School of Pharmacy

Medication Incidents in a Private Hospital:

Frequency, Type, Causes and Outcomes

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DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature: _____

Date: ___/___/2011

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LIST OF ABBREVIATIONS

Abbreviation	Full Name
ACSQH	Australian Council for Safety and Quality in Healthcare
ACSQHC	Australian Commission for Safety and Quality in Health Care
ACPA	Australian Community Pharmacy Authority
ACHS	Australian Council on Healthcare Standards
ADR	Adverse Drug Reaction
AIMS	Australian Incident Monitoring System
APAC	Australian Pharmaceutical Advisory Council
CCPS	Coordinator of Clinical Pharmacy Services
CCU	Coronary Care Unit
CPA	Community Pharmacy Agreement
DCP	Deputy Chief Pharmacist
DTC	Drug and Therapeutics Committee
eMMS	Electronic Medication Management System
FTE	Full Time Equivalent
ICU	Intensive Care Unit
IMSN	International Medication Safety Network
ISMP	Institute for Safe Medication Practice
MCR	Medication Chart Review
MPPSC	Medication Policy and Procedure Subcommittee
NMSBC	National Medication Safety Breakthrough Collaborative
PAC	Preadmission Clinic
PBS	Pharmaceutical Benefits Scheme
PC	Prescribing Clarification
PDA	Personal Digital Assistant
PHARM	Pharmaceutical Health and Rational use of Medicines
PHIQS	Private Health Industry Quality and Safety Committee
PRP	Pharmaceutical Review Policy (WA Health Department)
PS	(Involvement of) Pharmacy Services
QAHCS	Quality in Australian Health Care Study

QUM	Quality Use of Medicines
RCA	Root Cause Analysis
RMP	Risk Management Processes
SHPA	Society of Hospital Pharmacists of Australia
SHPA-CP	Society of Hospital Pharmacists of Australia Standards of Practice in Clinical Pharmacy
SJOGHC	St John of God Health Care
SJOGHS	St John of God Hospital Subiaco
TDM	Therapeutic Drug Monitoring
TR	Therapeutic Reason
UK	United Kingdom
USA	United States of America
VMO	Visiting Medical Officer
WAMSG	Western Australian Medication Safety Group
WHO	World Health Organisation

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ABSTRACT

BACKGROUND:

Medication Safety has become a major health issue in Australia and internationally. Medication use is a part of most people lives with around seven in ten Australians and nine in ten older Australians having taken at least one medication over a two week period. But the taking of medications is not devoid of risk to the patient and a subsequent cost to society. This risk of an adverse outcome can be due to a predictable or idiosyncratic direct effect of the medication (adverse drug reaction) or a breakdown in the systems involved in the management of medications (medication incident). Although the risk of an adverse outcome is low and most medication incidents do not cause any harm, the volume of medications in use dictates that the problem when quantified is still significant. Following the publication of major patient safety studies it has become possible to estimate that almost 2 to 3 per cent of all hospital admissions are related to problems with medicines with an annual cost of $380 million.

In 2002, following the publication of the Second National Report on Patient Safety –Improving Medication Safety" it became apparent that despite medication safety issues growing in awareness in public hospitals, the same could not be said for private hospital practice which catered for about one third of all admitted patient episodes in Australia. Later that year a first step was taken with the Private Health Industry Quality and Safety workshop with representatives from most private hospitals attending. This meeting highlighted that medication safety practices at St John of God Hospital Subiaco was not aligned very well with public sector hospitals and that a number of deficiencies existed requiring urgent attention.

AIMS:

This study had a broad range of aims. These were as follows:

1. To chronicle the development of medication safety procedures at St John of God Hospital Subiaco, nationally and internationally.
2. To quantify and uniformly classify, medication incidents reported from different sources in a private hospital

3. To develop and assess a range of contributing factors as to why the medication incidents occurred
4. To quantify the clinical significance of reported medication incidents
5. To develop strategies to minimise/reduce the incidence of medication incidents in the future
6. To investigate the influence of pharmacy ownership, location and employment of clinical pharmacists on medication incident reporting practices in Australian private hospitals.

METHOD:

The study was conducted in different phases. Initially the focus was a retrospective review of reported medication incidents in the hospital based on the date of occurrence of the medication incident rather than the date of review by a pharmacist. Secondly all incidents were then classified using a standardised format using the origin of the error. These included prescribing errors by medical practitioners, dispensing error by pharmacists and administration errors by nursing staff. Standard sub-categories were devised by St John of God Health Care, the national body coordinating the practices of all St John of God Hospitals, but in some instances they were noted to be too general. This led as part of this study to the development of more specific and sensitive categories for dispensing errors.

Due to the realisation that medication error was now seen as a systems failure it was appropriate then to assess the risk to the patient and/or the organisation for a particular incident as well as determine some measure of harm to the patient. The level of risk associated with a medication incident was ranked according to the consequence of the incident and the likelihood of it recurring. Allied to this, a determinant of harm suffered by a patient following an incident or error was devised and promoted which differentiated harm into potential and actual harm.

To further gauge private hospital medication safety practices, a national survey was undertaken of Australian private hospitals to gain an insight into the methodology used to collect and collate medication incidents and the roles played by pharmacy services in that process. In particular the survey sought to determine the influence of

the ownership and location of the pharmacy service on those practices along with the employment or not of clinical pharmacists.

RESULTS:

The classification of medication incidents by the date of occurrence aided in the assessment of why an incident occurred as it now became possible to study whether the ward location and day or time of an incident contributed in any way to causing that error. The classification of medication incidents by their origin in the medication cycle, highlighted that most incidents were reported by nursing staff and were therefore heavily weighted towards administration errors, which embodied their core medication function.

The development of knowledge and understanding surrounding the causes and contributing factors associated, in particular with administration and dispensing medication errors, has helped to retrain caregivers to seek ways to avoid the incident in the future rather than focusing on any individual blame for what is a system failure.

The clinical significance of a particular incident both to the patient and to an organisation can be more adequately assessed if a risk stratification and harm model is in place. This is apparent when dispensing errors were assessed as clinically significant to the pharmacy department but from a hospital perspective were noted only to have a potential for harm. In contrast, while the majority of administration errors had the potential for harm, some did cause actual harm.

With the awakening of the need to improve our medication practices, the Pharmacy Department and the Hospital have committed to embracing more fully those practices more commonplace in public hospitals. These included having an active Drug and Therapeutics Committee and the implementation of clear medication polices and guidelines. Other initiatives have been embraced such as the use of standardised medication charts and ensuring a strong focus on medication reconciliation at the transitions of care. This included the employment of more clinical pharmacists to service areas such as preadmission and high risk areas such as Intensive Care and Oncology.

The survey, with a response rate of 43%, highlighted that pharmacy services in private hospitals in Australia were either located On Site (52.8%) or Off Site (47.2%)

and were either Hospital Owned (22.2%) or Contracted Out (77.8%). On Site pharmacy respondents were significantly more likely to be involved in the review of medication incidents ($p = 0.047$), have a policy on medication safety ($p = 0.024$), employ more clinical pharmacists ($p = 0.006$) and have a higher mean number of medication incidents reported ($p = 0.001$) as compared to Off Site pharmacies. Pharmacy providers who employed clinical pharmacists were more likely to be involved in the review of medication incidents ($p = 0.02$). Hospital Owned services were more likely to report a higher number of medication incidents ($p = 0.011$) and be On Site whilst Contracted Out services were more likely to be Off Site ($p = 0.026$).

Medication safety has grown to become an international phenomenon. Two of the World Health Organisations top five priority areas to improve patient safety worldwide involve medication usage. In Australia, the formation of an active Australian Commission on Safety and Quality in Health Care, has provided leadership to all hospitals both private and public whilst at state level Medication Safety Groups drive more local state based issues. The willingness of some private hospitals to embrace fully the concept of medication safety is very evident at St John of God Health Care where a national medication reference group was set up to lead all their hospitals along a common path and this has been complemented recently by the formation of a medication safety committee at the Subiaco campus.

CONCLUSION:

The safe use of medicines is still a major issue. Medication errors are now recognised to be a system failure. Great progress has been made to improve the system of how we manage medications in our hospitals, but the system must continue to evolve. Gaps still exist that need addressing to make our hospitals safer. The various private hospital models that exist lend themselves to differing levels of service and participation in medication safety. It is vital that the Australian Council for Health Care Standards, the private health insurers and the Commonwealth Health Department develop a higher expectation from all private hospitals to ensure systems are in place so that patients are safe regardless of the health care environment they enter.

CHAPTER 1 WHY DO THE PROJECT?

1.1 BACKGROUND

Australian healthcare is a comprehensive and highly technical service with well trained and motivated staff of all disciplines. But problems do occur in this industry as in any, usually as a result of system failures that lead to mishaps by doctors and nurses.[1,2] Lessons can be learnt from other industries such as aviation to reduce and manage any risk and improve safety by concentrating on system improvement and redesign.[3] Bruce Barraclough in his Preface to the Second National Report on Patient Safety said that safety in healthcare is highly valued by patients and their families, and is a complex function of safe systems of care and safety conscious personnel, to provide the best value for our health dollar.[4] He also stated that ~~a~~dverse events were more likely the result of error prone situations rather than error prone people". [4]

In particular, medication safety has become a major focus for the Commonwealth Department of Health and Ageing in Australia under the auspices initially of the Australian Council for Safety and Quality in Healthcare (ACSQH) formed in January 2000.[3] The ACSQH defined in the Glossary of their reports that an incident as an ~~e~~vent or circumstance, which could have, or did lead to unintended and/or unnecessary harm to a person, and/or a complaint, loss or damage".[4,5]

Michael Cohen, president of the Institute for Safe Medication Practice, defines a Medication Error as ~~a~~ny preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the healthcare professional, patient or consumer".[5] Near misses or potential adverse events are events that by chance are intercepted before they reach the patient and they do not cause harm.[5-7]

Since human error is inevitable, systems need to be designed to tolerate the occurrence of errors but minimise their potential to cause harm.[7] Hence medication errors can usually be attributed to faults in the medication systems rather than the individual.[7] Medication errors are considered common in the healthcare system.[5-7] They can occur at any time during the continuum of care in a hospital setting from admission to discharge of a patient, involving prescribing, dispensing and medication

administration.[5-6,8] Medication errors are considered the leading cause of adverse events in Australia and overseas.[9,10] Although the majority do not cause any harm, i.e. near misses, 1-2 % of medication errors do cause adverse drug events.[7] Ten to twenty per cent of adverse events in hospitals are drug related with 50% or more being considered preventable.[11,12] Other studies have quoted figures as high as 30-45%.[13,14] In Australia, medication errors are estimated to be responsible for 80,000 hospital admissions and a cost of $350 million per annum.[15] Queensland Health believes drug related problems are the underlying cause in 4-5% of unplanned hospital admissions and 15-50% of geriatric admissions.[16]

The potential for error has increased as the number of medications, especially generic brands, has exploded over the past few years, together with the reducing length of stay of patients in hospital, and the rising acuity and expected higher occupancy of beds. So as patients are turned over faster, pressures mount on staff to provide the quality of care required.

The ACSQH was formed to ~~l~~lead national efforts to improve the safety and quality of health care, with a particular focus of reducing the likelihood and effects of errors".[3] To date the ACSQH has provided two national patient safety reports to Health Ministers focused on minimising medication incidents. The first report Safety First was presented in July 2000.[6] The Second National Report on Patient Safety-Improving Medication Safety was presented in July 2002.[4] This report has highlighted many issues including; the beneficial role of clinical pharmacists in medication error reduction, individual patient medication supply in hospitals, use of computerised prescribing with clinical decision support systems by doctors, and transfer of information between hospitals and community settings. Other issues identified were the need for a multidisciplinary approach and ownership by all stakeholders, and the need to identify the causes and contributing factors leading to medication incidents.[4]

The promotion and urging for a greater uptake of the role that clinical pharmacists could play as medication managers was timely, as pharmacists had to this point been attempting to justify their existence and quantify their roles in the medication cycle.

With the focus squarely on public health settings to date and medication safety initiatives embraced in particular hospital sites only, the private hospital setting was floundering on its own trying to adopt public sector models or creating its own. A coordinated approach begun with the first _Safety and Quality of Medicines- Issues for the Private Sector Workshop", held 17-18 October 2002 in Sydney under the auspices of the Private Health Industry Quality and Safety Committee (PHIQS).[17] This workshop put private health on the agenda and under the spotlight. At the workshop it was identified that the success of the government's initiatives required private health to become fully involved. Discussions took place on how this would occur from the relevance and implementation of the Australian Pharmaceutical Advisory Committee principles of the Continuum of Care Guidelines[18] through the role of advisory committees. This workshop crystallised the need for published work on medication incidents in the private health arena and to provide information on the type, frequency and causes of medication errors in that setting.

There have been many audits on the number and types of medication incidents in the public sector setting but at that time none had focused on the causes. This is the first study in a private hospital setting to attempt to quantify and classify, as well as look at the causes and contributing factors of medication incidents. It is hoped this information will assist in developing a model that may be used with all forms of reported medication errors and provide a mechanism to link them altogether.

This research project into medication incidents in private hospitals was inspired by two major events. The first was local and followed the submission of a report by the Deputy Chief Pharmacist on the work carried out whilst reviewing medication incidents for the hospital to the Drug and Therapeutic Committee (DTC) meeting at St John of God Hospital Subiaco (SJOGHS) in December 2002. This report was considered a landmark report for the hospital as it was the first time a review of all medication incidents by error type had been conducted. The review initially covered a 6 month period but was later extended to cover the 12 months July 2001 to June 2002. Prior to this, reports were made on an ad hoc or as needed basis to cover the period between DTC meetings and no comparative data was available.

Underpinning this was the strong belief that a review by a senior clinical pharmacist was an essential part of the process as the unique skills of the clinical pharmacist in

medication management were ideally suited to this purpose. The position would require adequate resourcing if it was to continue and with that in mind all medication incidents reviewed during the 2001 to 2002 period had a time allocated to it to reflect both the direct and indirect time involved in reviewing them. The Hospital Executive were presented with this data and were asked for direction as to how this would best be progressed as the time involved could not be easily sustained within the current staff full time equivalents (FTE) of the pharmacy department.

The second event was the primary investigators attendance at the PHIQS Workshop in Sydney in October 2002[17] and the discussion surrounding the availability of the Second National Report on Patient Safety - Improving Medication Safety. Attendance and discussion at this event, which catered for the majority of private health providers in Australia, prompted the realisation that there was a need for a major shift in thinking. As a result the following initiatives were embarked upon:

1. Review how incidents were classified to more appropriately reflect the practice environment and to strive for a more uniform approach to allow comparison with public sector health providers.
2. Change the data set included from date of review to the date the incident occurred.
3. Differentiate incidents as either –Prescribing", –Dispensing" or –Administration" errors which would more broadly reflect the type of processes involved in a hospital setting for that error.
4. Highlight the usefulness of annual comparisons to allow benchmarks to be attained and comparisons made with other institutions of a similar size or within our own organization. This would also allow the monitoring of any improvement strategies that were put in place or to target a specific area for improvement.
5. Broaden the type of review to include why the incident happened. Identification of the _why' was seen as integral to the development of strategies necessary for the prevention or reduction of the incidence of a particular type of medication incident.
6. Development of a medication incident data set that was specific to private hospital practice as none was seen to exist at that point.

7. Extend the understanding of the _why‘ an incident occurred to facilitate the assessment of the level of harm or risk associated with that incident to the patient or the organisation.

1.1.2 The Rise of Medication Safety at St John of God Hospital Subiaco (SJOGHS) 1997-2006

In 1997 SJOGHS created the position of Coordinator of Clinical Pharmacy Services (CCPS) to develop a hospital wide clinical pharmacy service, and to support a medication safety focus. This required the involvement in all committees and structures that were involved in medication safety issues at the hospital which would reduce the risk of harm to patients and the hospital, and focus on the quality use of medicine. Some of these aspects included education to nursing and pharmacy staff, provision of or advice on the purchase/provision of up to date medication information resources, preparation of standardized medication guidelines to caregivers on wards and clinical areas, development of medication related policies and procedures, development or updating of any therapy and medication charts and forms etc. In addition the CCPS became a member of the hospital‘s DTC.

At this time, in the late 90‘s, any reported medication incidents were recorded on a hard copy –Accident and Incident Report” form (HR 150) (Appendix 1) which was sent to the Chief Pharmacist for review and comment. Once signed the form was returned for storage in the patient‘s medical record. By 1997 the DTC was provided by the Chief Pharmacist with a quarterly de-identified summary of the medication incidents reported with similar errors grouped together. Unfortunately, many forms often had incomplete information. This often necessitated investigation of the medical record by the Chief Pharmacist to ascertain what had in fact occurred. If any action or trend was noted it became the CCPS (later the Deputy Chief Pharmacist) role to enact whatever action if any that had been recommended. Subsequent to this, in 1999 and on the CCPS‘s recommendation, a Medication Policy and Procedure Subcommittee was formed as a subcommittee of the DTC to assist in the review and development of medication policies and procedures, and to advise and implement any changes that were required to improve medication safety and reduce the hospital‘s risk due to the frequent recurrence of similar errors noted from the hospital‘s medication incident reports.

In conjunction with this role the Chief Pharmacist in January 1999 requested the DCP to assume responsibility for the review of all medication incidents sent to the Pharmacy Department and to continue to advise the DTC on the types of errors seen and identify any trends.

1.1.3 Types of Errors Reported

The medication incidents reported were classified according to the twelve category descriptions used on the Accident and Incident Report form (HR150).

Table 1.1 Medication incident categories on the Accident and Incident Form (HR150)

Medication Incident Categories	Description of Medication Incident
1	Extra dose given
2	Incorrect fluid
3	Incorrect IV rate
4	Not given
5	Not ordered
6	Given but not signed for
7	Wrong dose
8	Wrong patient
9	Wrong route
10	Wrong time
11	Previous drug reaction, but given
12	Other

It became apparent that this process of investigation and reporting of medication incidents was flawed. There was no control or follow up over what actions had or would occur as a result of the investigations and suggestions put forward by the DCP. This lack of outcomes for the time invested came under scrutiny as other duties were impacted on. In association with this the medical members of the DTC were concerned over their own and the hospital‘s liability surrounding the reviewing of medication incident trends where no perceived action or improved outcome (reduction in error type) was apparent.

1.2 METHOD

1.2.1 INTRODUCTION OF SUMMARY MEDICATION INCIDENT FORM AND DATABASE ENTRY

To improve the reporting of the outcomes achieved following this review by the DCP, a change in process was initiated in July 1 2001. The DCP would begin to summarise the incident and suggest some recommendations to attempt to avoid the incident in the future, on a separate –Summary Medication Incident" form (Appendix 2), which would be attached to the Accident and Incident Form. The recommendations would be based on experience, knowledge of hospital/nursing /pharmacy policy and procedure, legal requirements and common sense. The Accident and Incident form including the Summary, would then be sent for data entry into a newly created Access® database. After this the completed form would be sent to the relevant Nursing Care Centre Director for review or further investigation if needed and any comments entered onto the data base. The completed form would then be stored in the patient's medical record.

Every month the clinical projects nurse would print off a report (Appendix 3) for the newly formed Medication Policy and Procedure Sub-Committee to review the DCP's recommendations and any comments added to the database. This committee, whose terms of reference were extended, would comment on or endorse the pharmacy recommendations and initiate any strategy that was required. This Medication Incident Summary Report (Appendix 3) would then be tabled at Nursing Practice and Research Council for action by the Nurse Managers and a quarterly report compiled for the hospital's DTC.

This was considered to be an improvement on the previous process and the DCP undertook this role with a view to it being reviewed for effectiveness after a 6-month trial.

As more experience was gained with the new process the time taken to review, summarise and suggest recommendations had become an issue for pharmacy as the medication incident numbers had become more consistent and the complexity of the reports increased. Added to this, it was noted that the time spent investigating an incident may involve a number of blocks of time being devoted to a single incident due to its complex nature and the need to speak to relevant staff. However, the

Pharmacy Department was not allocated any additional resources to tackle this new ~~–r~~isk management" role.

1.2.2 Impact and Effectiveness of the Change in Reporting Process for Medication Incidents

The process change implemented in July 2001 was effective as the entry of the summary and recommendations from the DCP onto the database, allowed the easy generation of reports.

The monthly summary reports allowed the easy review of the previous periods incidents by the various hospital committees and assisted the endorsement or action required from the recommendations.

A number of new concerns were soon highlighted with this improved process:

1. Workload may influence the speed of data entry by the data entry clerk so that an incident from a particular month often did not appear in the report until the following month, or later.
2. Incident reports tended to arrive in pharmacy in bundles even though the incident dates were not the same. This created a backlog of work associated with investigating each incident and slowed down the process even further.
3. Some medication incident forms were not coming to pharmacy at all for review /comment and were not being entered onto the database.
4. Some incident forms were delayed as they were reviewed by members of the Hospital Executive first, contrary to the agreed procedure which stated they be sent directly for review by the DCP in the first instance. This delayed entry onto the data base and subsequent committee review.
5. The time invested in reviewing medication incidents and the effectiveness of that investment in preventing further similar incidents needed to be reconsidered. Although all recommendations from the DCP were endorsed by the Policy and Procedure Sub-Committee, there was a lack of structure as to how these recommendations were to be managed or actioned to ensure effective outcomes. The highlighting of some issues at Nursing Practice and Research Council did

not seem to ensure practice change and the same incidents recurred time after time.

6. The majority of medication incidents reflected that hospital policy was not being followed. The need for individual professional accountability for regular breaches of hospital policy needed to be balanced against the voluntary reporting of incidents and a "No Blame" culture associated with reporting. Whilst penalising individuals involved in reporting incidents was not thought to be appropriate as it could reduce or prevent incidents being reported, it was evident that current strategies were still not preventing the recurrence of similar events.

An interim report was prepared for the Executive Director of Clinical Services on 7th March 2002 which provided some interim results for discussion by Nursing Executive and Pharmacy Senior Management groups at its April meeting. Issues addressed were:

1. The investment of time by the DCP and the lack of adequate resources for the Pharmacy Department to fulfil this role.
2. The then Health Services (Quality Improvement) Act 1994[19] and the concerns regarding litigation or liability for reviewing committees in a hospital setting, in particular of medication incidents.
3. The subsequent abandonment of any review or comment by DTC, Medication Policy and Procedure Subcommittee and Nursing Practice and Research Council as a direct result of the doubts concerning indemnity under the Health Services (Quality Improvement) Act 1994.
4. The recurrence of the same types of incidents despite the development and more routine use of the self-directed learning package, "Principles of Medication Administration in Nursing Practice" developed in May 2001. This joint initiative between nursing and pharmacy was part of a strategy to reduce the incidence of medication errors on the wards by requesting all staff to complete the package.
5. Who was responsible to follow up trends in medication incidents and implement strategies for correction?
6. The need to focus on "Why this incident occurred" and "What were the contributing factors"? A Severity ranking was also required.

7. That the hospital needed to consider employing a Clinical Risk Manager to oversee this important medication safety issue in the future

The meeting held on the 17th April 2002 led to the following conclusions:

1. The time invested by pharmacy was very worthwhile but too big a commitment and not part of the DCP's Job Description.
2. The responsibility for investigation was to be returned to the Nurse Managers primarily who would investigate "who was primarily responsible" and "why this incident occurred".
3. The format of the Accident and Incident form was to be reviewed and a project nurse was to be employed to review it,
4. Pharmacy was still to see all medication incident forms and sign the form once sighted. Summaries were to be discontinued and any relevant recommendations placed on the form itself.
5. Outcome management was not addressed any further but was noted for future review.

1.3 RESULTS

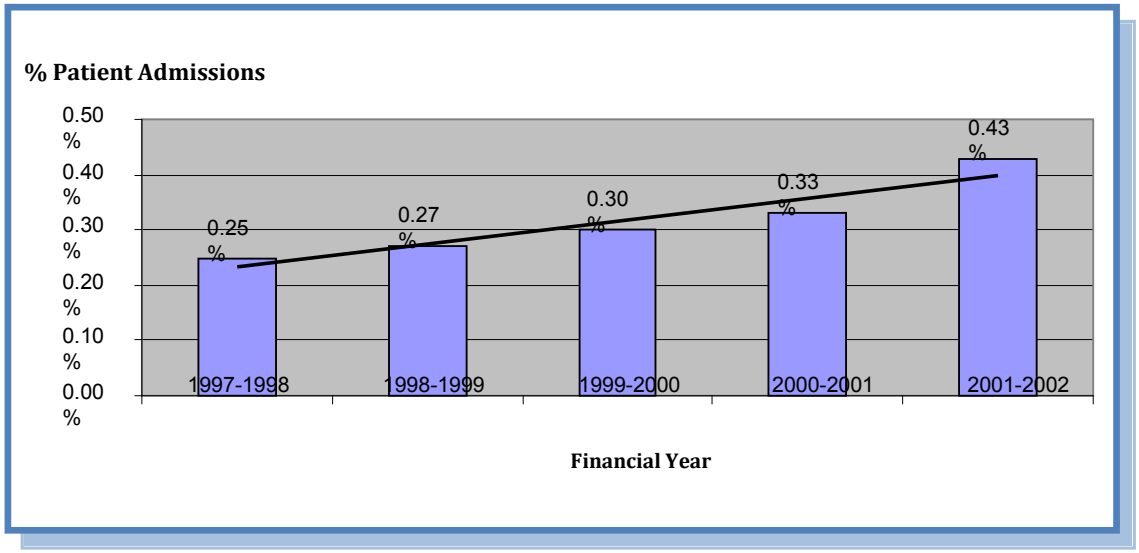
1.3.1 REPORT TO DRUG AND THERAPEUTICS COMMITTEE ON MEDICATION INCIDENT DATA JULY 2001-JUNE 2002

A report on all medication incidents reviewed by the DCP for the 12 months July 2001 June 2002 was submitted to the hospital's DTC at their July 2002 meeting. This was an extension of the report provided to senior hospital staff in April 2002.

During this period, 2001-2002, 901 Accident and Incident forms were submitted for review at St John of God Hospital Subiaco. This equated to 2.13% of all admissions to the hospital being involved in an incident. At this time, 'all admissions' included all inpatient, day case, maternity and newborn patients. Of these, 20% (184/901) were Medication Incidents forms reviewed by pharmacy and collated into a report for the DTC to demonstrate the incidence and spread of medication incident reports.

This figure accounted for 0.43% of _all admissions‘ as defined above. This figure had steadily increased over the previous 5 years as shown in Figure 1.1:

Figure 1.1 Medication incidents as percentage of patient admissions



1.3.2 MEDICATION INCIDENTS BY WARD OR DEPARTMENT

Medication incident forms were received from all wards and departments in the hospital. They cover a broad range of specialties as expected of a large private hospital (Table 1.2).

Table 1.2 Ward names at St John of God Hospital Subiaco and a description of their specialty

Ward names	Description of specialty
33	Delivery Suite
34	Neonates
41	Cardiology
42	Intensive Care Unit
43	Gynaecology surgery
44	General surgery
51 & 52	Orthopaedics
53 & 54	Maternity
61	Neurology
62 & Ivy	Oncology inpatients & Day cases
7	Urology and Ophthalmology
Paeds	Paediatrics
Theatre	Peri-operative areas
Short Stay Unit	

Table 1.3 Number incidents reviewed by DCP per quarter by ward or department

Ward or Department	First Quarter (n)	Second Quarter (n)	Third Quarter (n)	Fourth Quarter (n)	Total number of incidents (n=184)	Percentage of Total by ward %
33	1	1	0	1	3	1.6
34	1	0	0	2	3	1.6
41	4	5	2	3	14	7.6
42	1	1	1	1	4	2.2
43	3	3	1	7	14	7.6
44	14	5	1	7	27	14.7
51	2	7	5	7	21	11.4
52	1	5	5	3	14	7.6
53	1	2	4	1	8	4.3
54	1	4	4	1	10	5.4
61	7	5	10	8	30	16.3
62	2	2	4	9	17	9.2
7	2	1	1	1	5	2.7
Paediatrics	0	0	1	1	2	1.1
Theatre	1	1	2	2	6	3.3
Short Stay	0	2	0	0	2	1.1
Ivy (Day Onc)	3	0	0	0	3	1.6
Pharmacy	1	0	0	0	1	0.5
Total	45	44	41	54	184	100%

The number of reports reviewed was relatively even over the four quarters 2001-2002. However, there were a slightly higher number of incidents reviewed in the last quarter as it was the end of the reporting period for that year (Table 1.3).

The greatest number (16.3%) of forms came from the Neurology Ward 61 (Table 1.2) which managed both medical (neurology) and surgical (neurosurgery) patients. This was followed by Ward 44 Gynaecological Surgery (14.7%) and Orthopaedics Ward 51 (11.4%). It is interesting to note that the Cardiology and Oncology wards, which are high throughput medical wards with patients expected to be on multiple medications had a lower number of reports with 14 (7.6%) and 17 (9.2%), respectively. A suspicion existed that the number of forms emanating from a specific

area was a factor of the enthusiasm of the relevant Nurse Manager for the process and willingness to ensure reports were completed rather than a reflection of the lack of incidents occurring. It is also noticeable that there was very little consistency across the quarters if we look at a particular ward's frequency of review by pharmacy (Figure 1.2). This initial review was seen as a timely intervention to provide the DTC with base level data on medication incident frequency and so an assessment could be made in the future on any possible under reporting.

Figure 1.2 Number of incidents reviewed by pharmacy (DCP) per quarter by ward or area

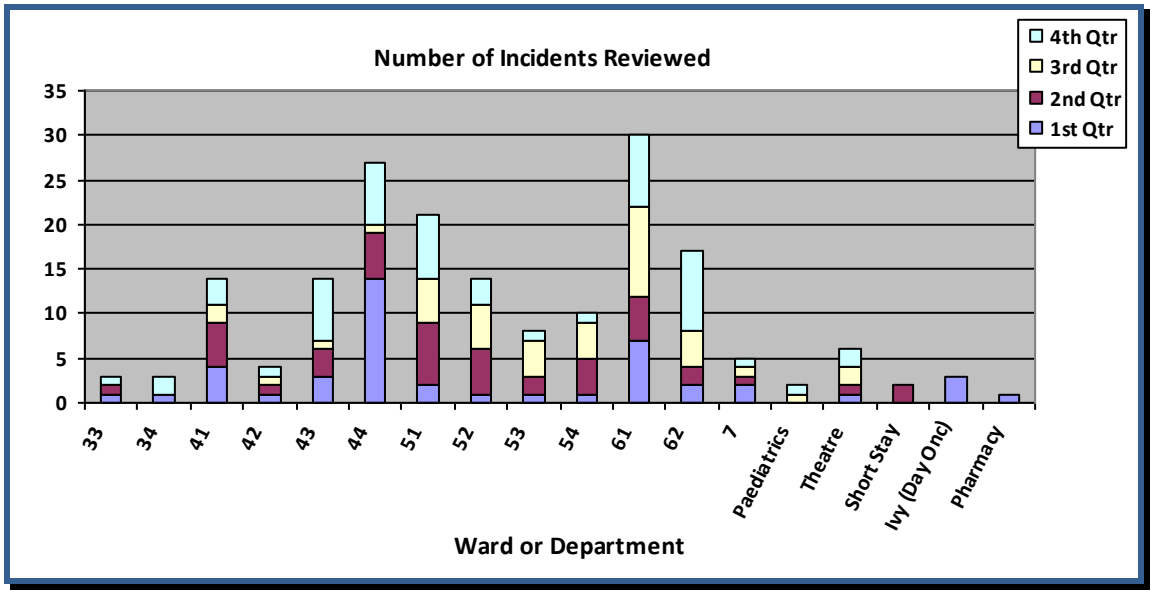
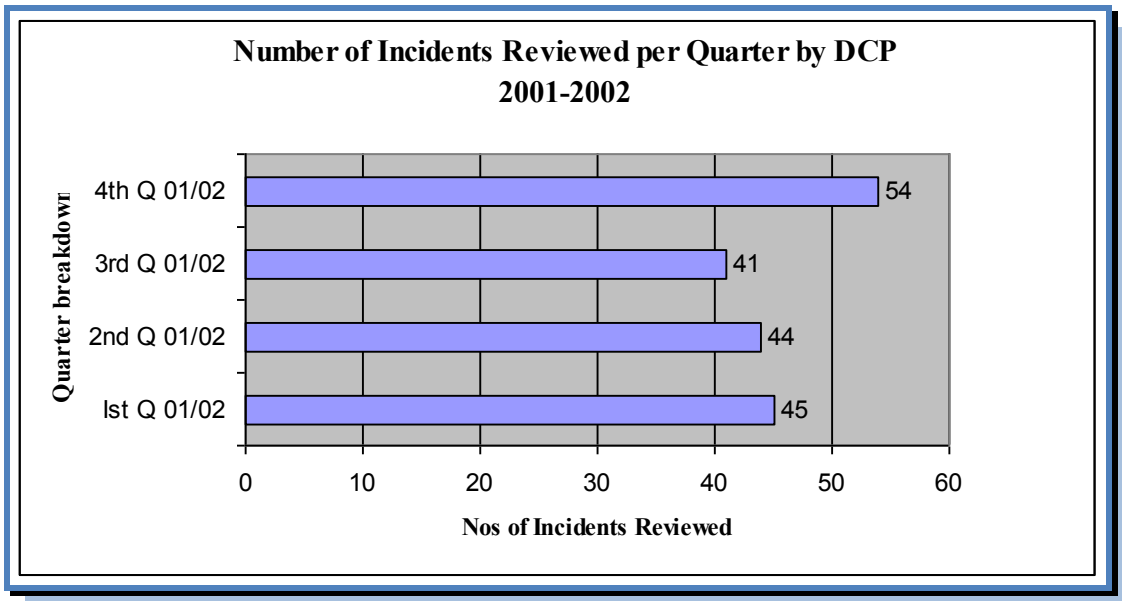


Figure 1.3 Number incidents reviewed per quarter 2001-2002



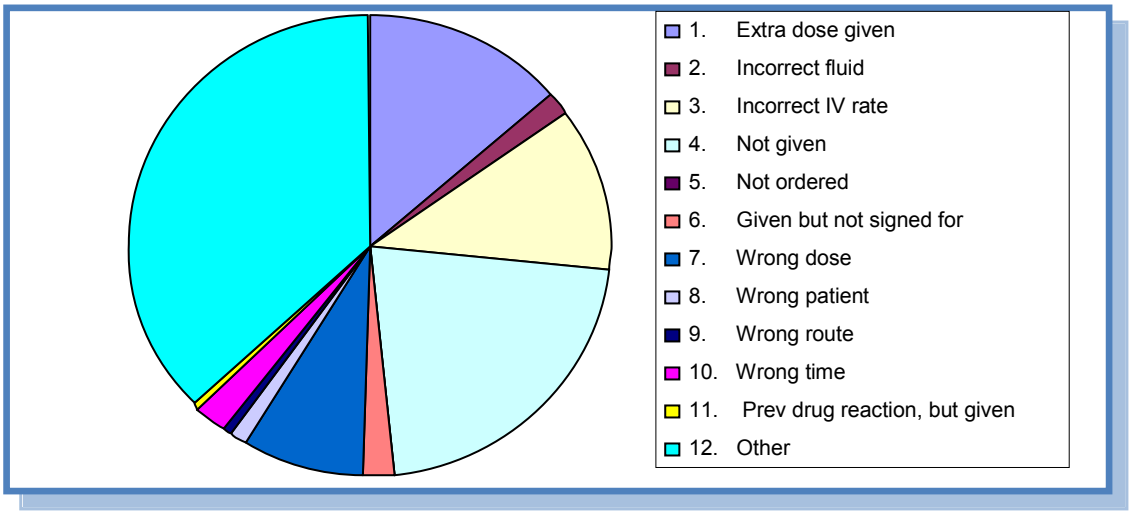
1.3.3 MEDICATION INCIDENT CATEGORIES

Each medication incident report had the potential to be categorised according to error type to assist in further understanding the incidents (Table 1.1). When applied to a year's data the classification showed that the "Other" category was the most common, making up 37% of the incident reports (Figure 1.4). This category was used for anything that could not be easily classified using the stated available categories on the form. The high number indicated the need to reassess the existing categories in use and to create some new ones that would capture the information better. Besides the "Other" category the most frequent categories used were "Not Given" (21%) and "Extra Dose Given" (14%) (Table 1.4). This trend was also observed when the data was looked at on a quarterly basis, although "Incorrect IV rate" was a substantial issue in the first and second quarter and declined thereafter, after some strategies were put in place to reduce this type of error cluster.

Table 1.4 Breakdown of the various medication error types reported 2001-2002

Type of error	1st Quarter (n)	2nd Quarter (n)	3rd Quarter (n)	4th Quarter (n)	Number of incidents (n)	Percent of total (%)
1. Extra dose given	5	7	3	10	25	14
2. Incorrect fluid	2	0	1	0	3	2
3. Incorrect IV rate	9	7	1	4	21	12
4. Not given	9	10	8	13	40	21
5. Not ordered	0	0	0	0	0	0
6. Given not signed	0	0	1	3	4	2
7. Wrong dose	5	1	3	6	15	8
8. Wrong patient	0	1	1	0	2	1
9. Wrong route	0	0	1	0	1	1
10. Wrong time	1	0	1	2	4	2
11. Previous drug reaction	0	1	0	0	1	1
12. Other	14	17	21	16	68	37
Total Incidents	45	44	41	54	184	100

Figure 1.4 Classification of medication incidents 2001-2002



1.3.4 Breakdown of the "Other" Classification

As the "Other" category was the largest group at 37% of incidents (Table 1.4), it was felt appropriate and helpful to review what types of errors were required to be categorised in this manner (Table 1.5). It was hoped that this information would assist in providing feedback so that the number of classifications or categories could be increased to better reflect practice at our hospital.

By far the biggest reason the "Other" category was used was for Schedule 8 (narcotic) discrepancies, accounting for 31% of reports. This was followed by "Incorrect drug given" which accounted for 19% of reports and "Incorrect drug transcribed by doctor" with 7.3%.

Table 1.5 Breakdown of the various "Other" medication error types reported:

Type of "Other" Error Types	Number of "Other" incidents (n)	Frequency of "Other" incidents (%)
Schedule Eight Discrepancy	21	31
Incorrect drug given	13	19
Incorrect drug transcribed by Doctor	5	7.3
Delay in order for patient	4	5.9
Documentation breach by Nurse	4	5.9
Epidural management issues	4	5.9
Intravenous pump issues	4	5.9
Extravasation	3	4.4
Fall secondary to medication	3	4.4
Pharmacy (Dispensing/Supply)	3	4.4
Contraindicated drug charted	2	2.9
Given not ordered	2	2.9
Total	68	100

1.3.5 THERAPEUTIC CLASSES OF MEDICATIONS INVOLVED IN THE REPORTS

The therapeutic classes of the medications involved in the incidents reviewed gave some indication of the seriousness of each error and assessment of the potential for harm (Table 1.7). It should be noted that there were 190 medications reported/reviewed from the 184 Medication Incidents submitted, which meant some incidents involved more than one medication. Schedule 8 medications or narcotics made up 21.6% (41/190) of the medications involved and when added to the Analgesics/NSAIDS group (6.8%) and the Epidural group (3.1%) brought the total of pain relieving medications to almost a third of all medications involved (31.6%). This typically reflects the predominantly surgical nature of a large private hospital such as SJOGHS and the expected high use of pain medications. Antibiotics were involved in 16.3% of cases (31/190) of occasions and this may reflect their likely use for surgical antibiotic prophylaxis and treatment of post-operative infections. Cardiovascular medications with (14.7%) were the third most commonly involved medications, possibly reflecting the demographic of some patients attending the hospital and the likelihood that some cardiovascular co-morbid condition would exist allied to having a large cardiology medical ward.

