bowel disease  
For ARM and Syntocinon, BP 140/75 Pulse 64 Temp 36.9  
Venflon sited. Bloods obtained
- 09:13 Commenced CTG monitoring  
FH baseline 150 b.p.m, good variability, very reactive.  
Fetal movements +++++. No uterine activity at present
- 09:30 VE performed by [SG1] ARM attempted but cervix very posterior
- 09:35 ARM performed by myself, clear liquor seen, FSE applied with consent
- 09:30 VE Cervix  $\frac{1}{2}$  cm thick, 2 cm dilated, posterior, ARM, clear liquor. Cephalic presentation -3 [station]. ARM, FSE, for epidural, commence Syntocinon
- 09:45 Commenced IV Syntocinon at multips regime 3mls = 2mu
- 09:46 [Mother] requesting epidural, anaesthetist currently busy in theatre  
[Mother] informed not distressed with pain
- 10:00 FH baseline 140 b.p.m, variability present, good accelerations  
Contracting 3 - 4 in 10 palpating mildly, not painful or felt by [mother]
- 10:10 IV Syntocinon increased 4.5 mls/hr = 3 mu
- 10:15 Anaesthetist present  
Explaining risks of epidural
- 10:20 [Mother] positioned on L, [left] lateral for epidural to be sited
- 10:28 Epidural in situ, test dose given
- 10:35 BP 130/80  
Olsalazine 500 mg given as charted [in black]  
FH baseline 140 b.p.m, good variability, very reactive  
Contracting 3:10 palpating mild / moderate
- 10:40 IV Syntocinon increased to 6ml / hr = 4 mu/min [written in black]
- 11:20 FH 135 b.p.m, very reactive, fetal movements +++  
Contracting 3:10 palpating mild to moderate
- 11:20 IV Syntocinon increased to 7.5 = 5 mu/min
- 11:30 [Mother] re-positioned on left lateral, pressure areas intact  
Continues to drain clear liquor  
[Mother] attempting to sleep
- 12:00 Observations charted *on partogram*  
Contracting 4:10 palpating moderately  
IV Syntocinon continues at 7.5 ml / hour = 5 mu/min  
[Mother] comfortable and pain free
- 12:30 FH 130 b.p.m remains reactive and accelerative  
CTG monitor not picking up contractions very well ? due to maternal position  
Contracting 3-4:10 palpating moderate  
[mother] consents for IM Syntometrine for 3<sup>rd</sup> stage  
Consents for baby to have Vitamin K  
Would like to A/F [artificially feed] Cow & Gate  
Continues to drain clear liquor

- Discussed plan of care with [mother]  
For catheterisation and repeat VE at 13:45  
(4 hours from commencing Syntocinon)
- 12:40 [Mother] currently sleeping
- 12:50 Interim care by [AM]  
FH baseline 120
- 13:00 Care handed back to AM1  
[Mother] repositioned sitting upright  
Pressure areas intact  
Continues to drain clear liquor
- 13:05 FH baseline 125 b.p.m very reactive, good variability  
Contracting 3-4:10  
[Mother] comfortable and pain free
- 13:30 FH 130 b.p.m
- 13:35 Catheterised prior to examination  
500 mls of clear urine
- 13:45 VE performed to assess progress. Please see over  
13:45 See over = Cervix 1 cm thick, 4 cm dilated, poor application to presenting part, clear liquor, cephalic -3, to discuss plan with Reg, reassess in two hours
- 14:00 Case taken over by [AM2]. CTG baseline 120 b.p.m  
"sleeping trace" BP 120/70, pulse 72, temp 36.7
- 14:20 [Mother] draining clear liquor +++  
inco pad changed and [mother] turned onto left side. Pressure areas intact. CTG baseline 120 b.p.m with accelerations
- 14:35 Hartmann's 1 litre replenished
- 14:45 CTG baseline 130 b.p.m with good variability.  
Syntocinon still infusing at 7.5 mls (5mu / min). Contractions 3:10 and moderate on palpation
- 15:00 CTG baseline 120 b.p.m with accelerations to 150 b.p.m
- 15:15 Fentanyl syringe replenished. Running as 9.9 ml/hour. CTG baseline 120 b.p.m.  
[Mother] very comfortable at present
- 15:30 Contractions 3-4 in 10. CTG baseline 120 b.p.m
- 15:45 VE performed with consent (to assess progress) see over - (catheterised)  
CTG baseline 120 b.p.m
- 15:45 Cervix fully effaced, soft, 6 cms dilated, application fair, anterior position, clear liquor, cephalic presentation, -1, reassess 2 hours
- 16:00 CTG baseline 120 b.p.m ? sleeping trace
- 16:10 [Mother] turned to R. [right] lateral position to aid pressure relief. FH 160 b.p.m
- 16:20 Syntocinon replenished, running at 7.5 ml (5 mu / min)
- 16:30 CTG baseline 130 b.p.m with good variability  
Contractions 4:10 and moderate
- 16:45 CTG baseline 120 b.p.m with good variability  
[Mother] now sat upright. No liquor seen on pad.
- 16:55 BP 101/70 P = 80 T = 36.4C

17:00 CTG baseline 120 b.p.m with accelerations with contractions. [mother] sleeping at present

17:15 CTG baseline 115 b.p.m

17:30 CTG baseline 120 b.p.m. Contractions 3:10 but not palpating very strong  
Will re VE @ 17:15 to assess progress and decide plan of action

17:45 VE with consent to assess progress see over catheterisation

17:45 See over = Cervix fully effaced, 7 cms dilated, application fair, position anterior, clear liquor, cephalic – 1 ? Syntocinon under doctor's instructions

17:50 [MC1] asked re: increasing Syntocinon. Consultant to review  
CTG baseline 120 b.p.m  
Contractions not adequate, increase Syntocinon if necessary. Reduce when established

18:00 [Mother] Left lateral for pressure relief

18:05 Syntocinon increased to 8 mu / min (12 mls) as per doctors instructions

18:25 CTG baseline 120 b.p.m "sleeping trace"  
Syntocinon increased to 16 mu/min (24ml)

18:40 Checked by MC1. Accelerations 120, good variability, baseline 116.  
[Mother] aware of some sensation down below. Nil visible.

19:00 CTG baseline 120 b.p.m with good variability

19:15 CTG baseline 130 b.p.m. [mother] still feels like something is happening  
down below, nothing visible yet.

19:30 CTG baseline 130 and some early decelerations with contractions.

19:45 VE performed with consent and catheterised (fully dilated)  
CTG baseline 130 b.p.m. [mother] has rectal pressure. To commence pushing now

19:55 Cervix fully dilated, blood stained liquor, cephalic presentation =1. Commence pushing

20:05 FH 120 b.p.m

20:15 FH 120 b.p.m pushing well

20:20 FH 120 b.p.m with decelerations to 100 b.p.m

20:25 FH 130 b.p.m pushing well

20:35 FH 130 b.p.m

20:40 [Mother] now kneeling FH 140 b.p.m

20:45 FH 150 b.p.m with decelerations to 80 b.p.m

20:50 FH 140 b.p.m

20:50 FH 150 b.p.m with decelerations to 70 b.p.m. Pushing well

21:00 Good descent, vertex visible, FH 140 b.p.m with decelerations to 70 b.p.m

21:05 FH 130 b.p.m with decelerations to 80 b.p.m

21:15 FH 140 b.p.m, good descent

21:25 AM entered room [2<sup>nd</sup> midwife for delivery]



- 21:35 FH 100 FSE removed
- 21:30 Normal delivery of live female infant. Syntometrine 1 amp at birth of anterior shoulder. Babe dried and wrapped at [mother] request  
Baby given to mum
- 21:41 Placenta delivered by controlled cord traction and maternal effort  
EBL 500 mls. Brisk PV loss  
Contraction rubbed up, catheterised and Syntocinon 40 units in N. Saline commenced  
On vaginal examination, small 2<sup>nd</sup> degree tear observed, sutured as over  
Observation taken and recorded
- 22:15 Co-proxamol given  
Epidural Cannula removed – tip present. IV Syntocinon completed discontinued – Venflon left in situ. Washed, transferred to ward.