An in-house single day snapshot survey, conducted in 2002, of the medication demographic or the number of medications charted for patients on SJOGHS wards, (Table 1.6) indicated that wards with a higher percentage of medical patients had a greater mean number of regular medications charted as compared to surgical patients (7 vs 3.5 to 4). Surgical patients were more likely to have a higher mean number of ‗when required' medications charted than medical patients (4-5.5 vs 2.5) and were more likely to have an epidural or ―patient controlled analgesia" device in place. The mean age of patients in hospital that day varied quite considerably with oncology and cardiology patients (medical) ranging from 53.5 to 56 years, orthopaedic surgery patients were 60-65 years of age over both orthopaedic wards, while the general surgery ward had a patient mean age of 71 years.

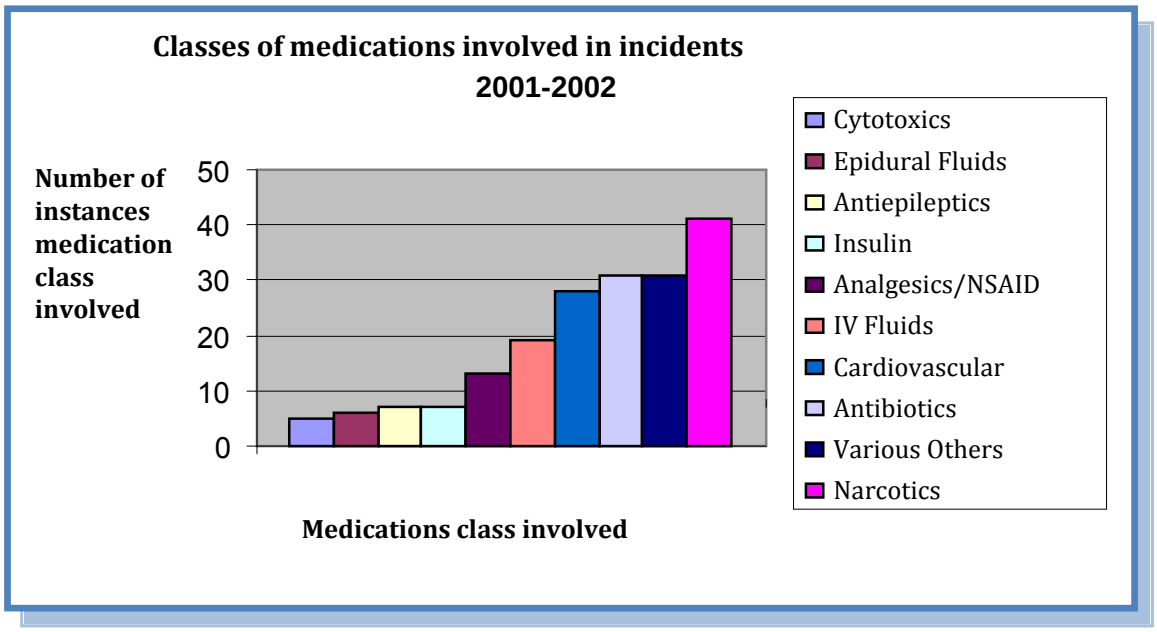
Table 1.6 Average number of medications prescribed for patients at SJOGHS 2002

Ward	Age	Average No. Medications	Average No. of Narrow Therapeutic	Average No. of 'when required'	No. of IV Medications	No. of PCA's	No. of Epidurals	% of patients surgical	No. of Patients
41	56.0	7.0	0.35	2.81	6	1	0	32.2	31
42	31.7	7.0	0.33	2.67	0	1	0	66.6	3
43	63.7	4.4	0.09	4.13	20	1	4	86.4	22
44	71.0	4.4	0.19	3.00	5	2	0	51.9	27
51	65.0	4.3	0.11	5.44	0	1	0	100	18
52	60.0	3.5	0	4.71	0	4	1	100	24
61	60.9	4.62	0.17	4.96	8	1	0	45.8	24
62	53.5	6.04	0.48	2.59	7	0	0	0	27
7th floor	68.8	4.16	0.11	3.11	1	0	1	52.6	19

Table 1.7 Therapeutic classes of medications involved in the reported incidents

Class of Medication	Number of times medication class involved (n)	Frequency of occurrence (%)
Cytotoxics	5	2.6
Epidural Fluids	6	3.1
Antiepileptics	7	3.7
Insulin	7	3.7
Analgesics/NSAID	13	6.8
IV Fluids	19	10
Cardiovascular	28	14.7
Antibiotics	31	16.3
Various Others	31	16.3
Narcotics	41	21.6
Total medications	**190**	**100**
Total incident reports	184	

Figure 1.5 Classes of medications involved in incidents 2001-2002



1.3.6 TIME TAKEN BY REVIEW PROCESS

One of the major concerns of the Pharmacy Department was the amount of DCP time taken up by the review process of these incidents. It was deemed essential that a log be maintained of the time involved –directly" in reviewing, investigating and reporting on each incident. Further, it was seen as essential that the –indirect time" involved in preparing a report for various committees and developing policies and procedures to reduce the incidence of medication incidents also be recorded. Using this data for each incident it was found that the mean amount of time necessary to directly review and comment on an incident was approximately 40 minutes (Table 1.8). The mean indirect time per incident was approximately 15 minutes which gave a mean total time of approximately 55 minutes per incident reviewed. The monthly mean average ranged from 36-133 minutes per month. Over the year the time invested equated to 10,330 minutes or 172 hours and 10 minutes. If we assume the Deputy Chief Pharmacist routinely works a 38 hour week over a 48 week period (given four weeks annual leave) then the commitment to this process of review is approximately 3.6 hours a week or almost 9.4% of the position's work time. It is worth noting that the troughs seen in January reflect the very low activity in the hospital over the Christmas and New Year break and consequent lower number of incidents reported.

Table 1.8 Direct and indirect review time (minutes) spent on medication incidents

2001-2002 Month	Number of incidents (n)	Direct time (mins)	Mean direct time/incident (mins)	Indirect time (mins)	Total time (mins)	Mean total time/incident (mins)
July	20	700	35	180	880	44
August	9	305	34	240	545	60
September	16	550	34	450	1000	63
October	8	595	74	465	1060	133
November	20	740	37	180	920	46
December	16	795	50	170	965	60
January	9	260	29	60	320	36
February	13	625	48	605	1230	95
March	19	630	33	390	1020	54
April	16	665	42	60	725	45
May	16	660	41	180	840	53
June	19	765	35	60	825	43
Totals	184	7290	40	3040	10330	56

Figure 1.6 Time in minutes to review incidents each month

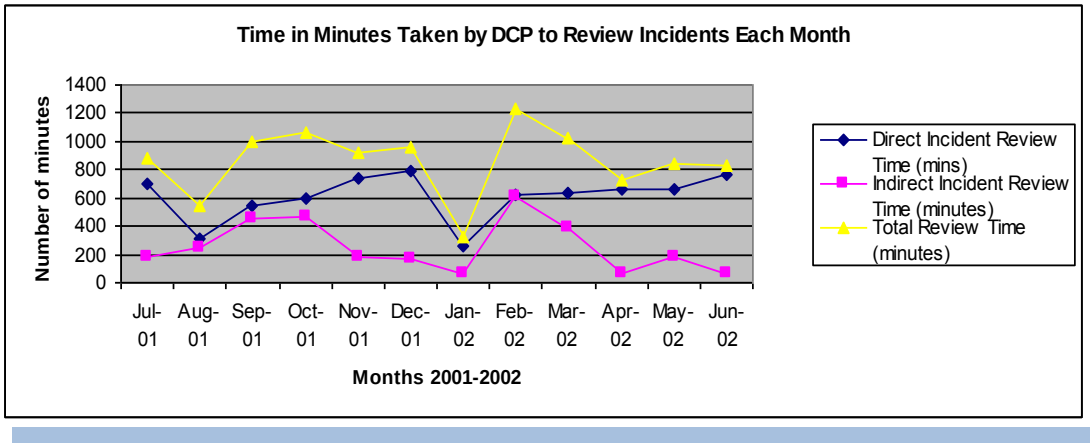
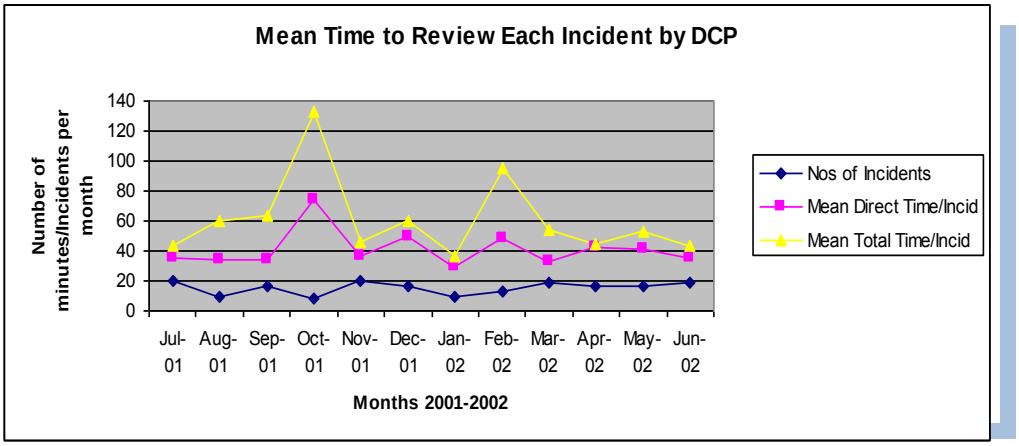


Figure 1.7 Mean time to review each incident



1.4 DISCUSSION

At SJOGHS since 1990, a generic accident and incident form has been used to record all incidents including patient falls, patient injuries, complaints, medication and miscellaneous incidents. It was intended to be a voluntary, ~~"n~~o blame" system which was initiated by a nurse, doctor or pharmacist, investigated initially by the relevant nurse manager and if a medication was involved, sent to the Pharmacy Department for comment.

The ACSQHC defined a medication error as a "failure in the (drug) treatment process that leads to, or has the potential to lead to, harm to the patient and includes an act of omission or commission.[4,5] While the 1966 National Coordinating Council on Medication Error Reporting and Prevention definition of a medication error is quoted as any "preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of a health care professional, patient or consumer" by Michael Cohen, President of the Institute for Safe Medication Practices (ISMP).[4]

We know from the Quality in Australian Health Care Study[9] that medication errors occur frequently in the hospital setting and can occur anywhere along the continuum from prescribing by the doctor, dispensing by the pharmacist and administration by the nurse. It has been reported that 10-20% of adverse events are drug related with 50% of these deemed preventable.[9] The 2001 data from incidents occurring within Australian hospitals that use the Australian Incident Monitoring System, maintained by the Australian Patient Safety Foundation, show that 11.6% of reports were for medication errors, e.g. omissions, wrong dose or wrong medication.[4,5]

1.4.1 ISSUES RAISED AS RESULT OF REPORT

The Hospital Executive was presented with interim results from this data in March 2002 and a final report in July 2002 which was also presented to the hospital's DTC. The report raised the following issues:

1. The investment of time by pharmacy with no extra allocation of staff to meet the needs of the day as well as the future.
2. The high probability of underreporting.
3. The concerns regarding the liability under the Health Services (Quality Improvement) Act 1994[19] and the need for the hospital to overcome this to allow a wider multidisciplinary committee review of all adverse events including medications.
4. Development of trend data and responsibility and ownership for corrective strategies to prevent recurrence.
5. The need to improve the incident classifications used.
6. The need to determine why the incidents occurred and what were the contributing factors.
7. The need to determine what risk and/or harm existed, if any, for each reported incident.
8. The need to consider the creation and appointment of a Clinical Risk Manager position for the hospital with the Pharmacy Department still involved with a more streamlined medication incidents review process.

1.4.2 USE OF POOR DESCRIPTOR/CLASSIFICATIONS

Looking at some of these issues more closely it became apparent that the classification system available on the form in use at the time was inadequate. The descriptions were not robust enough and did not cater for many common scenarios. For example, "Incorrect medication given" did not have its own classification and ended up being included in the "Other" category. As a result the "Other" category was quite large and formed the largest group with 37% of reports whilst omissions were the highest error type reviewed comprising 21% of all incidents.

This classification system was limited and could not and did not differentiate between incidents that were deemed 'near misses' from those that reached the patient. The Second National Report on Patient Safety definition of a "near miss' or "close call" was one where it was deemed to have caused no harm but the incident had the potential for harm if it had reached the patient or had the potential to reach the patient.[4] They can be indistinguishable from adverse events except for their outcome.[4] The system in use could not provide any differentiation between incidents that caused actual harm or had the potential for harm. The facts indicated that these anomalies in the risk management system needed attention.

1.4.3 Presentation of results to SHPA WA Conference

This report culminated in the presentation of a paper at the Society of Hospital Pharmacists WA State Branch Conference 6-8th September 2002, Perth, entitled "Should the Pharmacist Act as a Risk Manager for Medication Errors?" (Appendix 4).

The paper was well received and the major points outlined from the paper were that:

1. It was important to have a single person coordinating the analysis of medications incidents.
2. A pharmacist was ideally placed to do this role.
3. The reporting process needed to be improved to reduce underreporting.
4. An electronic data system solution should be investigated and may be more efficient to record, disseminate, alert and report on medication incidents.
5. Medication incidents should be part of a coordinated risk management strategy which would include falls and other safety issues.
6. The major shortcoming noted in the report and presented paper was that the incidents included were based on those incidents that were reviewed by the DCP in a particular month and year and not when the medication incidents occurred. From a system point of view, a further shortcoming was that the classifications used to describe the incidents were poor, unclear and required review.

1.5 CONCLUSION

In the past a process of committee review existed so that possible causes of medication incidents could be discussed and strategies implemented quickly to minimise risk and improve outcomes. Following concerns about liability and lack of indemnity under the Health Services (Quality Improvement) Act 199419, committee review ceased in 2002 and the responsibility for error management was returned to unit managers. Pharmacy still had a role to play as a reviewer but not to the same extent as before.

The hospital agreed to investigate whether a new Accident and Incident Form with more accurate classifications, could be provided and that all medication incidents would be sent to pharmacy immediately. Pharmacy, it was hoped would then have a date of review which would more closely reflect the date of the incident.

SJOGHS sought assistance from the St John of God Health Care (SJOGHC) national head office on these matters. This issue was of great interest to them as coincidentally a national approach was seen as fundamental to the organization‘s development as a safe and quality driven provider of health care to the private sector. A new hard copy form was proposed for development which in time it was envisaged would become a wholly electronic system (see Chapter 7). Similarly SJOGHC was moving towards developing quality and safety departments in each hospital which would undertake the risk management function and provide a method to overcome the qualified privilege issues. This initiative was to take place irrespective of whether pharmacy departments had a high profile in a particular private hospital in the group or not e.g. in Subiaco the Pharmacy Department had a section 94 restricted Pharmaceutical Benefits Scheme license and was owned by the hospital with all pharmacy staff working as employees of the hospital. This was and is not the norm in private hospital pharmacy practice and external contracted pharmacy services are provided to a private hospital often only to the level that a service agreement has dictated. This issue will be further discussed in Chapter 5 when the findings of a survey of leading private hospitals and large private hospital operators in Australia will be presented to determine the level of medication incident management that occurs in each hospital and the involvement of their pharmacy provider in that process.

CHAPTER 2 STUDY OBJECTIVES

This study was divided into a number of sub-studies which had the following objectives:

1. To chronicle the development of medication safety procedures at St John of God Hospital Subiaco, nationally and internationally.
2. To quantify and uniformly classify, medication incidents reported from different sources in a private hospital.
3. To develop and assess a range of contributing factors as to why the medication incidents occurred.
4. To quantify the clinical significance of reported medication incidents.
5. To develop strategies to minimise/reduce the incidence of medication incidents in the future.
6. To investigate the influence of pharmacy ownership, location and employment of clinical pharmacists on medication incident reporting practices in Australian private hospitals.

CHAPTER 3 DEVELOPMENT AND IMPLEMENTATION OF A NEW INCIDENT REPORTING SYSTEM

3.1 MEDICATION INCIDENTS 2001-2002

3.1.1 BACKGROUND - THE WAY FORWARD

Following attendance at the Private Health Industry Safety and Quality workshop in Sydney October 2002[17] and the publishing of the 2nd National Report Patient Safety [4] in the same year, it became apparent that a fresh approach was required to improve medication safety in our private hospital. It was also apparent that there were gaps in our reporting (Chapter 1) and that risk would not be reduced unless a more comprehensive approach was undertaken and a greater understanding of the types of errors occurred. This new approach included:

- The classification of errors into their primary sources i.e. prescribing, dispensing and administration.
- The development of standardised classification or description under each error type as the error descriptions currently which were in use had proven not to be specific enough.
- The collection of data in a more reproducible, uniform manner to enable comparative reports to allow the hospital to achieve benchmarking with other leading private hospitals. This in particular would require that reporting was conducted on the basis of when the incident was reported and not when the incident was reviewed by the DCP.
- The development of a list of reasons or contributing factors as to why these incidents occurred and when they occurred e.g. time of day, what day; and who was primarily responsible (Enrolled or Registered Nurse, Agency/Casual/permanent nursing staff, Prescriber, Pharmacist). The identification of the person involved even by professional classification was deemed difficult considering the promotion of the _No blame‘ culture of incident reporting at the hospital.
- The development/implementation of a _Risk‘ severity tool to be aligned with each incident and medication error type.

- The development/implementation of an outcome based ‗Harm' model to encompass both Potential and Actual harm to patients.

The requirements for change prompted the commencement of this research project as a means of changing and improving practice in medication safety. This research involved:

1. A re-examination of the medication incidents already reviewed but now quantified from a date of incident point of view rather than the date of review and classified as per prescribing, dispensing or administration medication errors.
2. A review of any self-reported pharmacy dispensing incidents from the same period.
3. A review of any pharmacist interventions from the same period if possible.

With the aims to:

4. Develop some Causal statements and contributing factors for different error types to identify ‗why' they occurred.
5. Gain an insight into the types of practices currently in use in other Private Hospitals around Australia to improve medication safety.

3.1.2 METHOD

3.1.2.1 ETHICS APPROVAL

The Curtin University of Technology Human Research Ethics Committee (HR 29/2004) conditionally approved the project in 2004 (Appendix 5) and on the 9th June 2005 the completed questionnaire (Appendix 6) and covering letter (Appendix 7) were submitted and final approval granted by the committee.

3.1.2.2 A FRESH LOOK AT THE 2001-2002 DATA USING BETTER TOOLS

SJOGHC which supports and manages each hospital in the St John of God group as part of a cohesive national approach to incident management and medication safety in particular, developed new categories and sub-categories (Appendix 8) for use by all member hospitals. This categorized medication incidents into prescribing, dispensing and administration errors with subcategories within each classification to further aid description.

Given the shortcomings identified by the review of our medication incidents in Chapter 1, the data for 2001 to 2002 was revisited with the date of incident now being an essential determinant for inclusion rather than the date the incident was reviewed by the DCP and those incidents were reclassified using the new national tools. At this juncture all the medication incidents had been saved electronically in a database but not all the other non-medication incidents. Hence the total number of Hospital Incidents is lower than is reported initially (i.e. 205 versus 901) (Table 3.1).

Although medications were the highest category of incident (Table 3.1), it was noted that three in the therapeutic device category dealt with medications, as did the six patient record incidents which dealt with medication charts and as such were included in the medications total. This provided a total of 162 medication related incidents.

Table 3.1 Patient incidents by incident category on database 2001-2002

New Incident Category	Number of incidents (n)	Frequency of occurrence %
Access	0	0
Behaviour	3	1.5
Biohazard Exposure	0	0
Blood/Oxygen	1	0.5
Decision Making	0	0
Fall	8	3.9
Injury	4	2.0
Intra-operative	1	0.5
Medication	152	74
Nutrition	0	0
Patient Record	6	2.9
Quality of clinical care	3	1.5
Result reporting	2	1
Safety Issues	8	3.9
Therapeutic Device	17	8.3
Total	205	100

3.1.3 RESULTS

3.1.3.1 BREAKDOWN OF MEDICATION INCIDENTS INTO SUB-CATEGORIES

Using the newly developed tool provided by SJOGHC, the 162 medication incidents could then be subcategorised into prescribing, administration and dispensing errors (Table 3.2).

Table 3.2 Breakdown of 2001-2002 medication incidents into subcategories

Incident categories	Number of medication incidents (n)	Frequency of occurrence (%)
Administration (by Nurse)	132	81.5%
(Pharmacy) Dispensing	9	5.5%
Prescribing (by Doctor)	12	7.4%
Pat. Record & Therapeutic Device	9	5.5%
Total medication incidents 01-02	162	100%
Total Bed days occupied 01-02	123,847	
Medication incidents/Bed day	0.00131	

It is now apparent (Table 3.2) that the majority of medication incidents reported during 2001-2002 could be classified as administration errors (81%) with prescribing errors next at 7% followed by dispensing errors (6%). This result was what had been expected given that the vast majority of reported medication incidents in the hospital are completed by nursing staff and should thus reflect more their participation in the medication cycle, i.e. the administration of medication.

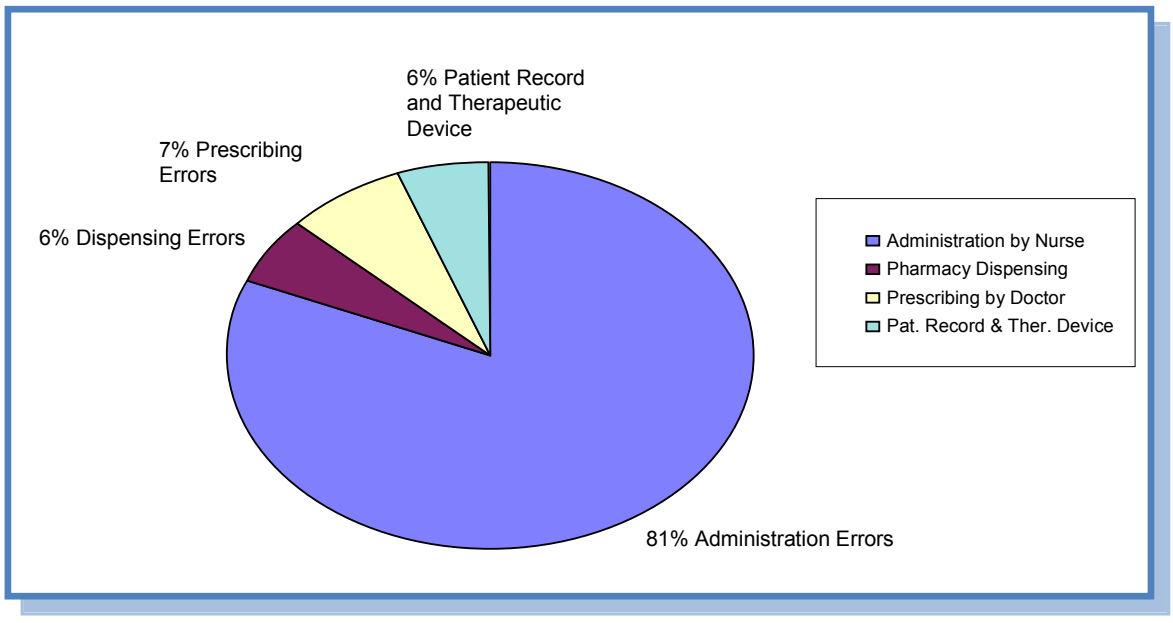
In addition a review of the recorded pharmacy dispensing errors for that period was undertaken, as the Pharmacy Department keeps separate records of all dispensing errors that are self-reported by staff in the department. The dispensing incidents reported here in this section (Table 3.2) were only those where a nurse had picked up the error and had entered the incident onto an incident report form and hence onto the new electronic data base. The frequency of just over 5% (9/162) dispensing errors in total for a year was considered to be very low by pharmacy management staff and was believed to reflect gross under reporting if this source was the only one used.

The self-reported dispensing errors in pharmacy are entered in a hard copy ledger and were not included in the hospital reporting system. The error rate was reported by the Chief Pharmacist as a percentage of prescriptions dispensed in his monthly and quarterly reports to the Hospital Executive.

The prescribing error rate of 7.4% was felt to represent gross underreporting and reflect only known transcription errors or some duplication of order errors that had been picked up by nursing staff. It was postulated that a review of the Clinical Pharmacists‘ intervention reports would provide a more accurate determinant for the prescribing error rate as the majority of these interventions would reflect changes to doctors' orders on a therapy chart and as such would predominantly relate to prescribing errors.

In order to allow comparison of incident rates over time or between hospitals, it was agreed that a common denominator should be adopted. This was determined to be bed occupancy; i.e. number of incidents per number of bed days occupied. This equated in financial 2001-2002 to: 162/123,847 or 0.00131 medication incidents reported per occupied bed day (Table 3.2).

Figure 3.1 Percentage of medication incidents by source 2001- 2002:



3.1.3.2 BREAKDOWN OF ADMINISTRATION INCIDENTS

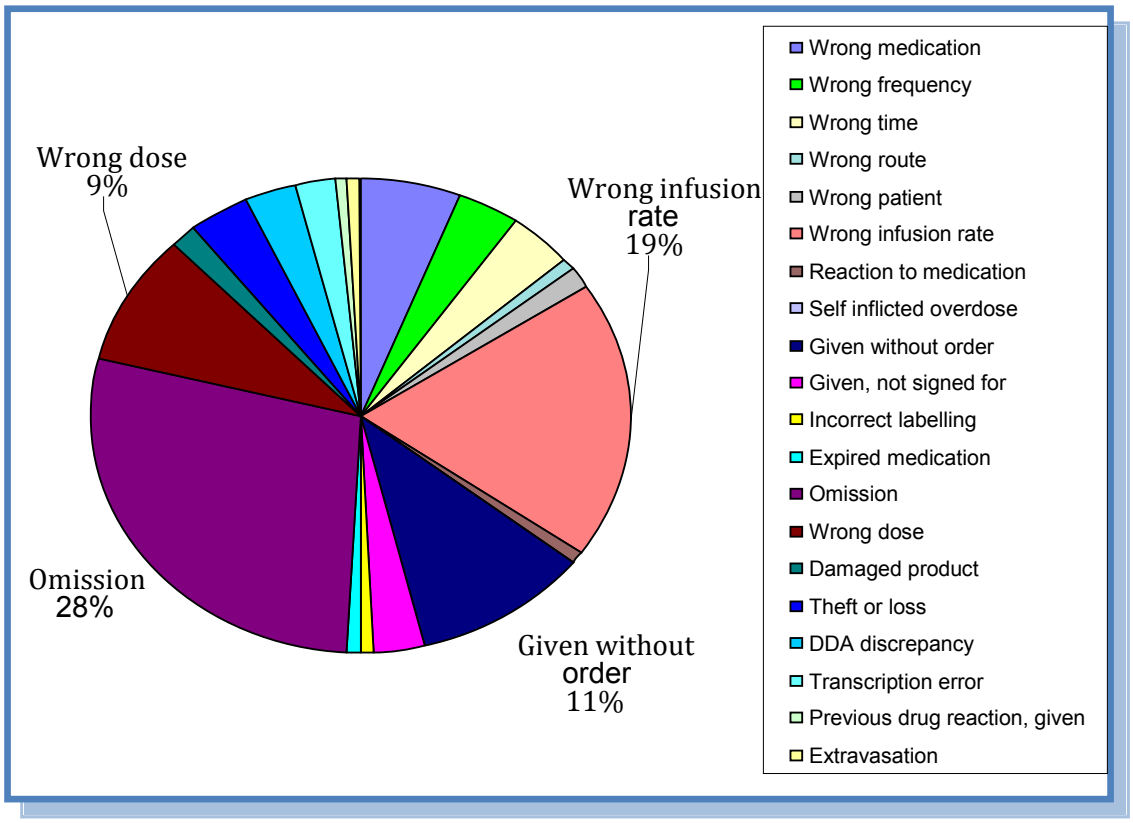
Using the SJOGHC subcategories we can get an assessment of the different types of administration errors that are reported.

The results demonstrated that omissions (Table 3.3) were the highest category of administration errors reported, as was seen in the initial report _by date of pharmacist review' (Table 1.4) and this was not unexpected. They were followed by the –wrong infusion rate" comprising 19% of reported administration errors. This category reflects the practice of administering intravenous fluids by gravimetric means where drops are counted to relate to a specific rate per millilitre with the standard being 20 drops per mL. This method of administration is fraught with inconsistency as it is easy for the patency of the line to be changed by kinking when for example patients lie on it or if the roller clamp used to modify flow is not moved to a new part of the line after each rate change. It became apparent from these incidents that large volumes (e.g. 1000mL) were often infused over 1-2 hours instead of the prescribed 10-12 hours. If this fluid contained a potent medication a potential adverse medication event could occur quite easily. The solution proposed to the hospital was to consider a budgetary change to enable purchase of enough volumetric IV pumps to ensure the gravimetric means of administering intravenous fluids was no longer practised.

Table 3.3 Administration incidents by subcategory 2001-2002

Administration error subcategory	Number of incidents (n)	Frequency of occurrence (%)
Omission	37	28
Wrong infusion rate	25	19
Given without order	14	11
Wrong dose	12	9
Wrong medication	8	6
Wrong time	5	4
Wrong frequency	5	4
Theft or loss	5	4
Given, not signed for	4	3
Schedule 8 discrepancy	4	3
Transcription error	3	2
Wrong patient	2	2
Damaged product	2	2
Extravasation	1	1
Incorrect labelling	1	1
Expired medication	1	1
Previous drug reaction, given	1	1
Wrong route	1	1
Reaction to medication	1	1
Self-inflicted overdose	0	0
Total	132	100

Figure 3.2 Administration medication incidents by sub-category



3.1.3.3 A REVIEW OF THE TIME MEDICATION INCIDENTS WERE REPORTED TO HAVE OCCURRED

An analysis of when medication incidents were reported was considered a worthwhile item to review, to see if there was any particular time of the day or stressors that may influence or be implicated in causing medication errors.

3.1.3.3.1 NURSING SHIFT TIMES IN HOSPITALS

The commencement and ending of shifts for nursing staff has often been considered a time when medication errors could occur as one team of caregivers 'handover' patient care to another team. This exchange of information and care process occurs at least three times in a 24 hour period. This handover is a very complex process and medication management is only a portion of the information passed on. Handover is achieved by face to face contact or if unavailable written or taped messages. If we assign for the purpose of this review 8 hours to each shift to accommodate morning, afternoon and nightshifts, the times worked should be quite uniform (Table 3.4). But nursing working shifts are nonstandard and these times do not reflect actual practice (Table 3.5) as they are designed to accommodate workforce availability and ward level acuity e.g. shifts are not of the exact same length each day and some shorter

shifts are used to accommodate busy times within the 24 hour period, such as 0700-1330 hours and 1800 to 2400 hours (Table 3.5). Added to this there is usually a cross over period of about thirty minutes between night shifts and morning shifts and morning shifts and afternoon shifts to allow staff to ―handover" from one to the other that particular patient's care. This handover period has long been thought to be an "at risk period" for medication and other errors to occur secondary to communication gaps and in 2010 became a key focus area of improvement for the Australian Commission for Safety and Quality in Health Care.[20]

Table 3.4 Nursing eight hourly shift times

0700-1500 hrs.	Morning shift
1500-2300 hrs.	Evening shift
2300-0700 hrs.	Night shift

Table 3.5 Nursing normal shift times in a private hospital 2002

0700-1530 hrs.	Morning shift
1300-2130 hrs.	Evening shift
2130-0730 hrs.	Night shift

3.1.3.3.2 NURSING SHIFT TIMES AND MEDICATION INCIDENT REPORTING

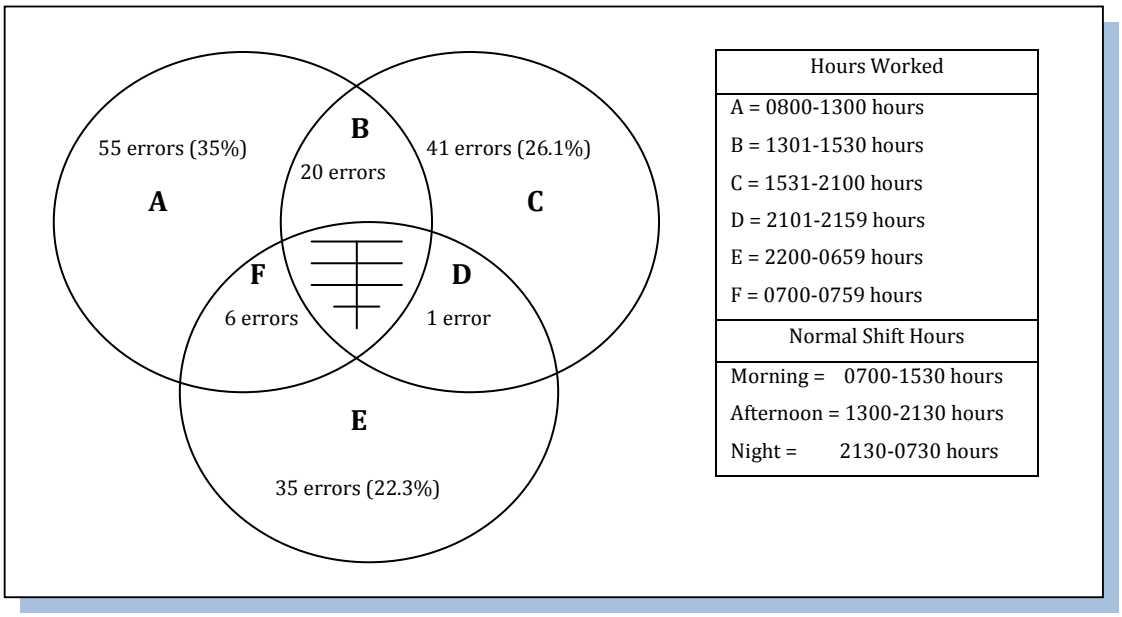
With this in mind a review was undertaken of the time an incident was reported to have occurred. Six discrete time slots were developed to facilitate the fact that short and long shifts exist and to cover all the likely changeover periods or at risk times (Table 3.6.). As it was noted that five incidents did not have a time assigned to the incident report it was decided that they should be excluded from the review. As a result the frequency of occurrence was reported out of a total 157 medication incident reports.

Table 3.6 Medication incidents by time occurred

Period Code	Time period incident recorded as occurred (hours)	Number of incidents (n = 157)	Frequency of occurrence (%)
A	0800 - 1300 hours	55	35
B	1301 - 1530 hours	20	12.7
C	1531 - 2100 hours	41	26.1
D	2101 - 2159 hours	1	0.6
E	2200 - 0659 hours	35	22.3
F	0700 – 0759 hours	6	3.8
	Total	**157**	**100**

The majority of reported medication incidents (35%) occurred in the period 0800 to 1300 hours (Table 3.6) which corresponds with the busiest time on the ward of a private or a public hospital. This is when morning medications are administered as well as meals (breakfast and lunch) and other patient care issues must be attended to. It is also a period when many patients are being prepared for morning surgery and is a busy and stressful time. Allied to this many medical practitioners arrive on the ward to review their patients and a nursing staff member may become interrupted to accompany them on their ward round. The next most prominent time for errors was the afternoon shift or Period C (26.1%) followed by the night shift or Period E (22.3%). It must also be noted that the changeover period from morning to afternoon shift (Period B) was the next most reported error time and was almost four times higher than the changeover period from night-time to morning shift (Period F) (12.7% Period B Vs 3.8% Period F). But if we make allowance that Period B was 2.5 hours in duration, the average error rate per hour becomes much closer (8 per hour Period B Vs 6 per hour Period F). The changeover period from afternoon to night shift (Period D) was by far the least reported time for medication incidents with only one report which may reflect that the time period is relatively quiet and free of interruption.

Figure 3.3 Number of medication incidents per time occurred



3.1.3.3.3 NURSING SHIFT TIMES AND OMISSION MEDICATION INCIDENTS

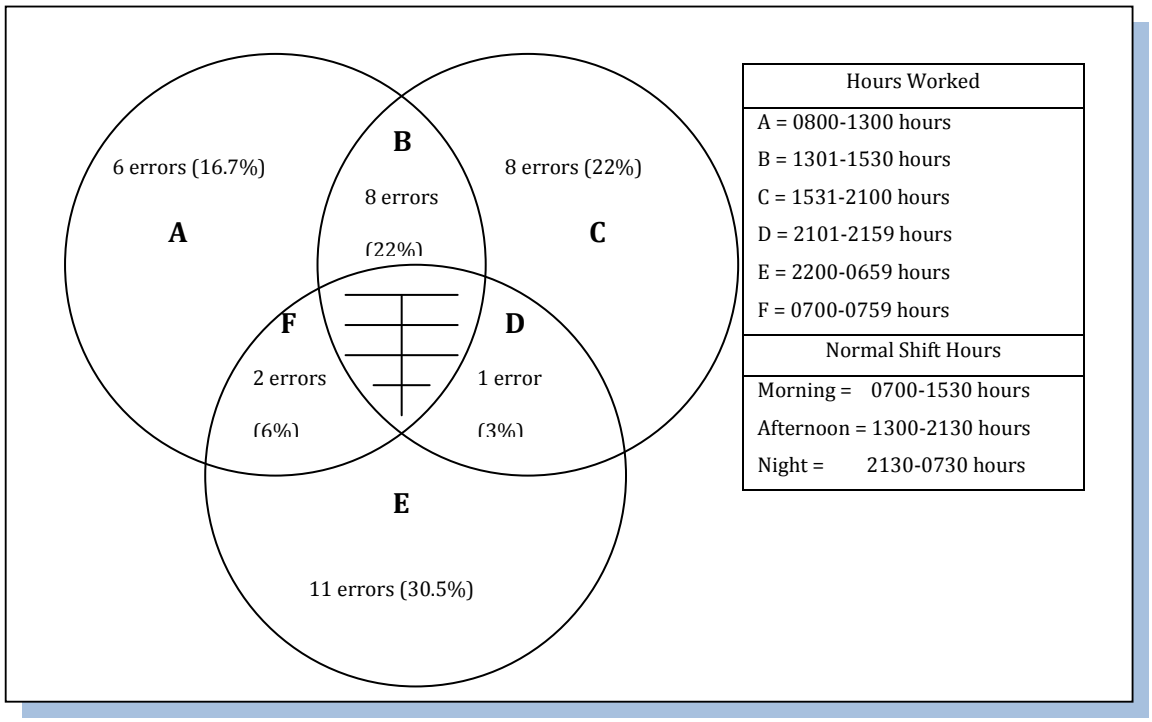
As omission errors were the highest category of incident reported, it was thought reasonable to apply the same criteria for nursing shift changes to assess when most of the omissions were reported to have occurred. It was noted that one report that involved an omission did not record the time of the incident and was such excluded from this part of the review.

The review indicated (Table 3.7) that it was during the night shift (Period E) that the highest numbers for omission errors were reported with almost a third (30.6%) of all omissions reported then. The periods B (22.2%) and C (22.2%) were equivalent and represented the next highest reporting times (i.e. when changing from morning to afternoon shift and during the afternoon shift).

Table 3.7 Omission medication incidents by time occurred

Period Code	Time Period Incident Recorded as Occurred (hours)	Number of Incidents N = 36	Frequency of occurrence (%)
A	0800 - 1300 hours	6	16.7
B	1301 - 1530 hours	8	22.2
C	1531 - 2100 hours	8	22.2
D	2101 - 2159 hours	1	2.8
E	2200 - 0659 hours	11	30.6
F	0700 – 0759 hours	2	5.6
	Total	36	100

Figure 3.4 Times of Omission Medication Incidents



3.1.4 DISCUSSION

The reviewing of medication incidents by date of incident rather than by date of review as before, provided a more accurate and consistent method of assessing the data. This approach would now allow accurate comparisons of the data from one month to the next and from one year to the next. This more consistent approach would allow for benchmarking to be undertaken with other hospitals in the SJOGHC Group, as well as other suitable peer group hospitals in the future.

The differentiation of these medication incidents into the sub-categories of prescribing, dispensing and administration errors further clarified the origin and type of error that was being reported. Administration errors were the predominant form of error reported which reflected the fact that the medication administration process is a direct nursing responsibility and medication incident reports were primarily completed by nursing staff. A number of studies have studied administration error rates in Australian hospitals using different supply systems. Where administration was based on a _ward stock or imprest' system (bulk ward stock supplied by pharmacy staff but measured and dispensed by nursing staff) administration error rates ranged from 15 to 20%.[21,22] When individual patient supply was used (pharmacy prepared measured individual doses) the error rate was reduced to 5-8%.[22]

Medication errors of omission were the most frequent administration errors reported at SJOGHS. This fact is supported in a review of studies carried out which concluded that errors of omission and under use made up as much as one third of the total medication incidents reported.[23] While omissions were the largest category of administration errors they were noted to occur either at the busiest times of the day for the ward e.g. in the morning or when nursing staff numbers were at their lowest e.g. during night duty. A recent UK National Patient Safety Agency Rapid Response Report[24] highlighted that although omissions and delays in therapy may not seem serious, they were for some critical medicines and conditions including patients with sepsis or pulmonary embolism. The report detailed 27 deaths and 68 cases of severe harm from omission of these medications between 2006 and 2009.[24] These errors could be avoided by developing a list of high risk medications and guidelines to follow when a medicine is omitted or delayed. The report also suggested continued medication incident review as well as an annual audit of omissions of critical

medications be undertaken.[24] This latter strategy has become an annual feature of SJOGHC. The audit is carried out in all hospitals within the group over the same time period and provides a valuable insight to our medication administration practice. Another local initiative has been trialled on a ward in SJOGHS where the nurse administering medications wears a distinctive bib asking for _no interruptions' while that nurse undertakes the administration process. To date initial results indicate that it has been a success in reducing the number of omitted and delayed medications.

3.1.4.1 REPORTING ERROR RATES

The number of medication incidents reported was still felt to be grossly under reported at SJOGHS, although what the actual true reporting rate would be, may be impossible to determine. The ISMP[25] infer that the collection of error rates as an indicator of patient safety within an institution is debatable. They contend that the true incidence of error reporting is dependent on having a clear reproducible definition of what an incident is, as well as the manner with which errors are identified and the efforts made to report them.[25] A high error rate could be suggestive of an unsafe practice environment or it could reflect an organisational culture which encourages error reporting. Conversely, low error rates may be suggestive of a successful medication safety programme or initiative or may be the result of a punitive, blaming culture which discourages people to report errors.[25] Low error rates can lead to a false sense of security and an acceptance of preventable errors such as omissions.[25]

To avoid underreporting and improve medication incident reporting, education was needed as to what should be reported, the process must be simple and feedback must be given to reporters of all professions.[26]

Michael Cohen, co-founder of and president of ISMP (USA), stated that analysing the causes of medication incidents and implementing changes to address them, as well as measuring outcomes from those changes was a more effective way to gauge the success of error prevention strategies.[25]

3.1.5 CONCLUSION

The review of medication incident reporting in 2001 -2002 has given some indication of the type of problems faced by the hospital in creating a medication safe culture. A number of challenges are still outstanding and will be need to be addressed to ensure the number of administration error are reduced and in particular the number of omitted or delayed medications. This latter group of errors long thought to be relatively harmless, now require further work to ensure critical medicines and critical conditions are identified earlier to avoid harm to patients. The perceived problems of under reporting or excess reports need to have a balanced interpretation, given an organisation requires a culture of reporting with no blame attached to learn from the reported incidents. There is still a need for the development and implementation of a risk stratification tool, a measurement of harm (both actual and potential) associated with each incident and the provision of appropriate resourcing for the management and assessment of these incidents by the Pharmacy Department and the hospital at large. In addition further effort is required to capture more accurately the number of pharmacy dispensing errors and medical prescribing errors.

3.2 DISPENSING ERROR REVIEW 2001-2002

3.2.1 BACKGROUND

In house reporting of pharmacy dispensing errors has been part of the Pharmacy Department‘s practice at SJOGHS since 1995. The errors were reported in a ledger set aside for the purpose and the account and accuracy of the detail of the error relied on the reporter. The prompt for a report usually came from a third party, usually a nurse or clinical pharmacist, or more rarely the discharged patient who discovered the error at home. Reports initiated from a medical practitioner were extremely rare and occurred only when a patient reported a suspicious event to them and the information was then passed onto pharmacy.

Errors were not classified by type and were recorded using very generic descriptors. These included: date of incident, patient identifier, description of error, reported by, action taken, pharmacist involved aware and recorders name. There was no linkage of this system of recording by the Pharmacy Department with the accident and incident forms in use at the time in the hospital and later the electronic system of

reporting. Pharmacy dispensing errors would only get into the accident and incident reports if a ward nurse, on discovering an error, decided to complete a form as well as report the error to the Pharmacy Department

The SJOGHC subcategory classifications for dispensing errors were a similar but shorter version of the classifications for administration errors prepared for ward use. These codes were developed in isolation and without consultation with the Pharmacy Department at SJOGHS. The intent of this section of the research project was to take the new dispensing error classification codes and apply them to the reports of dispensing errors received by the department. This would enable more consistent reports to be produced with a defined classification or error type, which it was hoped would lead to easier recognition and subsequent avoidance or reduction of that type of error. This strategy would also allow the Pharmacy Department to produce more consistent reports and allow some bench-marking to take place with other hospitals in the future.

3.2.2 METHODOLOGY

3.2.2.1 REVIEW OF SJOGHC NATIONAL DISPENSING ERROR SUBCATEGORIES

The reported pharmacy dispensing errors for financial year 2001 to 2002 were chosen for review as they covered the same period used for the medication errors already studied earlier. An attempt was made to apply the SJOGHC nationally derived codes to the errors described in the dispensary error ledger for that period. All medication errors were designated the letter M, with administration errors as M1, dispensing errors M2 and prescribing errors M3. Sub-categories existed for each major category and were each designated an extra number, e.g. dispensing error wrong medication was M2.1 (Table 3.8).

Table 3.8 Pharmacy dispensing error categories developed by SJOGHC

Dispensing error category	Description of dispensing error categories
M2.1	Wrong medication
M2.2	Wrong frequency
M2.3	Wrong time
M2.4	Wrong route
M2.5	Wrong patient
M2.6	Incorrect labelling
M2.7	Expired medication
M2.8	Omission
M2.9	Wrong dose
M2.10	Damaged product
M2.11	Theft or loss
M2.12	DDA discrepancy
M2.13	Previous drug reaction dispensed

On closer examination the categories or codes as presented were not appropriate or practical to the range of errors that could occur in a large private hospital pharmacy department and in particular for use in the inpatient Dispensary. These inadequacies included the following:

1. The specific dispensing error subcategory was unlikely to occur and so the classification was irrelevant or needed further clarification to make it relevant, e.g. M2.3 _wrong time‘ or M2.8 _omission‘ which was clarified to become _not supplied when ordered‘.

2. The subcategory was not specific enough and allowed for an error to be classified under a number of subheadings which would then be open to the interpretation of the reporter, e.g. M2.6 _incorrect labelling‘ was felt to be too broad and did not offer sufficient information on the type of labelling error that had occurred. This was later clarified to mean wrong drug name, strength or form stated on the label. Another example was M2.9 _wrong dose‘ which could be used to describe an incorrect strength of medication being dispensed causing the wrong dose to be administered, or the dose was incorrectly stated on the label i.e. 1 tablet instead of 2 tablets.

3. No subcategory existed to accurately reflect a type of error that had occurred, e.g. M2.1 _wrong medication" was changed to M2.1.1 and M2.1.2 to demonstrate whether the medication was chosen incorrectly and the label was wrong or the label was correct in the interpretation of the prescription but the medication was incorrect due to a choosing error.

These anomalies were due in the main to the fact that the sub-categories selected were created from the administration error sub-categories with no consultation with the Pharmacy Department prior to their introduction nationally to all St John of God hospitals. As a consequence, it became apparent that some newer more specific codes were required to cover all the types of errors that could occur during the dispensing process.

Some additional error codes were developed as part of this review process and they included the inclusion of new codes for _wrong form' and _wrong strength' which were not adequately covered by the existing codes. Similarly, codes which had to differentiate between interpretation of a prescription or computer data entry errors from errors in choosing of a medication, were not well accommodated. An example of this was where a label was created correctly but the error occurred subsequently in the choosing of the product or alternatively where the label was incorrect but the choice of medication could be correct or incorrect.

To accommodate this deficiency five new codes were introduced whilst some of the codes such as code M2.6 _incorrect labelling' was clarified to reflect any other labelling errors not already catered for in the existing or newly developed codes. These extra codes are designated as —new" in the Table 3.9.

3.2.3 Results

3.2.3.1 Dispensing Error Types and subcategories 2001-2002

In total 95 dispensing errors had been reported through the dispensary ledger system (Table 3.9). These errors can be further categorized into the time in the dispensing process they occurred, i.e. errors of interpretation of the prescription and/or data entry into the computer to generate a label (designated with a #) or a choosing of medication error (designated with a *). It should be noted that some errors met more than one category as specified above.

The results indicate (Table 3.9) that the two most frequent errors reported were sub-categories M2.5 _wrong patient‘ (25.3%) and M2.14.2 _wrong strength of medication/correct label‘ (24.2%). Wrong patient (M2.5) was interpreted to mean where the wrong patient‘s name appeared on the label. This type of error usually occurred as a result of the computer screen not being cleared from the previous patient before commencing dispensing or where the wrong patient identifier was entered and the outcome was not checked appropriately against the medication chart order. This can be a result of fatigue, haste or interruption to the normal dispensing and checking processes.

Wrong strength chosen/correct label (M2.14.2) was a choosing error usually as a consequence of pharmaceutical manufacturers packaging not distinguishing between different strengths very well, i.e. look alike or sound alike names. This is a growing phenomenon as a result of companies wanting to achieve a _brand‘ image for all their products. In this new sub-category the labels were correctly interpreted from the medication order and the error occurred subsequent to this, during the choosing of the item from the shelf.

In the case of wrong strength chosen/incorrect label (M2.14.1) the wrong medication strength was chosen but the prescription was interpreted incorrectly as well. This may be due to two factors, one where the prescription was misinterpreted due to poor product knowledge or a poorly legible prescription, or secondly where the item is chosen incorrectly first and the incorrect item influences the data entry for label generation.

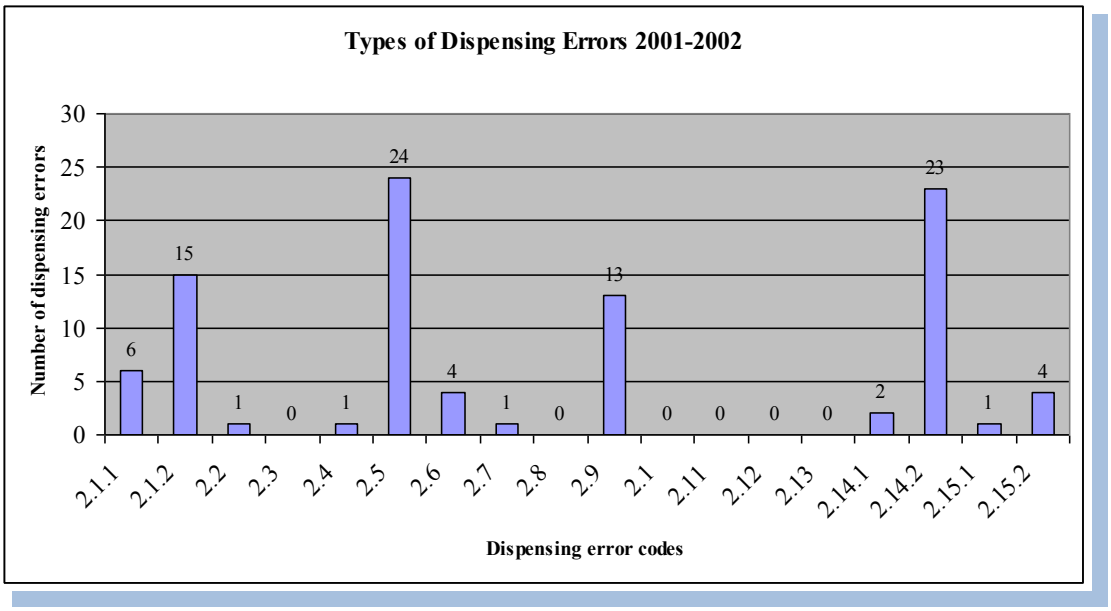
Table 3.9 New and existing medication dispensing error subcategories

Dispensing error codes	Description of various subcategories	Number of errors (n = 95)	Frequency of occurrence %
M2.1.1	Wrong medication and incorrect label * #	6	**6.3**
M2.1.2 (new)	Wrong medication/correct label *	15	**15.8**
M2.2	Wrong frequency #	1	**1.1**
M2.3	Wrong time #	0	**0**
M2.4	Wrong route #	1	**1.1**
M2.5	Wrong patient #	24	**25.3**
M2.6	Incorrect labelling i.e. wrong drug name, strength or form stated on label #	4	**4.2**
M2.7	Expired medication *	1	**1.1**
M2.8	Omission (not supplied when ordered)	0	**0**
M2.9	Wrong dose #	13	**13.7**
M2.10	Damaged product *	0	**0**
M2.11	Theft or loss	0	**0**
M2.12	S8 discrepancy	0	**0**
M2.13	Previous drug reaction dispensed	0	**0**
M2.14.1 (new)	Wrong strength of medication/incorrect label * #	2	**2.1**
M2.14.2 (new)	Wrong strength of medication/correct label *	23	**24.2**
M2.15.1 (new)	Wrong form of medication and incorrect label * #	1	**1.1**
M2.15.2 (new)	Wrong form of medication/correct label *	4	**4.2**
Total 2001-02	Number of dispensing errors recorded	**95**	**100**
Total 2001-02	Number of prescription/items dispensed	**114,621**	
	Dispensing error rate/ prescriptions dispensed	**.000828**	

Note these errors all involve an error in labelling

* Note these errors all involve where the wrong item is chosen

Figure 3.5 Types of dispensing errors including 'new' codes



3.2.3.2 DISPENSING ERROR REPORTS PER QUARTER

Dispensing error reports were greatest in the first and third quarters of the financial year, (Table 3.10). This is despite the fact that the third quarter (January to March) is usually a quieter time of the year for the hospital with many beds closed and staff on leave over the Christmas/New Year period and often into late January. On the other hand, given that wards are closed during this period, staff who are working are often assigned to wards they are not as familiar with. Similarly the mix of patients that staff are caring for on a particular ward are often quite different to the usual patient cohort seen on that ward due to bed access pressure. These two environmental issues would increase the potential for error and possibly explain the increased rate of reporting in the third quarter.

Table 3.10 Frequency of dispensing errors reported per quarter 2001 -2002

Quarter period	Number of dispensing errors reported (n)	Frequency of occurrence (%)
July to Sept 2001	30	31.6
Oct to Dec 2001	21	22.1
Jan to March 2002	28	29.5
April to June 2002	16	16.8
Total	**95**	**100**

3.2.3.3 Dispensing Error Indicator Rate

The number of reported dispensing errors reported to and by the Pharmacy Department staff was documented as 95. Internal dispensing records indicated that 114,621 prescription items were dispensed during the same financial period (Table 3.9). This equates to an error rate of 0.000828 errors per prescription items dispensed through the Pharmacy Department in 2001-2002, or one dispensing error reported per 1206.5 prescription items dispensed.

Although the number of prescriptions dispensed is a very precise denominator to determine workload in the pharmacy, it may be more applicable to use another hospital wide denominator to allow comparison with other performance indicators. For example the total number of discharges or separations during this financial year for SJOGHS was 23,119 (Table 3.11).

Table 3.11 Inpatient discharges/separations 2001-2002

Discharge/Separation categories	Number of separations (N)
General	18761
Maternity	3469
Newborns	889
Total Discharge/Separations	**23119**

This equates to 0.0041 pharmacy dispensing errors per discharge or separation or one dispensing error reported for every 243.4 patient discharges or separations.

3.2.3.4 Inclusion of Medication Incident Reports of Dispensing Errors

Although it was felt the total of 95 reports accurately reflected all the reported errors to the department it may not have accounted for all errors that had occurred. It was possible that some errors may have slipped through unnoticed by the end users, nursing staff or patients on discharge. This fact could only be determined in a prospective study where all dispensed items are checked for errors prior to leaving the department by a third party over a set period of time and the results extrapolated for a year.

On the other hand it is worth noting that the nine pharmacy dispensing incidents recorded in the medication incident data already reported on, were all identifiable in this pharmacy dispensing error cohort as well. Therefore the Pharmacy Department was informed of a dispensing error and an incident form was completed on approximately 10% of occasions (9/95). An incident form is more likely to be filled out by nursing staff when the error has left the Pharmacy Department and has reached the patient on the ward or department. The fact that all nine dispensing errors reported on the hospital system and discovered on the ward, were subsequently identified in the pharmacy dispensing error report, reflects the accuracy of that report and that the values quoted for dispensing errors in the hospital accident and incident system reflect underreporting.

3.2.4 Discussion

3.2.4.1 Some Identified Causes of Dispensing Errors

Following this review it was felt useful to try and determine why dispensing errors occurred at SJOGHS. It would appear that from a review of the sub-categories of dispensing errors that they fit the following general categories:

- an error in labelling
- an error in choosing a medication
- or a combination of both

In early 2003 a number of potential causes for dispensing errors were determined during a group review with dispensary staff. An error in labelling was deemed to be multifactorial. They could be due to misinterpretation of part of the medication order. This could be caused by many factors that included legibility, lack of product knowledge, interruptions, and pressure to complete prescriptions owing to the volume of work or demands of the patient or nursing staff to receive the medication. Other potential causes mentioned included key stroke entry, wrong or rushed selection on the computer, or the inadvertent non-clearance of the computer screen from a previous entry.

An error in choosing the medication could be due to a misinterpretation of the order (due to legibility issues or look alike sound alike names) and/or a selection error (due to similar packaging). The issue of look-alike sound alike names was deemed to

require attention by the pharmaceutical industry and the Therapeutic Goods Administration in the future.

3.2.4.2 DISPENSING PROCESS AND ERROR POTENTIAL.

Peterson stated[27] in an Australian survey that the dispensing process was a core activity of the pharmacist which allowed safe and efficient provision of medications some of which could be dangerous. The process was composed of a sequence of checks and steps, often as much as 20-30,[28] which if interrupted or broken could lead to poor quality outcomes for the patient and undesirable consequences for the pharmacist.[27] Dispensing errors are errors in the dispensing process by a pharmacist that are undetected and corrected prior to the patient leaving the pharmacy[27] or are a discrepancy with a written prescription order and the following of that order.[29] They usually form part of the reportable medication errors in a hospital.[28]

Ongoing review of this system is necessary to minimise any harm to the patient and any loss of credibility of the pharmacist from a dispensing error.

The use of individual patient dispensing from an original order will reduce the frequency of error as compared to non-individual dispensing.[28] This however is complicated further by the system in use, for example carbonated copies that are unclear, use of photocopy or faxed prescriptions, and large prescription volumes for different patients sent in advance of need.[28].

3.2.4.3 FREQUENCY OF DISPENSING ERRORS

A 1996 USA study stated 5% of filled prescriptions contained some type of dispensing error[30] and another study in a hospital based outpatient pharmacy[31] revealed 12.5% with errors, of which 1.6% were considered potentially serious.

An Australian survey of pharmacists[27] revealed that although pharmacists were concerned about dispensing errors and that they may be increasing, they were unsure what the error rate was and considered the dispensing errors that do occur to be part of their practice.

Dispensing error rates in UK hospitals have been reported as between 16-18 per 100,000 dispensed items.[32,33]

The SJOGHS dispensing error rate in 2001 – 2002 was quoted earlier (Table 3.9) and was noted to be higher at 82.8 errors per 100,000 dispensed items.

3.2.4.4 CONTRIBUTING FACTORS TO DISPENSING ERRORS

The primary contributing factors noted by pharmacists in studies that contribute to dispensing errors were:

- High prescription volumes[27]
- Pharmacist fatigue[27]
- Pharmacist overwork[27]
- Interruption to dispensing[27,34]
- Similar or confusing medication names[27]
- Communication errors[29]
- Drug labelling and packaging[29]
- Work environment and conditions- light, space, flow[29]
- Work overload[29]
- Distractions and interruptions[29]
- Out-dated sources of information[29]
- Poor patient counselling – errors often picked up during counselling[29]
- Low work volume[34] -lack of concentration

3.2.4.5 FACTORS TO REDUCE DISPENSING ERRORS

The following factors have been reported to assist in reducing dispensing errors:

- Having mechanisms for checking dispensing procedures[27]
- Systematic dispensing workflow[27]
- Checking the original prescription[27]
- Improve the packaging and labelling of products[27]
- Distinctive medication names[27]
- Counselling patient at time of supply[27]
- Up to date medication knowledge[27]

- Avoiding interruptions[27,34,35]
- Reducing workloads[27,34]
- Improving doctors handwriting[27]
- Privacy to allow counselling of patient[27]
- Unit dose dispensing[28] reduced errors by 57%
- Patient Individualised labelled dispensing[28]

3.2.4.5.1 PHARMACIST DISPENSING WORKLOAD

As workload for a pharmacist in a dispensary has been identified as a contributor to dispensing errors, having a targeted workload rate would then be a useful indicator or alert. A review of the literature indicates that there exists a lack of any available consensus.

An Australian study suggested that 17 items per hour was the safest maximum number of prescriptions to be dispensed by a pharmacist during a 9 hour day.[27]

The Australian Pharmacy Board suggest a rate of 12-15 items per pharmacist per hour while a UK hospital benchmarking group suggest 13 items per pharmacist per hour.[34]

The Welsh national average for hospital dispensary activity was reported as 9.9 items per pharmacist per hour (95% CI = 0.9, n = 17).[34]

Another approach was a USA risk analysis model that reported using a geometric probability distribution that enabled an assessment of dispensing error risk to be made as a function of a pharmacy‘s accuracy rate and the number of prescriptions a pharmacy staff member should dispense in a work shift.[36]

3.2.4.5.2 PHONE INTERRUPTIONS

It is common in dispensaries in hospitals for them to be areas which are busy, noisy and with high stress levels placed on staff.[35] It is not uncommon to be dispensing a prescription, attempt to answer a telephone and deal with a caregiver or patient at the dispensary window.[35] This increased stress on dispensing staff may increase the risk of a dispensing error. Changing the work environment and reducing stress levels were reported to be positive moves by hospital pharmacy staff.[35] Some examples

included the employment of pharmacy receptionists or the use of a dedicated _phone help desk' for callers were reported as good ways to alleviate interruptions and stress situations.[35]

3.2.4.5.3 USE OF TECHNOLOGY TO ACHIEVE SAFER SYSTEMS

The results of an American Society of Hospital Pharmacists survey of over 1000 hospitals to gauge their practice pertaining to the dispensing and administration of medications, indicated some interesting practice developments to improve dispensing accuracy and reduce error.[37] In this survey, a growth in decentralized drug distribution models was noted; automated dispensing cabinets were used in 72% of hospitals and robots by 15%. Increases were noted in unit dose dispensing, two pharmacist checking for high risk medications, while hand written medication administration records (akin to a medication chart) declined substantially.[37] Bar-code technology was implemented by 9.4% of hospitals, smart infusion pumps by 32%.[37] Thirty per cent of hospitals surveyed provided around the clock services and 12% used off site medication order review after hours.[37]

In some states of Australia e.g. Victoria, scanners have been mandated for use in the dispensing process. Dispensing selection errors in Australia account for approximately 50% of all cases brought to the attention of the Pharmaceutical Defence Limited, professional indemnity insurers for pharmacists.[38] The use of scanners has been reported to cause a significant reduction in the number of reported incidents involving wrong selection when done in conjunction with patient counselling and ensuring pharmacist workload is not excessive.[38]

A recent article by Poon et al, highlighted the value of bar-coding technology in a hospital setting.[39] In a hospital, almost one third of serious medication errors occurs at the ordering stage of the medication cycle, one third at administration, and another third during transcription and dispensing processes.[8] Other information technology such as computerised physician order entry has been shown to reduce serious medication errors by 55%.[39]

Bar-code verification has been shown to prevent dispensing errors in the pharmacy[38,40] and is considered a promising strategy by USA Veterans Affairs hospitals. It may be used at the bedside to verify a patient's identity and match it to

the administered medication.[41] This is usually implemented in conjunction with an electronic medication administration system, which Poon et al reported reduced significantly the number of administration errors in that institution.[39]

3.2.5 CONCLUSION

The pharmacy dispensing errors were collected by pharmacists based on reports from nurses, pharmacists or patients. The process was independent of the hospital's medication incident process except in approximately 10% of cases where an incident form was completed as well. The development of sub-categories to classify and describe the types of dispensing errors that had occurred was felt to be a major step forward. The complexity of the process has been highlighted with the need for the development of newer sub-categories to reflect all the errors possible and to highlight in what part of the process the error was made. This is reflected in particular in the need for categories to capture whether the label was prepared correctly and the wrong item was chosen or whether the label was incorrect and the medication was chosen correctly or not.

The reporting of all dispensing errors noted (medication incident forms and dispensary error book), excluding any duplication and their reporting through the hospital's central system would provide a more accurate figure for the hospital on the number of medication dispensing errors that occur on an annual basis. A more robust and accurate process will allow the hospital to benchmark their error rates with other peer group hospitals. It will be essential that the hospital system is sensitive to the type of information needed to report a dispensing error and have an appropriate and meaningful classification system in place.

Pharmacy dispensing errors were reported accurately at SJOGHS during this period, but the hospital's centralised medication incident reporting system only recorded 10% of the actual dispensing errors that had occurred. The remaining dispensing errors were noted and siloed only in the Pharmacy Department. The total dispensing error rate at SJOGHS was noted to be higher than published studies (88 vs 16-18 errors per 100,000 items dispensed) but would have been less if the centralised reporting rate (8 per 100,000 items dispensed) was the one used for comparison.[32,33]

This is an important clarification that has to be considered by hospital authorities when assessing error rates sources to ensure they have the complete picture.

Secondly the dispensing error process needs to focus more on why dispensing errors occurred and to ask staff to assign contributing factors to all reported errors. Understanding the _why' an error occurred will assist in introducing steps to reduce our exposure to that error category. Finally it is important that some sort of _harm' measurement is introduced to assess the risk that the hospital has been exposed to. Although most dispensing process failures do not harm patients[28] they are indicative of a fragile process and an increased risk of a more serious event. They are also considered commonplace, but despite this, they can reach significant levels and are an indicator of a breach in the safe supply of medications to the patient,

3.3 PHARMACIST INTERVENTIONS 2001-2002

3.3.1 BACKGROUND

Ward based Clinical Pharmacists have provided a clinical pharmacy service to all inpatients, medical practitioners and nursing staff at SJOGHS since 1997. Their role as medication managers assists in ensuring appropriate prescribing, dispensing and administration of medications to all patients during their stay. Allied to this, clinical pharmacists are involved in a variety of diverse roles which included the supply of medication, cost minimisation of treatment, Poisons Act compliance, and education for nursing, medical and pharmacy staff. The service is provided Monday to Friday during business hours only (0800 hours to 1630 hours). The role and cost benefit of employing clinical pharmacists in improving medication safety has been well documented.[42,43] They are required to record their activities as a workload measure as well as demonstrating clinical benefit and improved patient safety by recording the types and outcomes of their interventions in medication management matters on behalf of the patient and their employer.

3.3.2 METHOD

3.3.2.1 CLINICAL PHARMACIST ACTIVITY RECORDING

Clinical pharmacists recorded their activities using a Clinical Services Documentation Form (Appendix 9) developed in house by the Pharmacy Department at SJOGHS. This form divided their involvement into two distinct categories:

- Clinical Services
- Pharmacist Intervention Details

The details of these activities were then added by the pharmacists into an Access™ database, created for the Pharmacy Department, from which reports could be provided as required.

3.3.2.1.1 CLINICAL SERVICES

Clinical Services recorded the number and type of activities that were carried out on a ward and included the core clinical functions of the clinical pharmacists:

- Medication chart review
- Counselling
- Information provision to patients or carers
- Intervention numbers
- Pharmaceutical Benefits Scheme Authority requests, Pension or Concession Number clarifications
- Adverse drug reactions investigated.

Clinical services activity did not include any medication supply services provided, Schedule 8 medications delivered or any cost minimisation negotiations carried out directly with Health Funds or Pharmaceutical Companies on behalf of patients.

3.3.2.1.2 INTERVENTION DETAILS:

An Intervention was defined by the Society of Hospital Pharmacists of Australia (SHPA) as ~~"a~~ny change made to therapy by the Clinical Pharmacist"[42] during their visits to the wards. The interventions reflected changes to therapy made as a result of prescriber error, e.g. omission and transcription errors or suggested changes by the clinical pharmacist following pharmaceutical review to aid administration or improve

therapy, e.g. change of form from intravenous to oral with a suitable dose, or suggesting an appropriate choice of medication for the patient‘s current condition.

Intervention details were recorded based on the criteria listed below and where possible codes were used to assist in recording those details. The criteria covered the following:

- Medication involved
- Reason for the intervention
- Type of intervention made
- Outcome/Benefit
- Brief description

Codes were developed in house and in consultation with other local practitioners in Western Australian public sector hospitals. The codes were of two types, those that were used to depict the _reason why‘ the intervention was carried out and codes that described the _type of intervention‘ carried out.

3.3.2.1.3 PHARMACY INTERVENTION DATABASE REVIEW

Following review of the database of clinical pharmacist activities for the period July 2001 to June 2002, it became apparent that the dataset had a number of shortcomings. It appeared that gaps in the recording of the detail existed and that in fact individual clinical pharmacists had not entered the data as expected. During this period there was also a lack of secretarial assistance available to help enter the handwritten clinical services and intervention data onto the Access™ database. This double handling of data from paper based collection to data entry into an electronic database, was a perceived weaknesses of this approach.

For the cohort July 2001 to June 2002 the figures for all clinical services were entered for the twelve months including the number of Pharmacist Interventions. Unfortunately only five months detailed data on the Pharmacist Interventions conducted were entered covering the period February 2002 to June 2002 inclusive. Given the time elapsed from collection of data to its review, staff turnover prevented the recovery of the missing information.

The clinical services data available was further reduced to include only the pertinent data for this study. As such only two points collected under clinical services were collated in full and they were the number of Medication Chart Reviews (MCRs) conducted and the number of Pharmacist Interventions carried out. The data for the MCRs by the clinical pharmacists was seen as an essential core activity of the pharmaceutical review processes whilst the number of Pharmacist Interventions was an outcome measure of the value of the service.

It is likely that there was still a degree of under reporting as individuals, without clerical support, put off entering the data which eventually could get mislaid or the volume became so large a burden that it was never completed. A solution tailored to providing live reporting of interventions and workload statistics at the time of completion at the bedside was required.

3.3.3 Results

3.3.3.1 Intervention Rate per Medication Chart Review (MCR) completed

As the MCR process is the primary component of the activity of the clinical pharmacist and is the source of information for assessment and intervention if required, it is reasonable to portray the available Pharmacist Intervention results as a proportion of MCRs (Table 3.12). This resulted in an average intervention rate of 0.043 interventions per MCR or one pharmacy intervention per approximately every twenty three MCRs.

Table 3.12 Medication chart review vs pharmacist interventions July 2001 to June 2002

Month	Number of MCRs conducted	Number of pharmacist interventions	Ratio of intervention rate to MCR's
Jul-01	2537	127	0.050
Aug-01	1841	76	0.041
Sep-01	2613	132	0.051
Oct-01	1286	38	0.030
Nov-01	737	34	0.046
Dec-01	1235	21	0.017
Jan-02	1473	38	0.026
Feb-02	1824	49	0.027
Mar-02	1030	37	0.036
Apr-02	884	78	0.088
May-02	995	71	0.071
Jun-02	1064	47	0.044
Total	**17519**	**748**	**0.043**

3.3.3.2 REASON FOR INTERVENTION BY THE CLINICAL PHARMACIST:

The Pharmacist Intervention recording sheet used a range of different codes to reduce the amount of writing and shorten the time that the clinical pharmacist required to accurately record their activities (Table 3.13). The secondary advantage of the codes used was that it allowed the measurement of different types of interventions and acted as a classification system.

Table 3.13 Description of codes used for the reason for pharmacist intervention

Code	Code description for reason for intervention
6.1	Drug has a documented ADR
6.2	Drug given > 72 hours without serum levels taken
AH	Admission history
ADV	Adverse effects from drug
AF	Administration facilitation
CON	Contraindicated drug
D	Dose frequency/time incorrect
DC	Discharge counselling
HOS	Hospital policy/protocol
INT	Drug interaction
PC	Prescribing clarification (significant)
PR	Pathology results
TDM	Therapeutic drug monitoring
TR	Therapeutic reason
O	Other

As stated earlier, the dataset with the details of the Pharmacist Interventions was found to be incomplete and was only available for the period February 2002 to June 2002 inclusive. During this period 282 Interventions were recorded in full and available for review.

The most frequent reasons stated for intervention (Table 3.14) by the clinical pharmacist were for Therapeutic Reasons (TR) (28%) followed by Therapeutic Drug Monitoring (TDM) (14.9%) and Prescribing Clarifications (PC) (14.2%) with Dose/Frequency/Time incorrect (D) next at 10.3%. Prescribing errors could be associated with approximately 60% (9/15) of the intervention reason codes. They included the following Clinical Indicators 6.1 and 6.2, AH, CON, D, HOS, INT, PC and TR whilst the remainder (40%) of intervention codes reflected interventions to improve a patient‘s benefit from their therapy.

In this dataset, 67.7% of interventions recorded were linked with possible prescriber error with the balance 32.3% linked with improving a patient's benefit from their prescribed therapy. All interventions improved the level and quality of pharmaceutical care for the patient and acted as a second check for a busy prescriber.

Table 3.14 Reason for pharmacist intervention February 2002 to June 2002

Reason code for pharmacist intervention	Number of interventions (n)	Frequency of occurrence (%)
6.1	5	1.8
6.2	3	1
ADV	17	6
AF	18	6.4
AH	19	6.7
CON	1	0.4
D	29	10.3
HOS	6	2.1
INT	9	3.2
O	9	3.2
PC	40	14.2
PR	5	1.8
TDM	42	14.9
TR	79	28
Total	**282**	**100**

3.3.3.3 TYPE OF INTERVENTION MADE BY THE CLINICAL PHARMACIST

Table 3.15 documents the codes used to describe the different types of interventions carried out by the clinical pharmacists.

Table 3.15 Description of codes used to identify type of intervention made

Code	Code description for type of intervention performed
A	Addition of drug
C	Cessation of drug
D	Dose change
O	Other
P	Pathology test
R	Route of administration change
S	Substitution of drug
T	Time of administration change (not frequency)

The results (Table 3.16) indicate that the most frequent type of intervention was a dosage change (36.2%) followed by cessation of a medication (18.1%) and Other (18.8%). The Other code was used when the type of intervention did not fit one of the already described codes.

Table 3.16 Types of pharmacist interventions February 2002 to June 2002

Type Code for pharmacist intervention	Number of interventions n	Frequency of occurrence %
A	32	11.3
C	51	18.1
D	102	36.2
O	53	18.8
P	7	2.5
R	5	1.8
S	24	8.5
T	8	2.8
Total	**282**	**100**

Table 3.17 Breakdown of pharmacist interventions by type and reason

Intervention Reason / Type	A	C	D	O	P	R	S	T	Reasons (n)	Frequency of occurrence %
6.1		3		1			1		5	1.7
6.2			1	2					3	1
ADV	1	6	3	3	1		3		17	6
AF	0	2	1	10		2	2	1	18	6.4
AH	5		10	2			1	1	19	6.7
CON		1							1	0.4
D			24	1		1	1	2	29	10.3
HOS	1	2		2			1		6	2.1
INT		6					2	1	9	3.2
O	2		2	5					9	3.2
PC	2	5	17	13	1	1	1		40	14.2
PR		1	1	1			2		5	1.8
TDM	1	1	27	6	5			2	42	14.9
TR	20	24	16	7		1	10	1	79	28
Types (n)	32	51	102	53	7	5	24	8	282	100
Frequency of occurrence %	**11.3**	**18.1**	**36.1**	**18.8**	**2.5**	**1.8**	**8.5**	**2.8**	**282**	**100**

The most frequent reason for intervention (Table 3.17) was therapeutic drug monitoring (TDM, 14.9%) followed by prescribing clarification (PC, 14.2%) and dose (D, 10.3%). This is not surprising given the primary role of the clinical pharmacist is the pharmaceutical review of a prescribed order and to assess the clarity of the orders and the appropriateness of the doses prescribed for a particular patient based on reference to evidence based guidelines or by measuring outcomes of the effect of the previous dose. Reviewing the most common type of intervention i.e. a dose change (Table 3.16) it becomes apparent that the most frequent reasons for that intervention are therapeutic drug monitoring (27/102), dose (24/102), prescribing clarification (17/102) and admission history (10/102). The addition of the admission history is interesting as a reason for intervention, as it highlights that when that

activity is performed accurately and a subsequent reconciliation of that admission medication history to the orders prescribed by the doctor is carried out, there is a great potential to reduce error and avoid harm to that patient. This concept is now known as _medication reconciliation'.

3.3.3.4 PHARMACIST INTERVENTIONS BY WARD/SPECIALTY:

On examination of the interventions by ward (Table 3.18) over the five month period it became apparent that the spread of intervention numbers was not uniform with some wards having many more interventions that others. Another observation was that some of the recorded interventions were picked not by the ward clinical pharmacists but by the dispensing pharmacists in the Dispensary. These latter interventions were recorded against the name of the ward with the letter –D" after it on entry to the database, to designate the origin of the intervention was the Dispensary.

Clinical pharmacists accounted for the majority (89.7%, 253/282) of interventions while the dispensing pharmacists accounted for 10.3% (29/282). That differential may have been larger as there was likely a degree of underreporting by the clinical pharmacists onto the database and it was known that some data was lost.

The high number of interventions (Table 3.18) from the General Surgery (22.3%), Neurology (22%), Obstetrics and Gynaecology (18.8%) and Orthopaedic (9.2%) areas was not surprising given the high number of patients admitted by the hospital to those specialties. The low intervention numbers for the Medical wards e.g. wards 41 and 62, was thought to reflect poor reporting and entry into the database and in addition much of the data from the Oncology Ward was lost from a Personal Digital Assistant (PDA) when its power source failed.