## Case 16: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 09:20 Admitted from [ward] for augmentation.  
Temp 36.8 P88 PU'd on ward O/P fundus = dates. Lie longitudinal. Presentation – ceph PMH [past medical history] – nil of note – no allergies. Has had a show. Pain relief discussed and would like an epidural. Anaesthetist informed. CTG commenced FH 130 – 135 reactive trace
- 09:30 Anaesthetist present [A] to explain procedure Venflon sited
- 09:45 Epidural being sited. Bradycardia noted whilst procedure being done. Refreshments given FH 110-115 reactive trace
- 10:20 VE performed with consent – see over will review in 2 hours. Contractions 3:10 regular and strong on palpation
- 10:30 FH 130 – 135 b.p.m reactive trace
- 10:45 FH 130 – 135 b.p.m contractions 2-3: 10
- 11:00 FH 130 – 135 b.p.m contractions 2-3: 10 feeling stronger on palpation.
- 11:15 FH 130 – 135 b.p.m contractions 3:10 [mother] remarking how comfortable she is and appreciation of the pain relief. Written consent to be observed by camera
- 11:30 SB [REG1] and is happy with progress
- 11:45 FH 130 – 135 b.p.m reactive trace contractions 3:10
- 12:00 FH 130 – 135 b.p.m no other problems ( )
- 12:15 FH 125 – 130 b.p.m Contractions 2-3:10
- 12:20 Turned to left lateral, to relieve pressure off buttocks
- 12:30 FH 130-135 contractions 2-3:10
- 12:45 FH 130 – 135 contractions 2-3:10 contractions not palpating as strongly as before
- 13:00 VE see over. Performed with consent Bladder emptied 250 mls Syntocinon commenced 2 mu / 3 mls FH 130 – 135 b.p.m reactive trace
- 13:20 Syntocinon 4mu
- 13:35 Synto increased to 8 mu Contractions 2:10 FH 115-120 reactive. Maternal observation satisfactory
- 13:50 Syntocinon 12 mu. Care taken over by [AM2]. [Mother] comfortable not aware of any discomfort CTG baseline 124, good variability, some accelerations present.
- 14:00 Contracting 3-4:10 irregular at present, Syntocinon maintained on 16 MU
- 14:45 Maternal obs. normal CTG sleeping trace at present, variability good
- 14:30 Contracting 3:10 mod/strong remain slightly irregular  
FH 146. Syntocinon maintained on 16 mu
- 14:45 CTG baseline 146 accelerations present. Fentanyl syringe renewed – remains effective
- 15:00 Moved onto right side, pressure areas appear intact  
Aware of some mild discomfort lower right side, to inform me if persistent
- 15:20 Still aware of discomfort / pain on right side, No improvement since lying on right side
- 15:25 Left side satisfactory BP 115/70

5 mls 0.25 Marcain given with [mother] lying on right side.

15:30 BP 120/75 following top up  
CTG baseline 130, reasonable variability

15:35 Beginning to feel benefit of top-up  
[mother] dosing. For assessment at 16:00

15:45 Sat upright. Pressure areas intact. More comfortable

16:00 VE see over with consent. Catheterised 300 mls urine NAD  
[mother] aware of findings

16:15 CTG remains satisfactory. Contracting 4 - 5 : 10 satisfactory

16:30 Syntocinon maintained on 16 mu

16:30 Contracting 4:10 strong. CTG baseline 140, good variability  
[Mother] comfortable

16:45 Beginning to be aware of some discomfort in right side of back / abdomen.  
Obs. satisfactory

17:00 Discomfort worsening. Plan for VE prior to top up to assess. See over  
5 mls 0.25% Marcain given BP 120/70

17:15 Beginning to feel some benefits.

17:30 Contractions 4-5:10 strong FH remains satisfactory.

17:45 Instruction and explain re-second stage of labour given. Informed consent for episiotomy if  
required

18:00 Contracting 4:10 strong. Commenced active pushing

18:05 Pushing well in upright position FH 136.

18:10 Vertex not visible yet

18:15 FH 140 down to 90 variability good

18:20 Vertex still not visible. [mother] pushing well

18:30 FH 144, some late decelerations noted variability good

18:40 Good maternal effort

18:45 FH 132, accelerations present

18:50 Vertex just visible at height of contraction but no real progress FH baseline 140, good variability,  
accelerations present

18:55 [SR1] asked to review as good contractions, good maternal effort and little progress

19:00 Continues to push well, caput just visible.

19:05 [SHO1] and [SR1] present  
VE by [SR1] for forceps delivery. Good perineal analgesia from epidural  
[Mother] aware and informed of situation. Consents to plan.

19:10 Forceps blades applied, awaiting contraction. FH 142

19:13 FSE removed

19:17 NBF [Neville Barnes Forceps] after 3 contractions of live male in good condition.

## Case 17: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 10:35 Transferred to labour ward for surgical induction. [mother] has had a Prostin.  
O/A Temp 36.5 P80 BP 100  
Fundus small for dates longitudinal lie, cephalic presentation 2/5th FH 140 Reg.  
VE performed, FSE applied ARM see over  
Feeling faint – turned onto left side CTG in progress (SHO)  
[see over = 10:40 Cervix fully effaced, soft, thick, 2 to 3 cms dilated, loosely applied, ARM, clear liquor, cephalic –2, FSE applied]
- 10:40 More comfortable on L [left] side  
Syntometrine and Vitamin K discussed  
[Mother] happy with this
- 11:30 Contractions 3:10 coping well, using her Entonox effectively FHR 137.  
Contractions remain 3-4:10 FH reg. Resting well between contractions
- 12:15 Vomited x 2 clear fluid, settled. Contracting 4:10  
FHR 145 b.p.m continues to use Entonox
- 12:30 [AM2] taken over from [AM1]
- 12:45 Continues to contract well 4:10. Using Entonox. Some pressure in back. FHR 135  
Requesting more effective pain relief. Discussed pros/cons Pethidine and epidural
- 13:00 VE to assess dilatation – see over. 9 cm. Advised epidural not best for such good progress.  
see over = 13:00 Cervix fully effaced, 8 to 9 cms dilated, well applied, clear liquor, cephalic, 0 station, not for epidural, prepare for delivery, left side
- 13:10 Started pushing
- 13:30 Encouraged maternal effort with pushing. Head visible  
FHR 125 with dips with contractions. Good recovery and variability between.  
Pushing but progress slow. For Syntocinon infusion.  
Dips to 80 b.p.m but good recovery in between with variability
- 13:55 Venflon sited
- 14:00 Syntocinon commenced 3 mu. Contractions stronger  
Good maternal effort and making progress
- 14:10 FH 140. Dip to 60 b.p.m with contraction. Good recovery
- 14:15 FH 120. Good maternal effort. Head descending
- 14:20 FH 140 Good variability. Encouraged to push
- 14:25 Venflon fell out but making good progress. Not re-sited
- 14:35 Delivery of live male infant. Cried immediately. Clear liquor. Baby wrapped and given to mum

## Case 18: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 16:15 Admitted from home in early labour. Onset of regular contractions at 15:00  
Now T+6  
O/A Temp 36.6 P102 BP 120/70 FH 170 – 180  
O/P Fundus = date longitudinal lie, cephalic presentation 2/5  
[mother] is happy for baby to have Konakion IM for IV Syntocinon  
No birth plan. [Mother] would like to bottle feed – discussed  
VE see over. See over = 16:30 ex fully effaced, thin, 4 cm dilated, application poor, posterior, membranes ruptured, cephalic –2
- 16:45 Registrar asked to review trace due to increased FHR and 1 deceleration See over
- 16:50 *Reviewed by [REG1]*  
*G7 P5+2. Spontaneous onset of labour. Draining clear liquor*
- 16:50 CTG stamp: [rubber stamp with check boxes that review completes and signs]  
Reason: deep deceleration  
Baseline rate: 170 Variability: [checked]. Accelerations: ++  
Reassuring [checked]. Action: continue in labour
- 16:55 Student MW involved in case
- 17:00 FHR 160 b.p.m good beat to beat variability  
Contracting 1:10 moderate coping well. Draining clear liquor. Up to toilet
- 17:05 Back from toilet, walking around and happier to be out of bed
- 17:15 back to toilet, on return remaining out of bed
- 17:30 FHR 165 b.p.m good variability  
Contracting 2:10 moderate. Remains happier out of bed and coping well with contractions
- 17:36 Back to toilet, remaining up and about
- 17:45 Back to toilet, returned to bed and requesting epidural, advised to use Entonox initially and assess its effect
- 18:00 VE with consent see over  
FHR 180 b.p.m. Contracting 3 to 4 in 10 stronger  
FSE off, monitoring heartbeat by auscultation  
Lying on left side. Using Entonox well through contractions
- 18:30 Conts 3-4 : 10 getting stronger. [Mother] using Entonox effectively. FH 158
- 18:40 [Mother] moved to left lateral position
- 18:45 External signs of full dilation, wants to push FH 166
- 18:50 FHR 165 b.p.m [mother] pushing with contractions
- 18:55 FHR 160 b.p.m
- 19:00 FH 140 b.p.m pushing
- 19:05 FHR 145 b.p.m
- 19:10 VE fully dilated. FSE applied. Pt [patient] request
- 19:15 FHR 140 b.p.m. Contracting 4:10 strong  
pushing well vertex visible
- 19:20 SVD of live male infant, cord round neck, clamped and cut.  
10 units Syntocinon given I/M with delivery of shoulder