Table 3.18 Interventions by clinical and dispensing pharmacist by ward

Ward	Ward Speciality	Number of interventions by clinical pharmacists (n)	Number of interventions by dispensary pharmacists (n)	Frequency of occurrence %
41	Cardiology	3	4	2.5
42	ICU	26	2	10.1
43	Obs & Gynae Surgery	51	2	18.8
44	General Surgery	60	3	24.4
52	Orthopaedics	20	6	9.2
61	Neurology	60	2	22.0
62	Oncology	6	2	2.8
7th Floor	Plastics/Urology	18	8	9.2
Paediatrics	Paediatrics	6	0	2.1
DSU	Day Surgery Unit	2	0	0.7
Not stated	Unknown	1	0	0.4
Total of interventions (n)/N		**253/282**	**29/282**	**100**

3.3.3.5 PHARMACIST INTERVENTIONS BY MEDICATION INVOLVED:

The most frequent medication involved in the recorded interventions was gentamicin with 29 interventions from the total of 282. The most frequent reason for intervention was TDM accounting for 89.7% of gentamicin interventions (Table 3.19). The most common type of intervention initiated was a dose change (65.5%) with TDM as the most frequent reason for that intervention (17/19). This is predictable as gentamicin is a nephrotoxic and ototoxic medication with a recognised relationship between the dose administered, measured serum concentration, the length of treatment and the potential for toxicity.[44]

There were 19 interventions with the medication tramadol which was a new pain relieving medication on the Australian market at that time. Tramadol has multiple action sites as it has serotonin and noradrenaline uptake inhibitor properties along with opioid agonist activity. The majority (eight) of the reasons for intervention were

for therapeutic reasons and involved the ceasing, substitution or dose reduction of the medication as the type of intervention. Three of the interventions were for potential interactions with other medications that may have exacerbated the effects of the tramadol e.g. enhanced the serotonergic effects when co-administered with antidepressants such as selective serotonin receptor inhibitors, which could cause serotonin syndrome.

Table 3.19 Example of gentamicin interventions by reason and type from database

Gentamicin intervention Reason/Type	C	D	O	P	T	Reasons for interventions (n)	Frequency of occurrence %
6.2		1	1			2	6.9
TDM	1	17	3	3	2	26	89.7
TR		1				1	3.4
Types of interventions (n)	1	19	4	3	2	29	100
Frequency of occurrence %	3.4	65.5	13.8	10.3	6.9	29	100

Another intervention example was paracetamol which was ceased by the clinical pharmacist on seven occasions primarily due to a duplication of orders following a therapeutic review of the patient‘s pain management. On another occasion Painstop® which contains promethazine and paracetamol was prescribed as a four hourly regimen based on the paracetamol content only. This caused sedation in the patient due to the high promethazine content and the dose frequency was amended to be given six hourly which was more reflective of the dosage interval for promethazine, thus lowering the total daily dose and minimising the sedation side effect.

3.4 DISCUSSION

3.4.1 ROLE FOR CLINICAL PHARMACISTS

Evidence as to the value of clinical pharmacists has been mounting over the past decade and recognition of their roles in preventing medication adverse events has been publicised in major Australian reports and publications. The Second National Report on Patient Safety in 2002[4] stated that clinical pharmacy services were a key area known to improve medication safety. The Australian Pharmaceutical Advisory Council –Guiding principles to achieve continuity in medication management" published in 2005[45] outlined a way forward to improve the system of transference of medication information across all the different health care settings a patient moves through. Guiding principle 2 –responsibility for medication management" outlined the responsibilities of each profession in medication management and clearly articulated roles for clinical pharmacists beyond a supply function. These included medication review, supporting information for medicines, monitoring of response and the transfer of information (at admission and discharge). In particular Stowasser et al[46,47] reported two randomised controlled studies that outlined the benefit of medication liaison services to improve medication management continuity into the community and using clinical pharmacists in this role. These studies indicated this approach led to fewer problems with medicines, fewer visits to medical practitioners and lower readmission rates.[46,47]

The Western Australian Department of Health in March 2007, released its Pharmaceutical Review Policy (PRP).[48] This policy outlined that the role of Pharmaceutical Review was part of a robust clinical governance system to improve the quality processes around medication usage. The first of its five Standards highlighted that all inpatient medication charts were reviewed, ideally on a daily basis by a suitable credentialed professional such as a clinical pharmacist. Studies have shown that error in the prescribing or ordering stage of a medication in a hospital account for the majority of medication errors.[49,50] These included dose and frequency addition and adjustments owing to ambiguous, incomplete or inappropriate orders. These results mimic closely the types and reason for clinical pharmacist interventions noted in our cohort (Table 3.17).

The benefits of a clinical pharmacist conducting a regular medication chart review were reported as reduced adverse drug events, reduced length of stay, reduced probability of readmission and reduced drug costs.[43]

The second PRP Standard requests a medication reconciliation on admission be conducted and this is also very relevant as a clinical pharmacist could easily undertake this function in conjunction with either a doctor or nurse depending on the type of hospital setting. The value of the process has been vindicated by reports that between 60-70% of patients will have at least one discrepancy during their admission reconciliation process. In private hospital practice it is likely the medication history will be taken initially by a nurse and/or a clinical pharmacist, as most hospitals do not have junior medical staff and most doctors are Visiting Medical Officers. Some hospitals such as SJOGHS have a Preadmission Clinic where patients are initially screened by nursing staff and if considered high risk are referred for review by a clinical pharmacist. A review of 800 referral interviews of high risk surgical patients to the Preadmission Pharmacist in 2004-2005 at SJOGHS showed that 1.8 pharmacist interventions for errors were noted per interview.[51] The errors primarily were for omitted details (53%), omitted drug (29%), wrong dose (6%) and wrong drug name (2%). Of the omitted details they ranged from missing strength, dose, frequency and form in descending order.

The SHPA Standards of Practice in Clinical Pharmacy[42] outlined the roles that a clinical pharmacist must carry out within recommended pharmacist to patient ratios. The SHPA also produced a position statement which highlighted that an increased use of clinical pharmacists in hospitals, would lead to improved patient health outcomes and a better use of health resources.[52] The ACSQH in a Fact Sheet in 2004 stated that ~~"p~~harmacists in hospitals can support systems to reduce medication incidents, through patient and staff education, monitoring and medication review".[53]

3.4.2 Value of Clinical Pharmacist Interventions

Since the eighties clinical pharmacists have felt the need to quantify and prove the value of their roles on the wards. This has led to the publication of numerous studies to demonstrate their value in Australian hospitals. These studies have demonstrated that clinical pharmacists reduced the length of stay, decreased the risk of readmission

and reduced the likelihood of adverse medication events such as drug toxicity or exacerbations of pre-existing medical conditions.[54-56]

Evidence of positive outcomes and benefits achieved by having hospital based clinical pharmacists involved in patient care have been primarily focused on specialised areas such as cardiology, respiratory, psychiatry or intensive care.[57,58,59,60] Similar results have also been achieved in paediatric settings where the most common type of intervention or error noted was incorrect dosage and the most prevalent was overdosage.[61] The American Society of Hospital Pharmacists published recommendations to prevent medication errors in hospitals and highlighted the level of undetected medication errors that exists while emphasising the role of the pharmacist in ensuring optimal use of a patients medicine by a systems orientated collaborative approach.[62] This Guideline provided recommendations for prescribers, nurses and pharmacists to undertake to avoid medication error that are still valid today, including monitoring of drug therapy and availability at it‘s point of initiation, up to date knowledge, good dispensing procedures, use of ancillary labels and good counselling techniques.[62]

The publication by Dooley et al in 2004 not only showed improved patient health outcomes, but finally placed a financial value on the important interventions made by clinical pharmacists in Australia.[43] This multicenter study across eight public hospitals demonstrated that for every $1 spent on clinical pharmacy services in drug therapy or management, approximately $23 was saved in hospital costs. These hospital costs were quantified as costs associated with patient readmission, decreased length of stay, medication cost savings and laboratory tests avoided.

A Thai study in 2008, studied the cost savings associated with clinical pharmacist interventions in an Intensive Care setting.[63] The study concluded that the pharmacist interventions yielded a reduced overall drug cost secondary to cost savings and adverse drug event cost avoidance.[63]

Evaluating end user satisfaction via a survey is a way of evaluating the effectiveness and value placed on how a service is provided. A recent study provided an effective tool to measure perceptions and satisfaction of nursing staff pre and post the

introduction of a clinical pharmacy service to general surgery and gastrointestinal surgery wards.[64]

3.4.3 Clinical Pharmacy Service Delivery Models

Different models of clinical pharmacy service have been investigated in an attempt to optimise the benefit associated with having a clinical pharmacist. The traditional model of having a clinical pharmacist assigned to a particular ward or wards is now being reviewed as to whether attachment to a medical team model would more effectively use the skills of a clinical pharmacist. A recent South Australian study demonstrated that the APAC guiding principles were partly achievable using either model.[65]

3.5 CONCLUSION

The range, acceptability and availability of clinical pharmacy services in hospitals has grown substantially over the past two decades in Australia. The acceptance of the clinical pharmacist as part of the multidisciplinary team has led to better patient outcomes and better and more cost effective medication management. The particular skills of the clinical pharmacist are now sought as an essential component in the effort to improve the process and reduce the chance of medication error occurring.

Clinical pharmacist‘s activities or interventions have now been validated not only in their clinical value to reduce harm from medications, but have been costed out to demonstrate substantial financial benefit to the health care system.

Clinical pharmacy services in private hospitals have struggled more than their counterparts in the public sector to achieve the funding required to employ sufficient staff to achieve satisfactory pharmacist to patient ratios. Private hospitals have had to use the revenue gained from PBS dispensing and reimbursement from the Health Insurance Commission to fund clinical pharmacy services, a funding model it was never intended to be used for. Currently no model of direct funding for clinical pharmacy services is available in the private sector on a fee per service basis and so despite their proven benefit of improving clinical outcomes for patients, clinical pharmacy services are still at risk. With the amount spent on the health dollar in Australia continuing to grow, scrutiny of every aspect is expected and highly

probable to include medication provision and any associated fees. This potential stressor on available revenue for private hospitals may reduce that hospitals willingness to entertain new or sustain current clinical pharmacy services levels.

Given the recent surge in the publics‘ uptake of private health insurance and the expectations of the consumer to be admitted to a medication safe hospital, a dilemma may occur if tighter margins reduce the number of employed clinical pharmacists whose sole role is to intervene to make medication management safer. A new funding model would be required that is not linked to the supply of medications but more linked to a fee for service model to ensure an appropriate clinical pharmacist to patient ratio is maintained in private hospitals.

The continued research into and collection of pharmacist interventions has been and will continue to be an important tool in ensuring the viability of clinical pharmacist services.

The development of an agreed denominator e.g. occupied bed days, would ensure that consistent reproducible data would be obtained and would facilitate benchmarking against peer hospitals. In addition the problem of underreporting could be overcome by researching an electronic solution e.g. the use of wireless linked notebooks, that would allow immediate and live recording of any interventions made at the bedside.

The inclusion and recording of pharmacist interventions into a centralised hospital incident reporting system, along with medication incidents and pharmacy dispensing errors, would ensure that their value would be reflected in regular hospital reports, avoid silos of information and would provide a complete picture of the medication safety status of a particular institution.

CHAPTER 4 UNDERSTANDING THE CAUSES, RISK AND HARM ASSOCIATED WITH MEDICATION INCIDENTS AND DISPENSING ERRORS

4.1 BACKGROUND

In subsequent years post 2001-2002, with the increasing profile of the newly instituted Safety and Quality Departments in each St John of God Hospital, the focus shifted to attempting to increase the number of incidents reported from the numbers seen in 2001- 2002. This was due in part to underreporting in the past and the increased profile and status granted to medication safety in more recent years. By 2005 SJOGHS had a full time Safety and Quality Department with a Manager and support staff, electronic direct reporting had been instituted replacing paper based forms and the hospital had been involved in major national medication safety initiatives including the National Medication Safety Breakthrough Collaborative Wave 2.

Throughout this time the Pharmacy Department continued to provide a review of each medication incident reported. This review was to ensure that all the data pertaining to the incident had been collected and documented to provide an accurate account. From this the reviewing pharmacist (DCP) could gain an insight into the causes and contributing factors which led to the incident and then determine what actions needed to be taken to prevent their recurrence in the future. A record was maintained of the direct time involved in reviewing each incident and implementing any strategies to prevent the incident recurring.

To facilitate this, a data recording sheet was developed which allowed the reviewer to focus on the most pertinent information required to make an assessment of why an incident occurred and what were the direct causes and contributing factors. Understanding of the why an incident occurred would focus our efforts on strategies to prevent recurrence of the same incident.

In earlier attempts at collecting this information used by the reviewing pharmacist, the information collected was descriptive and not based on evidence, besides

experience of the practitioner or reviewer. Although any review was considered better than none a more reproducible approach was felt would have greater benefit.

A review of the literature was undertaken to assess and compile a list of published causes and contributing factors that were involved in medication errors in a hospital setting. The provision of medication management to a patient in a hospital is very complex and involves a multiplicity of tasks carried out by many different health care professionals including medical practitioners, nurses and pharmacists. Having a good understanding of the tasks and processes involved and the role each profession plays were important factors in determining the causes as to why something could go wrong in the chain from prescribing, dispensing to administration of a medication.

James Reason proposed the ‗Swiss Cheese' model to explain the occurrence of system failures like medical mishaps.[66,67] He postulated that hazards were prevented by barriers which had weak points or holes which open and close at random. If by chance the holes line up, the hazard reaches the patient and causes harm. This model draws attention away from the individual and onto the system and highlights randomness over deliberate action in error occurrence.[66,67] The Reason ―Swiss Cheese Model"[66,67] demonstrated how complex this process was and the need for hospitals to put a number of barriers in place to block off the holes in the cheese' or gaps in the system. These blocks comprise of many factors from appropriate medication charts, guidelines, policy and procedures, adequate training, readily available information resources and peer view by multidisciplinary committees to name a few. For an adverse event to occur, a number of factors must be in alignment i.e. the holes in the cheese must line up. The seriousness of the incident will depend on the outcome or harm suffered by the patient.

Reason outlined that human rather than technical failures represented the greatest threat to complex systems such as healthcare.[68] He stated human fallibility cannot be entirely eliminated.[68] He described different error types that occurred in different parts of an organisation and needed different risk management strategies. These included slips, lapses, trips and fumbles (execution failures) and mistakes (planning failures) which are divided into rule based and knowledge based mistakes.[68] Reason described the difference between errors (information problems) versus violations (motivational problems). He also spoke of active failures involving the direct contact

with the patient and latent failures on an organisational level which are slower to surface.[68]

The Reason model for contributing factors for system failure[68] was used as the basis for the contributing factors for the medication incident review process used at SJOGHS to allow us to more fully understand the why an incident occurred. Reason believed that ―human factors are a product of a chain of causes and the individual's psychological factors are the last and least manageable".[68]

A structured analysis framework was then required to investigate the system conditions that contributed to an event.[69,70] Root cause analysis (RCA) provides a systematic method to achieve this by learning the how and why (root/primary cause) an event happened and linking it to the effect seen and thus allowing the possibility of developing strategies to prevent it happening again in the future. As part of an RCA, there is a need to establish a causal link chain leading to a potential root cause and contributing factors.[69,70]

So, as it was reasonable to understand the _how and why' an error occurred it was also necessary to define the outcome (effect) of that error and to determine two further parameters, i.e. the degree of risk for the organization associated with a particular incident and the degree of harm to the patient from each incident. By determining the extent of the risk and the harm involved, the organization or hospital can then be alerted at the appropriate level to ensure an appropriate review was undertaken commensurate with that risk or harm level.

4.2 METHOD

4.2.1 METHODOLOGY OF DEVELOPING A LIST OF CAUSES AND CONTRIBUTING FACTORS

4.2.1.1 DEVELOPMENT OF A DATA COLLECTION SHEET

The first step involved the preparation of a data collection sheet to be used by the reviewer. This process took multiple drafts to get to a point where the form prompted the reviewer to record the information in a sequential and logical manner. Each draft was trialled on different reviewers and all comments considered, to ensure the final draft was deemed suitable to collect all the appropriate information. The details that were finally agreed upon (Table 4.1) (Appendix 10) were complemented with some

room for a short summary of the medication incident. It was hoped to have seven to eight incidents summarized on each form and they would be maintained in hard copy in a file kept for that purpose in the Pharmacy Department. This process would allow the reviewer the opportunity to identify any trends that may be occurring, e.g. the same error recurring on the same or different wards or a spike in the number of reports being submitted from a particular area. Having identified a trend, the reviewing pharmacist could then alert senior hospital staff and suggest some remedial action, e.g. suggesting the initiation of some education at the local level or throughout the hospital, or suggesting improvements in the use of therapy or medication charts or the development of guidelines that may further assist staff understand a task and avoid that error in the future.

Table 4.1 Data collected for medication incident review process

Data collected for incident reviews
Incident date
Database number
Ward
Patient UR No
Error type
Caused by
Contributing factors
Medication ordered
Medication administered
Risk rating
Harm rating
Date of review
Time taken (minutes)
Brief description of incident

4.2.1.2 DETERMINATION OF CAUSES & CONTRIBUTING FACTORS OF MEDICATION INCIDENTS

In 2002 as part of the medication incident review process by the hospital's Medication Policy and Procedure Sub Committee, a trend in causes of errors became apparent as similar errors or system breaches repeatedly occurred. This led to the development of a list of the most common _causal statements' or primary reasons for medication errors noted in the hospital. No literature addressed the issue of contributing factors for medication errors in a private hospital but the general system failures outlined did have some application.[69,70] In order to determine their relevance to private hospital practice numerous meetings were held with the clinical pharmacists at SJOGHS in early 2006. These statements it was felt did not go far enough as it became obvious that the causes of medication error were often multifactorial. While a statement may give a description of what happened or the primary reason it did not dig down to the factors that contributed to the error.

Then the _causal statements' were grouped into those relevant to the major classification of medication errors i.e. prescribing, dispensing and administration errors (Table 4.2). A range of –contributing factors" could then sit under each casual statement based on the systems factors already identified but would reflect practice at SJOGHS.[69,70] It was noted that some contributing factors doubled as causal statements and that similar contributing factors would be used under the different types of error causal statements. After a number of versions, the current draft (Appendix 10) was seen as the best fit for our hospital and the type of errors we were exposed to.

The new process for medication incident review (which was primarily for administration errors) would in future now include the following new steps:

- classification of the error type' into initially a prescribing, dispensing, or administration error classification,
- followed by a determination as to _what caused the incident' (primary reason/causal statement), and then
- noting any obvious _contributing factors' (why it happened/what contributed to the primary cause)
- leading to preventative action to stop recurrence of the event.

Table 4.2 Causal statements for medication incidents

Prescribing:	1. Unclear medication orders
	2. Medication order written incorrectly
	3. Medication order not charted by medical staff
	a. admission medication missed
	b. expired medication chart not rewritten
	c. variable dose omitted
Dispensing:	1. Pharmacy dispensing error
	2. Stock not issued by pharmacy or received on ward
	3. Out of date medication supplied to ward or directly to patient
Administration:	1. Nursing oversight (missed dose on chart)
	a. verbal/short term order (once only) from front of chart
	b. variable dose from front of chart
	c. regular charted medication order
	d. separate therapy chart existed
	2. Misinterpretation of medication order
	3. Deviation from nursing policy
	4. Delivery device (e.g. IV pump) programmed incorrectly
	5. Use of gravity fed IV Infusions instead of IV pumps
	6. Lack of knowledge/understanding of the medication order
	7. Stock unavailable
	8. Stock misplaced
	9. Error in discharge process
	a. medications not given to patient
	b. medications given to wrong patient
	10. Wrong medication chosen from imprest or patient's own
	11. Out of date medications administered by nurse to patient
	12. Inadequate storage of medications
	13. Unclear documentation of medication order
	14. Other

Table 4.3 Contributing factors to medication incidents (v4 December 2006)

1. INSTITUTIONAL AND ORGANISATIONAL FACTORS	2. WORK ENVIRONMENT
A. Hospital bed not available B. Ward bed not available C. Constraints on operating theatre D. Required facilities not available E. Managers not supportive F. Administrative support inadequate G. Medication/therapy charts poorly designed	A. Workload excessive B. Inadequate staffing levels C. Equipment not available or poorly maintained D. Poor design of equipment leading to error E. Other equipment problems e.g. chute malfunction F. Lost in transit (medications +/-chart) G. Use of casual or agency staff- unfamiliar with patient or processes H. Interruptions during complex task I. Excessive noise J. Procedure/Guidelines not provided
3. COMMUNICATION AND TEAM FACTORS	**4. INDIVIDUAL (STAFF) FACTORS**
A. Communication between junior and senior staff B. Communication between departments C. Abnormal results not communicated D. Relevant information not communicated E. Documentation inadequacies F. Management plan not documented G. Insufficient information to receiving team on referral H. Insufficient supervision of junior staff I. Senior staff not available or not responsive J. Unclear definition of responsibilities K. Lack of checking procedure L. Staff not made aware of hospital policy	A. Unwillingness to seek assistance B. Inadequate knowledge or skills C. Inexperience D. Incompetence E. Hospital policies/protocols not followed F. Lapse in concentration G. Technical error H. Error of judgement I. Physical or mental health factors J. Overseas trained staff K. Personal issues L. New staff member
5. TASK FACTORS	**6. PATIENT CHARACTERISTICS**
A. Poor task design or unclear instructions B. Procedure/guidelines not available/accessible C. Inadequate training or education D. Inaccurate test results E. Too many steps in procedure (complex)	F. Patient condition (complexity and seriousness) G. Patient co-morbidities H. Patient unavailable I. Patient sleeping J. Patient refused dose K. Non-disclosure of medications L. Financial hardship M. Behavioural issue

4.2.2 Causes and Contributing Factors for Dispensing Errors

Following the successful development of causal statements and contributing factors for medication incidents, the model was considered applicable to pharmacy dispensary errors. A similar process was undertaken using the same system factors as a starting point. Consultation was had with the dispensing pharmacists with regard to the contributing factors (Table 4.3) already developed for medication incidents as to their suitability for dispensing errors. A consensus approach was taken to determine those that were deemed suitable or to identify specific contributing factors relevant to private hospital pharmacy practice.

Following a series of meetings in 2006, the DCP, clinical pharmacists and dispensing pharmacists agreed to a list prepared using the same model.

4.2.2.1 Causal Statements or Primary Causes of Dispensing Errors

The first step undertaken was to identify the primary causes of dispensing errors by pharmacists. The group concluded that there were three major types of error being identified. These included:

1. Choosing or selection errors by the pharmacist (or technician)
2. Misinterpretation errors of prescription orders written by the doctor
3. Processing or transmission errors from the medication chart to the computerised label generation programme.

4.2.2.2 Contributing Factors to Dispensing Errors

The contributing factors chart for dispensing errors was developed (Table 4.4) using the already developed medication incidents contributing factors (Table 4.3) as a starting template. The same six major system factors were identified as relevant to this class of error as they were for medication incidents. They included:

1. Institutional/Organisational and Departmental factors
2. Work Environment
3. Communication and Team factors
4. Individual (Staff) factors

5. Task factors

6. Patient Characteristics.

Where required and when considered more relevant to the dispensing process, new contributing factors were identified specifically for dispensing errors by the group.

Table 4.4 Contributing factors to dispensing errors (v2 June 2006)

1. INSTITUTIONAL AND ORGANISATIONAL FACTORS	2. WORK ENVIRONMENT
A. Medication not available B. Similar medication names C. Similar packaging D. Medication incorrectly located on shelf E. Lack of chute canisters to supply wards	A. Workload excessive B. Inadequate staffing C. Reduced staffing e.g. after-hours or weekends D. Equipment not available or poorly maintained e.g. chute or computer systems down E. Excessive noise F. Distractions G. Multiple interruptions e.g. phone, staff, other duties
3. COMMUNICATION AND TEAM FACTORS	**4. INDIVIDUAL (STAFF) FACTORS**
A. Communication between departments B. Relevant information not communicated C. Documentation inadequacies D. Insufficient supervision of junior staff E. Senior staff not available or not responsive F. Unclear definition of responsibilities G. Poorly written/unclear orders H. Requests for multiple patients on same requisition	A. Unwillingness to seek advice B. Inadequate knowledge or skills e.g. unfamiliar with medication C. Inexperience D. Incompetence E. Hospital policies/protocols not followed F. Dispensing policies/protocols not followed G. Breach of dispensing checking procedure H. Lapse in concentration- oversight I. Interpretation error J. Physical or mental health factors- sick
5. TASK FACTORS	**6. PATIENT CHARACTERISTICS**
A. Poor task design or unclear instruction B. Protocol not available C. Inadequate training or education D. Key stroke error on computer	A. Patient condition (complexity and seriousness) B. Patient co morbidities- multiple medications **C.** Drug Alert status

4.2.3 MEDICATION INCIDENTS SEVERITY OR HARM

During the National Medication Safety Breakthrough Collaborative (NMSBC) a tool called the "Harmometer" (Appendix 11) was introduced to the teams. This defined harm into nine levels from A to J with the initial A to D levels defined as causing 'potential harm', and the next five, E to J, describing 'actual harm', with J as Death as a result of the incident (Table 4.5). This "Harmometer" tool was based on a tool developed by the American National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) Index for categorising medication errors[71] and was adopted by SJOGHS to define harm (Appendix 12).

Table 4.5 Level of harm associated with an incident

Harm level	Description of harm level
Level A:	No error/harm - but potentially injurious circumstances
Level B:	Error occurred, didn't reach patient
Level C:	Error reached patient, not harmful
Level D:	Not harmful, increased monitoring
Level E:	Additional treatment, intervention, temporary harm
Level F:	Prolonged hospitalisation, temporary harm
Level G:	Permanent patient harm
Level H:	Near-death event (MET, ICU required)
Level I:	Death

From our medication safety definitions we know that a "Near Miss" is a potential incident that did not cause harm,[4] i.e. a potential incident that was discovered before it occurred (e.g. nurse identifies a wrongly chosen medication from the imprest cupboard or a wrongly dispensed or labelled medication arrived from pharmacy and did not administer it). Thus, "near misses" could be identified from a harm rating point of view as Category A or B for if the patient does not take or use the medication then this is interpreted as NOT having reached the patient. Whilst "reaching the patient" means patient administered the medication, i.e. Category C and above and this would not be considered a "near miss".

Similarly the same harm scale can be applied to our dispensing errors to assess the level of harm associated with each error category..

It is well accepted that all incidents and adverse events must be reported on a hospital incident form. Similarly all _near misses' that are prevented at ward/department/outpatient level, should also be reported on a hospital incident form to ensure that those breaches in the system are highlighted and lessons are learnt from the experience. This holds true for errors that are reported through the medication incident system or are reported by the Pharmacy Department as dispensing errors. 'Near misses' in the Pharmacy Department, i.e. that do not leave the department, should be reported in house via the pharmacy dispensing error book. Pharmacists are also encouraged to report all errors that have left the department that they are made aware of and whether they have requested an incident form to be commenced. This process ensures that errors are not counted twice.

4.2.4 Risk Assessment Tool

The hospital and SJOGHC nationally adopted a Risk Rating Matrix to classify risk for the organisation. This type of risk assessment is used regularly as a hazard management tool in industry or is called a _process hazards analysis'. This Risk Rating Matrix was formulated by assessing the "Consequence of the incident" with the "Likelihood" of the incident occurring or recurring and was based on the AS/NZS 4360: Risk Management Standard.[72]

The consequences are qualitative statements that helped the reviewer to assess the impact of the incident on patients, contractors/visitors, caregivers, facility/security, reputation/public confidence and complaints, finance and administration, and organisational accreditation/licensing. This process establishes gaols for each area and allows easy identification of any risk. Using these descriptor terms the reviewer could then add a weighting to that consequence from negligible to critical (Table 4.6.)

Table 4.6 Consequences (Qualitative) of an incident

Consequence of an incident
Negligible
Minor
Moderate
Major
Critical

The likelihood is the likelihood of the frequency of the incident with its consequences occurring again (Table 4.7).

Table 4.7 Likelihood of occurrence of an incident

Description of occurrence	Frequency rating
Almost certain	Weekly
Likely	Monthly
Occasionally	3-5 times per year
Unlikely	1-2 times per year
Rare	Less than 1 per year

By then applying the appropriate likelihood rating with the chosen consequence rating the risk matrix can be used to assess the risk with that particular incident and the appropriate action or alert can immediately be put in place after this evaluation of the risk. The risk rating can range from Extreme A Risk to Low Risk (Table 4.8).

Table 4.8 Risk matrix assessment tool

Likelihood	Consequence				
	Critical	**Major**	**Moderate**	**Minor**	**Negligible**
Almost certain	Extreme A	Extreme A	Extreme B	High	High
Likely	Extreme A	Extreme A	High	High	Medium
Occasionally	Extreme A	Extreme B	High	Medium	Low
Unlikely	extreme B	extreme B	Medium	Low	Low
Rare	Extreme B	Extreme B	Medium	Low	Low

Each level of risk from the matrix is associated with an –Action required", with the greater the risk, the higher the need to inform hospital management and/or executive staff members and the quicker the action that must be taken. (Table 4.9)

Table 4.9 Action required as result of risk assessment

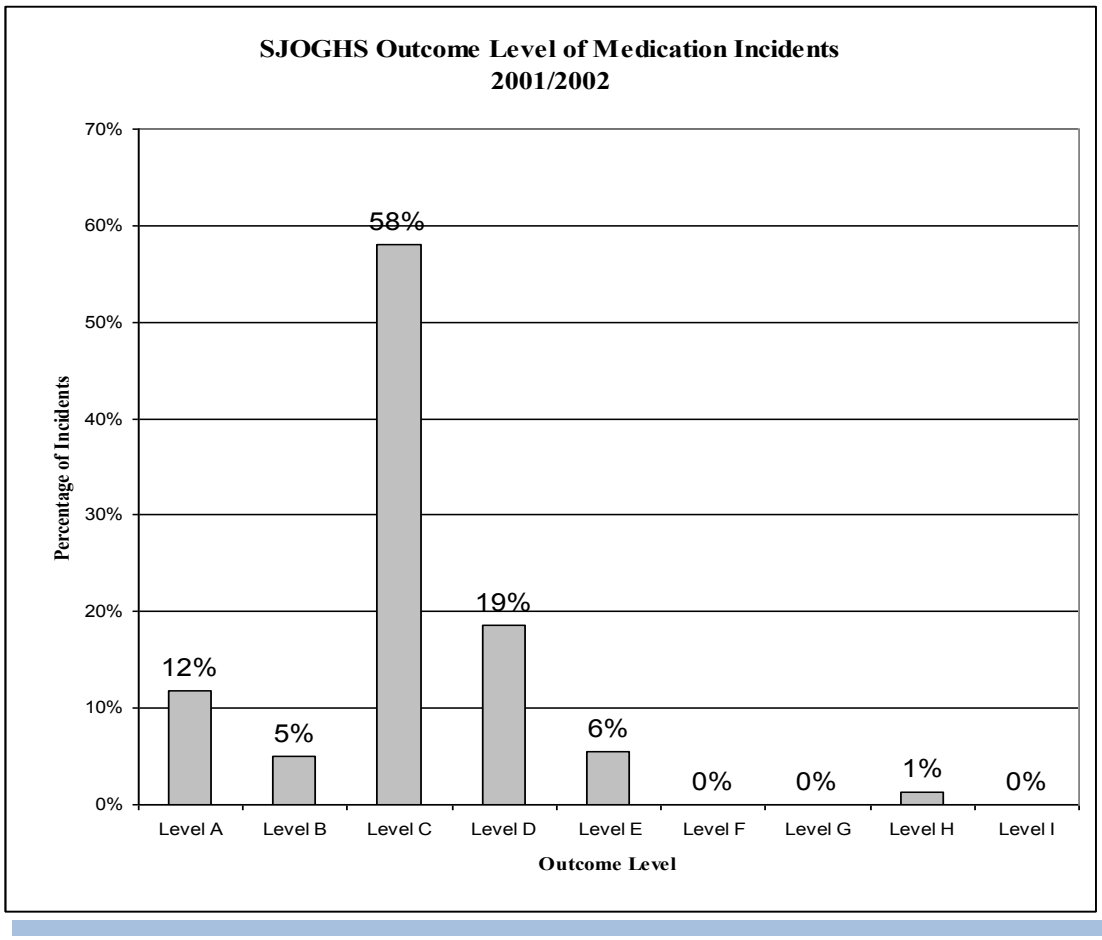
Risk Level	Action Required
Extreme A	Immediate action needed and monitored by Directors. Initiate RCA. Notify National Risk Manager
Extreme B	Immediate action needed and monitored by Directors. Initiate investigation, corrective action, preventative measures. Notify National Risk Manager
High	Manager responsibility, Director involvement where appropriate
Medium	Managers responsibility. Link action requirements with department planning process
Low	Managers responsibility through procedure review and quality activities

4.3 RESULTS

4.3.1 MEDICATION INCIDENTS AND THE HARM RATING SCALE

Following review of our cohort of medication incidents from 2001- 2002, we can see (Figure 4.1) that the majority of incidents are classified with regard to harm, as being between A and D and so have a potential for harm. The results indicate that 58% (94/162) of errors are in Level C where the error reached the patient (i.e. taken by the patient) but caused no harm. Only 7% of incidents are rated E or above where harm was considered to have occurred. Two incidents are rated as Level H which necessitated an admission to Intensive Care Unit or the Emergency Response Team was called.

Figure 4.1 Outcome Level of medication Incidents



4.3.2 DISPENSING ERRORS AND HARM RATING SCALE

As noted earlier the same harm rating scale can be applied to our dispensing error reports but with some slight differences. The assigning of a ranking for severity for pharmacy dispensing errors will depend on who is reviewing it as the Pharmacy Department would view some dispensing errors more seriously from their perspective than others in the hospital may. This is because accuracy in dispensing is paramount for the pharmacy profession and the department has to maintain high levels of compliance with dispensing processes to minimize the chance of error.

The hospital would view the first two levels of harm (Category A and B) as equivalent to ‗near miss' events but from the Pharmacy Department perspective there would be only one ‗near miss' category (Category A), as the Pharmacy Department would consider any error that left the department more seriously.

- Error noted before leaving the department and corrected (Category A)
- Error that left the Pharmacy Department but noted before reaching the patient, returned and corrected (Category B)

This latter example (Category B) is more serious from a pharmacy perspective as it has a greater potential for harm and the Pharmacy Department would consider any wrongly dispensed item leaving the department a ‗Pharmacy Dispensing Incident' regardless of whether it reached the patient or not.

Similarly dispensing errors noted that did get to the patient, i.e. patients drawer or possession, but have not been taken by or administered to the patient, would also be categorised as Category B by the hospital but the Pharmacy Department would consider these incidents more serious in their potential for harm. Hence, Pharmacy would subcategorise these errors as Category B2 – incorrect medication is in the patient's possession or medication drawer but not taken.

Errors noted after reaching the patient and after being administered, but that caused no harm were deemed Category C. Errors that reached the patient and were administered and lead to increased monitoring only were Category D.

All categories would be adjudged in the same manner as medication incidents with categories A to D a measure of potential for harm and the subsequent categories E to I defining errors that cause actual harm to the patient.

Table 4.10 Level of harm associated with each dispensing error type 2001-02

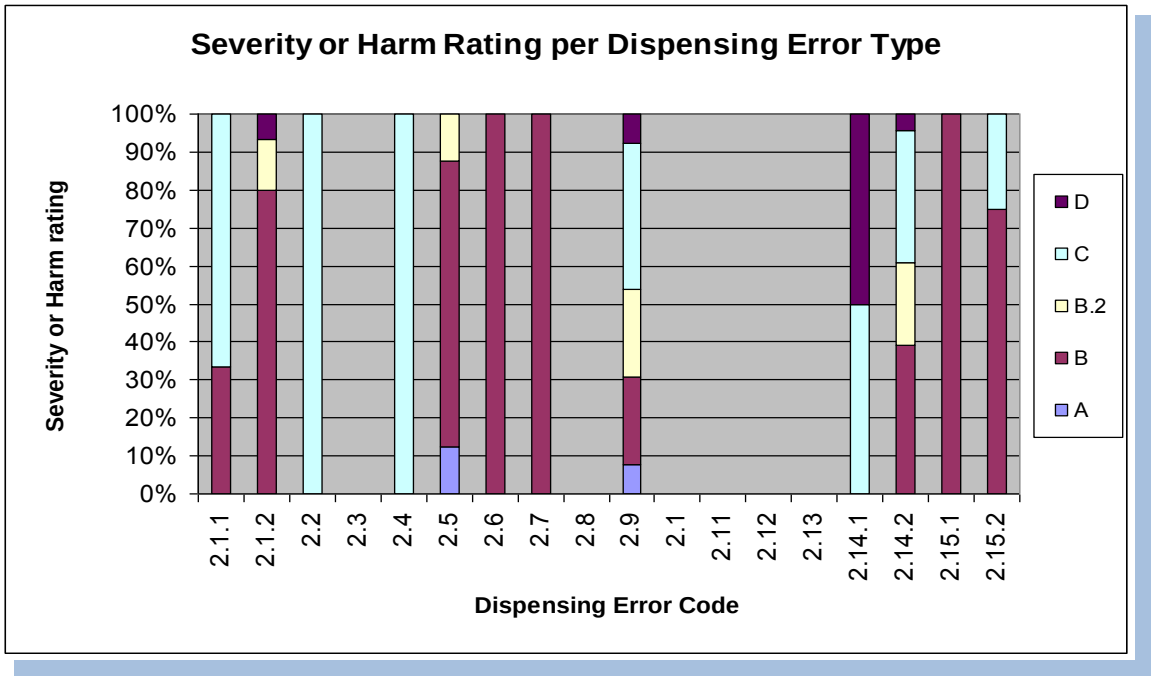
Dispensing	Level of Harm										
Error Type	A	B	B.2	C	D	E	F	G	H	I	Total
2.1.1	0	2	0	4	0	0	0	0	0	0	6
2.1.2	0	12	2	0	1	0	0	0	0	0	15
2.2	0	0	0	1	0	0	0	0	0	0	1
2.3	0	0	0	0	0	0	0	0	0	0	0
2.4	0	0	0	1	0	0	0	0	0	0	1
2.5	3	18	3	0	0	0	0	0	0	0	24
2.6	0	4	0	0	0	0	0	0	0	0	4
2.7	0	1	0	0	0	0	0	0	0	0	1
2.8	0	0	0	0	0	0	0	0	0	0	0
2.9	1	3	3	5	1	0	0	0	0	0	13
2.1	0	0	0	0	0	0	0	0	0	0	0
2.11	0	0	0	0	0	0	0	0	0	0	0
2.12	0	0	0	0	0	0	0	0	0	0	0
2.13	0	0	0	0	0	0	0	0	0	0	0
2.14.1	0	0	0	1	1	0	0	0	0	0	2
2.14.2	0	9	5	8	1	0	0	0	0	0	23
2.15.1	0	1	0	0	0	0	0	0	0	0	1
2.15.2	0	3	0	1	0	0	0	0	0	0	4
Totals	4	53	13	21	4	0	0	0	0	0	95

When we review the most frequently reported dispensing error types (Table 3.9) by harm (Table 4.10) we can see the degree of potential harm associated with these errors as no error was categorised above Category D.

Wrong patient, error type 2.5 (n =24/95), is represented in harm categories A (3/24), B (18/24) and B2 (3/24). Whilst error type 2.14.2 (n = 23/95) i.e. wrong strength of medication/correct label, is represented in the harm categories B (9/23), B2 (5/23), C (8/23), and D (1/23). Finally wrong medication/correct label, error type 2.1.2 (n

=15/95) is represented in harm categories B (12/15), B2 (2/15), and D (1/15). As can be seen from Figure 4.2 and Table 4.11 no errors were considered likely to have caused a patient any actual harm (i.e. harm Category E or above)

Figure 4.2 Severity or harm rating per dispensing error type

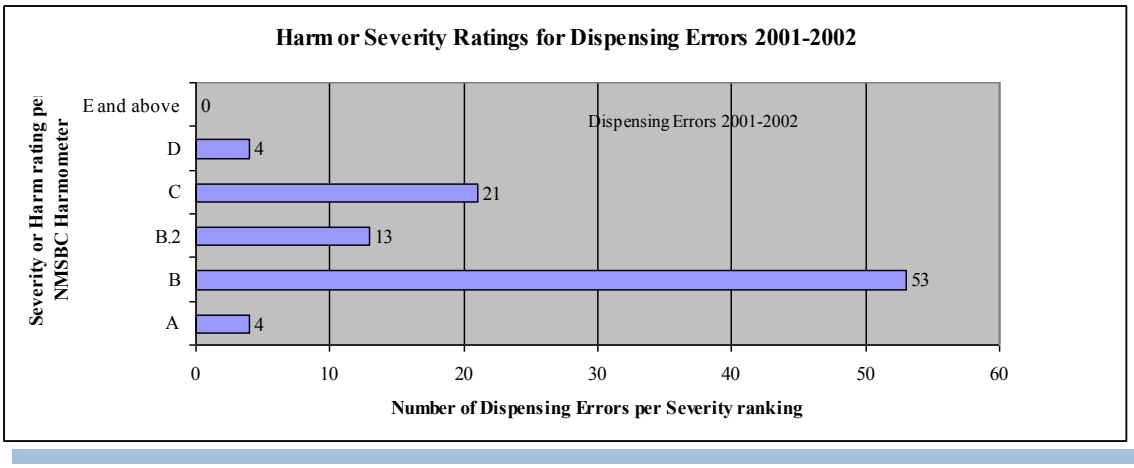


As shown in table 4.11 the majority (69.5%) of dispensing errors were categorised with a potential for harm of category B (B + B2), with 22.1% as Category C. Very small numbers (4/95) are categorised as Category A or D.

Table 4.11 Dispensing errors per harm rating

Level of Harm	Number of dispensing errors (n)	Proportion of dispensing errors %
A	4	4.2
B	53	55.8
B.2	13	13.7
C	21	22.1
D	4	4.2
E and above	0	0
Total	95	100%

Figure 4.3 Harm rating per dispensing errors



For the year 2001-2002 the dispensing errors reported were all rated as level A to level D and as such were viewed as potential errors. From the hospital's perspective 73.7% of errors (70/95) were considered near misses (i.e. Level A and B1 and B2) and did not reach the patient (Table 4.11). The Pharmacy Department would consider that only 4.3% (4/95) were near misses as the rest of the errors left the Pharmacy Department.

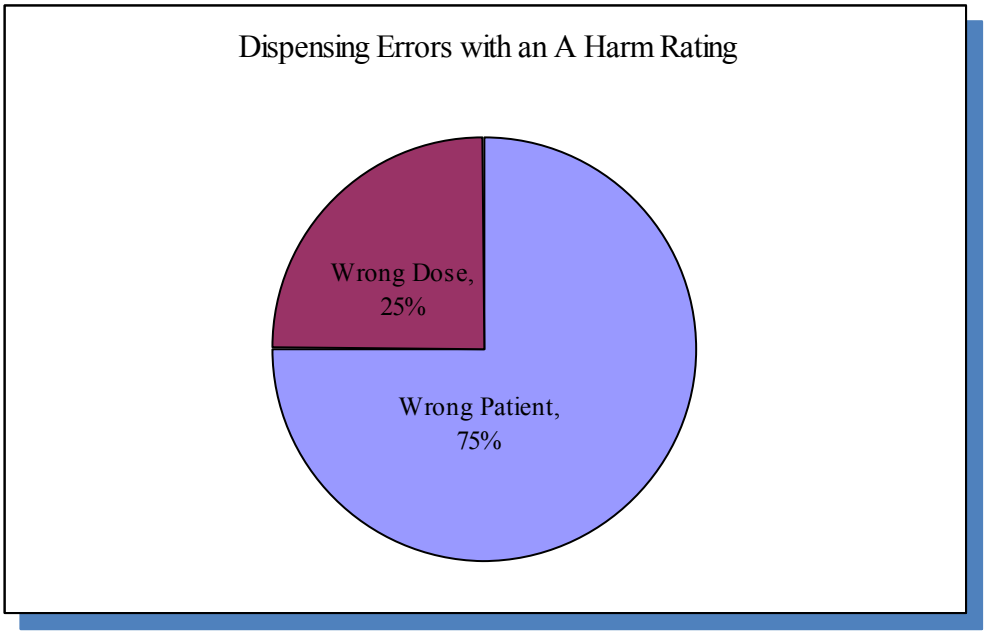
Of the Category B dispensing errors that did not reach the patient, i.e. not administered to the patient, 55.8% were intercepted before reaching the patient's bedside locker or their possession and were picked up at the collection point at the chute, the bench in the ward medication room or the nurse's station. A further 13.8% (13/95), Category B2, were found in the patient's possession or in the patient's locked medication drawer.

Of those errors that were administered to the patient 22.2% (21/95) caused no harm whilst a further 4.2% (4/95) required some extra monitoring to be carried out.

4.3.2.1 BREAKDOWN OF DISPENSING ERRORS PER HARM RATING CATEGORY

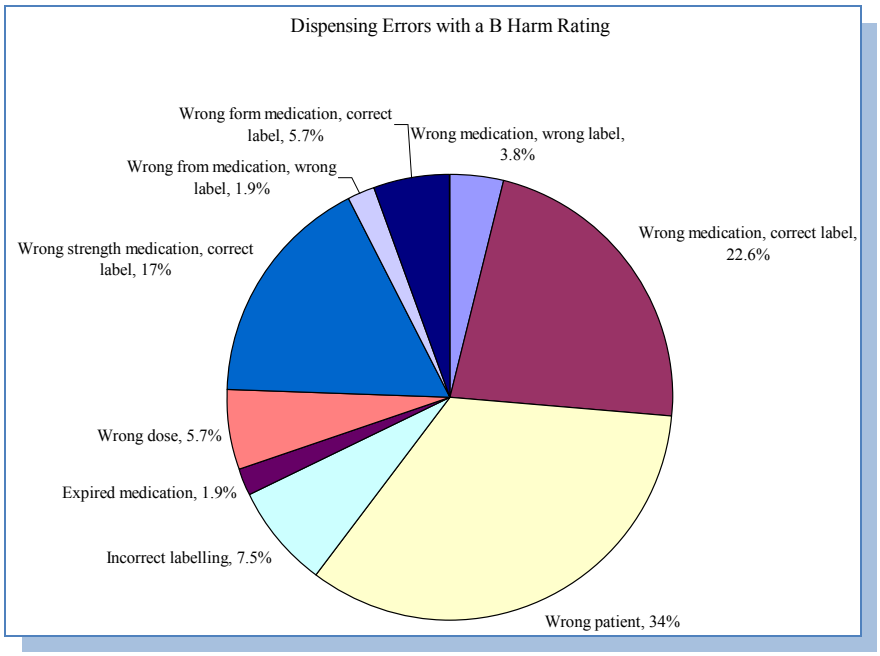
The number of dispensing errors with a Harm Level A category rating i.e. discovered before leaving the Dispensary or inpatient pharmacy department was small (Figure 4.4) and in 75% of cases the error involved the medication being dispensed to the wrong patient.

Figure 4.4 Level A Harm dispensing errors



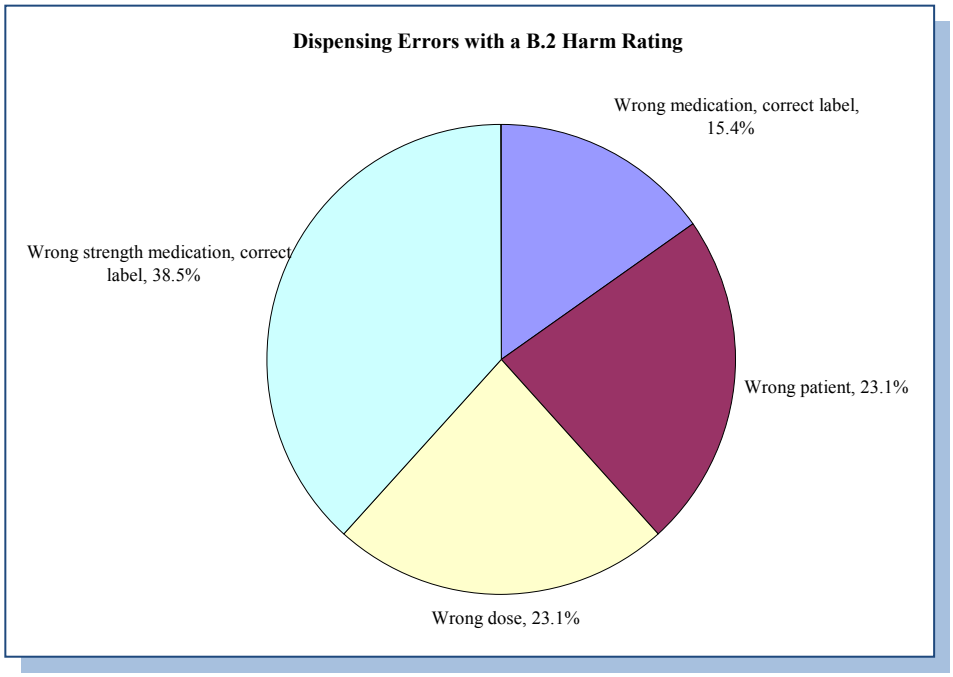
The largest category of dispensary errors had a Level B Harm rating. This category was further subdivided in category B and category B.2 where the dispensing error had left the department but had not reached or been administered to the patient (Figure 4.5). The level B.2 level is a pharmacy indicator to more closely reflect dispensed items that got as far as the patient‘s bedside or locked medication drawer before the error was noted. The most frequent dispensing errors seen with a Level B harm rating were _wrong medication/correct label‘ (22.6%) and wrong patient (34%) and _wrong strength/correct label‘ (17%).

Figure 4.5 Level B Harm dispensing errors



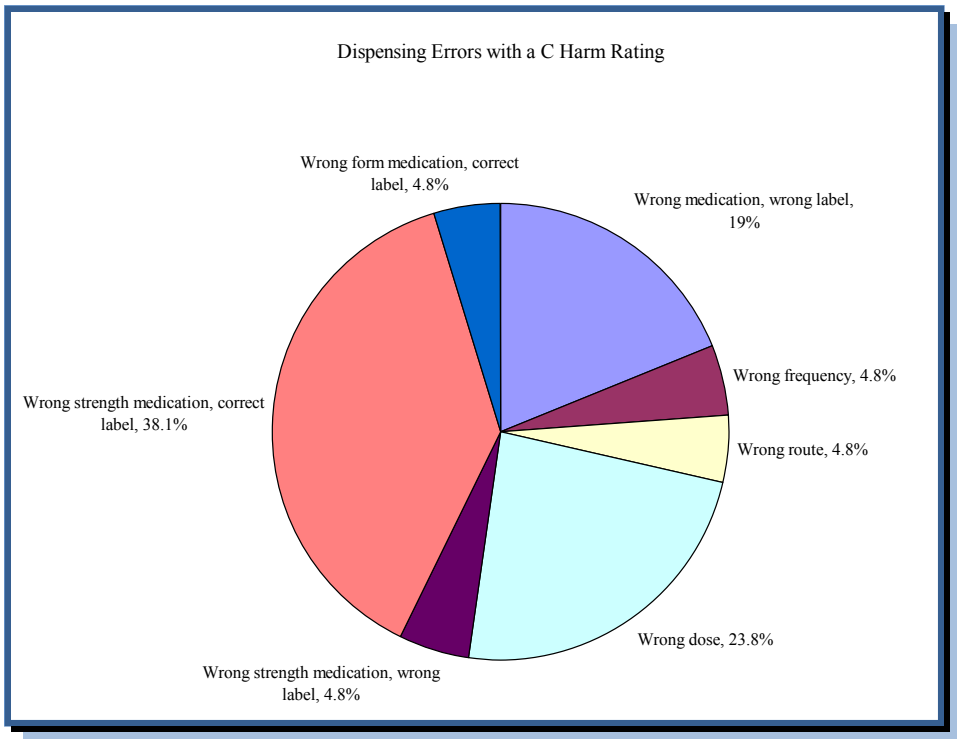
The Level B2 category of harm is deemed more serious by the Pharmacy Department than by the hospital as they reached the patient but were not administered to the patient. It is interesting to note that _wrong patient‘ (23%) and wrong medication/correct label‘ (15.4%) and _wrong strength/correct label‘ (38.5%) again provided the majority of errors as they did in the Level B Harm category (Figure 4.6).

Figure 4.6 Level B2 Harm dispensing errors



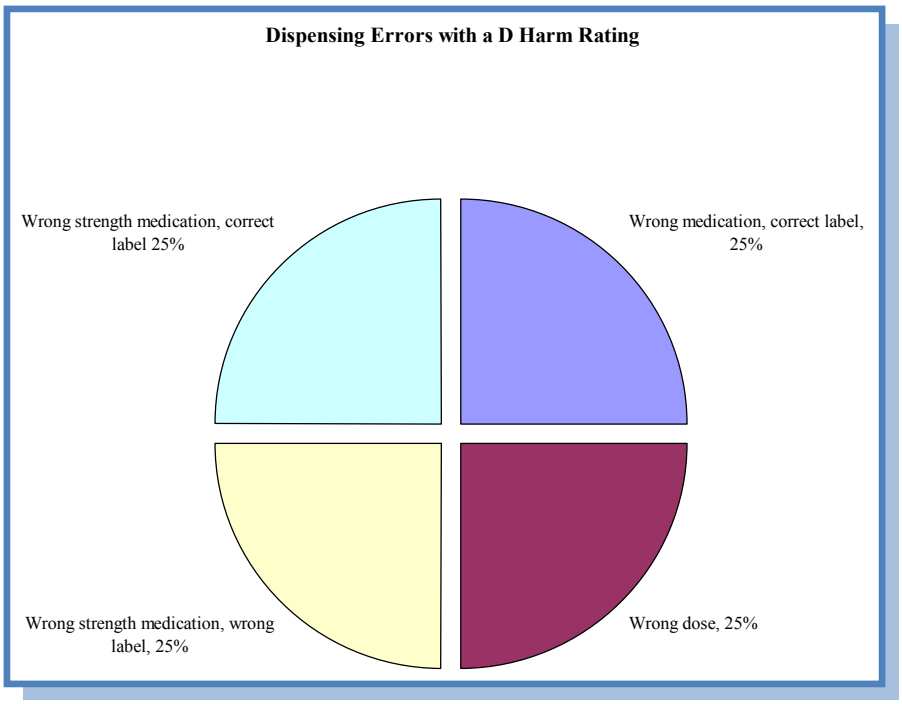
Dispensing errors with a Level C harm rating were the second largest category (22.1%) after Level B (Table 4.11). In this category the wrongly dispensed medication was administered to the patient but was deemed not to have caused any harm. The majority of errors (38.1%) involved the wrong strength/correct label, i.e. the wrong strength was chosen but the correct strength was processed and reflected on the label (Figure 4.7). This was followed by _wrong dose' (23.8%) and wrong medication/wrong label (19%). All of these errors have potential for harm with either the wrong dose being administered or the entirely wrong medication being administered to the patient.

Figure 4.7 Level C Harm dispensing errors



In the case of Level D errors the medication was administered to the patient and deemed would have had some pharmacological effect on the patient and hence required some monitoring to take place. This category only reflected 4.2% of dispensing errors (Table 4.11) and was the most serious category of harm identified with our dispensing errors in this 2001-2002 cohort. Each error type involved, (Figure 4.8), could have serious consequences with the wrong medication, wrong doses or wrong strength being administered to the patient.

Figure 4.8 Level D Harm dispensing errors



4.3.3 Causal Statements and Contributing Factors to Dispensing Errors

Following the development of a table of contributing factors to dispensing errors by pharmacists (Table 4.4), each of the dispensing error categories were reviewed by a group of pharmacists and the DCP as to the most likely applicable contributing causes. Where possible, a causal statement or primary reason for the error was initially identified and then the agreed likely contributing factors added. Each factor was then ranked as to their perceived importance or priority by the group at that time. The results of this process are outlined below in the following tables (Tables 4.12 to 4.17).

Table 4.12 Dispensing error codes 2.1.1, 2.1.2

Dispensing error Code and Description	Primary Cause	Contributing Factors - Ranked according to probability
M2.1.1 Wrong medication/ wrong label	Interpretation	1. Poorly written-unclear order
		2. Similar names
		3. Confused with generic name
		4. Unfamiliar generic name
		5. Unfamiliar with drug
		6. Drug knowledge
		7. Sickness
M2.1.2 Wrong medication / correct label	Breach in checking procedure	1. Distraction e.g. excessive noise
		2. Multiple interruptions
		3. Similar drug names
		4. Similar packaging
		5. Drug stored in incorrect location
		6. Busy workload

Table 4.13 Dispensing error codes 2.2 to 2.5

Dispensing error Code and Description	Primary Cause	Contributing Factors - Ranked according to probability
M2.2 Wrong frequency		1. Poorly written/unclear order
		2. Breach in checking procedures
		3. Drug knowledge- unfamiliar with drug
M2.3 Wrong time		Not relevant to dispensing errors
		Suggest deletion
M2.4 Wrong route		1. Poorly written/unclear order
		2. Breach in checking procedures
		3. Drug knowledge- unfamiliar with drug
M2.5 Wrong patient	Breach in checking procedure	1. Busy workload
		2. Distractions e.g. noise
		3. Interruptions e.g. phone, attendance at front counter, drug information queries
		4. Computer entry not cleared from previous patient
		5. Incorrect key entry for patient e.g. Wrong UR number entered

Table 4.14 Dispensing error codes 2.6 to 2.9

Dispensing error Code and Description	Primary Cause	Contributing Factors -Ranked according to probability
M2.6 Incorrect labelling - drug name, form, strength	Breach in checking procedure	1. Busy workload
		2. Distractions
		3. Interruptions
		4. Sickness
M2.7 Expired medications	Breach in checking procedure	1. In date stock not ordered
		2. Expiry dates not checked
M2.8 Omission/Not supplied on ordering	Breach in checking procedure	1. Drug not available at the time
		2. Delivery not received from supplier
		3. Not ordered when stocks low
M2.9 Wrong dose	Breach in checking procedure	1. Poorly written/unclear order
		2. Drug knowledge
		3. Unfamiliar with drug

Table 4.15 Dispensing error codes 2.10 to 2.13

Dispensing error Code and Description	Primary Cause	Contributing Factors -Ranked according to probability
M2.10 Damaged product	Breach in checking procedure	1. Not packaged effectively for transporting i.e. refrigeration, chemotherapy, chute system
M2.11 Theft or loss	Breach in checking procedure	1. Sent to wrong ward or department
		2. Chute malfunction
		3. Supply misplaced by nursing staff e.g. placed in wrong patients drawer, not given to patient on discharge or transfer
M2.12 Schedule 8 discrepancy	Breach in checking procedure	1. Schedule 8s sent in chute and not handed to an authorised person
		2. Schedule 8s not signed into S8 register
		3. Signed incorrectly into the S8 register
		4. Nurse did not check the movement properly on receipt or on placing into ward safe
M2.13 Previous drug reaction and dispensed	Breach in checking procedure	1. Not recorded on all charts

Table 4.16 Dispensing error codes 2.14.1 and 2.14.2

Dispensing error Code and Description	Primary Cause	Contributing Factors -Ranked according to probability
M2.14.1 Wrong strength/wrong label	Interpretation	1. Poorly written-unclear order
		2. Similar names
		3. Confused with generic name
		4. Unfamiliar generic name
		5. Unfamiliar with drug
		6. Drug knowledge
		7. Sickness
M2.14.2 Wrong strength/ correct label	Breach in checking procedure	1. Distraction e.g. excessive noise
		2. Multiple interruptions
		3. Similar drug names
		4. Similar packaging
		5. Drug stored in incorrect location
		6. Busy workload

Table 4.17 Dispensing error codes 2.15.1 and 2.15.2

Dispensing error Code and Description	Primary Cause	Contributing Factors -Ranked according to probability
M2.15.1 Wrong form/ wrong label	Interpretation	1. Poorly written-unclear order
		2. Similar names
		3. Confused with generic name
		4. Unfamiliar generic name
		5. Unfamiliar with drug
		6. Drug knowledge
		7. Sickness
M2.15.2 Wrong form / correct label	Breach in checking procedure	1. Distraction e.g. excessive noise
		2. Multiple interruptions
		3. Similar drug names
		4. Similar packaging
		5. Drug stored in incorrect location
		6. Busy workload

4.4 DISCUSSION

A series of primary causes or causal statements and contributing factors specific to SJOGHS have now been developed, based on the system factors identified.[68-70] These are assigned to each medication incident and pharmacy dispensing error and play a major role in assisting the Pharmacy Department in understanding the –why" an incident occurred and in developing preventative strategies to avoid them in the future. The contributing factors for medication incidents were developed initially and then used as the basis for a similar set of contributing factors for dispensing errors. In conjunction with this a Risk Rating and Harm Rating scale have now been included for all incidents saved on the electronic system Risk- Pro™ used by the organisation.

Following the review of our cohort of medication incidents from 2001-2002, we can see (Figure 4.1) that the great majority of incidents were classified, with regard to harm, as being between category A and D and had a potential for harm. Only 7% of medication incidents were rated E or above where actual harm was considered to have occurred and two incidents were rated as Level H which necessitated an admission to the Intensive Care Unit or the Emergency Response Team was called.

The majority of dispensing errors had a harm category rating of Level A and B and were considered _near misses' as they were picked up before they reached the patient. Level B errors were picked up after they left the Pharmacy Department but before they were administered to the patient and constituted the majority of dispensing errors. Owing to the seriousness that Pharmacy viewed these errors a new Level B.2 category was developed for dispensing errors that had reached the patient, i.e. in their medication drawer or in the possession of the patient, but had not been administered. Of the dispensing errors that were administered to the patient only a very small number required increased monitoring. This study indicated that dispensing errors had a potential for harm but were less likely to cause actual harm compared to medication incidents.

Preventative strategies to avoid medication errors in Australian hospitals were identified over a decade ago. 73 They included some we have made progress with including increased awareness of labelling and drug packaging issues, prescribing abbreviations, structured medication charts, use of ward based clinical pharmacists and

improved medication admission histories and education of patients on discharge. But other strategies such as electronic physician ordering, prescribing education for junior medical staff and individual patient dispensing are still not sufficiently advanced.

More recently a Western Australian study reviewed ward-based clinical pharmacists identified clinically significant errors in prescribing, dispensing or the administration of drugs, during their routine clinical rounds.[74] A senior pharmacist then selected incidents for study based on whether preventable errors had caused actual or potential patient harm. Staff members involved in the errors were interviewed to determine what may have contributed to the error and how it could be avoided in the future.

The study noted that attentional slips, memory lapses and knowledge-based mistakes commonly occurred when staff were busy, distracted or tired — often when they were working after hours or on long shifts or were dealing with patients who were unfamiliar or had complex conditions.[74] Communication problems between or within specific teams or failing to acquire relevant information before prescribing or administering unfamiliar drugs were also identified as contributing factors.[74].

The participants in the study emphasised vigilance and personal responsibility. They considered drug prescribing, dispensing and administration high-risk clinical tasks that needed to be performed meticulously and without interruption at all times.[74]

4.5 CONCLUSION

The development and use of a risk assessment matrix and a harm rating system allied with appropriate coding of medication errors has advanced greatly the understanding of the different types of errors that exist, their frequency and potential for recurrence and for causing harm to the patient. Developing and understanding the cause of an error and the apportioning of contributing factors to each incident is the most valid method of learning from an error category and helping to reduce the likelihood of that medication incident recurring again. Investing the time to review and debrief participants in serious or harmful medication incidents in a structured manner has the potential to further deepen the understanding of why errors occur during the complex clinical task that is medication management.

CHAPTER 5 DEVELOP STRATEGIES TO REDUCE MEDICATION ERROR

5.1 BACKGROUND

By 2001, the Commonwealth Government had identified that to ensure the safe and quality use of medicines partnerships were required with private hospital practice and not just public sector hospitals. The Private Health Industry Quality and Safety (PHIQS) Committee was established in 2001 to lead and coordinate safety initiatives in this sector. A coordinated approach begun with the first ‗Safety and Quality of Medicines- Issues for the Private Sector Workshop", held 17-18 October 2002 in Sydney under the auspices of PHIQS.[17] This workshop put private health on the agenda and initially focused on two key areas: firstly ‗continuum of quality use of medicines from hospital to home' and secondly ‗organisational structures, including medication advisory committees'.[17] At the workshop it was identified that the success of the government's initiatives required private health to become fully involved. To do this it was recognised that private hospital practice was diffuse and initiatives had to differentiated to accommodate local requirements.[17] Greater education and understanding of initiatives had to be established to ensure appropriate governance occurred around medication safety.[17] This workshop crystallised the need for published work on medication incidents in the private health arena and to provide information on the type, frequency and causes of medication errors in that setting.

In order to progress the stated aims of the PHIQS meeting, it was essential to understand some of the issues more fully that influenced private hospital pharmacy practice and made it so complex and different to the public hospital sector. Private hospital pharmacies have to incorporate the Pharmaceutical Benefits Scheme into their provision of medications to hospital patients despite the Scheme being designed for community not hospital practice. Similarly they need to accommodate the goals of the different ownership models that exist for private hospitals in Australia, i.e. ―Not For Profit" and ―For Profit" hospitals which may directly affect the motivation to embrace additional pharmacy services that go beyond the supply of medications function. In addition to different models of ownership, different location models

existed for pharmacy services which could influence the ability of that service to respond to a request for change from the Government. In addition patients are expected to pay for any services received from their hospital stay, treatment and medications and this can be further compounded by the health insurers' relationship with the hospital owners. Private hospitals are in the main serviced by Specialist Visiting Medical Officers (VMOs) who are not routinely on site and they have few or no junior medical staff. The hospitals are predominantly led by nursing staff who provide the bulk of the permanent staff caring for patients.

The PHIQS meeting in 2002[17] had challenged the attendees to determine the extent of the medication safety practices in private hospitals as there was little or no knowledge in comparison to public sector practice.

As part of this research project a survey to ascertain information on how medication safety practices were managed in Australian Private Hospitals was undertaken. Firstly this was to establish an understanding of the extent of medication incident reporting and management and secondly to establish what role if any hospital pharmacy service providers played in the process.

5.1.1 Funding for Private Hospital Medications

5.1.1.1 Pharmaceutical Benefits Scheme

Private hospital health care practice is based on a user pays model which includes medications. The funding streams used for medications are more familiar to community pharmacy based patient care. In this regard Australia is unique in having the Pharmaceutical Benefits Schedule (PBS) as a means to provide to the community subsidized medications.[75] The PBS directs the payment of specified fees to pharmacies for the cost of acquisition, the process of dispensing and provision of consumer information. These arrangements for PBS dispensing are set out in five year agreements negotiated between the Pharmacy Guild of Australia (representing pharmacy owners) and the Australian Commonwealth Government and are known as Community Pharmacy Agreements (CPAs).[76] The Fifth CPA was signed on the 3rd May 2010.[76]

The cost of PBS medications is shared by the patient and the Australian Government. Different patient co-payments exist depending on the cost of the medication and the

reduced contribution of those entitled to concessions.[76] Reimbursement from the Australian Government is a very complex, time consuming, predominantly paper based system. On the other hand, payment to pharmacy for non-PBS listed medications are the full responsibility of the patient unless their private insurance company has a specific arrangement with that hospital.

The incorporation of the PBS into private hospital practice adds a degree of complexity to hospital pharmacy practice that is not catered for in the workload and staffing models for Pharmacy Services published in Australia.[42,77] These public sector based research models suggest responsibilities to be performed by the clinical pharmacist and staffing models based on pharmacist to bed ratios that specifically do not cater for any dispensing, supply, or the associated paperwork required to access reimbursement of PBS listed items. This complex activity though, is essential to recover the funds for the medications needed to treat a hospitalised patient and to provide compensation for the supply functions, with a fee to dispense. This fee is an essential element of the profit making ability of a pharmacy and covers the clinical pharmacy and stock management services provided.[78] In a typical community pharmacy, 70 per cent of sales income is derived from the PBS benefit-paid prescriptions.[76]

To be permitted to dispense PBS listed medications, a pharmacy must hold a PBS license which is obtained on application to the Australian Community Pharmacy Authority (ACPA).[76] ACPA can issue two different licenses to applicants. They are, a full license to dispense PBS medications to any member of the public (Section 90 approval), or a restricted license for inpatient hospital PBS use (Section 94 approval). The latter restricted license holders cannot service the general public and are only allowed to dispense PBS medications for inpatient or discharge purposes. This restricted license is common in private hospitals,[78] and where it exists, a section 90 license holder is allowed to operate on or near the campus to cater for the general public including hospital staff.

5.1.1.2 HEALTH FUND ARRANGEMENTS

Additional layers of complexity are added to health care provision in private hospitals by the fact that patients seeking choice will take out private health insurance to facilitate this as well as minimise their costs. Health Insurers will dictate terms with individual private hospitals or groups of hospitals as to what type of funding will be provided. These terms will include how medications for the treatment of their members are managed. It is common then, that the health funds will insist that the patient be given access to the PBS medicines first as a medicare card holder, before any consideration is given to making a claim against the insurer for a particular non PBS medicine.[79] This further highlights the importance of the PBS as a funding model for pharmaceuticals and the additional strata of information that pharmacy staff in private hospitals need to be familiar with.

5.1.1.3 PHARMACY OWNERSHIP

Another unique fact is that in Australia and distinct from other health professionals, the pharmacy profession and their services are highly regulated by Commonwealth, State and territory legislation.[76] Regulations limit the ownership of community pharmacies to registered pharmacists and impose restrictions on the location of existing and new pharmacies.[76] Most jurisdictional legislation places numerical limits on the number of pharmacies that can be owned by a pharmacist in a particular jurisdiction.

5.1.1.4 PHARMACEUTICAL REFORM AGENDA

The Australian Government has implemented a Pharmaceutical Reform Agenda. Each State and Territory has been offered the opportunity to approve the dispensing of medications by public hospitals under the PBS in return for implementation of the APAC Guidelines (PSA reform).[76] The APAC Guiding principles for the continuity of medication management 2005[45] are designed to provide cohesive care to patients across the transition of care between the community and hospital and back into the community by reducing medication related harm. This development adds greater substance for the need by private hospital services to embrace these types of services.

For too long private hospital pharmacy providers had been constrained by their medication supply functions. Today in larger public hospitals, hospital pharmacists have become widely recognised as a part of multidisciplinary clinical teams,

particularly in complex areas with complex medication use such as oncology. Their roles span the transition from admission medication review, inpatient monitoring and management to predischarge counselling and provision of medication lists and consumer product information. Hospital pharmacy has grown to meet the challenges and now provides a more patient centred healthcare model that goes beyond the supply paradigm and the confines of the hospital walls.

This challenge is just as relevant to the private hospital sector if hospitals are

- going to respond to the needs and expectations of a more educated patient as to the role a hospital pharmacist can provide
- provide optimal medication management services to their patients to the standards dictated by peer groups e.g. SHPA Standards of Practice
- meet the expectations of the State and Commonwealth Government for safe clinical practice and
- the growing expectations of a safer medication environment for their patients by a more powerful and demanding health insurance sector.

5.1.1.5 PROVISION AND FUNDING OF COGNITIVE PHARMACY SERVICES

The provision of cognitive services in pharmacy practice such as clinical pharmacy, committee representation and drug information are still not routinely funded. Wyer did describe that some (Off Site, Contracted) private hospitals did charge for services provided, such as provision of guidelines and meeting attendances.[78] In most private hospital settings their provision is reliant on the profitability of the pharmacy managing the medications and the optimal management of the PBS adds therefore to the profitability of a pharmacy. It should be noted though that as patents expire in increasing numbers on commonly prescribed PBS items and their wholesale price decreases, this will reduce the return to the pharmacy provider and may be seen as a threat to these services.[76] This threat will be larger for small individual concerns and will require the need for affiliations within bigger entities with bigger purchasing power and support. This change, which will affect community pharmacy initially, will also impact on pharmacy providers to private hospitals, in particular in rural areas or where servicing specialized needs e.g. psychiatry. Group ownership will be

essential where high turnover hospitals and centralised purchasing contracts will be necessary to subsidise weaker more exposed services.

This would be the same whether the pharmacy is located on or off site although off site would provide its own challenges in providing access to clinical pharmacists for their cognitive services and the linkage with the important supply functions.

As ownership must be by a pharmacist, in private practice one would expect that contracted services would be the norm. The fact that hospital owned pharmacies do exist can only be a result of that institution having a pharmacist as a partner or an owner. In Australia, this is frequently the case with private hospitals that are run by religious congregations as Not for Profit institutions. The ability to reinvest the income generated from PBS reimbursement is a strong indicator of the potential investment in ancillary pharmacy cognitive and medication safety activities.

5.1.1.6 BENEFITS OF CLINICAL PHARMACY SERVICES

Clinical pharmacists embrace this function as medication safety experts and have a proven benefit in the prevention of adverse medication outcomes and by influencing the prescribing and administration of medications.[17,43,45,52,53] Recent research has begun to quantify the financial benefit associated with having a clinical pharmacy service that is staffed and resourced appropriately.[43] The authors, speaking from a public sector hospital point of view, specified that hospital based clinical pharmacists were responsible for detecting 56.3 interventions per 1000 hospital overnight admissions.[43] This is significant when other studies[9,80] have indicated that up to 190,000 hospital admissions per year may be associated with a medication and as many as 50% of these may be preventable. The average time spent on the clinical intervention was 9.6 minutes.[43] Once annualized, for each dollar spent on a clinical pharmacist to initiate change, their intervention saving was valued as $23 to the hospital.[43] Even when all clinical pharmacy activities are accounted for the savings exceeded the cost of the employment of clinical pharmacists. A USA study showed that providing clinical pharmacy services can help minimize drug related problems and control health care costs for ambulatory care patients.[81] The author estimated that that for every dollar (USA) invested in clinical pharmacy services, an average of $16.70 can be saved in overall health care costs.[81]

5.1.1.7 PHARMACEUTICAL REVIEW

On 23 April 2004 the Australian Health Ministers issued a Joint Communiqué agreeing to a series of seven uniform steps in the national health reform agenda aimed at improving safety in public hospitals. One of the steps was *"To also help safer use of medicines, by the end of 2006, every hospital will have in place a process of pharmaceutical review of medication prescribing, dispensing, administration and documenting processes for the use of medicines''.*[48]

A definition for Pharmaceutical Review in 2005 was a "Minimum standard of systematic appraisal of all aspects of patients management within an institution conducted by a qualified professional (ideally a pharmacist) acting as part of a multidisciplinary team. It includes objective review of medication prescribing, dispensing, distribution, administration, monitoring of outcomes and documentation of medication related information in order to optimize the quality use of medicines".[48,82]

An announcement was made at the 10 February 2006 Council of Australian Governments' (COAG) meeting, about measures to commence 1 July 2006 *"to improve care for older patients in public hospitals to minimise their length of stay*, to *avoid readmission."*[82]

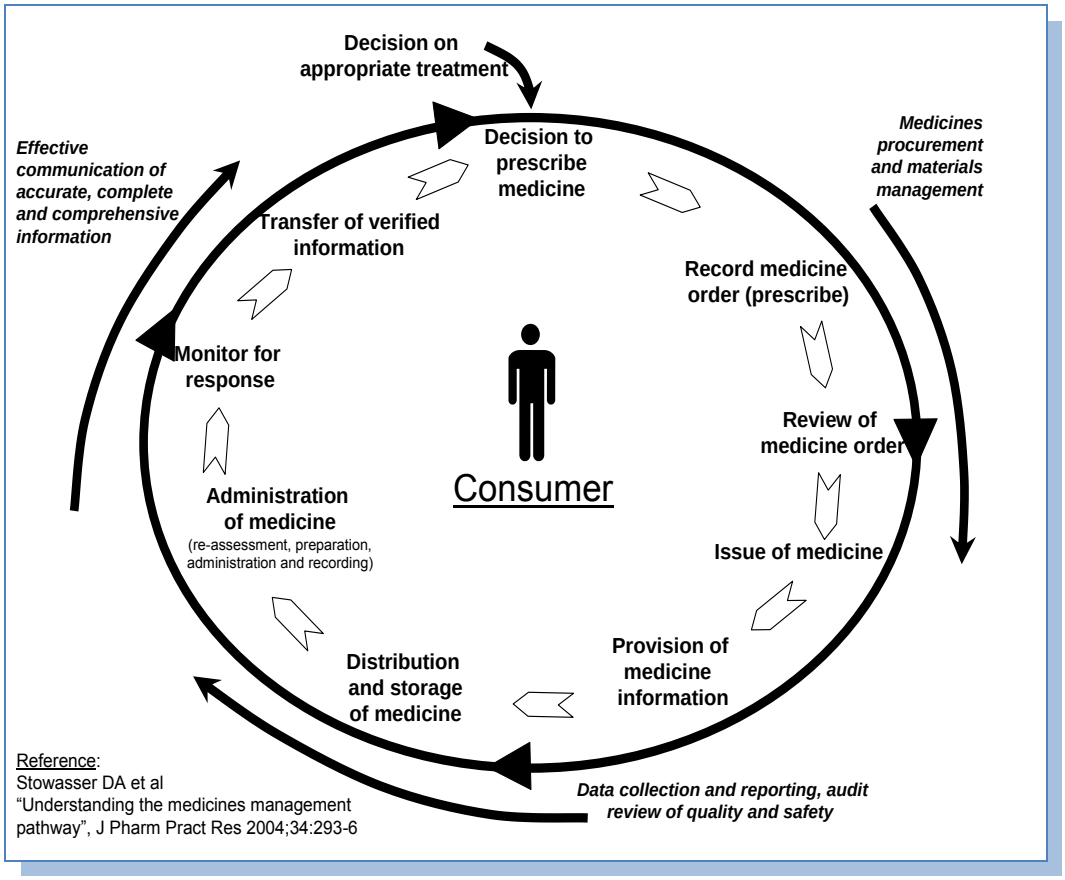
The SHPA in their letter to the Health Ministers,[82] supported this announcements and suggested that the "SHPA Standards of Practice for Clinical Pharmacy (SHPA-CP),[42] albeit designed for pharmacists, represent a mature and detailed **resource** that was suitable for adaptation for the broader provision of "Pharmaceutical Review" by all members of the health care team". The letter continued that SHPA supported a national approach on Pharmaceutical Review but also that funding be considered for activities such as medication reconciliation at discharge and hospital outreach medication reviews conducted by hospital pharmacists for patients deemed to be at 'high risk'. The usefulness of the SHPA-CP was recognised during the development of the Australian Pharmaceutical Advisory Council (APAC) guiding principles to achieve continuity in medication management[45] with several sections of the SHPA-CP being offered as resource references for relevant APAC guiding principles.[82] The SHPA-CP also mimic the key features of the Pharmaceutical Review process.