## Case 19: Transcription of labour events documented in the case notes by midwifery and medical staff

---

- 11:45 Transferred to labour ward contracting  
IOL T+10  
Has been investigated for essential hypertension  
Requesting epidural – need to wait for blood results  
Venflon attempted with explanation – but missed vein – to get anaesthetist to site it shortly  
CTG commenced – baseline 130 – no accelerations, reduced variability,  
using Entonox pro-term and happy with this  
BP currently 170/100
- 12:20 Early decelerations to 120 from 140 baseline  
Trace remains with slightly decreased variability  
Venflon sited bloods sent for FBC [full blood count] if epidural wanted later  
Explained need for FSE at some stage  
OP Fundus term  
Lie long  
Pres cephalic
- 12:30 BP 170/?120 difficult to hear  
BP with Dynamap 172/110
- 12:40 VE see over BP 170/114  
12:40 VE cervix fully effaced, soft, application fair, mid position,  
membranes ruptured, liquor clear, cephalic – 2. Pelvis feels adequate  
To reassess and apply FSE with consent – early decelerations
- 12:50 164/104 Dynamap  
[SHO1] – for Nifedipine 10 mg stat
- 13:00 Out to toilet
- 13:15 BP 120/58! Much calmer now  
CTG baseline tachycardia 160 + and reduced variability  
Temperature 37.9 – to recheck orally
- 13:35 *For review by [SG1]*  
*CTG stamp: date and time*  
*Reason: tachycardia, baseline rate 170-180*  
*variability – good*  
*Reassuring: box checked*  
*CTG signed with data and time*  
*Signature of [SG1]*  
*Action: CTG remains tachycardic*
- 13:45 WBC [white cell blood count] 13.6  
Hb [haemoglobin] 12.0 Plats [platelets] 314 –  
Anaesthetist called to site epidural
- 14:00 Epidural being sited  
FH remains tachycardic 170 + but more reactive now  
Care handed over to [AM2]
- 14:15 Care taken over by [AM2]  
Epidural in situ  
CTG baseline tachycardia noted, however has good variability
- 14:25 Syntocinon regime commenced
- 14:45 [Mother] asleep and pain free
- 14:50 Syntocinon 4 m7u

- 15:00 [Mother] comfortable on lt [left]. side. Pressure areas intact, clear liquor draining  
Temp down to 36,6 P 82
- 15:30 Syntocinon 8 mu
- 15:55 Syntocinon 4 mu as contractions 5:10
- 16:15 C/O [complaining of] headache – BP 170/120
- 16:17 BP 170/110
- 16:25 [REG1] informed. Paracetamol x 2 given for headache: for VE stat
- 16:30 VE see over  
See over = Cervix 1 cm thick, soft, 5 cms dilated, well applied, liquor clear, cephalic presentation  
–1 no caput or moulding
- 16:55 *Asked to see [REG1]  
labile BP IOL for post dates 5 cm  
CTG early decelerations  
Plan ; Rx with anti-hypertensive*
- 17:05 Labetalol 100 mgs orally given  
WBC 13.6  
Hb 12  
Platelets 314
- 17:20 Plan: will need anti-hypertensive if problems with BP continue
- 17:45 [Mother] asleep
- 18:10 *Ward round [REG1 & C]  
Primp – essential hypertension (x 1 Nifedipine today)  
T+11 IOL with 1 Prostin  
On Syntocinon and epidural  
BP 169/104  
Cx 4 cm @ 17:00  
(SRM at 14:00)  
Contracting 3:10  
CTG 140 b.p.m baseline good variability  
Early decelerations +  
Accelerations +  
Plan – reassess 3 hours after last VE*
- 18:30 BP 175/105 Syntocinon 8 mu
- 18:00 *Consultant visit  
Unstable BP start IV Labetalol*
- 19:00 [REG1]  
*IV infusion started  
Aim for mean arterial pressure of < 125 mmHg  
60 mls containing 300 mg Labetalol  
Start infusion at 4 ml/ hour = 20 mg / hour  
Increasing by 8,12,16,20,24,28,32 (max)  
Every 30 mins if necessary  
Until a maximum of 32 mls / hour = 160 / hour*
- 19:00 Labetalol via IV commenced at 4 mls / hour  
Epidural top up of 0.25% Marcain given  
MAP 128 [mean arterial blood pressure] BP 166/100  
[19:30 VE 1cm thick, soft, 5cm dilated, well applied, clear liquor cephalic –1]
- 19:40 *Asked to review progress [REG1]  
Contracting 4:10 on 8 mu Syntocinon*

*Moderate palpable*

*Abd T*

*Cephalic 3/5*

*V/V NAD*

*Cx 4 cm dilated, stretching to 5*

*Cephalic -1 station*

*Caput ++*

*?/ LOA position (difficult to define)*

*CTG: Baseline with good variability and accelerations on VE*

*Plan: increase Syntocinon to 16 mu / min and further if necessary and reassess in two hours time*

- 19:45 Syntocinon 16 mu 24 mls/ hr
- 19:45 Labetalol increase 8 mls/hrs
- 20:00 Pressure areas intact. Asleep MAP 116 BP 162/92  
Headache subsided and [mother] feels much better
- 20:30 Asleep again. Contracting strongly 4:10  
FH shows some early decelerations, however baseline has good variability
- 21:00 MAP maintained at below 125 mmHg  
Blood results
- |             |      |                      |      |
|-------------|------|----------------------|------|
| NA          | 136  | Albumin              | 35   |
| Potassium   | 4.6  | Globulin             | 31   |
| Bicarbonate | 20   | Alkaline Phosphatase | 238  |
| Urea        | 2.1  | Bilirubin            | 11   |
| Creatinine  | 68   | AST                  | 17   |
| Uric Acid   | 66   | White Cell Count     | 15.8 |
| Haemoglobin | 12.2 |                      |      |
| Platelets   | 315  |                      |      |
- 21:30 VE cervix fully effaced, soft, 6 cms dilated, well applied, clear liquor, cephalic presentation at spines, caput ++ moulding ++
- 21:40 Care taken over by [AM3]  
Top up epidural given by [MC1]  
BP 157/84 Mean 104
- 22:00 FH 152 b.p.m reduced variability. Shallow deceleration (early) noted contracting 4:10 moderate to palpate
- 22:10 Syntocinon IV syringe replaced  
continues to run at 16 mu / min  
BP 153/85 mean is 100
- 22:30 FH 148 b.p.m. Good variability accelerative trace now.  
[mother] sleeping at present. Partner gone to the phone.  
Continues to contract 4:10  
BP 126/96 Mean 111  
FH 138 b.p.m
- 22:45 *SB [seen by] Consultant for VE at 23:30*  
*FH 132 sleep trace*
- 23:00 BP 144/76 Mean 104  
Contracting 4:10 moderate  
On to right lateral. [mother] very shaky  
DW [REG1] and she will VE at 23:30
- 23:30 *Registrar [REG1] review*  
*On Syntocinon 16 mu. Contracting 4:10 moderate, CTG 140 baseline, good variability, accelerations ++*  
*P/Abdo F = T Bladder not palpable*  
*Cephalic 1/5th*

*P/V V/V NAD*  
*Clear liquor*  
*Cx 8 cms*  
*LOP position at 0 spines to +1*  
*Plan: reassess 2 hours PV*  
*On Labetalol 8 mls/hr*  
*BP 142/77*  
*cervix fully effaced, soft, 8 cms dilated, clear liquor, ceph pp [REG1]*  
*FH 140 b.p.m good trace*  
*contracting 5:10 mod/strong*  
*BP 144/76 mean 104*

00:00 BP 150/73 mean 100  
CTG satisfactory FH 132 b.p.m  
Started to use Entonox again  
Breakthrough pain, right groin  
Contracting 5:10

00:15 Epidural syringe changed checked by [MC1]

00:20 Syntocinon syringe checked by [MC1]  
[mother] continues to use Entonox

00:30 FH 143 b.p.m sleep trace continues  
Contracting 5:10 palpates strong  
Labetalol continues at 8 ml/hour  
BP 158/89  
Epidural top up given Marcain 0,25% 10 mls

01:30 *FH 148 b.p.m sleep trace noted*  
*Continues to use Entonox*  
*VE 10 cm – see over*  
*[see over = 10 cms, liquor clear, cephalic, at spines, caput gone pelvis feels adequate. To assess*  
*leave 1 hour for descent]*  
*BP 152/92*  
[REG1]

01:35 SB [REG1] to leave for 1 hour for descent  
BP 158/86 Mean 114

02:00 FH 146 sleep trace seen  
Contracting 5:10  
Still contracting well

02:35 *Registrar review [REG1]*  
*CTG 140 pm baseline with reduced variability for 60 mins*  
*No accelerations / decelerations*  
*P/Abdo Head 0/5*  
*P/V V/V NAD*  
*Vx DOA position*  
*-1 to - 2 below spines*  
*Caput ++ moulding +*  
*Increased variability on VE*  
*Plan – commenced active pushing*  
*Third stage Syntocinon 20units and 40 u Syntocinon in 50 mls 5% D. infusion over 4 hours*

02:45 Active pushing commenced

02:55 FH 139 baseline much better  
160/101 BP mean 115

03:00 FH 140 B.P.M  
BP 153/94 mean 115  
Venflon issued

03:15 [SHO1] inserting Venflon  
BP 150/84

03:30 Labetalol syringe commenced  
Two late deceleration to 60 b.p.m  
Seen by [REG1] who has decided to perform NBFD  
Stirrups etc. prepared. Episiotomy

03:53 Delivery live male 8/1 9/5

03:54 IV Syntocinon 1 amp given

04:00 Delivery placenta by CCT [controlled cord traction]

04:30 No skin to skin contact at maternal request (both hands have Venflon)  
Episiotomy sutured. Labetalol disc.  
EBL 300  
Tea – wash – ward



## Case 20: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 11:45 Admitted to labour ward from [ward] for augmentation of labour  
Abdominal palpation  
Fundus = dates  
Lie = long  
Position ROA  
Presentation cephalic 2/5th palp [palpable]  
Observation 110/80 Pulse 80 Temp 36.4  
CTG commenced FHHR [fetal heart heard and regular]  
We leave room for a break [mother] has buzzer for assistance
- 12:35 CTG discontinued as [mother] needs to PU [pass urine]. FH 120 b.p.m baseline very reactive with good variability. Contractions are regular and palpable 3 in 10. Pain relief discussed, [mother] would like to consider an epidural. Vit K discussed
- 12:45 VE with consent and ARM with consent, very tense on examination not repeated by myself [AM1 senior ward midwife]
- 12:50 Anaesthetist contacted. Entonox commenced
- 13:00 Anaesthetist present pros and cons discussed re epidural [mother] happy to go ahead. [mother] prepared for epidural. External CTG in progress FH 130 b.p.m [mother] sat up with legs over side of bed and in position for an epidural
- 13:30 Epidural sited and running as 1 ml per hour, VE performed with consent. FSE applied as previously discussed and agreed.  
FH baseline of 130 b.p.m – good variability with accelerations  
Effective epidural
- 14:10 Syntocinon commenced @ 2 mu per min. Contractions 4:10 but mild
- 14:25 Care of [mother] handed to [AM2 Core midwife]
- 14:25 Care by [AM2]  
[mother] comfy, Syntocinon up to 4 mu Contractions still incoordinate
- 14:50 Syntocinon up 8 mu contractions 3 to 4 in 10 much better  
CTG reactive
- 15:00 Feeling some breakthrough pain on left side – would like a top up infusion up to 9.9 mls/hr
- 15:15 Pain much better now, happy on left side. Synto maintained at 8 mu.  
Bladder ( )
- 15:25 450 mls catheterised
- 15:30 Position altered
- 16:00 Breakthrough pain felt exactly the same place – top up 10mls 0.25% ( )
- 16:25 On right side
- 17:00 VE see over  
Plan leave 1 hour for descent  
Start pushing 1 hour
- 17:20 Care temporary by AM [supper break]  
CTG satisfactory, variable and accelerative baseline 130 b.p.m.  
[mother] comfortable experiencing occasional mild rectal pressure. Coping well.
- 17:30 CTG remains satisfactory
- 18:00 Pushing commenced FH 140 b.p.m

18:15 Contractions moderate Synto up 16 mu  
18:20 Vertex now advancing well. FH 140 b.p.m down to 100 but recovers well  
18:30 Vertex advancing slowly. FH 150 with early deceleration  
18:35 FH 150 b.p.m FSE off  
good trace  
18:40 Vertex advancing  
18:45 FH 140 b.p.m.  
18:50 Pushing now  
18:55 [Mother] vomited and vertex advancing well  
19:00 Paeds informed  
19:05 Normal delivery of a female infant  
to paeds [paediatrician] – in good condition

## Case 21: Transcription of labour events documented in the case notes by midwifery and medical staff

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- 10:15 Care by [AM1 senior ward midwife]  
Received onto labour ward for IOL – ARM at T + 10  
Pregnancy otherwise normal. Bishop score = 9  
Palpation large fetus, fundus = term, lie long, presentation cephalic 2/5
- 10:25 VE cervix 5 cms – see over. ARM performed – clear liquor  
External CTG in progress. Appears satisfactory  
To observe CTG for 30 – 40 minutes and then mobilise for a while
- 10:25 VE: Cervix soft, 1cm thick, loosely applied 5 cms dilated, ARM, clear liquor, cephalic –2 above spines, sutures transverse  
Birth plan discussed – [mother] knows about the need to have IV Syntocinon (previous PPH). Plans to artificially feed. Baby to have IM Vit K.  
[Mother] had an epidural last time but not intending to have one this time at present  
[Mother] consented to have labour video
- 10:55 CTG reactive and [mother] is having some irregular but painful contractions
- 11:20 Contractions have become frequent and painful since 11:00  
CTG satisfactory – using Entonox now
- 11:30 Having very strong and frequent contractions  
CTG satisfactory, heavy show noted
- 11:40 Strong frequent contractions, heavy show  
[mother] having occasional sensation to push  
CTG early deceleration with some contractions
- 12:00 Period of fetal bradycardia 70 – 80 b.p.m  
VE cervix fully dilated. FSE applied
- 12:05 VE fully dilated, clear liquor, cephalic just above spines, ROA, caput +, no moulding, appears satisfactory. To assess period of fetal bradycardia. FSE applied FH to 100-110 b.p.m to start pushing.
- 12:10 FH improved baseline 105 – 110 b.p.m and reactive
- 12:15 Baseline 115 b.p.m but early decelerations to 80 b.p.m – normal variability
- 12:25 In kneeling position now  
Some descent but quite slow
- 12:40 Reactive FH of 90 – 100 b.p.m  
Squatting now  
Head descending slowing
- 12:45 Into L lateral – FH remains reactive 90 – 100 b.p.m
- 12:50 Head progressing
- 13:03 Normal delivery head in transverse  
Live boy 9/1 9/5 [Apgar scores]  
Syntocinon 10 IU [international units] given IV  
Baby left skin to skin
- 13:08 Placenta and membranes by CCT  
Gritty but complete  
EBL 250 mls  
2<sup>nd</sup> degree tear repaired with Vicryl.

## 12. Sample audio-video transcript

A sample transcript from case number 2 has been provided. Due to the volume of material it was not possible to include all the transcripts within the thesis. A copy of the completed transcripts for each audio-video recording can be found on the CD-ROM provided in the folder named 'Thesis transcripts'. The transcripts may not be reproduced or distributed.

Time	SEG	Person	Action	Description	Initial review comment
17:37:08	02_01	AM1:	AC:	Bedside [sits at]	
		P:		[Sitting at left hand side of bed]	
17:37:08		AM1:		Contraction there [Explanation of fetal monitor]	
17:37:28		AM1:	AC:	Bedside sitting ends	
			C:	[Can't hear because of volume of fetal monitor]	
		AM1:		I'll just take your temperature and blood pressure	
17:38:12		AM1:	AC:	Bedside [sits at]	
		AM1:		( ) what's his name	
		M:		( )	
		AM1:		( ) understand what's going on isn't he?	
			C:	[Fetal monitor very loud]	
17:39:08		AM1:	AC:	Takes blood pressure	
		AM1:		Lovely	Feedback
17:40:25		AM1:	AC:	Record keeping [BS]	
17:41:20		AM1:		Have they discussed about pain relief?	
17:41:26		AM1:	AC:	Record keeping ends [BS]	
		M:		Yeah mm ( ) epidural and everything( )	
17:41:36		AM1:		Oh right. Did you want to have an epidural?	
		M:		I wasn't going to but I think I probably will ( ) .	
		AM1:		Yeah. The reason they sometimes suggest having an epidural is because there is a little more chance of having to sort of assist the delivery which can be a little uncomfortable ( ) . That's the reason why its suggested. On the other side I suppose em ( ) you've delivered normally before without any trouble and hopefully it will go the same way just a precaution because baby's coming bottom first . When I examine you if I find the neck of the womb opened up a quite a bit do you want to sort out the epidural then?	Information giving
		M:		( ) Yeah	
17:42:23		AM1:		( ) You understand if you have an epidural you need to have a drip in your arm and we need to monitor baby's heart rate?	Information giving
		M:		Yeah	
		AM1:		They just ask you to sit on the edge of the bed ( ) arch your back out. Its usually not painful. They put local anaesthetic into your lower back and em you will feel a pushing sensation ( ) put a drip up first.	Procedural information
		AM2:		OK I'll just go and do that and get some water for you	
17:43:18		AM2:	AC:	Bedside sitting ends	
17:43:25		AM2:	AC:	Leaves room	
				[with notes]	
		P:		( )	
17:43:54		M:		Groans	
		P:	AC:	Holds M's hand	
		P:		( )	
		AM2:		Hello it's AM. Brought you some water.	
17:45:02		AM2:	AC:	Enters room	