5.1.1.8 MEDICATION MANAGEMENT CIRCLE

The second National Report on Patient Safety for the Australian Council on Quality and Safety in Health Care in July 2002[4] noted, "*In order to recognise what can go wrong with use of medicines, we need to understand the processes that are involved*." The report described a *pathway for medicines in hospitals*, from the decision to prescribe to monitoring the patient response. To achieve the goal of safe use of medicines, all steps of the medicines management pathway must be delivered without error.

A paper[83] by Stowaser in 2004, described the pathway as a closed loop or circle, comprised of nine steps and three background processes, with feedback on the effect of the medicines and how transfer of information regarding the previous steps influence future treatment decisions in the next cycle of care.

Figure 5.1 The medicines management pathway



5.1.1.9 WA HEALTH DEPARTMENT PHARMACEUTICAL REVIEW POLICY

In March 2007 the Western Australian Health Department launched its Pharmaceutical Review Policy to "*strengthen the quality processes around*

medication use in Western Australia (WA) by outlining the key component of the process".[48] The key drivers were the Australian Health Ministers directive in 2004 and the national health reform agenda. The policy was made applicable to all WA public hospitals and related to all staff involved in medication safety. The policy[48] consisted of 5 standards which were linked back to an appropriate APAC Guideline:

- Chart review
- Medication reconciliation on admission
- Medication education during hospitalisation and on discharge
- Discharge process-communication with general practitioners and other health professionals
- Quality activities promoting medication safety.

5.2 METHOD

5.2.1 DEVELOPMENT OF QUESTIONNAIRE

From April through to May 2005 a questionnaire and covering letter (Appendices 7,8) were developed for circulation to Australian Private Hospitals to assess how they managed medication incidents in their hospitals. Opinions were sought from key hospital risk management and pharmacy staff in an effort to gather meaningful data from the questionnaire. The questionnaire entitled "Medication Incidents Management, Questionnaire for Australian Private Hospitals" was comprised of 27 questions and was broken into three (3) distinct sections, namely:

- Hospital and Patient Demographics (Qs 1 to 7)
- Risk Management Processes (Qs 1 to 13)
- Involvement of Pharmacy Services (Qs 14 to 27)

The questionnaire and covering letter was reviewed and approved by the Quality and Safety Department at SJOGHS in late May 2005 and was subsequently sent for approval by the Human Research Ethics Committee at the Curtin University of Technology.

5.2.2 ETHICS APPROVAL

The Curtin University of Technology Human Research Ethics Committee (HR 29/2004) initially approved the project in 2004 (Appendix 5) and on the 9th June 2005 the questionnaire and covering letter were submitted and approved by the Committee..

5.2.3 DATABASE OF PRIVATE HOSPITALS IN AUSTRALIA

A database of Australian Private Hospitals proved to be a very difficult task to obtain and had to be researched and constructed by the primary investigator due to the fact that each hospital was either an individual concern or belonged to some larger group and each viewed the other as a competitor. The larger groups were predominantly aligned along ownership by a private company or a religious congregation with ―Not for Profit" status. An example of the latter was Catholic Health Care which had as members, St John of God Health Care, Mercy Health and Mater Health under their umbrella. The larger private companies operating hospitals included Healthsense and Ramsay Healthcare. Many of these companies were open to corporate takeover and could suddenly be marketed under a different name; for example Mayne Health was taken over by venture capitalists including Citigroup in 2003 and was rebadged as Affinity Health. During the time of the survey many sources were used to assemble the database. One of the barriers in compiling the database was the reluctance of companies to give out information about their hospitals in case it could be used by a competitor and was seen as commercial in confidence.

Compounding the difficulty in compiling the database were:

- The inability of local contacts (e.g. a pharmaceutical company or wholesaler) to provide information on the size of the hospital or postal address.
- The Health Department of WA data on private hospitals being limited to Western Australia only
- The Private Hospital Association nationally, being unable to provide a comprehensive list of members as not all private hospitals belonged to their group. In fact in the end, for commercial reasons, they would not provide any

information on their members despite submitting the survey and covering letter for review.

In addition, assistance was sought from the primary investigators‘ hospital, SJOGHS, who were also unable to help.

Finally, a review of the yellow pages provided some leads for private hospital groupings in each state. Allied with this numerous searches via the internet established a short list of companies or corporations that were involved in private health care. From this a search was made of each individual corporation‘s website to establish the hospitals which were owned by them. Each hospitals individual website was then visited to establish the size of that hospital, i.e. number of beds and the types of services offered.

5.2.4 Excluded Hospital Sites

It was decided that hospitals with less than 80 beds would not be included unless they provided an extensive range of services, e.g. had an Accident and Emergency Department or an Intensive Care or Coronary Care unit (ICU/CCU). It was also decided that private hospitals that managed public hospitals beds for a particular Health Department would also be excluded. This practice was more apparent on the eastern seaboard of Australia (e.g. Victoria, New South Wales, Queensland and South Australia).

All postal details of potential hospitals were entered into an Excel® database until a final list of 88 hospitals nationally was constructed which had representation from all states. Hospitals were found to be aligned with three major groups. These were Ramsay Healthcare with 31 hospitals, Catholic Health 30 and Healthscope 27 hospitals.

5.2.5 TO WHOM SHOULD THE QUESTIONNAIRE BE SENT?

The question to whom the questionnaire should be directed to was deliberated on for some time. As many of the questions were of a general nature with regards to medication management within a hospital and others were requesting information on pharmacy services, it was difficult to establish who should receive the questionnaire. Cognisant that everyone is busy in healthcare it was felt imperative that one person should attempt to complete the questionnaire if possible, rather than have to rely on a number of people to do so.

Pharmacy services to private hospitals vary substantially from hospital to hospital. Some hospitals such as SJOGHS own their own pharmacy department and all pharmacy staff are employed by them. Other hospitals have a pharmacy department on site but it is not owned by them and services are provided on a contractual basis. Others are serviced by a pharmacy off site which is often a community pharmacy and which operates under a contractual arrangement as well. It was felt that sending the questionnaire to the pharmacy service providers was not ideal as they may not have a consistent knowledge of the hospitals services pertaining to medication management. Instead, the questionnaires were addressed to the "Quality Coordinators" in each hospital. Even though this may not be their exact title, it was thought there would be someone who would have a responsibility for the quality potfolio in the hospital and so that person would be in the best position to answer the questions posed.

5.3 RESULTS

5.3.1 RESPONSE RATE TO QUESTIONNAIRE

The initial batch of surveys and covering letters were sent out in October 2005 with responses to be returned in an enclosed pre-paid envelope by the 18th November 2005. The response rate was 35/88 (39.8%). A reminder was posted to 21 hospitals whom it was thought would be likely to respond by December 2005. From these reminders a further three responses were received providing a total response rate of 38/88 hospitals or a rate of 43.2% (Table 5.1)

Table 5.1 Questionnaires and reminders sent to Australian Private Hospitals

Grouping	Number sent N	Initial replies	Reminders	Final response rate n/N (%)
Ramsay Health	31	17	1	17/31 (54.8)
Catholic Health	30	11	17	14/30 (46.7)
Healthscope	27	7	3	7/27 (25.9)
Total	88	35	21	38/88 (43.2)

5.3.2 Data Analysis and Privacy concerns

It was agreed and stated in the covering letter that for the purposes of data-analysis and publication all data would be grouped and no reference would be made to individual institutions. Results of the survey would be made available for downloading from the Curtin University School of Pharmacy website once finalised or would be provided on request. A table of participating hospitals by state is included in Appendix 13.

5.3.3 Results from Questionnaire

The overall response rate for the survey was 38/88 or 43.2%. The greatest number of respondents came from New South Wales (NSW) followed by Victoria (Vic), Queensland (Qld), Western Australia (WA), South Australia (SA) and Tasmania [Table 5.2]. There were no responses received from either the Northern Territory (NT) or the Australian Capital Territory (ACT). The WA response was disappointing given that this was a local research project with only 50% of expected hospitals replying.

Table 5.2 Response rate by State (n = 38)

State	Number of Hospitals n	Proportion of Hospitals (%)
New South Wales	13	34.2
Victoria	9	23.7
Queensland	7	18.4
Western Australia	5	13.2
South Australia	3	7.9
Tasmania	1	2.6
Total	**38**	**100**

5.3.3.1 HOSPITAL AND PATIENT DEMOGRAPHICS OF RESPONDING HOSPITALS

The first series of seven questions in the survey sought to illicit hospital demographic data to assist in the evaluation of similarities that exist between hospitals and their core business activities. It must be noted that some responders did not respond to certain questions whilst other questions were always answered. This may imply that certain questions were considered commercial in confidence and were not for general use or the nature of the information was not known or easily identified. If questions were not responded to as a result of commercial reasons, this was done despite an assurance that all data would be deidentified.

Table 5.3 (Q1) Number of beds in each hospital

Bed Numbers	Number of Hospitals n	Proportion of Hospitals (%)
< 100	13	34.2
100-150	9	23.7
150-200	5	13.2
200-250	5	13.2
> 250	6	15.8
Total	38	100

The majority (65%) of responding hospitals had 100 beds or more, with almost 16% having more than 250 beds which would equate to a similar size as SJOGHS (Table 5.3).

Table 5.4 (Q2) Average level of occupancy

Occupancy	Number of Hospitals n	Proportion of Hospitals (%)
<70%	10	28.6
71-80%	12	34.3
81-90%	9	25.7
>90%	4	11.4
Total	35	100

Over 70% of respondents reported occupancy rates greater than 70%, with 37.1% reporting rates greater than 81%. These high average figures probably reflect the greater surgical focus of the private hospitals, which results in reduced seasonal variations which may be seen with public hospitals..

Table 5.5 (Q3) Specialties catered for in each hospital

Medical or surgical specialty	Number of Hospitals n	Proportion of Hospitals (%)
Orthopaedics	37	97.4
General surgery	37	97.4
Plastics	33	86.8
Gastroenterology	31	81.6
Obstetrics and Gynaecology	31	81.6
Urology	33	86.8
Oncology	23	60.5
Cardiology	21	55.3
Paediatrics	17	44.7
Neurology	12	31.6
Other	13	34.2
Total	38	100

Of the hospitals that responded 97.4% stated they catered for Orthopaedics and General Surgery, whilst 86.7% catered for Plastics and Urology specialties (Table 5.5). These were followed closely by Gastroenterology and Obstetrics and Gynaecology which were provided by 81.6% of hospitals.

Table 5.6 (Q4) High acuity areas in hospitals?

High acuity area	Number of Hospitals n	Proportion of Hospitals (%)
Emergency Department	12	44.4
Adult Intensive Care Unit	21	77.8
Neonatal Intensive Care Unit	5	18.5
Coronary Care Unit	23	85.2
Total	27	100

Only 12/27 (44%) respondents stated their hospital had an Emergency Department (Table 5.6). On the other hand, almost 78% of respondents stated their hospital had an adult ICU, which possibly reflects the high surgical/procedural orientation of private hospital practice and 85% of hospitals had a CCU possibly reflecting a high proportion of cardiology patients being managed in the private sector, although this result was higher than expected given that only 55% of hospitals reported providing Cardiology services (Table 5.5).

Table 5.7 (Q5) Medical versus surgical patients

Distribution of patients	Number of Hospitals n	Proportion of Hospitals (%)
Medical > Surgical	1	2.6
Surgical > Medical	26	68.4
Surgical = Medical	11	28.9
Total	38	100

Table 5.8 (Q6.1) Average length of stay for surgical patients

Average Length of Hospital Stay (Days)	Number of Hospitals n	Proportion of Hospitals (%)
< 1 day	1	2.9
1-3 days	20	58.8
4-5 days	13	38.2
Total	34	100

Table 5.9 (Q6.2) Average length of stay for medical patients

Average Length of Hospital Stay (Days)	Number of Hospitals n	Proportion of Hospitals (%)
<1 day	0	0
1-3 days	2	6.5
4-5 days	8	25.8
6 or more	21	67.7
Total	31	100

Table 5.7 indicates that in the majority of private hospitals, surgical patients outnumber medical patients (68.4%). The average length of stay of surgical patients was 5 days or less in 100% of respondents and 3 days or less in 55% of hospitals (Table 5.8). In contrast the average length of stay for medical patients was longer, with 6 or more days in 67.7% of respondents and 4-5 days in 25.8% of hospitals (Table 5.9). In those cases where these questions were not answered it was thought that the most likely explanation was the potential commercial sensitivity of the data.

Table 5.10 (Q7) Collocation with public hospital

Collocation with public hospital	Number of Hospitals n	Proportion of Hospitals (%)
Yes	6	15.8
No	32	84.2

Six hospitals nationally reported being collocated with a public hospital. This low number also reflects the Western Australian experience where only one such hospital collocation of public and private exists at Joondalup Health Campus.

5.3.3.2 Risk Management Processes (RMP)

This portion of the questionnaire sought information on the risk management processes (RMP) in use and whether medication incidents were collected, the frequency, how they were managed/processed, who reviewed them and what types of reports were generated and for whom.

Table 5.11 (Q1 RMP) Medication Safety policy exists?

Medication Safety policy	Number of Hospitals n	Proportion of Hospitals (%)
Yes	31	86.1
No	5	13.9
Total	36	100

Table 5.12 (Q1.2 RMP) Could a copy be made available?

Availability of Medication Safety policy	Number of Hospitals n	Proportion of Hospitals (%)
Yes	21	84
No	4	16
Total	25	100

Of the respondents 86% stated their hospital had a Medication Safety policy (Table 5.11) and 84% stated they would make a copy available (Table 5.12).

Table 5.13 (Q2.1 RMP) Are medication incidents reported?

Medication incidents reported	Number of Hospitals n	Proportion of Hospitals (%)
Yes	38	100

Table 5.14 (Q2.2 RMP) Part of hospital incident reporting?

Medication incidents are part of the hospital incident reporting	Number of Hospitals n	Proportion of Hospitals (%)
Yes	37	100
Total	37	100

All hospitals stated that medication incidents were reported (Table 5.13) and in every hospital, bar one, medication incidents formed part of that hospital's Incident Reporting system (Table 5.14).

Table 5.15 (Q3 RMP) How are medication incidents reported?

Mode of incident reporting	Number of Hospitals n	#Proportion of Hospitals (%)
Hard copy	33	86.0
Electronic	15	39.5

#Note: some hospitals offered both manual and electronic reporting

Table 5.16 (Q3.2 RMP) Could a hard copy form be provided?

Availability of hard copy report form	Number of Hospitals n	Proportion of Hospitals (%)
Yes	23	79.3
No	6	20.7
Total	29	100

Table 5.17 (Q3.3 RMP) Could a copy of the electronic form be provided?

Availability of electronic report form	Number of Hospitals n	Proportion of Hospitals (%)
Yes	8	66.7
No	4	33.3
Total	12	100

At the time of the survey, the majority of medication incident reports were provided on hard copy with a smaller number using an electronic format (Table 5.15). While the majority of respondents were prepared to provide copies of their hard-copy incident reporting forms (Table 5.16), a smaller proportion were prepared to provide access to their electronic system (Table 5.17).

Table 5.18 (Q4.1 RMP) Medication incident reports are initially reviewed by?

Reviewer	Number of Hospitals n/N	Proportion of Hospitals [N = 38] (%)
Senior Nurse	10/38	26.3
Nurse/Unit Manager	30/38	78.9
Director	4/38	10.5
Pharmacist	6/38	15.8
Other	1/38	2.6

In the majority of hospitals the initial review of medication incidents was conducted by a Nurse Unit Manager (78.9%) or a Senior Nurse (26.3%) or possibly both (Table 5.18).

Table 5.19 (Q4.2 RMP) To whom are medication incidents sent to?

	Number of Hospitals n/N	Proportion of Hospitals [N = 38] (%)
(Nursing) Director	19/38	50.0
Medication Safety Officer	2/38	5.3
Project Officer	3/38	7.9
Safety & Quality Coordinator	18/38	47.4
Other	11/38	28.9

Following initial review, the medication incident reports were usually sent to a Director i.e. Director of Nursing or Nursing Co-Director or Safety and Quality Officer/Coordinator. Very few hospitals had a designated Medication Safety Officer (Table 5.19).

Table 5.20 (Q 5 RMP) Do you have a Safety and Quality Coordinator?

Safety and Quality Coordinator	Number of Hospitals n	Proportion of Hospitals (%)
Yes	37	97.4
No	1	2.6
Total	38	100

Almost all hospitals (97%) stated they had a Safety and Quality Coordinator (Table 5.20), whilst only 47% of them reported that medication incident forms were sent to them (see Table 5.19).

Table 5.21 (Q 6 RMP) Are medication incidents placed on database?

Medication incidents database exists	Number of Hospitals n	Proportion of Hospitals (%)
Yes	35	92.1
No	3	7.9
Total	38	100

The majority of hospitals (92.1%) used a database to collate their medication incident data (Table 5.21).

Table 5.22 (Q7 RMP) What database is used?

Database used	Number of Hospitals n	Proportion of Hospitals (%)
Excel	10	28.6
AIMS	0	0
Access	2	5.7
CHRIS	1	2.9
Risk Manager Pro	3	8.6
Risk Monitor Pro	2	5.7
Riskman	16	45.7
S.H.E.	1	2.9
Total	35	100

There was wide variation in the types of databases used to store medication incident data in private hospitals. This is interesting given that the AIMS system, which is predominantly in use nationally throughout the public hospital system, was not used by one responding private hospital. Many hospitals used a Microsoft Excel Spreadsheet and 46% of hospitals used a –Riskman" database (Table 5.21).

In answer to the question (Q8) _Who manages the database input of incidents' there were no answers from any hospital. It was therefore assumed that this was undertaken by clerical staff. The provision of a specific resource at SJOGHS to enter the data took some time to realize as prior to this time the data input relied on the good will of secretarial staff who volunteered time to do the task.

Table 5.23 (Q9.1 and 9.2 RMP) Are reports produced and frequency?

Reports provided	Number of Hospitals n	Proportion of Hospitals (%)
Yes	38	100
Frequency of reports		
Monthly	30	78.9
Quarterly	13	34.2
Six monthly	5	13.2
Annually	4	10.5
Ad Hoc	5	13.2

All hospitals reported that reports were produced from the medication incident data collected, regardless of whether the data was placed into a database or not (Table 5.23). Eighty per cent of hospitals produced monthly reports, whilst 34% produced quarterly reports. Six and twelve monthly reports were produced less frequently.

Table 5.24 (Q10 RMP) Type of report produced?

Report type	Number of Hospitals n	Proportion of Hospitals (%)
Error types	34	94.4
Error frequency	28	77.8
Contributing factors	14	38.9
Error severity	26	72.2
Other	17	47.2
Responses	36	100

There were a variety of different reports provided by hospitals (Table 5.24). The majority of respondents provided reports on the different error types reported, followed by the frequency of each error type and a severity measure for each error.

Table 5.25 (Q11 RMP) Are reports reviewed by hospital committee?

	Number of Hospitals n	Proportion of Hospitals (%)
Yes	37	97.4
No	1	2.6

According to the respondents, 97% of hospitals had the reports reviewed by a hospital committee to provide some peer review (Table 5.25). It was interesting to note that no name was provided for these hospital review committees. At the primary investigator‘s hospital, the Drug and Therapeutics Committee provided this peer review for many years. Subsequently a subcommittee was formed called the Medication Policy and Procedure Subcommittee which among other things became the peer review committee until such time as a Quality and Safety Department was established.

Table 5.26 (Q11.2 RMP) Actions of review committee

Committee Actions	Number of Hospitals n	Proportion of Hospitals (%)
Table report only	11	29.7
Practice changes	34	91.9
Authorise education	29	78.4
Other	9	24.3
Responses	37	100

All hospitals who used a committee to review the reported medication incidents stated that they were involved in remedial actions to try and reduce or remove that error in the future. These actions varied from suggesting practice changes in that hospital (92%) and authorizing staff education (78%) where appropriate (Table 5.26). While 30% of hospitals suggested that they tabled the report only, many of these hospitals still took action to change practice.

Table 5.27 (Q12 RMP) Number of medication incidents reported in past 12 months

Number of Incidents Reported	Number of Hospitals n	Proportion of Hospitals (%)
0-50	12	37.5
51-100	7	21.9
101-150	5	15.6
151-200	2	6.3
201-250	4	12.5
251-300	0	0
301-350	0	0
351-400	2	6.3
Responses	32	100
Mean	111.63	
Standard Deviation	100.14	

Of our respondents, 75% stated that the number of reported medication incidents was less than 150 per annum and 37.5% had less than 50 incidents reported annually (Table 5.27). The average number of medication incidents report amongst the 32 responding hospitals was 112±100 per annum.

Table 5.28 (Q13 RMP) Number of medication incidents reported in comparison to previous year

Number of incidents compared to previous year	Number of Hospitals n	Proportion of Hospitals (%)
More	8	25
Less	11	34.4
Same	8	25
Don't know	5	15.6
Responses	32	100

Almost one third of respondents (Table 5.28) reported that the number of medication incidents reported was less than the number reported in the previous year whilst 25% stated it was the same and another 25% said it was greater than the previous year.

5.3.3.3 Involvement of Pharmacy Services (PS) in Medication Incident Management

This portion of the questionnaire dealt with the role pharmacy services (PS) in each hospital plays in medication incident management. There are many different pharmacy service models in place in private hospital practice in Australia. Each model may have a different focus on medication error prevention depending on the extent of the agreed services they provide.

Table 5.29 (Q14 PS) Hospital have pharmacy service?

Hospitals that have a pharmacy service	Number of Hospitals n	Proportion of Hospitals (%)
Yes	36	94.7
No	2	5.3
Total	38	100

The great majority of hospitals stated that their hospital had a pharmacy service (Table 5.29).

Table 5.30 (Q15 PS) Pharmacy service on site/off site?

Location of pharmacy service	Number of Hospitals n	Proportion of Hospitals (%)
On Site	19	52.8
Off Site	17	47.2
Total	36	100

Of the respondents that had a pharmacy service, slightly over half (53%) replied that they had a pharmacy service located on site (Table 5.30).

Table 5.31 (Q16 PS) Ownership of pharmacy department

Ownership of pharmacy Service	Number of Hospitals n	Proportion of Hospitals (%)
By Hospital	8	22.2
Contracted Out	28	77.8
Total	36	!00

Contracted pharmacy services accounted for 78% of hospitals while the balance were owned by the hospital (Table 5.31).

Table 5.32 (Q 17 PS) Are clinical pharmacists employed?

Clinical pharmacists employed?	Number of Hospitals	Proportion of Hospitals (%)
Yes	30	85.7
No	5	14.3
Total	35	100

Thirty of the respondents (86%) stated they employed clinical pharmacists to undertake clinical pharmacy services on the wards (Table 5.32).

Table 5.33 (Q18 PS) Number of clinical pharmacists employed?

Number of clinical pharmacists employed?	Number of Hospitals n	Proportion of Hospitals (%)
0.5-1	14	51.9
>1-2	5	18.5
>2-3	2	7.4
>3-4	1	3.7
>4-5	2	7.4
>5-6	1	3.7
>6	2	7.4
Total	27	100
Mean	2.33	
Standard Deviation	2.00	

The respondents indicated that 70% of hospitals employed up to two clinical pharmacists (Table 5.33). The mean number of clinical pharmacists employed by each pharmacy service was 2.33 +/- 2.00 clinical pharmacists. This low figure may be related to the fact that 70% of hospitals had less than 200 beds (Table 5.3).

Table 5.34 (Q19 PS) Percentage of wards serviced by clinical pharmacists

Percentage of wards serviced by clinical pharmacists	Number of Hospitals n	Proportion of Hospitals (%)
< 25%	3	10.3
25-50%	4	13.8
51-75%	5	17.2
Over 75%	17	58.6
Total	29	100

Table 5.35 (Q20.1 PS) Are clinical pharmacists on wards full time?

Clinical pharmacists on wards full time?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	4	13.3
No	25	83.3
Some	1	3.3
Total	30	100

Table 5.36 (Q20.2 PS) If part- time, do clinical pharmacists have other duties?

If part time do clinical pharmacists have other duties?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	19	76
No	5	20
Unknown	1	4
Total	25	100

Although 30 hospitals reported employing clinical pharmacists, 70% of them employed only two clinical pharmacists (Tables 5.32 and 5.33). 59% of respondents stated that their clinical pharmacists covered over 75% of wards in those hospitals (Table 5.34). Only four hospitals employed clinical pharmacists on a full time basis on the wards, so the balance must have provided services on a part time basis (Table 5.35). The majority (76%), of the part time ward clinical pharmacists employed, had other duties to perform within the pharmacy department (Table 5.36). The remainder (5/25, 20%) were employed as part timers whose primary function, it would appear were ward clinical pharmacy duties.

Table 5.37 (Q21 PS) Clinical pharmacist activities to reduce medication error?

Clinical pharmacist activities?	Number of Hospitals n	Proportion of Hospitals (%)
Preadmission clinic	2	6.7
Admission history interview	8	26.7
Medication chart review	25	83.3
Discharge counselling	25	83.3
Provide medication lists	23	76.7
Trial management	6	20
Design of charts	14	46.7
Medication guidelines	23	76.7
Nursing policy advice	23	76.7
Nurse education	28	93.3
Total	30	100

Looking at specific activities that assist in accurate transfer of information from home to hospital we see a minor involvement by clinical pharmacists in preadmission clinics (6.7%) and a slightly higher involvement (27%) in the taking of admission history interviews (Table 5.37). More routine daily duties reported for clinical pharmacists such as daily MCR were conducted in 83% of hospitals. Activities that assist in this process were also provided by the majority of hospitals. These included assisting in the design of medication charts (47%), provision of medication guidelines (77%), and advice on nursing polices (77%). In service education to nursing staff (93%) was a common activity. Activities related to the transfer of patients from hospital to the home were frequently undertaken with the provision of medication lists on discharge (77%) and discharge medication counselling (83%).

Table 5.38 (Q 22.1 PS) Pharmacy involved with review of medication incidents?

Pharmacy involved in review of medication incidents?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	23	63.9
No	13	36.1
Total	36	100

Only 64% of responding hospitals involved their pharmacy provider in the review of medication incidents (Table 5.38). The balance would have involved nursing staff only, as staff medical practitioners are very rare in private hospital practice. It is likely that where pharmacy was not involved, nursing staff managed the entire review process.

Table 5.39 (Q 22.2 PS) Who in pharmacy is responsible for review?

Position/Title	Number of Hospitals n	Proportion of Hospitals (%)
Chief/Director/Manager	8	42.1
Deputy Chief Pharmacist	3	15.8
Coordinator Clinical Pharmacy	2	10.5
Clinical Pharmacist	7	36.8
Other	4	21.1
Total responses	19	100

The responsibility for the review of medication incidents in the Pharmacy Department varied substantially amongst respondents and it would seem that the review in some departments was carried out by more than one staff member. The Chief Pharmacist/Director of Pharmacy or Pharmacy Manager provided the review in 42% of cases with the clinical pharmacists (37%) being the next major group (Table 5.39).

Table 5.40 (Q 23 PS) Role of clinical pharmacists in medication incident review

Role of clinical pharmacist in incident review	Number of Hospitals n	Proportion of Hospitals (%)
N/A (no role)	6	20
Trend recognition	13	43
Remedial action	18	60
Education/change	22	73
Other	2	6.7
Responses	30	100

Table 5.41 (Q 24 PS) What FTE (Full time equivalent) of clinical pharmacist associated with review process?

FTE clinical pharmacist associated with incident review	Number of Hospitals n	Proportion of Hospitals (%)
1 fte	4	13.8
0.75 fte	1	3.4
0.5 fte	3	10.3
0.25 fte	4	13.8
< 0.25 fte	5	17.2
Unknown	12	41.4
Total	29	100

The respondents indicated that 73% of the clinical pharmacists involved in medication incident review in private hospitals were involved in education or the changing of processes to reduce or avoid future medication errors (Table 5.40). Providing advice on remedial action required in preventing the error recurring was given 60% of the time. Only 43% were involved in the recognition of trends in the types of errors reported.

Respondents did not know what component of a –full time equivalent" from pharmacy was involved in medication incident review in 41% of cases (Table 41). In four hospitals (14%) this was a full time role whilst in 31% of responding hospitals it was less than or equal to a quarter of a _full time equivalent'.

Table 5.42 (Q 25 PS) Do clinical pharmacist collect pharmacist intervention data?

Do clinical pharmacists collect intervention data?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	24	80
No	1	3.3
Unknown	5	16.7
Total	30	100

Table 5.43 (Q25.2 PS) Do interventions form part of incident reporting?

Do pharmacist interventions form part of incident data?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	14	58.30
No	10	41.70
Total	24	100

It was reported that in 80% of responding hospitals, clinical pharmacists collected their own pharmacist intervention data (Table 5.42) but only 58% of these respondents (Table 5.43) added their interventions to the hospitals medication incident reporting system.

Table 5.44 (Q 26 PS) Do pharmacy dispensing errors that arrive on wards form part of incident reporting?

Pharmacy dispensing errors noted on wards recorded as incidents?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	31	88.6
No	4	11.4
Total	35	100

Eighty nine per cent of hospitals reported in their hospital medication incident system any pharmacy dispensing errors that arrived from pharmacy onto the ward or hospital department (Table 5.44)

Table 5.45 (Q 27.1 PS) Do pharmacy record pharmacy dispensing "Near Misses"?

Do pharmacy record dispensing "near misses"?	Number of Hospitals n	Proportion of Hospitals (%)
Yes	17	48.6
No	12	31.6
Don't Know	6	15.8
Total	35	100

Almost half of all responding hospitals reported that their pharmacy departments recorded any dispensing errors detected prior to them leaving the department (Table 5.45). These errors are often referred to as ~~"n~~ear misses" or potential errors.

Table 5.46 (Q 27.2 PS) Are dispensing 'Near Misses' added to incident reporting?

Are dispensing 'near misses' added to incident reports	Number of Hospitals	Proportion of Hospitals (%)
Yes	8	47
No	9	53
Total	17	100

Of those pharmacy departments that recorded "near misses" nearly half of them (Table 5.46) added those errors to the hospitals medication incident management system.

5.4 DISCUSSION

Despite the initial difficulties in contacting private hospitals in Australia, the questionnaire elicited a response rate that was an acceptable and representative sample at 43.2% of those surveyed. The majority of respondents came from New South Wales and Victoria which are the more populous states. It was noted that 65% of responding hospitals had 100 beds or more and over 70% of respondents reported occupancy of greater than 70%.

The survey results indicated that the majority of private hospitals cater for surgical patients in preference to medical patients, with a key focus on procedures with a variable length of stay. This is commensurate with the fact that there are very few staff medical practitioners and most admitting doctors are considered to be VMOs who generally are Consultant Specialists. With the growing number of privately insured patients since the introduction of the 30% rebate in 1999 and the growing desire of Australians to have a choice in who should undertake their care, the need for access to the private sector is growing, accounting now for almost 40% of all admitted patients.[84] Between 2004-2005 and 2008-2009, the number of number of hospital separations increased 14.4% in public acute hospitals and 18.8% in private hospitals whilst the number of patient days in public acute hospitals increased by 7.4% and 10.1% in private hospitals.[85] There was also a relatively large increase in beds in private hospitals, and relatively small increases in public acute hospitals and private day-only hospitals.[85]

The survey indicated that a mix of surgical specialties such as Plastics, Urology, Gastroenterology and Orthopaedics were commonplace. There was limited availability of Accident and Emergency Departments amongst the hospitals surveyed which was in contrast to the presence of adult Intensive Care Units and Coronary Care Units. These latter critical care areas would complement a large and busy surgical case load.

As would be the norm in public hospitals in Australia, most private hospitals also had a medication safety policy and reported medication incidents as part of the hospitals Incident Reporting System. At the time of the survey the majority of incident reports were provided on hard copy with a smaller number using an electronic format such

as Riskman®, which is similar to the Australian Incident Monitoring System (AIMS) widely in use in public hospitals nationally.

Medication incidents were reviewed in almost all cases by the line manager who was usually a nurse, given that most incidents are reported by nursing staff. Review by higher officers in the hospital occurred less frequently but this may be because the reported incident did not warrant higher scrutiny. Appropriately, almost all hospitals produced monthly medication incident reports detailing the error types and frequency and these were reviewed by a committee who would provide guidance on practice changes to reduce or prevent recurrence of that error.

The great majority of private hospital respondents had a pharmacy service and these were split evenly between being On Site and Off Site. As Australian states govern through the relevant Pharmacy Acts the ownership rules for pharmacies and predominantly most require a pharmacist to be the owner of a pharmacy, it is not surprising that the minority of hospitals owned their own pharmacy service. Some of these hospitals, e.g. SJOGHS have been grandfathered under the Act, owing to the fact that members of the religious congregation owned and operated the pharmacy prior to the introduction of the Pharmacy Act of 1969.

As expected, since the publication of the Second National Report on Patient Safety[4] in 2002 and the publication of the Society of Hospital Pharmacists of Australia (SHPA) sponsored article on the value of clinical pharmacists in the medication management circle,[43] most private hospitals have employed clinical pharmacists at least on a part time basis to improve medication safety. The fact that only the minority of hospitals employed clinical pharmacists on the wards full time reflects that in many institutions the role of the clinical pharmacist has not progressed much further than the basic supply function. This low percentage of full time ward based clinical pharmacists will need to change in the future if hospitals are going to be able to embrace the Australian Pharmaceutical Advisory Council (APAC) Guidelines 2005[18] and the SHPA-CP Standards.[42] The transition of care has been identified as an important area to focus our attention on minimising medication errors. Medication management across the continuum from home to hospital and from hospital to home has increasingly been considered as important as the routine daily management of the patient whilst in hospital.[46-48,83]

Clinical pharmacists in private hospitals played a minor role in activities that emphasized the transition from the community to hospital such as preadmission clinic roles and the taking of admission medication histories. On the other hand activities related to the transition from the hospital to the community were more frequently undertaken, such as the provision of medication lists and discharge medication counselling. This is interesting given the importance given to accurate medication history taking in many local jurisdictions in Australia, including Queensland and Western Australia (WAMSG Working Party on Medication History), the launch of the WA Health Department Pharmaceutical Review Policy[48] which includes medication reconciliation, to a national approach to medication reconciliation by ACSGHC[86] and the WHO High 5s project.[87].

Recognised activities such as daily MCR, provision of medication guidelines, and education for nursing staff were conducted more frequently by clinical pharmacists working in the private sector.

Private hospital pharmacy departments were involved in the routine review of medication incidents in most hospitals with the Director of Pharmacy or Chief Pharmacist usually responsible for the review. Activities predominantly centred around remedial action and education for change in practice. Although Clinical Pharmacist involvement in this process was less, a minority of respondents stated they employed at least a portion of a full time equivalent of a clinical pharmacist to undertake a review of medication incidents. This is a good development as clinical pharmacists should be more aware of the types of issues that get reported as medication incidents on their wards and should be more easily able to recognise and empathise with how the system failed and have an understanding of how best to avoid it in the future. It is worth remembering that medication incidents reports are predominantly reported by nursing staff and in the main reflect administration errors.

Many clinical pharmacists were also reported to collect pharmacy intervention data, of which just over half reported their interventions as part of the hospitals medication incident reporting system. This is a great development as clinical pharmacist interventions usually reflect prescribing errors and this is an area that is infrequently reported by nursing staff through the medication incident reporting system.

Pharmacy dispensing errors that are picked up on the wards or departments are routinely reported on the hospital system, predominantly by nursing staff, but could also be reported by clinical pharmacists. Allied to this some hospital pharmacy departments recorded dispensing ”near misses” that do not leave the department and are picked up by a checking or supervising pharmacist. These checking roles are standard where dispensing technicians and pharmacy interns are used to commence the dispensing process. It is encouraging that nearly half of the responding hospitals reported these ~~“n~~ear miss” events as part of the hospitals incident reporting system.

5.5 CONCLUSION

With a response rate of 43% this survey of Australian private hospitals provides a glimpse into the practices that exist to promote medication safety within them. Allied to the variety of sizes of hospitals and the specialties catered for, medication risk management processes vary. In addition pharmacy services are provided in a variety of different models from those located Off Site to On Site, and services owned by the hospital or contracted out. These factors were thought to influence the involvement of pharmacy providers in medication incident reporting and actions that ensued from their investigation. The employment of clinical pharmacists varied from hospital to hospital, with the minority of respondents employing full time clinical pharmacists. These clinical pharmacists are far more likely to be involved in activities that focus on the daily medication management activities as well as preparation for discharge. Involvements in activities at the transition into hospital from home were noted to be underdeveloped at the time of the survey. Pharmacy providers had variable involvement with the collection of pharmacy intervention data, pharmacy dispensing errors and ~~“n~~ear misses”. The addition of this data to a centralised medication incident process was still requiring further development and promotion in most hospitals.

In conclusion medication safety practices do vary across the cohort of Australian private hospitals surveyed and working towards a more standardized approach to reporting was warranted and should be independent of the current factors that seem to influence the involvement of particular hospitals. A more detailed appraisal of factors such as pharmacy ownership, pharmacy location and the employment of clinical pharmacists may provide a greater insight to explain these noted variations.

CHAPTER 6 FACTORS INFLUENCING MEDICATION INCIDENT MANAGEMENT IN AUSTRALIAN PRIVATE HOSPITALS

6.1 BACKGROUND

Further analysis of the results of the Medication Incidents Management Questionnaire for Australian Private Hospitals was undertaken to determine the influence of particular parameters on the results. Each parameter analysis has been separated and forms a separate results section.

The parameters chosen were:

- Location of pharmacy services either On Site or Off Site
- Ownership model for pharmacy services
- Whether clinical pharmacists were employed

6.2 METHOD

Cross tabulations were prepared for each question in the questionnaire to evaluate the influence each parameter had on the responses. In this chapter, the influence of the three parameters chosen were presented and reviewed. The results from each question have either been tabulated or a separate scripted commentary has been made.

6.3 RESULTS

6.3.1 THE INFLUENCE OF LOCATION OF PHARMACY SERVICE ON SITE OR OFF SITE

Between states, there was no statistically significant difference between the proportion of pharmacy services provided On Site or Off Site (Table 6.1). Hospitals with a higher level of occupancy tended to have On Site pharmacies, although the difference did not reach statistical significance.

Table 6.1 Breakdown by State and level of occupancy

Breakdown within each state	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)	p value
New South Wales	4 (30.8)	9 (69.2)	13 (100)	0.291
Queensland	4 (80)	1 (20)	5 (100)	
South Australia	2 (66.7)	1 (33.3)	3 (100)	
Tasmania	0 (0)	1 (100)	1 (100)	
Victoria	6 (66.7)	3 (33.3)	9 (100)	
Western Australia	3 (60)	2 (40)	5 (100)	
Total	19 (52.8)	17 (47.2)	36 (100)	
Q2: Average level of occupancy:	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**Total n (%)**	**p value**
<70%	4 (21.1)	6 (42.9)	10 (30.3)	0.191
71-80%	6 (31.6)	6 (42.9)	12 (36.4)	
81-90%	6 (31.6)	2 (14.3)	8 (24.2)	
>90%	3 (15.8)	0 (0)	3 (9.1)	
Total	19 (100)	14 (100)	33 (100)	

Table 6.2 Specialties and critical care areas provided

Q 3 Specialties in each hospital	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Orthopaedics	19 (100)	17 (100)	36 (100)
Cardiology	14 (73.7)	6 (35.3)	20 (55.6)
Urology	19 (100)	13 (76.5)	32 (88.9)
Oncology	17 (89.5)	5 (29.4)	22 (61.1)
Obsterics &Gynaecology	19 (100)	11 (64.7)	30 (83.3)
Paediatrics	8 (42.1)	9 (52.9)	17 (47.2)
General surgery	19 (100)	17 (100)	36 (100)
Gastroenterology	19 (100)	11 (64.7)	30 (83.3)
Neurology	8 (42.1)	4 (23.5)	12 (33.3)
Plastics	17 (89.5)	15 (88.2)	32 (88.9)
Other	7 (36.8)	5 (29.4)	12 (33.3)
Total	19 (100)	17 (100)	36 (100)
Q 4 Special/Critical care areas in the hospital	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**Total n (%)**
Emergency Department	8 (44.4)	3 (37.5)	11 (42.3)
Adult ICU	16 (88.9)	4 (50)	20 (76.9)
Neonatal ICU	3 (16.7)	2 (25)	5 (19.2)
CCU	16 (88.9)	6 (75)	22 (84.6)
Total	18 (100)	8 (100)	26 (100)

Those hospitals that had pharmacy services provided On Site were more likely to cater for more complex specialties such as Oncology, Gastroenterology and Neurology. They were also more likely to have an adult ICU, CCU and an Emergency Department (Table 6.2).