		C:	[only one glass]	
		AM1:	[Gives to P]	
17:45:14		AM1:	Leaves room	
		OR:	Registrar on labour ward: asks AM1 what is happening with Mrs X. Not been examined yet. Registrar – examine now and let me know what she is.	
		M:	( )	
		P:	[Kisses M's hand]	
17:46:00		M:	[Groans]	
		P:	( )	
17:46:03		P: AC:	Fetal monitor [looking at]	
17:46:03		M: AC:	Fetal monitor [looking at]	
17:46:59		M:	They're looking quite good actually	
		P AC:	Stands up and looks at monitor	
17:48:04	2_02			
17:48:18		M:	Oh dear	
		M:	It's the last time I do this I think	
17:48:35		C:	Knock at door	
		AM1:	Its AM1:	
17:48:38		AM1: AC:	Enters room	
		AM1:	Forgot some water	
17:48:47		AM1: AC:	Leaves room	
17:49:02		AM1: AC:	Enters room	
		AM1:	Right I've just talked to the Registrar that's on duty tonight and em said that I would do an examination now ( ) I'll arrange the epidural if you're happy with that. ( ) know what's going on with you at the moment.	
		M:	( ) [laughs]	
17:50:04		AM1: AC:	Prepares vaginal examination trolley	
		AM1:	( )	
		M:	Yeah	
		AM1:	Do you want some gas and air while I'm doing this?	
		AM1:	Do you know how to use this? I'll just move your bed a bit close to this side	
17:51:00		AM1: AC:	Moves bed. Gives mother Entonox	
17:51:11		AM1:	Will that reach? So remember you need to start to use it as soon as you think the contraction is coming, don't wait until its built up and already starting to hurt and em it's a big deliberate breath and blow out and keep it in your mouth all the way through your contraction. Its not going to do you any harm its em got oxygen in it. It doesn't have any lasting effect it goes straight in and out again. Takes about 30 seconds or so to build up ( )	Entonox instruction
		M:	Oh.	
		AM1:	Had you had any contractions at all before the pessary?	
		M:	( ) as soon as I sat down they started ( ) I was having them when I came in when my waters broke. On the machine it showed contractions but I didn't feel any.	
17:52:55		AM1:	Depending on what how it feels I might or might not put a little electrode on. There's quite a good pick up so I might not have to bother ( )	Information giving
		AM1: AC:	I'll just bring the call bell down in case we need assistance	Safety
		AM1:	You might need the gas and air while I do it ( )	
		AM1:	What you need to do is bring your legs up( ) together and your knees apart. Perhaps bring your bottom down a bit more. That's it. Bring	



				your legs down ( ).	
17:53:54		AM1:	AC:	Hand hygiene	
		AM1:		Can you push the sheet back?	
		P:	AC:	Helps M. push sheet back	
17:55:00		AM1:	AC:	Vaginal examination [from time bed sheet pulled down]	VE 1
		AM1:		Just some water ( )	
		AM1:	AC	Swabs M down, uses correct hand, drapes M.	
					[if sheet was pulled up instead of down then M would not be so exposed]
		AM1:		Opened up a bit more from this morning. About four centimetres. Good, that's fine ( ) Sorry. Things have moved along this morning since xxxx examined you this morning its about four centimetres. I think it was one or two.	Feedback during procedure
17:56:43		AM1:	AC:	Vaginal examination ends [when bed sheet pulled up]	
17:56		AM1:	AC:	Shows M cervical dilation on cervicogram [plastic model of cervix]	[visual aid]
		AM1:		( ) You were perhaps a little bit more than that this morning and you're here now so you've done very well. You've got to get to 10 but what you find is that the first half takes longer than the second half.	Information giving. Positive feedback
		M:		OK	
		AM1:		The baby needs to be pushed down a bit more but em good news.	
		AM1:		Would you like me to organise the epidural?	Comfort
		AM1:		Yeah	
		AM1:		Would you like to change you're pad?	
		AM1:		OK right So I'll given him a ring and em he'll come along. Just continue using the gas and air. Heartbeat seems fine OK.	
		AM1:	AC:	Elevates bed head	
17:57:46		AM1:	AC:	Clears examination trolley	
		AM1:		And often when you've had a baby before it goes quickly and it went quickly the last time. Let's hope it's a repeat story. Right I'll just go and let him know.	
17:58:08	02 03				
17:58:08		AM1:	AC:	Leaves room	
			OR:	Informs Midwife Coordinator that Mrs X is four cms dilated and needs epidural. AM pages Anaesthetist. Informs Registrar of results of vaginal examination. Registrar informs Senior Registrar of labour progress by phone. Registrar says "Carry on" to AM1.	
			C:	[Can't hear conversation between parents as monitor too loud]	
		P:	AC:	Kisses M	
17:59:46		AM1:	AC:	Enters room	
		AM1:		Just gave him a ring. Not quite sure what he's up to. Just get a few things ready.	
17:59:56		AM1:	AC:	Sets up IV infusion	
18:00:52		AM1:		This fluid is just a plain solution its em a safety line and its also quite a good idea to give you extra before the epidural as it can make you're blood pressure drop a little bit and it avoids that happening.	Information giving
		P:		Am I in you're way?	Father 'in the

					way'
18:02:17		AM1:	AC:	Places infusion on stand	
		AM1:		No I'm fine	
		AM1:		Looks in drawers [forms for infusions and epidurals located here]	
18:04:11			C:	Knock at door	
		A:	AC:	Enters room [brings trolley in]	
		A:		Hi do you need an anaesthetist?	
		AM1:		Yes please	
		A:		Hello. Just get this in and out the way. [the trolley] I'm Dr xxxx one of the anaesthetists. I understand you want an epidural. You've got a breech? You term?	
		M:		Yes. No early	
		A:		A bit early are you?	
		AM1:		Em due xxxx	
		A:		Had you arranged to have a section or anything like that?	
		M:		No ( ) this morning	
		A:		Oh right what was the reason behind that?	
		M:		Just decided to let me have a go.	
18:04:54		A:		OK right. Is this your first baby?	
		M:		Second	
		A:		Second. Have you had an epidural before?	
		M:		No.	
		A:		Right OK. First one delivery all right?	
		M:		Yes	
18:05:06		A:		Any problems at all?	
		M:		No	
		A:		( ) a few quick questions with you and then I need to put a drip in your hand, get the drip up and we'll talk to you about the epidural after that.	
18:05:13		AM1:	AC:	Leaves room	
		A:		Are you normally fit and well?	
		M:		Yeah	
		A:		Have you got any medical problems, asthma, diabetes, allergies to any drugs?	
		M:		No	
		A:		Fine we'll just pop the drip up first then we'll speak to you about the epidural and answer any questions.	
		A:		I understand we're being videoed	Camera
18:05:47		AM1:	AC:	Enters room	
		M:		Yeah I think so	
		AM1:		You know we're being videoed	
		A:		Yeah I know	
			C:	[AM and A laugh]	
		AM1:		Can I turn the light on first of all?	
		A:	AC:	Switches main light on	
		AM1:		Yeah what happened her membranes went ( ) no contractions and then sort of ( ) section then Prostin and see ( ) quite quickly ( ).	
18:06:45		AM1:	AC:	Record keeping [NBS]	
18:07:05		AM1:	AC:	Record keeping ends [NBS]	
		AM1:		Would you like her on her side?	
		A:		I'll pop the drip in first. Are you left or right handed?	
		M:		Right	
		A:		Right. We generally put the drip in your non-dominant hand. So we'll put it in your left. OK? I don't know what you're like with needles but you might want to sit down or go round the	

				other side.	
		P:	AC:	Moves to right hand side of bed	
		A:		Em what we'll do is pop a little tourniquet round your arm	
18:07:48		AM1:	AC:	Fetal monitor [annotates CTG]	
		M:		( ) last time I had a drip ( )	
		A:		Just rest your hand on the bed. If you just make a fist ( )	
		A:		[Sites intravenous Cannula]	
18:08:47	02_04				
		A:		( ) little push into the back of your hand	
18:08:59		AM1:	AC:	Record keeping [NBS]	
18:09:56		AM1:	AC:	Record keeping ends [NBS]	
		A:		( ) just relax your hand while we're connecting.	
18:10:04		AM1:		Intravenous infusion [attends to]	
18:10:44		A:		Right we'll just stick all this in place and then get you in position for the epidural. Tell you all about that.	Epidural risk
		A:		As you're probably aware epidural like anything in life has risks associated with it as well as it's benefits ( ). So we'll just quickly run through them just so that you know em the possibilities of some of the things we talk about.	
18:11:41		A:		The first thing to say is one of the main reasons we put the drip in is the risk of lowering your blood pressure. That's why we do that. Em sometimes you might experience some itchiness or irritation with some of the drugs em. That's related to some of the pain killers in there and it em ( ). That's probably the commonest thing you'll experience in direct relation to the epidural ( ) em. It sometimes causes a little bit of bruising or soreness in the middle of your back when we put the epidural in just cause we have to press. That usually settles down ( ). More rarely it 'cause you to have a headache the epidural needle goes to far and punctures the membranes close to the spinal cord we probably see that in 1 in 300 women ( ) em even rarer still one of the nerve roots coming out of the spinal ( ) all right? Although the epidural we hope will give you 100% pain relief in labour we sometimes experience little segments, which don't give as much pain relief as well would like. So we can't guarantee that it will work everywhere all right? Some women are harder to get complete epidural block that others and that's just ( ) All right?. What we'll do, we'll flatten the bed out, put the bed up in the air so it's my working height and get you to go on your left hand side. Curl up into a ball on your left hand side. You can come back round to this side.	Risk, meaning of numbers - difficult for people to understand, lot of information to take in, can mothers really give 'informed consent' at this time?
		P:	AC:	Moves over to left hand side of bed	
18:12:11		AM1:	AC:	Record keeping [NBS]	
18:13:52		AM1:	AC:	Record keeping ends [NBS]	
		A:		While I'm putting the bed up. When you're in between contractions or comfortable you can start, we move you over on your left hand side and move your back to the edge of the bed there.	
		AM1:		Take this top tummy one off so it doesn't get in the way.	
		AM1:	AC:	Removes monitor contraction belt	
		A:		I'll take that stool to sit on.	

		P:		Yeah OK.	
		AM1:		There's one over here.	
		A:		Oh is there? You don't usually get two.	
18:14:26		A:		Right just start rolling over to your left hand side when you're comfortable there	
		AM1:	AC:	Assists M: into position	
		AM1:		That's it	
		A:		Shuffle back so that your back's to the edge of the bed.	
		A:		What we'll do is have a feel of your back and I'll wash my hands and get all the bits and pieces together OK. If you can get your, bend your knees all the way up to your bump. That's it so your knees are on top of each other. I'm just going to have a feel. Pop your chin right down on your chest and try and get you to curl this part of your back and the bottom of your spine right out towards me. Bring your shoulders back a bit more? Use your top arm to push your shoulders back. Just bring the whole of your back towards me. Just have a feel of your back, make a little mark on your back.	
		AM1:	AC:	Preparing the epidural trolley	
		P:	AC:	Holds M's hand	
18:16:02		AM1:		What size gloves do you take?	
18:16:03		A:		Seven and a half please.	
		A:		That's not bad. When we start we'll need you to try bend your back out towards me a little bit more arching your spine right out OK. If you imagine a cat that's been startled it arches its back right out. We get you to do that by putting your chin right down on your chest and getting your knees as high as you can. That's it, that's it, excellent.	
		P:		( )	
18:16:25		AM1:		Don't worry I'll sort that out.	
18:16:34		A:	AC:	Hand hygiene	
		A:		If you've got anything that's bothering you or any questions just ask as we're going along all right? We'll tell you exactly what we are doing all right?	
		M:		[laboured breathing]	
		AM1:		Getting worse? You find after the examination it always stirs it up a bit I think makes the contractions a bit stronger.	
		A:		She tried any Entonox?	
		AM1:		Would you like the Entonox?	
		M:	AC:	Shakes head [no]	
		AM1:		Doesn't like it much. You can carry on using it if you want to.	
		M:		( )	
18:17:22		AM1:		We give a little bit at first just to make sure you're not allergic to any thing then we connect you to ( ).	
18:17:38		AM1:	AC:	Assists anaesthetist to prepare trolley	
18:18:13		A:		Sheet down a little bit	
18:18:51	02_05		C:		P: stretched over holding M's hand. It must be very uncomfortable for him.
		AM1:		Do you want to use Marcain?	
		A:		Yes half percent Marcain	



18:19:12		AM1:	AC:	Checks medication with A	
		A:		It takes a few minutes for us to get our bits and pieces together out so bear with us	
		A:		( )	
18:20:26		AM1:		( ) sitting outside watching [laughs]	?reference to observer
		A:		( )	
18:21:14		A:		OK what we're going to do <i>first</i> is clean up your skin with an antiseptic. Now it's going to be very cold and make you jump. Some people say it's soothing and they like it. While we're doing that you can get your knees up as high as you can for me and your chin on your chest. Cold stuff coming on your back now. Sorry it's really cold. Once you've got your breath back and then what we do is pop a little stick drape over your back that keeps everything clean and sterile.	
		M:		OK	
18:22:05		A:		The little green towel that's coming over you is nice and sterile and clean so if you try not to touch that for me. Ok just get your knees up to your bump, chin right down on your chest and try and point this part of your back out towards me. All you've got to do now is tell me when you get a contraction so we'll stop what were doing. What we're going to do first is put come local anaesthetic in your back just like we did in the back of your hand. So that will numb the skin so you don't feel the epidural going in.	
		AM1:		Standing at bedside	C: [AM attentive during epidural]
		M:		Oh I've got a contraction coming	
		A:		OK well we'll carry on and put some local in while you're getting that. Sharp sting.	
18:23:13		AM1:		OK? You're doing fine.	praise
		A:		Just the local anaesthetic going in	
18:24		A:		OK that one gone?	
		M:		No	
		A:		You just tell us when its gone	
18:24:22		AM1:		That one gone?	
		M:		Yeah	
		AM1:		Last quite a long time don't they	
		M:		Another one	
		A:		Yeah ( )	
		AM1:		Try and keep in that position	
		M:		Worked well that pessary	
		AM1:		Did you have a pessary last time?	
		M:		Yeah. Its gone, its gone	
18:25:10		A:		OK knees right up to your bump for me, chin on your chest. Nice and still for me.	
		A:		OK nice and still for me	
18:26:06		A:		Might feel a bit of a twang in your back its just where I'm putting in the little plastic tube	
		A:		OK not too uncomfortable?	
		M:		There is another one on its way	
		A:		OK. The needle's out of your back so you can relax. If you stay reasonably still for us.	
		M:		Yeah	
		AM1:	AC:	Moves to right hand side of bed to assist anaesthetist	
18:28		A:		What we're doing now is putting a small amount of the pain killer in ( ) what we call a test dose	



				all right make sure that everything is in the right place and you're not going to react to it and we're going to stick this all in place ( ) cold spray on you back to help stick it.	
18:29:03	02 06				
		P:	AC:	Sitting down. Holding M's hand	[does not look very comfortable]
18:29:18		AM1:	AC:	Places dressing on M's back	
		AM1:		How long have we been using this?	
		A:		We've been using them for a while	
		AM1:		( ) haven't got round to asking anyone. Haven't been here for a while ( ).	
		A:		( )	
18:29:48		A:		What we're doing now is popping another bit of tape all the way up your back just to hold the plastic tubing ( ). That OK?	
		M:		Yep	
		AM1:	AC:	Placing tape on M's back	
19:39:40		A:	AC:	Removes gloves; throws in bin	
		A:		It's just it can roll off	
		A:	AC:	Moves to left hand side of bed [facing mother]	
18:30:57		A:		What we do now, you can either stay on your side or you can get back in the position you were in. All right? We'll put the bed down to a more ( ) height ( ) we'll check your blood pressure quite regularly over the next half an hour all right and em as soon as we're sure it's in the right place in about five minutes then we can put the main dose down the epidural and we'll start getting the full effect of the epidural, well you'll feel the edge coming off the contractions, in sort of 10 minutes or so and full effect in 15 or 20 minutes.	
		M:		Yeah OK Yeah	
		A:		All right?	
18:31:31		AM1:		Bring you down a bit.	
		M:		Is it to stay as you are or?	
		AM1:		You can stretch out a bit more if you want to.	
		M:		Yeah ( ).	
		AM1:	AC:	Adjusts head rest and bed height	
		M:	AC:	Lets go of P's hand	
		M:		( ) hand	
		P:	AC:	Hold's Ms hand	
		AM1:		Squeezing him [laughs]	
18:32:04		AM1:		Can I just pop this underneath you? [contraction belt]	
		AM1:	AC:	Replaces contraction probe	
		A:		Blood pressure ( ) before	
		AM1:		Yeah one twenty seventy something like that.	
18:33:48		AM1:	AC:	Fetal monitor [increases volume]	
				( ) near the edge	
		M:	AC:	Moves over a little	
		P:	AC:	Holds M's hand	
		AM1:		Just take your blood pressure. Sorry to keep disturbing you ( ).	
18:35:00		AM1:	AC:	Takes blood pressure	
		P:	AC:	Lets go of M's hand	
		P	AC:	Moves from stool to comfortable chair	
		M:		[Laughs]	
18:35:10		AM1:		Pull the chair over if you want to	Concern for father
		M:		( )	

		AM1:		Good. One ten sixty. Can I leave that on? I'll be doing it again shortly.	Feedback
18:36:06		A:	AC:	Moves over to left hand side of bed facing mother	
		?		No	
		A:		Now then any numbness, tingling, funny feelings in your legs at all?	
		A:		Right OK. Can you just bend your top knee all the way up? Straighten it down? That's it. Do the same with your bottom leg. OK fine. Any funny feeling?	
		M:		No	
18:36:17		AM1:	AC:	Record keeping [BS]	
		A:		When the epidural's working fully and most effectively, you might find one side is a bit more numb than the other ( ) just let us know. Obviously if you notice anything where you can't move your legs as well as you can now ( ). What we're going to do is give you the main dose now down the epidural. A bit cold down your back (its just that the plastic tube is taped to your back ( ) then what we do is connect ( ).	
18:37:42		M:		I was petrified about this	Fear
		A:		Were you?	
		AM1:		Oh were you?	
		A:		You should have said	
		M:		I was really petrified ( ) on the ward	
		AM1:		Oh	
		A:		Did someone come and see you on the ward?	
		M:		( ) baby would have turned	
18:38:01		AM1:		Well it didn't show	
		M:		It wasn't too bad. Once its happening you're all right	
		M:		But then Dr xxxx or one of his men ( )	
		A:		Is that your consultant?	
		AM1:		Mr xxxx wasn't it	
		M:		( ) Coloured bloke. Is Mr xxxx a skinny bloke with a beard?	
		AM1:		No he's em got glasses	
		M:		And a big coloured bloke xxxx was it?	
		AM1:		Yeah.	
		A:		( ) like I said we'll be checking your blood pressure about every five minutes	
		M:		And ( ) he was the one that yesterday said ( ) so I find myself and I'm already to go and in comes ( )	
18:39:23	02_07				
		M:		( )	
18:39:35		AM1:		Due about ( ) usually em what we might do is give it intravenously while you're in labour I'll check about that.	
		M:		OK	
		AM1:		Because we don't want your epidural to work on one side what we'll do. I've given you that main does now. We'll wait five or ten minutes and then get you over onto the other side so you get a nice even spread.	
		A:	AC:	Infusion pump [attends to]	
		P:		( )	
18:41:32		AM1:	AC:	Record keeping ends [BS]	

### **13. Delivery room activity observation schedule**

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Observation schedule of midwives' activities in the delivery room.