Table 6.3 Breakdown by surgical and medical patients

Q 5 Hospital caters predominantly for	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	p value
Surgical > Medical	14 (73.7)	11 (64.7)	0.559
Surgical = Medical	5 (26.3)	6 (35.3)	
Total	19 (100)	17 (100)	
Q 6.1 Average length of stay of surgical patients:	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**p value**
Up to 1 day	0 (0)	1 (6.7)	0.53
1-3 days	11 (61.1)	9 (60.0)	
4-5 days	7 (38.9)	5 (33.3)	
Total	18 (100)	15 (100)	
Q 6.2 Average length of stay of medical patients:	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**p value**
Up to 1 day	0 (0)	0 (0)	0.245
1-3 days	2 (11.8)	0 (0)	
4-5 days	3 (17.6)	5 (38.5)	
6 days	12 (70.6)	8 (61.5)	
Total	17 (100)	13 (100)	

As can be seen in Table 6.3 in those hospitals with an On Site pharmacy there was a slightly greater emphasis on surgery, however the difference was not statistically significant.

The location of pharmacy services did not affect the length of stay.

Table 6.4 Collocation, Medication Safety policy and medication incident reporting

		Pharmacy services are provided		
	Response	**On site n N (%)**	**Off site n N (%)**	**p value**
Q7: Collocated with a public hospital	Yes	5/19 (26.3)	1/17 (5.9)	0.101
Q 1.1 RMP: Has policy on medication safety? [1]	Yes	18/18 (100)	12/16 (75)	0.024
Q1.2 RMP: Copy of policy made available?	Yes	14/15 (93.3)	6/9 (66.7)	0.09
Q2.1 RMP: Medication incidents reported?	Yes	19/19 (100)	17/17 (100)	ns
Q 2.2 RMP: Part of hospital incident reporting?	Yes	19/19 (100)	16/16 (100)	ns

Of the respondents six hospitals were collocated with a public hospital (Table 6.4), and of these 5 (83.3%) were On Site. As such, if a private hospital is collocated with a public hospital it is more likely to be On Site whilst if it is not, it is likely to be Off Site (5/19 vs 16/17; p = 0.101). There is a significant difference on existence of a medication safety policy based on whether the pharmacy was located on site or not (p = 0.024). Almost all On Site pharmacies provided copies of the hospital‘s medication safety policy, as compared to two-thirds of Off Site pharmacies (p = 0.09).

All hospitals reported medication incidents independent of location of the pharmacy. Further, medication incidents were part of hospitals‘ incident reporting independent of location of the pharmacy department.

[1] RMP = Risk Management Processes of the Questionnaire.

Table 6.5 Format for collection of medication incidents

Q 3.1 RMP: Medication incidents are collected	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Hard Copy	15 (78.9)	16 (94.1)	31 (86.1)
Electronically	10 (52.6)	5 (29.4)	15 (41.7)
Total	19 (100)	17 (100)	36 (100)

Hospitals with On Site pharmacy services were more likely to collect medication incidents electronically (Table 6.5).

When hospitals were asked to provide a hard or electronic copy of how they collect their medication incident data, of those that responded it was more likely that an On Site pharmacy would provide a hard copy than an Off Site pharmacy, i.e. 12/13 (92.3%) from On Site compared to 9/14 (64.3%) for Off-Site pharmacies (p = 0.080).

When an electronic copy was requested we had six positive responses (75%) from On Site pharmacies compared to two (50%) for Off Site pharmacies (p = 0.386).

Table 6.6 Review of medication incidents

Q 4.1 Initial review of incident undertaken by	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Senior Nurse	1 (5.3)	8 (47.1)	9 (25)
Nurse/Unit Manager	16 (84.2)	12 (70.6)	28 (77.8)
Director	1 (5.3)	2 (11.8)	3 (8.3)
Pharmacist	5 (26.3)	1 (5.9)	6 (16.7)
Other	0 (0)	1 (5.9)	1 (2.8)
Total	19 (100)	17 (100)	36 (100)
Q 4.2 Incident reports are sent to	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**Total n (%)**
Director	10 (52.6)	8 (47.1)	18 (50)
Medication Safety Officer	2 (10.5)	0 (0)	2 (5.6)
Project Officer	3 (15.8)	0 (0)	3 (8.3)
Safety and Quality	9 (47.4)	8 (47.1)	17 (47.2)
Other	6 (31.6)	5 (29.4)	11 (30.6)
Total	19 (100)	17 (100)	36 (100)

It was more likely that if the pharmacy service was provided On Site that a pharmacist was involved in medication incident reviews (Table 6.6).Further, if pharmacy services were provided On Site it was far more likely that reports were sent to a Medication Safety or Projects officer.

Table 6.7 Use of a database and reports for medication incidents

	Pharmacy services are provided			
Question?	**Response**	**On Site n (%)**	**Off Site n (%)**	**P value**
Q 5 RMP: Have a Safety and Quality Coordinator?	Yes	19 (100)	16 (94.1)	0.284
Q 6 RMP: Medication incidents on a database?	Yes	18 (94.7)	16 (94.1)	0.935
Q 7 RMP: Database used is Excel	Yes	4 (21.1)	5 (33.3)	0.42
Q 9.1 RMP: Medication incident reports produced?	Yes	19 (100)	17 (100)	ns

As can be seen from the data presented in Table 6.7 a Safety and Quality Officer existed in all hospitals with an On Site pharmacy. Medication Incidents are entered onto a data base independent of the location of the pharmacy department, and databases other than Excel™ were in use in most hospitals. All hospitals produce medication incident reports, independent of the location of the pharmacy department.

No information was provided by respondents on who would enter the data onto the database.

Table 6.8 Frequency and content of medication incident reports

Q 9.2 RMP: How frequently are reports produced?	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Monthly	15 (78.9)	14 (82.4)	29 (80.6)
Quarterly	9 (47.4)	3 (17.6)	12 (33.3)
Six Monthly	4 (21.1)	1 (5.9)	5 (13.9)
Annually	4 (21.1)	0 (0)	4 (11.1)
Ad Hoc	5 (26.3)	0 (0)	5 (13.9)
Total	19 (100)	17 (100)	36 (100)
Q 10 RMP: Type or content of reports produced?	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**Total n (%)**
Type of error	19 (100)	13 (86.7)	32 (94.1)
Frequency of error	16 (84.2)	10 (66.7)	26 (76.5)
Contributing factors	6 (31.6)	6 (40)	12 (35.3)
Severity	16 (84.2)	8 (53.3)	24 (70.6)
Other	11 (57.9)	5 (33.3)	16 947.1)
Total	19 (100)	15 (100)	34 (100)

Whilst production of medication incident reports was commonly undertaken on a monthly basis (Table 6.8), hospitals with On Site pharmacies were more likely to have them across a range of times. In terms of the type and content of medication incidence reports it would appear that those produced in hospitals with On Site pharmacies were more comprehensive.

The location of the pharmacy did not influence the review process of medication incidents, with the majority of hospitals having a specific committee undertake this task. (Onsite 94.7% vs Off-site 100%; p = 0.337).

Table 6.9 Actions by Review Committee

Q 11.2 RMP Actions taken by reviewing committee	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Table report only	6 (33.3)	5 (29.4)	11 (31.4)
Suggest practice change	17 (94.4)	15 (88.2)	32 (91.4)
Authorise education	14 (77.8)	13 (76.5)	27 (77.1)
Other	5 (27.8)	4 (23.5)	9 (25.7)
Total	18 (100)	17 (100)	35 (100)

As can be seen from the data presented in Table 6.9 the location of pharmacy services did not seem to influence what actions were taken by the reviewing committee.

Graph 6.1 Mean number (± SD) of Medication Incidents reported in previous 12 months by pharmacy location

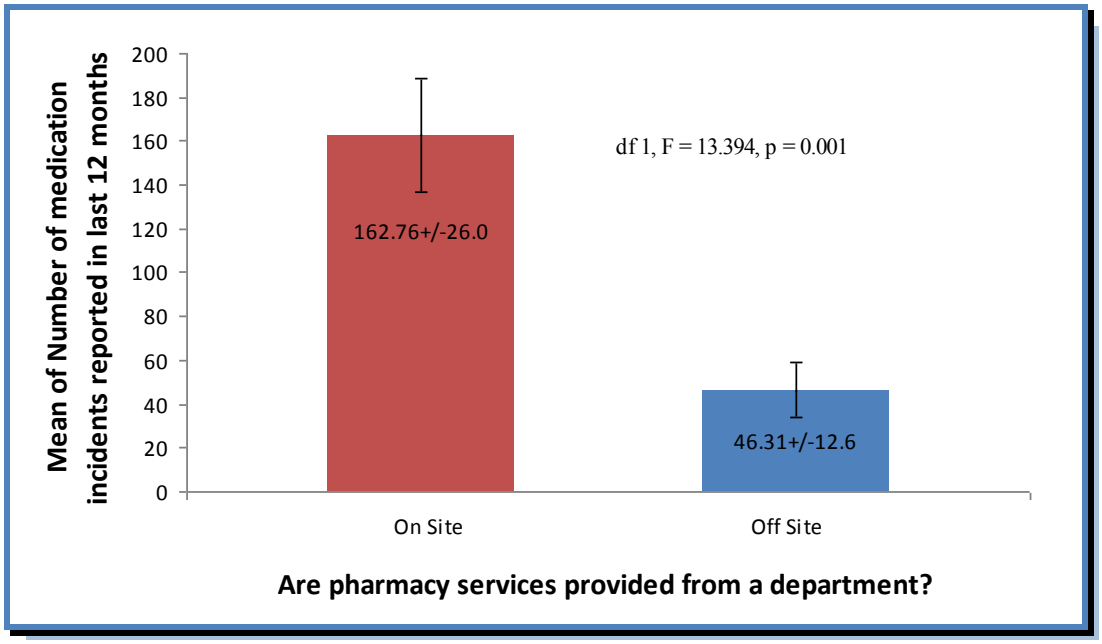


Table 6.10 Comparison of medication incident reports to previous year

Q 13 RMP: Comparison of medication incident numbers to previous year	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	p value
More	6 (35.3)	2 (15.4)	0.684
Less	5 (29.4)	5 (38.5)	
Same	4 (23.5)	4 (30.8)	
Don't Know	2 (11.8)	2 (15.4)	
Total	17 (100)	13 (100)	

From Graph 6.1 it is evident that the number of medication incidents reported is higher amongst hospitals with an On Site pharmacy. However, whether the rate of reporting had changed over the previous 12 months was unclear from the data presented in Table 6.10.

The remaining questions reflect the involvement of Pharmacy Services (PS) in the medication safety process. All respondents reported _Yes' that they had a pharmacy service associated with their hospital and this was independent of whether the pharmacy service was Off Site or On Site.

Table 6.11 Pharmacy ownership

Q 15 PS: Are pharmacy services owned or contracted? [2]	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	p value
Hospital owned	7 (36.8)	1 (5.9)	0.026
Contracted	12 (63.2)	16 (94.1)	
Total	19 (100)	17 (100)	

There was a significant difference in location of pharmacy services when compared to ownership model, as shown in Table 6.11, with hospital owned services tending to be on site and contracted services off site. (p = 0.026).

Clinical pharmacists were employed by On Site pharmacies more frequently than Off Site pharmacies but the difference was not statistically significant (On Site 89.5% Vs Off Site 81.3%;, p = 0.489). However, as can be seen from Graph 6.2, On Site pharmacies employed significantly more clinical pharmacists.

[2] PS means Pharmacy Services section of the Questionnaire.

Graph 6.2 Number of clinical pharmacists employed by pharmacy location?

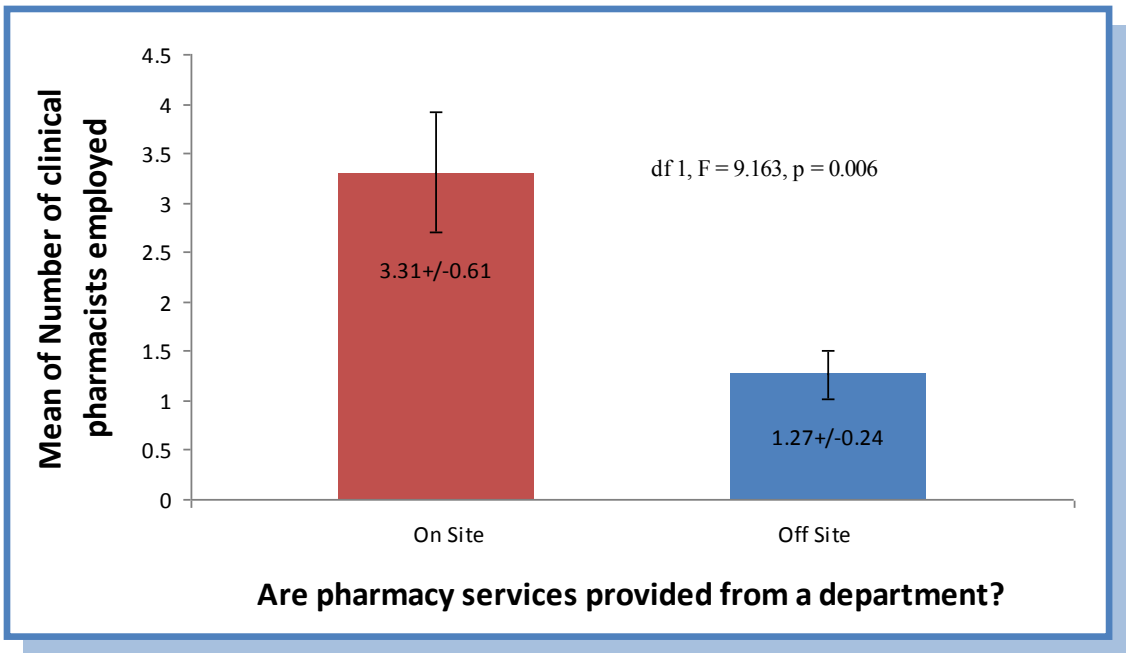


Table 6.12 Percentage of wards serviced by clinical pharmacists

Q 19 PS: percentage of wards serviced by clinical pharmacists	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	p value
< 25%	1 (6.3)	2 (15.4)	0.066
25-50%	0 (0)	4 (30.8)	
51-75%	3 (18.8)	2 (15.4)	
> 75%	12 (75)	5 (38.5)	
Total	16 (100)	13 (100)	

As can be seen from Table 6.12 hospitals with pharmacy services On Site were more likely to service more wards than those services provided Off Site, however the difference did not reach statistical significance (p value = 0.066).

Table 6.13 Time spent on wards by clinical pharmacists

	Pharmacy services are provided			
Question?	Response	On Site n (%)	Off Site n (%)	P value
Q 20.1 PS: Clinical pharmacists on wards fulltime?	Yes	5 (29.4)	0 (0)	0.101
Q 20.2 PS: Clinical pharmacist if part-time have other duties	Yes	13 (100)	6 (50)	0.014

Table 6.13 shows the allocation of clinical pharmacists duties in hospitals with On Site versus Off Site pharmacies. What is evident from the data is that On Site pharmacies had more pharmacists engaged in clinical services either on a full-time or part-time basis.

Table 6.14 Activities of clinical pharmacist

Q 21 PS: Clinical pharmacist activities	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Preadmission clinics	2 (11.8)	0 (0)	2 (6.7)
Admission histories	7 (41.2)	1 (7.7)	8 (26.7)
Daily medication chart review	13 (76.5)	12 (92.3)	25 (83.3)
Discharge counselling	16 (94.1)	9 (69.2)	25 (83.3)
Provide medilists	15 (88.2)	8 (61.5)	23 (76.7)
Management of trials	6 (35.3)	0 (0)	6 (20)
Design of charts/forms	11 (64.7)	3 (23.1)	14 (46.7)
Medication guidelines	13 (76.5)	10 (76.9)	23 (76.7)
Develop nursing policy	13 (76.5)	10 (76.9)	23 (76.7)
Nurse education	15 (88.2)	13 (100)	28 (93.3)
Total	17 (100)	13 (100)	30 (100)

Pharmacy services delivered on site were more likely to be involved in such activities as clinical trials management, admission medication history taking, discharge counselling, provision of medication lists, as well as design of charts and forms in use (Table 6.14). Core activities such as daily medication chart review and provision of medication guidelines were fairly standard across all sites.

One significant difference was that pharmacy services provided On Site were more likely to be involved in the review of medication incidents than those not. (On Site 78.9% vs Off Site 47.1%; $p = 0.047$.)

Table 6.15 Pharmacy roles in reviewing medication incidents

Q 22.2 PS: Who in pharmacy is responsible for medication incident reviews	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	Total n (%)
Chief/Director/Manager	7 (53.8)	1 (16.7)	8 (42.1)
Deputy Chief	2 (15.4)	1 (16.7)	3 (15.8)
Coordinator of Clinical Pharmacy	2 (15.4)	0 (0)	2 (10.5)
Clinical Pharmacist	4 (30.8)	3 (50)	7 (36.8)
Other	2 (15.4)	2 (33.3)	4 (21.1)
Total	13 (100)	6 (100)	19 (100)
Q 23 PS: What role do clinical pharmacists play in the review?	**Pharmacy On Site n (%)**	**Pharmacy Off Site n (%)**	**Total n (%)**
Recognise trends	8 (47.1)	5 (35.7)	13 (41.9)
Advise on remedies	10 (58.8)	8 (57.1)	18 (58.1)
Assist in education	12 (70.6)	10 (71.4)	22 (71)
Not applicable	3 (17.6)	3 (21.4)	6 (19.4)
Other	2 (11.8)	0 (0)	2 (6.5)
Total	17 (100)	14 (100)	31 (100)

As can be seen from the information provided in Table 6.15 pharmacy services provided Off Site were less likely to involve the Director of Pharmacy or have a Clinical Pharmacy Coordinator involved in medication incident review. However, where the pharmacy services were provided from did not seem to influence the roles clinical pharmacists played in the review of medication incidents. Further, it did not influence the allocation of clinical pharmacists to medication incident review as shown in Table 6.16.

Table 6.16 Allocation of clinical pharmacists to medication incident review

Q 24 PS: What FTE clinical pharmacist associated with medication incident review?	Pharmacy On Site n (%)	Pharmacy Off Site n (%)	p value
1 FTE	3 (17.6)	1 (8.3)	0.685
0.75 FTE	0 (0)	1 (8.3)	
0.5 FTE	2 (11.8)	1 (8.3)	
0.25FTE	2 (11.8)	2 (16.7)	
< 0.25 FTE	2 (11.8)	3 (25)	
Unknown	8 (47.1)	4 (33.3)	
Total	17 (100)	12 (100)	

Table 6.17 Reporting of pharmacist interventions and dispensing errors

	Pharmacy services are provided			
Question?	Response	On Site n (%)	Off Site n (%)	P value
Q 25 PS: Clinical pharmacists collect own interventions?	Yes	15 (83.3)	9 (60.0)	0.253
Q 25.1 PS: Are pharmacist interventions added to incident data?	Yes	8 (53.3)	6 (66.7)	0.521
Q 26 PS: Are dispensing errors that arrive on wards collected?	Yes	18 (94.7)	13 (81.3)	0.212
Q 27.1 PS: Does pharmacy self-record near misses?	Yes	13 (68.4)	4 (25.0)	0.023
Q 27.2 PS: Are pharmacy near misses added to incident data?	Yes	7 (53.8)	1 (20.0)	0.196

On Site pharmacy services are more likely to have clinical pharmacists collecting their own intervention data, but those with Off Site pharmacies more likely to include this data in their incident reports (Table 6.17), although the differences were not statistically significant.

Dispensing errors that arrive on the wards are collected as pharmacy dispensing errors regardless of the location of pharmacy service. However, near misses occurring in the pharmacy were far more likely to be reported in On Site pharmacies compared to their Off Site counterparts (68.4% vs 25.0%; $p = 0.023$)

On site pharmacy models are more likely to record pharmacy near misses as part of the general medication incident reporting system.

6.3.2 The Influence of the Ownership Model for Pharmacy Services

Table 6.18 Breakdown by State and level of occupancy

Breakdown within each state	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)	p value
New South Wales	1 (7.7)	12 (92.3)	13 (100)	0.309
Queensland	1 (20)	4 (80)	5 (100)	
South Australia	1 (33.3)	2 (66.7)	3 (100)	
Tasmania	1 (100)	0 (0)	1 (!00)	
Victoria	3 (33.3)	6 (66.7)	9 (100)	
Western Australia	1 (20)	4 (80)	5 (100)	
Total	8 (22.2)	28 (77.8)	36 (100)	
Q2: Average level of occupancy:	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**	**p value**
<70%	1 (12.5)	9 (36)	10 (30.3)	0.619
71-80%	4 (50)	8 (32)	12 (36.4)	
81-90%	2 (25)	6 (24)	8 (24.2)	
>90%	1 (12.5)	2 (8)	3 (9.1)	
Total	8 (100)	25 (100)	33 (100)	

Between states, there was no statistically significant difference in ownership model between the pharmacy services Contracted Out or Hospital Owned (Table 6.18). Hospitals with a higher level of occupancy tended to have Hospital Owned pharmacies, although the difference did not meet statistical significance.

Table 6.19 Specialties and critical care areas provided

Q 3 Specialties in each hospital:	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Orthopaedics	8 (100)	28 (100)	36 (100)
Cardiology	7 (87.5)	13 (46.4)	20 (55.6)
Urology	8 (100)	24 (85.7)	32 (88.9)
Oncology	7 (87.5)	15 (53.6)	22 (61.1)
Obstetrics & Gynaecology	8 (100)	22 (78.6)	30 (83.3)
Paediatrics	3 (37.5)	14 (50)	17 (47.2)
General surgery	8 (100)	28 (100)	36 (100)
Gastroenterology	8 (100)	22 (78.6)	30 (83.3)
Neurology	4 (50)	8 (28.6)	12 (33.3)
Plastics	7 (87.5)	25 (89.3)	32 (88.9)
Other	3 (37.5)	9 (32.1)	12 (33.3)
Total	8 (100)	28 (100)	36 (100)
Q 4 Special/Critical care areas in the hospital:	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**
Emergency Department	5 (62.5)	6 (33.3)	11 (42.3)
Adult ICU	7 (87.5)	13 (72.2)	20 (76.9)
Neonatal ICU	1 (12.5)	4 (22.2)	5 (19.2)
CCU	7 (87.5)	15 (83.3)	22 (84.6)
Total	8 (100)	18 100)	26 (100)

Those hospitals with a Hospital Owned pharmacy service were more likely to cater for more complex specialties such as Cardiology, Oncology, Gastroenterology and Neurology. They were also twice as likely to have an Emergency Department and more likely to have an Adult ICU (Table 6.19).

Table 6.20 Breakdown by surgical and medical patients

Q 5 Hospital caters predominantly for	Hospital Owned n (%)	Contracted Out n (%)	p value
Surgical > Medical	4(50)	21 (75)	0.178
Surgical = Medical	4 (50)	7 (25)	
Total	8 (100)	28 (100)	
Q 6.1 Average length of stay of surgical patients	**Hospital Owned n (%)**	**Contracted Out n (%)**	**p value**
Up to 1 day	0 (0)	1 (3.8)	0.409
1-3 days	3 (42.9)	17 (65.4)	
4-5 days	4 (57.1)	8 (30.8)	
Total	7 (100)	26 (100)	
Q 6.2 Average length of stay of Medical patients	**Hospital Owned n (%)**	**Contracted Out n (%)**	**p value**
Up to 1 day	0 (0)	0 (0)	0.102
1-3 days	0 (0)	2 (8.7%)	
4-5 days	0 (0)	8 (34.8)	
6 days	7 (100)	13 (56.5)	
Total	7 (100)	23 (100)	

As can be seen in Table 6.20 in those hospitals with Contracted Out pharmacy services there was an increased likelihood they would have a higher focus on surgery although the difference was not statistically significant. Contracted Out pharmacy service hospitals were more likely to have a shorter length of stay.

Table 6.21 Collocation, Medication Safety policy and medication incident reporting

		Pharmacy services are		
	Response	Hospital Owned n N (%)	Contracted Out n N (%)	P value
Q7: Collocated with a public hospital	Yes	4/8 (50)	2/28 (7.1)	0.014
Q1.1RMP: Has policy on medication safety[3]	Yes	8/8 (100)	22/26 (84.6)	0.238
Q1.2 RMP: Copy of policy made available	Yes	6/7 (85.7)	14/17 (82.4)	0.841
Q2.1 RMP: Medication incidents reported?	Yes	8/8 (100)	28/28 (100)	ns
Q2.2RMP: Part of hospital incident reporting	Yes	8/8 (100)	27/27 (100)	ns

Of the respondents six hospitals were co-located with a public hospital (Table 6.21) and of these 4 (66.6%) had a Hospital Owned pharmacy service. As such if a private hospital is collocated with a public hospital it is more likely that the pharmacy services would be Hospital Owned whilst if it is not collocated it is likely to be Contracted Out (4/8 vs 26/28; p = 0.014) and this difference was significant. All Hospital Owned pharmacy services stated the existence of a hospital medication safety policy and almost all provided copies of that policy as compared to 80% of Contracted Out pharmacies (p = 0.841).

All hospitals reported medication incidents and these incidents were part of the hospitals‘ incident reporting system independent of the ownership model.

Table 6.22 Format for collection of medication incidents

Q 3.1: Medication incidents are collected	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Hard Copy	6 (75)	25 (89)	31 (86.1)
Electronically	6 (75)	9 (32.1)	15 (41.7)
Total	8 (100)	28 (100)	36 (100)

[3] RMP means Risk Management Processes’ section of the Questionnaire.

Hospitals that owned their pharmacies were more likely to collect data on medication incidents electronically (Table 6.22).

When hospitals were asked to provide a hard or electronic copy of how they collect their medication incident data, of those that responded it was more likely that a Hospital Owned pharmacy would provide a hard copy than a Contracted Out pharmacy, i.e. 5/5 (100%) Hospital Owned compared to 16/22 (72.7%) for Contracted pharmacies (p = 0.185). When an electronic copy was requested we had four positive responses (80%) from Hospital Owned pharmacies compared to four (57%) from Contacted Out pharmacies (p = 0.408).

Table 6.23 Review of medication incidents

Q 4.1 Initial review of incident undertaken by	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Senior Nurse	0 (0)	9 (32.1)	9 (25)
Nurse/Unit Manager	6 (75)	22 (78.6)	28 (77.8)
Director	0 (0)	3 (10.7)	3 (8.3)
Pharmacist	5 (62.5)	1 (3.6)	6 (16.7)
Other	0 (0)	1 (3.6)	1 (2.8)
Total	8 (100)	28 (100)	36 (100)
Q 4.2 Incident reports are sent to	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**
Director	4 (50)	14 (50)	18 (50)
Medication Safety Officer	2 (25)	0 (0)	2 (5.6)
Project Officer	0 (0)	3 (10.7)	3 (8.3)
Safety and Quality	5 (62.5)	12 (42.9)	17 (47.2)
Other	3 (37.5)	8 (28.6)	11 (30.6)
Total	8 (100)	28 (100)	36 (100)

Hospital Owned pharmacies were more likely to have a pharmacist involved in medication incident reviews (Table 6.23). Further, it was more likely that reports were sent to a Medication Safety Officer or Safety and Quality person in a Hospital Owned pharmacy service.

Table 6.24 Use of a database and reports for medication incidents

		Pharmacy services are		
Question?	**Response**	**Hospital Owned n (%)**	**Contracted Out n (%)**	**P value**
Q 5 RMP: Have a Safety and Quality Coordinator?	Yes	8 (100)	27 (96.4)	0.588
Q 6 RMP: Medication incidents on a database	Yes	8 (100)	26 (92.9)	0.437
Q 7 RMP: Database used is Excel	Yes	2 (25)	7 (26.9)	0.914
Q 9.1 RMP: Medication incident reports produced	Yes	8 (100)	28 (100)	

As can be seen from the data presented in Table 6.24, a Safety and Quality Officer existed in almost all hospitals surveyed. Medication Incidents are entered onto a data base at more hospitals who own their pharmacy service and databases other than Excel™ were in use in most hospitals.

All hospitals produce medication incident reports, independent of the ownership of the pharmacy department.

Table 6.25 Frequency and content of medication incident reports

Q 9.2 RMP: How frequently are reports produced?	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**
Monthly	6 (75)	23 (82.1)	29 (80.6)
Quarterly	5 (62.5)	7 (25)	12 (33.3)
Six Monthly	3 (37.5)	2 (7.1)	5 (13.9)
Annually	3 (37.5)	1 (3.6)	4 (11.1)
Ad Hoc	4 (50)	1 (3.6)	5 (13.9)
Total	8 (100)	28 (100)	36 (100)
Q 10 RMP: Type or content of reports produced?	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**
Type of error	8 (100)	24 (92.3)	32 (94.1)
Frequency of error	8 (100)	18 (69.2)	26 (76.5)
Contributing factors	4 (50)	8 (30.8)	12 (35.3)
Severity	7 (87.5)	17 (65.4)	24 (70.6)
Other	5 (62.5)	11 (42.3)	16 (47.1)
Total	8 (100)	26 (100)	34 (100)

Whilst production of medication incident reports was commonly undertaken on a monthly basis independent of the ownership model, hospitals that owned their pharmacies were more likely to have them across a range of times. In terms of type and content of medication incident reports it would seem that those produced in hospitals that owned their pharmacies were more comprehensive.

The ownership of the pharmacy service did not influence the review process of Medication incidents with the majority of hospitals having a specific committee undertaking this task. (Hospital Owned 100% vs Contracted Out 96.4%; p = 0.588).

Table 6.26 Actions by review committee

Q 11.2 RMP Actions taken by reviewing committee:	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Table report only	2 (25)	9 (33.3)	11 (31.4)
Suggest practice change	8 (100)	24 (88.9)	32 (91.4)
Authorise education	5 (62.5)	22 (81.5)	27 (77.1)
Other	1 (12.5)	8 (29.6)	9 (25.7)
Total	8 (100)	27 (100)	35 (100)

As can be seen in the data presented in Table 6.26 the ownership of pharmacy services did not influence what actions were taken by the reviewing committee although those with a Contracted Out model had a slightly more varied role.

Graph 6.3 Mean number of Medication Incidents reported in previous 12 months by pharmacy ownership

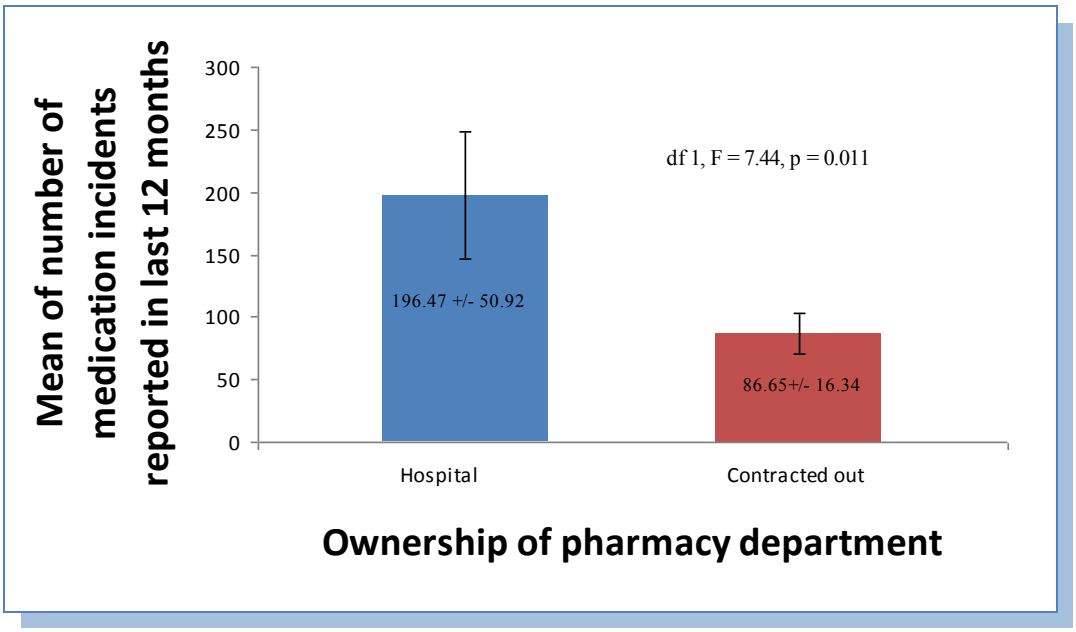


Table 6.27 Comparison of medication incident reports to previous year

Q 13 RMP: Comparison of medication incident numbers to previous year	Hospital Owned n (%)	Contracted Out n (%)	p value
More	3 (42.9)	5 (21.7)	0.591
Less	1 (14.3)	9 (39.1)	
Same	2 (26.6)	6 (26.1)	
Don't Know	1 (14.3)	3 (13.0)	
Total	7 (100)	23 (!00)	

From Graph 6.3 it is evident that the number of medication incidents reported is higher amongst hospitals that own their own pharmacy service. The rate of reporting change over the previous 12 months was hard to assess from Table 6.27 with Hospital Owned pharmacy services reporting more reports and Contracted Out pharmacy services reporting less reports.

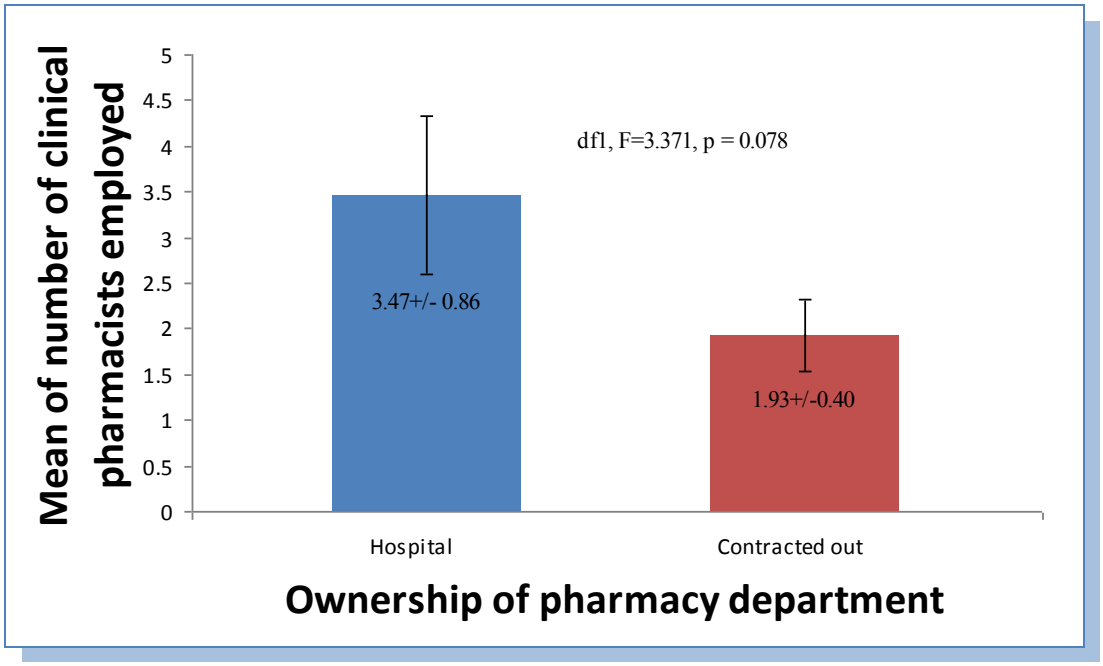
Table 6.28 Pharmacy location

Q 15 PS: Are pharmacy services provided from a Department?[4]	Hospital Owned n (%)	Contracted Out n (%)	p value
On Site	7 (87.5)	12 (42.9)	0.026
Off Site	1 (12.5)	16 (57.1)	
Total	8 (100)	28 (!00)	

There is a significant difference in ownership models when compared with location of pharmacy services as shown in Table 6.28, with On Site services tending to be Hospital Owned and Off Site services Contracted Out (p =0.026).

Clinical pharmacists were employed by Hospital Owned pharmacies more frequently than Contacted Out Pharmacy services but the difference was not significant. (Hospital Owned 100% vs Contracted Out 81.5%; p = 0.189). However, as can be seen from graph 6.4. Hospital Owned pharmacies employed significantly more clinical pharmacists.

Graph 6.4 (Q18 PS). Number of clinical pharmacists employed by pharmacy ownership?:



[4] PS means Pharmacy Services portion of the Questionnaire

Table 6.29 Percentage of wards serviced by clinical pharmacists

Q 19 PS: Percentage of wards serviced by clinical pharmacists	Hospital Owned n (%)	Contracted Out n (%)	p value
< 25%	1 (14.3)	2 (9.1)	0.633
25-50%	0 (0)	4 (18.2)	
51-75%	1 (14.3)	4 (18.2)	
> 75%	5 (71.4)	12 (54.5)	
Total	7 (100)	22 (100)	

As can be seen from Table 6.29, hospitals that owned their pharmacy service are likely to service more wards that those services that are Contracted Out (p = 0.633).

Table 6.30 Time spent on wards by clinical pharmacists

		Pharmacy services are		
Question?	Response	Hospital Owned n (%)	Contracted Out n (%)	p value
Q 20.1 PS: Clinical pharmacists on wards fulltime?	Yes	2 (25)	3 (13.6)	0.457
Q 20.2 PS: Clinical pharmacist if part time have other duties	Yes	5 (83.3)	15 (78.9)	0.812

Table 6.30 shows the allocation of clinical pharmacists' duties in hospitals that have Hospital Owned vs Contracted Out pharmacies. It is evident that most clinical pharmacists work on the wards on a part time basis and carry out other duties as well and this is independent of the ownership model involved.

Table 6.31 Activities of Clinical Pharmacist

Q 21 PS: Clinical pharmacist activities	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Preadmission clinics	1 (12.5)	1 (4.5)	2 (6.7)
Admission histories	4 (50)	4 (18.2)	8 (26.7)
Daily medication chart review	7 (87.5)	18 (81.8)	25 (83.3)
Discharge counselling	8 (100)	17 (77.3)	25 (83.3)
Provide medication lists	7 (87.5)	16 (72.7)	23 (76.7)
Management of trials	4 (50)	2 (9.1)	6 (20)
Design of charts/forms	5 (62.5)	9 (40.9)	14 (46.7)
Medication guidelines	7 (87.5)	16 (72.7)	23 (76.7)
Develop nursing policy	6 (75)	17 (77.3)	23 (76.7)
Nurse education	7 (87.5)	21 (95.5)	28 (93.3)
Total	8 (100)	22 (100)	30 (100)

Pharmacy services delivered from Hospital Owned pharmacies were more likely to be involved in such activities as admission medication history taking, discharge counselling, management of trials, design of forms and guidelines (Table 6.31). A core activity such as daily medication chart review was uniform across both models.