Adapted from a North American observation schedule developed by McNiven, Hodnett and O'Brien-Pallas (1992) for classification of nurses' activities in the labour ward.

#### **A. Physical comfort**

1. Using cold face cloth, warm compresses, putting on extra blanket
2. Bathing or assisting with shower
3. Changing linen, underpad or gown
4. Giving ice chips or fluids
5. Positioning women for comfort, not to get a better fetal monitor reading
6. Massage
7. Reassuring touch, holding hands, stroking
8. Assisting with ambulation, helping in and out of bed, walking in hall, walking to bathroom

#### **B. Emotional support**

9. Reassurance, encouragement, praise
10. Being with women, keeping company
11. Laughing, joking, social chitchat

#### **C. Instruction / information**

12. Instruct or coach (e.g. with breathing, pushing)
13. Suggest techniques to promote relaxation or comfort
14. Explain, provide information (e.g. about progress in labour, monitoring, procedures)
15. Interpret doctor's findings to women
16. Instructions to partner

#### **D. Advocacy**

17. Listening to women's requests, supporting women's decisions
18. Negotiate women's wishes with other team members
19. Discussion with visitors about woman's wishes

#### **F. Direct care**

20. Vital signs – taking temperature, blood pressure, adjusting monitor/ reading monitor, giving removing bedpan / inserting catheter, starting / adjusting intravenous infusion. Taking blood, giving medication, position changing to get a better monitor reading or to prevent pressure sores. Vaginal examinations, application of scalp electrode, giving epidural top up, changing syringe.

#### **G. Indirect care**

21. Assisting with procedures, listening while doctor talks to women, washing hands
22. Record keeping

## 14. Observation sample: reviewer agreement

<b>Physical comfort measures</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	21	68	89
Reviewer B	28	61	89

**Table L: Physical comfort measures**

<b>Emotional support</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	58	31	89
Reviewer B	67	22	89

**Table M: Emotional support**

<b>Information giving</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	62	27	89
Reviewer B	56	33	89

**Table N: Information giving**

<b>Advocacy</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	0	89	89
Reviewer B	1	88	89

**Table O: Patient advocacy**

<b>Direct care</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	56	33	89
Reviewer B	68	21	89

**Table P: Direct care**

<b>Indirect care</b>	<b>n observed</b>	<b>n absent</b>	<b>Total</b>
Reviewer A	60	29	89
Reviewer B	67	22	89

**Table Q: Indirect care**

## 15. Ethical and medicolegal issues of audio-video recording

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This appendix briefly discusses the ethical and medicolegal issues of audio-video recording in relation to some of the recommendations in the publication *'Guidelines on the use of Personal Information for Research'* (Medical Research Council 2000) and concludes with some recommendations for future work of this nature.

The researcher used a number of strategies to address ethical issues, some of which have been described in Chapter 5, section 5.13, protection of participants and research site and section 5.13.1, issues of confidentiality. When the study commenced the researcher had no real insight or appreciation that the audio-video data would be so complex and revealing. After all, it was 'just' looking at everyday practice. The researcher did however, appreciate that audio-video recording of patient care asked a great deal of parents and staff. Such work clearly needed to be conducted with sensitivity, but it was not possible to anticipate what the findings could be or the implications. Clearly, being blessed with foresight would indeed be a great gift. Researchers would be able to avoid unanticipated consequences, uncomfortable situations, dilemmas and emotional upheavals which one encounters in the investigation of real-life settings.

### **Personal approach to members of staff**

The most important aspect of the audio-video work was to approach individual clinicians and personally inform them about the study. Written information was provided for members of staff (appendix 17, page 420), however the researcher also visited wards and departments (afternoons and evenings; weekdays and weekends) to approach as many individual members of staff as possible and inform them about the study. When asking clinicians and parents to give so much at a very personal level it was important that the researcher demonstrated commitment to the study and that this was a serious investigation of labour ward care. Staff were provided with an opportunity to discuss any concerns regarding the use of audio-video recording. The main points that were made at this time were:

- Freedom to choose not to take part.
- Patient and staff identification would not be documented.
- The recording could be stopped at any time and sections deleted at the time of recording.
- Retrospective deletion would not be possible once the case recording was complete.
- The data would be used for research purposes.
- Individual data would not be accessible to managers.
- Wilful acts of harm, for example striking a patient, would be reported although the researcher considered that such acts would be unlikely to occur.

No members of staff refused to take part in the study and there was never a request for the video recording to be stopped or for retrospective deletion. The researcher did not observe wilful acts of harm, but did witness episodes of substandard care. How does one deal with this when confidentiality has been assured and no arrangements for individual feedback have been made? Should an individual be singled out and who should sit in judgement in such circumstances? What kind of transgressions and breaches in protocols should be reported? Can we expect individuals to achieve perfect and error free performance in all circumstances? How can researchers assure confidentiality if they are willing to reveal specific details about individuals? There are no correct answers to these questions and the very nature of this type of investigation means that researchers cannot be prepared for or anticipate every single eventuality. Firstly, the vulnerability of the care of mothers to errors was not well appreciated when the present work commenced. Secondly, if individual performance feedback was provided this would have changed the nature of the work setting when the aim of the study was to conduct unobtrusive observation. It is important to appreciate the kind of reactivity this intervention might have provoked and could have raised barriers to recruitment. Doctors and midwives may not have been so cooperative if the investigation was seen as an individual performance review. It may also have induced a 'big brother' atmosphere of surveillance. Finally, individual feedback would have required the researcher to maintain a record of the participants and this would have compromised the anonymity of participants.



## **Medicolegal issues**

The most common concern of midwives and doctors was the possibility of access to the video recordings if a medicolegal action or patient complaint arose. The strategy that had been decided was to allocate each tape to a unique study number and not to document any patient identification or the names of any members of staff involved in the care of the mothers. Most staff seemed to be satisfied with this. Paradoxically, a few thought that a recording could be made available if it was 'favourable' in order to defend their practice, but if the recording was not 'favourable' that it should not be made available. There was a general opinion that video recordings were probably more likely to be helpful than harmful under such circumstances, as it is difficult to keep an accurate record of events when actually dealing with an emergency situation. However the researcher explained that it would not be possible or desirable to reveal video recordings at the discretion of the clinicians involved and would not accede to requests of this nature.

## **Information for mothers**

The researcher tried to personally approach each individual mother for recruitment into the study and was introduced to the parents by their midwife. However this was not always possible and sometimes a midwife made the initial approach on behalf of the researcher and provided the mother with the patient information sheet. The researcher read through the information sheet (appendix 16, page 419) with the mother and partner, if present, and provided an opportunity for parents to ask questions. At this time mothers were informed that they need not feel obligated in any way to take part in the study, that they would not be treated differently whether they entered the study or not, that the video recording would not take place unless the staff were in agreement and that any person (clinician, visitor, mother, partner, healthcare assistant) could, at any time, ask for the recording to be stopped. Most mothers did not wish for any further time for consideration before agreeing to take part. Mothers were encouraged to discuss the research with their partners and to inform their midwife of the decision, as it was considered that it might be easier to decline through a 'third party' rather than directly to the researcher. No mother or their companions asked for the recordings to be stopped. Only three mothers declined to take part in the study.

One mother, recruited into the study by a midwife, initially thought entry to the study would entail a 'camera crew' in the room. However, when the mother was shown the room and the camera she considered this to be acceptable and agreed to take part in the study. The midwife explained that a wide-angle camera was used to capture the entire room and did not focus on the individual mother. The patient information sheet for future work will include a screen shot of the delivery room as shown in figure 5.4, page 93 and a picture of the camera in the delivery room as shown in figure 5.5, page 94 to help to explain the nature of the study to parents. The researcher also found these figures to be useful in discussions and meetings with clinicians and managers when recruiting additional sites for future work.

Personal information of any sort, which is provided for healthcare, or obtained for medical research, must be regarded as confidential. It was particularly important that respect for confidentiality was in relation to both patients and staff. Access to audio-video data was limited to a small number of research workers who were bound by either University or hospital regulations. It was not possible to inform the study participants in advance who would view the recordings. However, members of staff were informed that the videotapes would not be viewed gratuitously by large numbers of researchers and that information about any individual would not be revealed to managers. Some participants were made aware on completion of the study that the researcher was the only person to review all the recordings in their entirety.

The recommendation that 'at the outset researchers must decide what information about the results should be available to the people involved in the study' reflects the bias of current guidelines for quantitative research. The present study was exploratory in nature and posed a broad research question. It was therefore difficult to be specific in how the data would be used. Some of the study participants, particularly doctors, were keen to receive feedback on their performance and to be involved in future research. Sometimes there is the assumption that video recording is too big a 'threat' to be a feasible research tool in an acute healthcare environment. In the present work, most mature and experienced practitioners, particularly doctors were keen to examine and improve their performance. However, the researcher considered that this was not within the scope of the present

work. In addition, further research was needed to develop methods of performance assessment and feedback.

All information must be coded or anonymised as far as possible. Clearly it was not possible to anonymise the entire collection of audio-video recordings. Each case was given a study number, and no details of patient or staff names or other identifying features were documented, therefore the case rather than the recording was anonymised. All audio-video transcripts were anonymised. However, when conducting research with a small sample of patients there is a potential risk of the identity of a patient being inadvertently revealed, therefore, some patient details that were gathered (occupation, unusual medical or obstetric conditions) have been omitted from the thesis.

The use of a low-resolution monochrome camera was important, as the staff felt that black and white images made the research less personal and therefore non-threatening. The reviewers also considered this helpful in providing a sense of anonymity and distance from the participants. Recording in colour might have provided a more 'real' and intimate experience for reviewers. A small number of anonymised audio-video segments and screen shots have been used to illustrate recurrent themes of patterns of behaviour. A commercial video editing software program, (Studio PC, Pinnacle Systems Ltd., Middlesex, United Kingdom) was used to edit the digitised recordings. This program had facilities to overlay opacities onto the digitised video segments and was adequate when there was little movement. However, more sophisticated video editing was required to anonymise some of the video segments where the participants were moving around the room. A small number of video segments were professionally anonymised by an expert video-editor using professional, industrial standard video editing software. It is important to bear in mind that whether anonymised video clips or direct quotes from transcripts are used in presentations or publications, people will, on occasion, try to second-guess who the participants were and participants may attribute such data (correctly or incorrectly) to themselves or other individuals. This has happened. One midwife felt that she was recognised by a friend who attended a conference, despite careful processing of the video clips. The researcher immediately wrote a letter to the midwife explaining what had been shown at the conference and apologised for any distress that may have been caused. This was followed up by a telephone conversation with the midwife and an offer to show the particular video clip, which was an illustrative example of exemplary women-centred care. The midwife did not realise that the video clip shown had been anonymised with opacities. The sound quality had been distorted but it was possible that the midwife's voice was recognised. This has been addressed with the use of voice recording overlays (recording a 'voiceover' and inserting this into the video segment as a digitised sound file). It is the nature of all research that unanticipated consequences can occur. Clearly it is important to deal with such matters promptly and address the issues in an open manner with the participants.

This work was part of a larger study: 'A Multicentre Trial to Investigate the Clinical Impact of an Intelligent Decision Support System for Labour Management'. Ethics Committee approval had been given for the trial (Plymouth study number 933) and amendments for the present work were submitted for approval. It has become clear that the investigation of care within the delivery room is important in its own right and future work requires full proposal submissions rather than amendments. The researcher did not appreciate, when planning the initial study, the rich and revealing data that would emerge from the audio-video study. Ethics Committee approval has been obtained for audio-video recording within the delivery room in one site involved in the forthcoming randomised controlled trial.

The present work was conducted over several years. During this time there have been many changes to the way personal information is handled for example, restrictions on processing electronic and paper-based records when the Data Protection Act 1998 came into force. The implications of the Human Rights Act 1998 has promoted debate, in particular in relation to disparity between requirements for research, audit and clinical governance. More recently, in response to legal, technological and social changes, many organisations have revised their guidelines on the use of personal information for medical research ([www.mrc.ac.uk](http://www.mrc.ac.uk)). However, most current guidelines focus on patients' paper-based or electronic personal information, and the guidance is weighted towards quantitative methods of investigation, such as randomised trials and epidemiological studies.

## Recommendations

- Small group presentations should be conducted to inform staff of the nature of the audio-video work. The researcher should demonstrate the video equipment, the view captured by the camera and an example of anonymised video clips.
- Written information about the study should include a picture of the video equipment, a screen shot of the 'raw' captured video and an example of an anonymised video still.
- Researchers should personally approach individual clinicians to discuss the audio-video work to provide an opportunity for concerns to be expressed and addressed. With the implementation of the Human Rights Act 1998, written consent from members of staff as well as patients should be obtained.
- Researchers should have a procedure in place so that requests to stop the recording can be attended to promptly.
- Staff should be made aware that the recordings are not identified by patient hospital number and retrospective deletion of video data will not be possible once the recording is completed.
- Researchers need to make clear how they will protect the audio-video data so that access for medicolegal purposes is prevented. Staff should be made aware that the cases will be anonymised and therefore it will not be possible to provide video-recordings even at the request of the clinicians involved.
- Audio-video recording should be treated in the same manner as medical records and should be stored in a secure area with access limited to authorised personnel. Digitised computer files should be stored on a secure, password protected computer system.
- The video recordings should not be reviewed gratuitously. The right to privacy and confidentiality should be respected and access limited to that necessary for research purposes.
- In exploratory research, staff should be made aware that it is not possible to be precise about how the information will be used. However if the intention of the research is to provide feedback to individual participants, this needs to be explicitly stated in the information sheet and consent form.

## 16. Patient information sheet and consent form

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Amendment to research proposal (Plymouth study number 933): A multicentre trial to investigate the clinical impact of an intelligent decision support system for labour management

### PATIENT INFORMATION & CONSENT SHEET

Our hospital is taking part in a special study funded by the Medical Research Council. This leaflet is to inform you about the study and to explain what it means to you and your baby.

#### Normal care during labour

Currently, we monitor the unborn baby during labour in two ways. The first involves regularly listening to the baby's heartbeat using a stethoscope placed on mother's tummy. The second uses a machine to print out the baby's heart rate continuously on paper throughout labour. These methods have been used over the past 20–30 years and give doctors and midwives a pretty good idea on how well your baby is coping with labour, though not perfect.

#### A new approach

For many years doctors and scientists have been looking at ways to improve the way we monitor a baby during labour. The goal is to better identify which babies are in trouble and which are just fine. This way, we can keep the number of caesarean sections to a minimum and safeguard the health of the baby. In the last 9 years, a computer program was developed by engineers and expert doctors from around the world. This looks at the printout obtained by a normal fetal heart rate recorder and helps the doctor or midwife better understand it. A good understanding helps decide the best course of action to take, if any. This new approach involves no extra burden on the mother or baby, it is just trying to improve what is already done normally. We would like to develop the computer so that parents will also find it helpful. To do this we would like to video record the care given during labour so we can find out about parents views of labour, what kind of information parents ask for, what kind of information is given and if it is helpful. The camera is placed in an unobtrusive position and so that you would not be in full view

If you feel that you do not wish to take part in the study, this would not affect the care that you receive. If you decide you would like to take part in this study you would be cared for in the usual manner by your own midwife. You would be free to stop the recording at any time and you would of course be free to withdraw from the study at any time should you wish to do so and this would not affect the care that you receive.

We would ask you to sign to acknowledge that you have read and understood this information and would be willing to take part. It will be filed in your notes. If you have any questions or queries about this at any point please do not hesitate to ask us.

Thank you for taking the time to read this information sheet

Yours sincerely,

Maureen Harris, Research Midwife

Signature.....

Witnessed By.....

Date.....



## 17. Staff information sheet

---

Amendment to research proposal (Plymouth study number 933): A multicentre trial to investigate the clinical impact of an intelligent decision support system for labour management

Dear Colleagues

### **Further development of computerised decision support for labour management**

We would like very much to ask for your help and cooperation in the further development of our decision support system for intrapartum management. Over the past nine years the Perinatal Research Group has developed and validated this computer system in a programme of research supported by the Medical Research Council. The system shows very promising results and the Medical Research Council has provided further support so we can address some of the wider issues related to new technology in the work place.

The next phase in our work is to undertake a detailed study of the day-to-day activities of the obstetric teams on the labour ward. We are using a case study approach where researchers enter the work setting to observe and map the nature of teamwork and how this may be affected by technology. This will entail observation, interviews and video recording, details of which are provided below.

Observation of the obstetric team in their day-to-day activities will be undertaken in an unobtrusive manner. If at any time midwives, doctors or parents feel the presence of an observer inappropriate, the researcher will not enter into the situation or will withdraw from the situation. Opportunities for debriefing and further inquiry will be provided after each observation session.

Video: During the on-line testing of our prototype computer system, we would like to video record staff using the computer system in a small number of cases. This would only be undertaken where staff and patients were fully informed and agreeable. Staff and patients would be free to terminate the recording at any time should they wish to do so.

In accordance with good ethical practice confidentiality is assured. Participants will be free to withdraw from the study at any time should they wish to do so. We do hope that you will continue to help with our work and should you have any further questions please contact Maureen Harris on extension 53631.

Yours sincerely

Maureen Harris, Research Midwife



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Maureen Harris