Pharmacies owned by the hospital were slightly more likely to be involved in medication incident review than those that were not. (Hospital Owned 75% vs Contracted Out 60.7%; p = 0.458).

Table 6.32 Pharmacy roles in reviewing medication incidents

Q 22.2 PS: Who in pharmacy is responsible for medication incident reviews	Hospital Owned n (%)	Contracted Out n (%)	Total n (%)
Chief/Director/Manager	3 (50)	5 (38.5)	8 (42.1)
Deputy Chief	2 (33.3)	1 (7.7)	3 (15.8)
Coordinator Clinical Pharmacy Services	1 (16.7)	1 (7.7)	2 (10.5)
Clinical Pharmacist	2 (33.3)	5 (38.5)	7 (36.8)
Other	1 (16.7)	3 (23.1)	4 (21.1)
Total	6 (100)	13 (100)	19 (100)
Q 23 PS: What role do clinical pharmacists play in the review?	**Hospital Owned n (%)**	**Contracted Out n (%)**	**Total n (%)**
Recognise trends	5 (62.5)	8 (34.8)	13 (41.9)
Advise on remedies	3 (37.5)	15 (65.2)	18 (58.1)
Assist in education	5 (62.5)	17 (73.9)	22 (71)
Not applicable	2 (25)	4 (17.4)	6 (19.4)
Other	2 (25)	0 (0)	2 (6.5)
Total	8 (100)	23 (100)	31 (100)

As can be seen from the information provided in Table 6.32 pharmacy services owned by the hospital were more likely to involve the Director or Deputy Director of Pharmacy in medication incident review. However, who owned the pharmacy service did affect who would recognise trends with Hospital Owned more involved while advice on remedies or assistance with education was more likely provided by Contracted Out services.

Table 6.33 Allocation of clinical pharmacists to medication incident review

Q 24 PS: What FTE clinical pharmacist associated with medication incident review?	Hospital Owned n (%)	Contracted Out n (%)	p value
1 FTE	1 (16.7)	3 (13)	0.716
0.75 FTE	0 (0)	1 (4.3)	
0.5 FTE	1 (16.7)	2 (8.7)	
0.25FTE	1 (16.7)	3 (13)	
< 0.25 FTE	2 (33.3)	3 (13)	
Unknown	1 (16.7)	11 (37.8)	
Total	6 (100)	23 (100)	

The majority of Hospital Owned pharmacies provided 0.5 or less FTE to do this function compared to Contracted Services. It was interesting to note the number of responders who did not know how much time was spent on this function if the pharmacy provider was a contracted service.

Table 6.34 Reporting of pharmacist interventions and dispensing errors

		Pharmacy services are		
Question?	Response	Hospital Owned n (%)	Contracted Out n (%)	P value
Q 25 PS: Clinical pharmacists collect own interventions	Yes	7 (87.5)	17 (68)	0.539
Q 25.1 PS: Are pharmacist interventions added to incident data	Yes	3 (42.9)	11 (64.7)	0.324
Q 26 PS: Are dispensing errors that arrive on wards collected?	Yes	8 (100)	23 (85.2)	0.247
Q 27.1 PS: Does pharmacy self-record near misses?	Yes	6 (75)	11 (40.7)	0.171
Q 27.2 PS: Are pharmacy near misses added to medication incidents?	Yes	3 (50)	5 (41.7)	0.737

Hospital owned services were more likely to have clinical pharmacists collecting their own pharmacy intervention data, but Contracted Out services were more likely to include this data in their medication incident reports.

Dispensing errors that arrived on the wards were collected as pharmacy dispensing errors regardless of the ownership model in place. However, ~~"n~~ear misses" occurring in the pharmacy were far more likely to be reported by Hospital Owned pharmacies compared to their Contracted Out counterparts. (75% vs 40.7%, p = 0.171).

Pharmacy ownership models did not significantly affect whether pharmacy ~~"n~~ear misses" were added to the hospital's medication incident reporting system.

6.3.3 The Influence of the Employment of Clinical Pharmacists

Table 6.35 Breakdown by State and level of occupancy

Breakdown within each state	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)	p valu e
NSW	10 (83.3)	2 (16.7)	12 (100)	0.292
QLD	5 (100)	0 (0)	5 (100)	
SA	2 (66.7)	1 (33.3)	3 (100)	
Tasmania	1 (100)	0 (0)	1 (!00)	
Victoria	9 (100)	0 (0)	9 (100)	
WA	3 (60)	2 (40)	5 (100)	
Total	30 (85.7)	5 (14.3)	35 (100)	
Q2: Average level of occupancy	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**Total n (%)**	**P valu e**
<70%	6 (22.2)	3 (60)	9 (28.1)	0.356
71-80%	11 (40.7)	1 (20)	12 (37.5)	
81-90%	7 (25.9)	1 (20)	8 (25)	
>90%	3 (11.1)	0 (0)	3 (9.4)	
Total	27 (100)	5 (100)	32 (100)	

Between states there was no statistically significant difference between the proportion of pharmacy services that employed clinical pharmacists or not (Table 6.35), although more state respondents stated they employed clinical pharmacists than not.

Table 6.36 Specialties and critical care areas provided

Q 3 Specialties in each hospital:	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Orthopaedics	30 (100)	5 (100)	35 (100)
Cardiology	19 (63.3)	1 (20)	20 (57.1)
Urology	28 (98.3)	3 (60)	31 (88.6)
Oncology	20 (66.7)	2 (40)	22 (62.9)
Obstetrics & Gynaecology	26 (86.7)	4 (80)	30 (85.7)
Paediatrics	13 (43.3)	3 (60)	16 (45.7)
General surgery	30 (100)	5 (100)	35 (100)
Gastroenterology	26 (86.7)	3 (60)	29 (82.9)
Neurology	11 (36.7)	1 (20)	12 (34.3)
Plastics	27 (90)	4 (80)	31 (88.6)
Other	11 (36.7)	1 (20)	12 934.3)
Total	30 (100)	5 (100)	35 (100)
Q 4 Special/Critical care areas in the hospital:	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**Total n (%)**
Emergency Dept	10 (43.5)	1 (33.3)	11 (42.3)
Adult ICU	19 (82.6)	1 (33.3)	20 (76.9)
Neonatal ICU	3 (13)	2 (66.7)	5 (19.2)
CCU	21 (91.3)	1 (33.3)	22 (84.6)
Total	23 (100)	3 (100)	26 (100)

Those hospitals who had specialties in Cardiology, Urology, Oncology, Gastroenterology were more likely to employ clinical pharmacists. They were also more likely to have an Adult ICU and CCU (Table 6.36).

Table 6.37 Breakdown by Surgical and Medical patients

Q 5 Hospital caters predominantly for	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	p value
Surgical > Medical	21 (70)	4 (80)	0.647
Surgical = Medical	9 (30)	1 (20)	
Total	30 (100)	5 (100)	
Q 6.1 Average length of stay of surgical patients	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**p value**
Up to 1 day	1 (3.7)	0 (0)	0.169
1-3 days	15 (55.6)	5 (100)	
4-5 days	11 (40.7)	0 (0)	
Total	27 (100)	5 (100)	
Q 6.2 Average length of stay of Medical patients	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**p value**
Up to 1 day	0 (0)	0 (0)	0.513
1-3 days	2 (8)	0 (0)	
4-5 days	6 (24)	2 (50)	
6 days	17 (68)	2 (50)	
Total	25 (100)	4 (100)	

As can be seen in Table 6.37 those hospitals that employed clinical pharmacists had a greater focus on medical patients, however this was not statistically significant. The longer the length of stay for surgical or medical patients did appear to predict the likely employment of clinical pharmacists.

Table 6.38 Collocation, Medication Safety policy and medication incident reporting

		Pharmacy services include		
	Response	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	P value
Q7: Collocated with a public hospital	Yes	6/6 (100)	0/6 (0)	0.0272
	No	24/29 (82.8)	5/29 (17.2)	
Q 1.1RMP: Has policy on medication safety[5]	Yes	26/29 (89.7)	3/4 (75)	0.400
Q1.2 RMP: Copy of policy made available	Yes	18/21 (85.7)	1/2 (50)	0.203
Q2.1 RMP: Medication incidents reported?	Yes	30/30 (100)	5/5(100)	ns
Q 2.2RMP: Part of hospital incident reporting	Yes	29/29 (100)	5/5 (100)	ns

Of the respondents six hospitals were co-located with a public hospital (Table 6.38), and if a private hospital is co-located with a public hospital it is more likely to employ clinical pharmacists than not (6/30 vs 0/5; p = 0.272).Slightly more hospitals who employed clinical pharmacists had a policy on medication safety (p = 0.400) and were willing to make a copy available (p = 0.203).

All hospitals reported medication incidents and ensured they formed part of the hospitals' incident reporting system, independent of whether clinical pharmacists were employed or not.

Table 6.39 Format for collection of medication incidents

Q 3.1: Medication Incidents are collected RMP	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Hard Copy	26 (86.7)	4 (80)	30 (85.7)
Electronically	13 (43.3)	2 (40)	15 (42.9)
Total	30 (100)	5 (100)	35 (100)

[5] RMP means Risk management processes' portion of the Questionnaire.

Clinical pharmacists employed or not did not make any major difference as to how medication incidents were collected.

When hospitals were asked to provide a hard or electronic copy of how they collect their medication incident data, of those that responded it was more likely that a Hospital that employed clinical pharmacists would provide a hard copy than those that did not, i.e. 19/23 (82.6%) employed clinical pharmacist to 2/4 (50%) for those that did not (p = 0.148). When an electronic copy was requested we had 6/10 positive responses (60%) from Hospital's that employed clinical pharmacists compared to 2/2 (100%) for those that did not (p = 0.273).

Table 6.40 Review of medication incidents

Q 4.1 Initial review of incident undertaken by RMP	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Senior Nurse	8 (26.7)	1 (20)	9 (25.7)
Nurse/Unit Manager	23 (76.7)	4 (80)	27 (77.1)
Director	3 (10)	0 (0)	3 (8.6)
Pharmacist	6 (20)	0 (0)	6 (17.1)
Other	1 (3.3)	0 (0)	1 (2.9)
Total	30 (100)	5 (100)	35 (100)
Q 4.2 Incident reports are sent to RMP:	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**Total n (%)**
Director	14 (46.7)	4 (80)	18 (51.4)
Medication Safety Officer	2 (6.7)	0 (0)	2 (5.7)
Project Officer	3 (10)	0 (0)	3 (8.6)
Safety and Quality	16 (53.3)	1 (20)	17 (48.6)
Other	10 (33.3)	0 (0)	10 (28,6)
Total	30 (100)	5 (100)	35 (100

The initial review of medication incidents was performed by the Nurse Manager regardless of whether clinical pharmacists were employed or not (Table 6.40) but was performed by a pharmacist when clinical pharmacists were employed.

It is more likely that reports are sent to a Medication Safety, Project or Safety and Quality Officer if clinical pharmacists are employed.

Table 6.41 Use of a Database and Reports for Medication Incidents

Question?	Response	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	P value
Q 5 RMP: Have a Safety and Quality Coordinator?	Yes	29 (96.7)	5 (100)	0.679
Q 6 RMP: Medication incidents on a database	Yes	29 (96.7)	4 (80)	0.137
Q 7 RMP: Database used is Excel	Yes	9 (31.0)	0 (0)	0.191
Q 9.1 RMP: Medication incident reports produced	Yes	30 (100)	5 (100)	ns

As can be seen from the data presented in table 6.41, a Safety and Quality Officer existed in almost all hospitals surveyed. Medication incidents are entered onto a data base at more hospitals that employ clinical pharmacists and databases other than Excel™ were in use in most hospitals.

All hospitals produce medication incident reports, independent of whether clinical pharmacists are employed.

Table 6.42 Frequency and content of medication incident reports

Q 9.2 RMP: How frequently are reports produced?	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Monthly	24 (80)	4 (80)	28 (80)
Quarterly	11 (36.7)	1 (20)	12 (34.3)
Six Monthly	5 (16.7)	0 (0)	5 (14.3)
Annually	4 (13.3)	0 (0)	4 (11.4)
Ad Hoc	5 (16.7)	0 (0)	5 (14.3)
Total	30 (100)	5 (100)	35 (100)
Q 10 RMP: Type or content of reports produced?	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**Total n (%)**
Type of error	27 (96.4)	4 (80)	31 (93.9)
Frequency of error	22 (78.6)	4 (80)	26 (78.8)
Contributing factors	11 (39.3)	0 (0)	11 (33)
Severity	21 (75)	2 (40)	23 (69.7)
Other	14 (50)	2 (40)	16 (48.5)
Total	28 (100)	5 (100)	33 (100)

Whilst production of medication incident reports was commonly undertaken on a monthly basis independent of the employment of clinical pharmacists, hospitals that did employ them were more likely to have them across a range of times (Table 6.42). In terms of type and content of medication incident reports it would seem that those produced in hospitals where clinical pharmacists were employed were more comprehensive and reported on contributing factors and severity of the incident.

The employment of clinical pharmacists did not influence the review process of medication incidents with the majority of hospitals having a specific committee undertaking this task. (Clinical Pharmacists employed 96.7% vs those that did not 100%; $p = 0.679$).

Table 6.43 Actions by review committee

Q 11.2 RMP: Actions taken by reviewing committee	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Table report only	9 (31)	1 (20)	10 (29.4)
Suggest practice change	28 (96.6)	3 (60)	31 (91.2)
Authorise education	24 (82.8)	2 (40)	26 (76.5)
Other	7 (24.1)	1 (20)	8 (23.5)
Total	29 (100)	5 (10)	34 (100)

As can be seen in the data presented in Table 6.43 hospitals that employed clinical pharmacists had reviewing committees that were more likely to suggest practice changes and authorise corrective education.

Graph 6.5 (Q12 RMP) Mean number of Medication Incidents reported in previous 12 months by clinical pharmacists employed

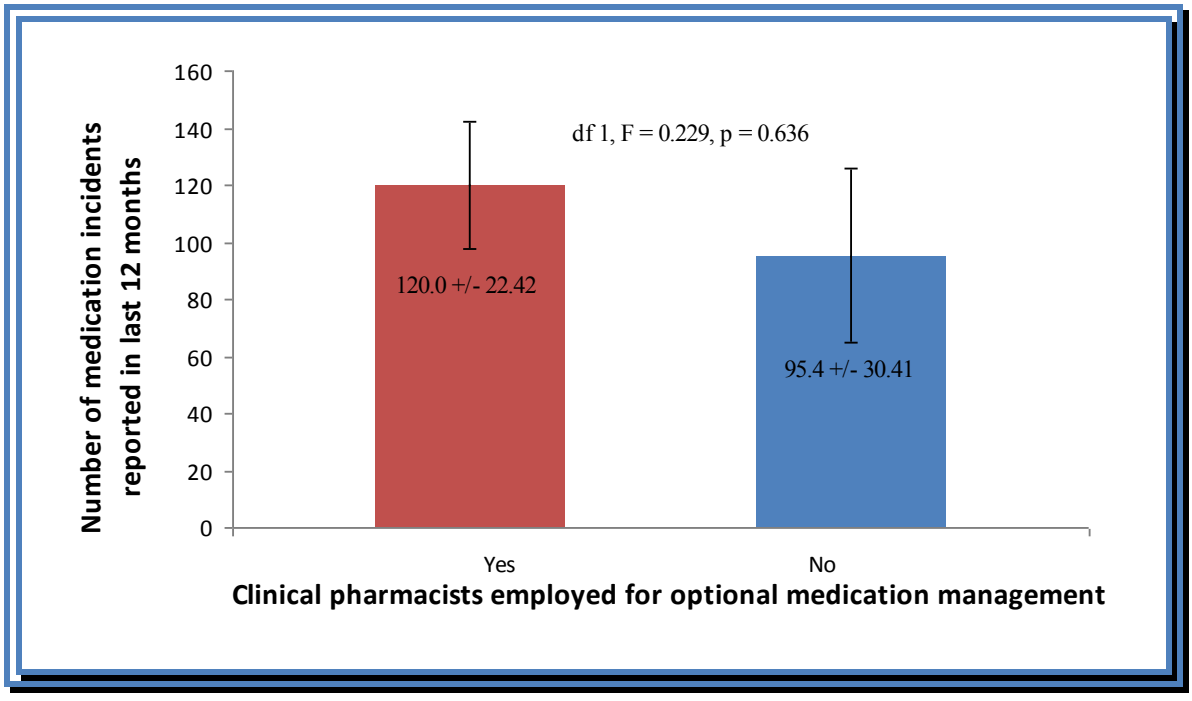


Table 6.44 Comparison of medication incident reports to previous year

Q 13 RMP: Comparison of medication incident numbers to previous year	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	p value
More	6 (25)	2 (40)	0.821
Less	9 (37.5)	1 (20)	
Same	6 (25)	1 (20)	
Don't Know	3 (12.5)	1 (20)	
Total	24 (100)	5 (100)	

From Graph 6.5 it is evident that the number of medication incidents reported is higher amongst hospitals that employ clinical pharmacists. The rate of reporting change over the previous 12 months was hard to assess from Table 6.44 with those that did not employ clinical pharmacists reporting more reports.

Table 6.45 Pharmacy location and ownership

Q 15 PS: Are pharmacy services located on site or off site?[6]	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	p value
On site	17 (56.7)	2 (40)	0.489
Off site	13 (43.3)	3 (60)	
Total	30 (100)	5 (100)	
Q 16 PS: Are pharmacy services owned or contracted?	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**p value**
Hospital owned	8 (26.7)	0 (0)	0.189
Contracted	22 (73.3)	5 (100)	
Total	30 (100)	5 (100)	

[6] PS means Pharmacy Services portion of the Questionnaire.

A pharmacy service was available to all hospitals regardless of whether clinical pharmacists were employed (30/30,100%) or not (5/5,100%).

Location of the pharmacy service as shown in Table 6.45, either On Site or Off Site, was not influenced by whether clinical pharmacists were employed or not (p = 0.489).

Clinical pharmacists were employed by Hospital Owned pharmacies more frequently than Contacted Out Pharmacy services but the difference was not significant. (Hospital Owned 100% vs Contracted Out 81.5%; p = 0.189).

However, as can be seen from graph 6.4. Hospital Owned pharmacies employed more clinical pharmacists.

Table 6.46 Percentage of wards serviced by clinical pharmacists

Q 19 PS: Percentage of wards serviced by clinical pharmacists	Clinical pharmacists employed n (%)
< 25%	3 (10.3)
25-50%	4 (13.8)
51-75%	5 (17.2)
> 75%	17 (58.6)
Total	29 (100)

Table 6.47 Time spent on wards by Clinical Pharmacists

Question?	Response	Clinical pharmacists employed n (%)
Q 20.1 PS: Clinical pharmacists on wards fulltime?	Yes	4 (13.3)
Q 20.2 PS: Clinical pharmacist if part time have other duties	Yes	19 (76)

Table 6.48 Activities of clinical pharmacist

Q 21 PS: Clinical pharmacist activities	Clinical pharmacists employed n (%)
Preadmission clinics	2 (6.7)
Admission histories	8 (26.7)
Daily medication chart review	25 (83.3)
Discharge counselling	25 (83.3)
Provide medication lists	23 (76.7)
Management of trials	6 (20)
Design of charts/forms	14 (46.7)
Medication guidelines	23 (76.7)
Develop nursing policy	23 (76.7)
Nurse education	28 (93.3)
Total	30 (100)

The questions represented by Tables 6.46 6.47 and 6.48 could only be answered by hospitals that employed clinical pharmacists.

Pharmacy providers who employ clinical pharmacists are statistically more likely to be involved in the review of medication incidents (Clinical pharmacists employed 73.3% vs Clinical pharmacist not employed 20%; p = 0.20).

Table 6.49 Pharmacy roles in reviewing medication incidents

Q 22.2 PS: Who in pharmacy is responsible for medication incident reviews	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
Chief/Director/Manager	7 (38.9)	1 (100)	8 (42.1)
Deputy Chief	3 (16.7)		3 (15.8)
Coordinator Clinical Pharmacy	2 (11.1)		2 (10.5)
Clinical Pharmacist	7 (38.9)		7 (36.8)
Other	4 (22.2)		4 (21.1)
Total	18 (100)	1 (100)	19 (100)
Q 23 PS: What role do clinical pharmacists play in the review?	**Clinical pharmacists employed n (%)**	**Clinical pharmacists not employed n (%)**	**Total n (%)**
Recognise trends	12 (42.9)	1 (33.3)	13 (41.9)
Advise on remedies	17 (60.7)	1 (33.3)	18 (58.1)
Assist in education	21 (75.5)	1 (33.3)	22 (71)
Not applicable	4 (14.3)	2 (66.7)	6 (19.4)
Other	2 (7.1)	0 (0)	2 (6.5)
Total	28 (100)	3 (100)	31 (100)

As can be seen from the information provided in Table 6.49, pharmacy services that employ clinical pharmacists were more likely to involve a range of pharmacy positions along with the Director of Pharmacy in medication incident review. However, employing clinical pharmacists did influence activities such as advice on remedies and assistance with corrective education. The data for when clinical pharmacists were not employed it was assumed referred to the roles provided by the Director of Pharmacy.

Table 6.50 Allocation of clinical pharmacists to medication incident review

Q 24 PS: What FTE clinical pharmacist associated with medication incident review?	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	Total n (%)
1 FTE	3 (11.5)	1 (33.3)	4 (13.8)
0.75 FTE	1 (3.8)	0 (0)	1 (3.4)
0.5 FTE	3 (11.5)	0 (0)	3 (10.3)
0.25FTE	4 (15.4)	0 (0)	4 (13.8)
< 0.25 FTE	5 (19.2)	0 (0)	5 (17.2)
Unknown	10 (38.5)	2 (66.7)	12 (41.4)
Total	26 (100)	3 (100)	29 (100)

The majority of hospitals that employed clinical pharmacists provide 0.5 or less FTE to do this function compared to the single response for the Director of Pharmacy when clinical pharmacists are not employed (Table 6.50). It was interesting to note the number of responders who did not know how much time was spent on this function and the number of respondents i.e. 3 that provided a full time clinical pharmacist to this role.

Table 6.51 Reporting of pharmacist interventions and dispensing errors

Question?	Response	Clinical pharmacists employed n (%)	Clinical pharmacists not employed n (%)	P value
Q 25 PS: Clinical pharmacists collect own interventions	Yes	23 (79.3)	1 (33.3)	0.08
Q 25.1 PS: Are pharmacist interventions added to incident data	Yes	14 (60.9)	0 (0)	0.227
Q 26 PS: Are dispensing errors that arrive on wards collected?	Yes	28 (93.3)	3 (75)	0.225
Q 27.1 PS: Does pharmacy self-record near misses?	Yes	17 (56.7)	0 (0)	0.041
Q 27.2 PS: Are pharmacy near misses added to medication incidents?	Yes	8 (44.4)	0 (0)	

As can be seen in Table 6.51, hospital pharmacy services who employed clinical pharmacists were significantly more likely to have clinical pharmacists collecting their own pharmacy intervention data (p = 0.08), but not all departments entered the interventions with the hospital incident data. These providers were more likely to collect data on dispensing errors that reached the wards as well (93.3% vs 75%; p = 0.225).

However, ~~"n~~ear misses" occurring in the pharmacy were far more likely to be reported by pharmacy services that employed clinical pharmacists compared to those who did not. (56.7% vs 0%, p = 0.041).

Having clinical pharmacists did not significantly affect whether pharmacy near misses were added to the hospital's medication incident reporting system.

6.4 DISCUSSION

The influences of the location of the pharmacy service (Table 6.1 to Table 6.17), the ownership of pharmacy services (Tables 6.18 to Table 6.34) and the employment of clinical pharmacists (Table 6.35 to Table 6.51) on responses to the Questionnaire have been reviewed and the results detailed in section 6.3. In this section the key findings for each of these studied influences will be discussed and where possible the results assessed against the published literature.

6.4.1 KEY FINDINGS FROM THE INFLUENCE OF LOCATION OF PHARMACY

Of those hospitals that completed the survey, nineteen hospitals responded they had a pharmacy On Site whilst seventeen responded they had an Off Site pharmacy. The balance (2/38) did not state they had a pharmacy service.

It was worth noting that all hospitals reported medication incidents and these were part of the hospital's incident reporting system independent of the location of the pharmacy, demonstrating a strong willingness to collect data. But it was significant that On Site pharmacy respondents had a policy on medication safety as compared to the Off Site pharmacies (p = 0.024), as well as having a higher mean number of medication incidents reported (p = 0.001). On Site pharmacy services were

significantly more likely to be involved in the review of medication incidents than Off Site ($p = 0.047$).

There was a significant difference in the location of pharmacy services when compared to ownership model, with hospital owned services tending to be On Site and contracted services more likely to be Off Site ($p = 0.026$). This is key to understanding the reasons why On Site services are provided at a higher level than Off site. The incorporation of a pharmacist into a multidisciplinary clinical team is easier to achieve if all hospital caregivers share the same employer and share the same mission for the organisation to reduce harm from medications. While clinical pharmacists were employed by the majority of pharmacies independent of their location, On Site pharmacies were more likely to employ almost three times more clinical pharmacists than Off Site pharmacies ($p = 0.006$). Similarly On Site pharmacies had more pharmacists engaged in clinical services activities either on a full time or part-time basis. If part-time, clinical pharmacists were more likely to have other duties to perform if employed by an On Site pharmacy ($p = 0.014$). Even in the pharmacy while completing the dispensing process, ~~"n~~ear miss" dispensing errors that occurred in the pharmacy were far more likely to be reported in On Site pharmacies compared to their Off Site counterparts ($p = 0.023$).

The more positive outcomes from On Site pharmacy services are obvious from the highlighted key results above. But this does not mean that there is not an important role for Off Site contracted services and that innovative solutions cannot be provided to ensure services are provided at an acceptable level. In the USA where the majority of hospitals are private, many different location and ownership models exist. Both On Site and Off Site pharmacy services are common but some key technological and system solutions have been developed to enhance Off Site services development. The use of telepharmacy is widely reported as a solution to service hospitals in rural and remote areas, even across state boundaries,[88] with long distance supervision of pharmacy technicians by pharmacists being developed. Various telepharmacy models are being implemented depending on state regulations, hospital ownership, hospital size and medication order volume. Some claim that error rates have improved since telepharmacy was introduced. In 2008 in USA, Off Site medication order review was used in 20.7% of hospitals in a national survey.[89] Telepharmacy has also spread to critical care beds with reports of small hospitals gaining benefit from connection to a

remote office based ICU monitoring facility powered by telemedicine technology called eICU.[90] The remote pharmacists provided ratification to electronic physician order entries as well as recommendations for problems with antimicrobial coverage and formulary choices. On Site pharmacies in the USA have also been expanding their services to an ―around the clock" clinical pharmacy service.[91] Use of an external source to problem solve and review clinical issues could help to offset this development. Similarly remote dispensing via remote access to a hospital's computer network and the use of electronic medication management systems with robotic dispensing processes are also gaining in popularity.[89] This has effectively been used to manage rural hospitals from a central larger ―hub" hospital in Minnesota during perceived high risk times such as weekends and public holidays.[92] Hence, a 24 hour clinical pharmacy review or information service could be provided to assist hospitals without an On Site pharmacy, using remote access to their computer systems. With private hospital bed numbers and throughput increasing annually, pharmacies must continually review and look for solutions that have been proven to be of benefit to ensure safe medication practices exist and harm to patients from medications is reduced.

6.4.2 KEY FINDINGS FROM THE INFLUENCE OF OWNERSHIP

Pharmacy Services in private hospitals in Australia were either Hospital Owned or Contracted Out to a third party. The majority of those surveyed were Contracted Out and this was consistent across all Australian states. Similar ownership models exist in USA with religious congregation owned hospitals owning their own pharmacies[93] and private companies such as Kaizer Permanente, a closed health maintenance organisation, owning or contracting services out.[94]

Peterson et al in 1988 surveyed Australian private hospitals and identified that the vast majority of the hospitals were serviced by the community pharmacies and that services provided varied across the sector.[125] Moles et al in 2004 in a survey of NSW private hospitals concluded that 92% were serviced by community pharmacies with 90% of these pharmacies located outside the hospital grounds i.e. Off Site. [126] They too noted that the type and frequency of pharmacy services provided varied greatly in these hospitals with some providing clinical pharmacy duties weekly whilst others provided services daily. [126]

Another ownership model exists in Australia called collocation. This is where a private hospital is constructed in the grounds of or near to a traditional public hospital or a privately operated public hospital. This is a growing trend in Australia, with 40 collocated hospitals reported to exist in 2000, with a range of collocation models in place in response to local needs.[78]

In this study, Wyer stated that only one pharmacy service was located Off Site and the rest were all On Site. The ownership of the pharmacy providing services was either owned by the private hospital (e.g. Catholic Health) or by the public hospital or in a partnership with either an On Site or Off Site pharmacy and a sessional clinical pharmacist.[78] This correlated closely with this projects findings where private hospitals collocated with a public hospital, were more likely to have a Hospital Owned pharmacy service whilst if not collocated it was more likely to be Contracted Out ($p = 0.014$). It is worth noting that the private denominational hospitals have operated as collocated hospitals much longer than the other private hospital models.[78]

All hospitals reported medication incidents that formed part of the hospitals' incident reporting system and produced regular reports which were all independent of the ownership model. Allied to this, dispensing errors that arrive on wards were collected as pharmacy dispensing errors regardless of ownership model. But it was noted that hospitals that owned their own pharmacies were more likely (75% vs 32%) to collect data on medication incidents electronically. This is most likely due to the fact that a hospital such as this would be more likely to have the funds to invest in this technology.

Daily medication chart review was uniformly reported across both ownership models and this correlates with Wyer's findings of common services in private hospitals including inpatient dispensing, medication chart review, drug information, discharge medication counselling and written information to selected patients.[78] In contrast, Moles et al more recently reported that although the range of pharmacy services provided to NSW private hospitals varied greatly they in particular noted that clinical pharmacy services were underdeveloped.[127] They reported that approximately a third of pharmacy providers provided medication chart review or patient counselling services at their private hospitals[127] but they did not examine the role of a pharmacist in medication incident reporting or management. Similarly, Petersons study from

1988, revealed that medication chart reviews were provided in approximately 49% of their sample of private hospitals.[125]

The number of medication incidents reported is statistically significantly higher amongst hospitals that own their own pharmacy service compared to Contracted Out services ($p = 0.011$). This is an important to note as hospitals that own their own pharmacy are more likely to reinvest the income generated into improving their medication management process. This would be due to the pharmacy staff being involved in hospital committees, aware of hospital priorities, having access to hospital initiatives e.g. electronic recording of incidents, and particularly being more aware of the value of clinical pharmacists working in a multidisciplinary team. This is easier to understand when you note that there is a significant difference in pharmacy ownership models when compared with the location of pharmacy services, with On Site services tending to be Hospital Owned and Off Site services Contracted Out ($p = 0.026$). A similar experience is reported in the USA when the Sisters of Mercy Health Systems recently transformed their medication management process by procuring new technology and by actively training and placing clinical pharmacists from their hospital owned pharmacies onto their wards.[93] The primary reason for this change by Mercy Health was the realisation that they needed to invest in patient safety and improve their clinical practices.[93]

6.4.3 Key Findings from the Influence of Clinical Pharmacists

The need for hospitals to employ clinical pharmacists to reduce medication related harm has been stated widely in the literature as medication safety grows in importance.[4,43] This has grown from the Second National Report in 2002,[4] to the Health Ministers assertion in 2004, that all inpatients in public hospitals should undergo a process of pharmaceutical review. This has led to the development of the WA Health Department Pharmaceutical Review Policy,[48] which was the first state to action this undertaking. Allied to this the assigning of a financial value on the impact of clinical pharmacist interventions on wards has led to increased publicity for the value of clinical pharmacists.[43,95]

This study demonstrates the uptake of these developments in the Australian private hospital sector and reflects the USA experiences highlighted by Mercy Health

Systems when they pursued active employment of greater numbers of clinical pharmacists on their wards i.e. a an increase of 0.5 FTE clinical pharmacist per 100 beds to 2.3 FTE per 100 beds to good effect.[93]

We know that all hospitals reported medication incidents, that were included in the hospitals incident reporting system and produced reports, independent of whether clinical pharmacists were employed or not. The initial review of medication incidents was performed by the nurse manager regardless of whether clinical pharmacists were employed or not, but where this task was performed by a pharmacist, clinical pharmacists were employed by that hospital, demonstrating their involvement in the process. It is worth noting, but not statistically significant that when hospitals employed clinical pharmacists they produced more frequent and comprehensive medication incident reports including type, contributing factors and severity of the incident.

Pharmacy providers who employed clinical pharmacists were statistically more likely to be involved in the review of medication incidents ($p = 0.02$) and they influenced the process by providing advice on remedial actions. Three of those providers had an FTE assigned to the role of medication incident review; however, the majority assigned 0.5 FTE or less.

Hospitals who employed clinical pharmacists were more likely to have clinical pharmacists collecting their own pharmacy intervention data (79% vs 33%; $p = 0.08$). This was not statistically significant, but an important fact none the less.

Both models collected data on dispensing errors that reached the wards but this was more common when clinical pharmacists were employed. Similarly ~~"n~~ear misses" occurring in the pharmacy were far more likely to be reported by pharmacy providers that employed clinical pharmacists compared to those who did not ($p = 0.041$)

The American Society of Hospital Pharmacists endorsed in June 2003, that ~~"d~~eficiencies in the sharing of patient information are core contributing factors to the discontinuity of care, which is a logical precursor to medical errors".[94] They stated that continuity of care was a vital requirement in the appropriate use of medications and that pharmacists should take responsibility for this and work to identify any gaps that would prevent the continuous management of medications.

These findings indicate clearly that clinical pharmacists, or a pharmacist in general, are a vital cog in the medication management cycle and their value has now been assigned a financial benefit. Clinical pharmacists' have a demonstrated and valued role in reducing medication misadventure. The quantum of medication incidents occurring or the level of medication misadventure has been shown to be inversely related to the number of clinical pharmacists employed to undertake pharmaceutical care on the wards. This fact strengthens the case further for their routine employment and their continued and ongoing involvement in medication safety.

6.5 CONCLUSION

Many different models exist for pharmacy services attached to Australian private hospitals. The extent of those services was affected by the location of the service, the ownership of the service and the employment or not of clinical pharmacists. Services provided On Site were more likely to be Hospital Owned and in general provided wider support to the hospital to avoid medication misadventure. Off Site pharmacies which were generally Contacted Out services were faced with the challenge of addressing some of the gaps and shortfalls in their service. These gaps are possible to overcome given the developments in technology and telepharmacy in particular in the United States of America and their success in meeting patients' needs for pharmaceutical care. The drivers for clinical pharmacist employment to avoid medication error and harm are becoming so obvious now that services that employ few or no clinical pharmacists will be forced by administrators, clinical staff and patients alike to improve the range and quality of their clinical pharmacy services to ensure optimal patient safety and care.

Other models such as public and private collocated services do exist and are growing in number in Australia. This model has demonstrated advantages based on the circumstances around their development but were not studied in any great detail in this study.

Finally, pharmacists are medication experts and their use in whatever model of private hospital pharmacy service that is in existence, will reduce the harm associated with medications in those hospitals.

CHAPTER 7 DEVELOPMENT OF MEDICATION SAFETY AND IMPACT ON ST JOHN OF GOD HEALTH CARE

7.1 BACKGROUND

The origins of the concept of medication safety lie in the concept of patient safety. Patient safety was first brought to the public's attention in the Harvard Medical Study and later reproduced in the Quality in Australian Healthcare Study (QAHCS).[9] The QAHCS showed that preventable problems due to health care management were a major cost to the Australian healthcare system with medication errors accounting for up to 10.8% of adverse events in hospitalised patients. This equated to 1.8% of hospital admissions associated with an adverse drug event (adverse drug reaction and medication error) severe enough to cause disability, of which 43% were considered preventable. Extrapolating these results to all public and private hospital admissions in Australian in 1994/95 provided an estimation that 87,000 adverse drug events in that year were severe enough to cause disability with an estimated cost of $350 million annually,

While the information from this study (QAHCS) identified preventable problems existed, it did not provide information useful to practicing clinicians on the nature of the problems or on prevention methods. These studies led to a national interest in addressing these issues and finding solutions and resulted in the formation of the Australian Patient Safety Foundation and the Australian Medication Safety Working Group. An initial Workshop entitled –Reducing Adverse Events in the Australian Health Care System" 13-14 March 1998 Adelaide[96], brought together many of the future major contributors to the area of medication safety. The contributors spoke of the nature and extent of medication related adverse events and hospitalisations, along with the need for a classification system, a national policy, a focus on system problems and identified high risk medications.

Subsequently some important reports were generated for the Australian Health Ministers, in particular the Second National Report on Patient Safety _Improving Medication Safety'[4] which focused on the work in medication safety primarily in the

public hospital sector and an increasing focus on identifying types of medication incidents and the risks associated with them.

7.1.1 Private and Public Hospitals in Australia:

The development of a medication safety focus in private hospital practice took longer owing to the diverse nature of private hospital practice. Private hospitals catered for many different ownership models including, _For Profit' and _Not for Profit', with commercial interests and sensitivities in a competitive marketplace providing little common ground. This allied to varying sizes and specialties covered made consensus and common focus difficult. In addition, private hospitals had to contend with a lack of medical practitioner buy in as the majority are non-staff members and are in fact Visiting Medical Officers (VMOs) who desire autonomy. Private hospitals had a different focus and different set of challenges to overcome to accommodate changes in practice, even if there was good evidence. This was highlighted at the Private Health Industry Quality and Safety Committee (PHIQS) meeting in Sydney 17-18 October 2002[17] along with the need to focus attention on this large component of the total health industry in Australia.[85] In 1994-95 Libby Roughhead reported[96] there were 3.4 million separations from public acute hospitals and a further 1.5 million private hospital separations. By 2004-5 and 2008-9, if we extrapolate the data available from the Australian Institute of Health and Welfare [85] the number of separations increased significantly over these years and the contribution of the private sector continued to grow. In 2004/5 public hospital separations were approximately 4.06 million compared with 3.04 million private hospital separations. By 2008/9 this had grown by a further 16% with public hospital separations now 5.0 million compared to 3.9 million private hospital separations.[85]

7.1.2 St John of God Hospital Subiaco Drug and Therapeutic Committee

The major medication safety supporting committee at SJOGHS, the largest hospital in the St John of God Health Care group, with approximately 300 beds in the early 2000s, was the hospital's DTC. This committee with multidisciplinary representation including medical practitioners, nursing and pharmacy representatives was modelled on similar committees operating in the public hospital sector in Western Australia. The committees function was not purely medication safety but in 2000 it was the only formal committee that would address any medication safety issues including

review of medication policies, guidelines, charts and forms. The committee evaluated new medication treatment modalities and was a forum to present data gathered from drug utilisation surveys and medication incident reports.

7.2 METHOD

A review of the Annual Reports of SJOGHC and key medication safety supporting committees at the Subiaco campus was undertaken to gain an insight into the development of medication safety within the organisation over the period 2000-2010. Allied to this a summary of parallel medication safety developments occurring within Australia was conducted.

7.3 RESULTS

7.3.1 FINANCIAL YEAR 2000-2001

7.3.1.1 SUBIACO DEVELOPMENTS:

In 2000 a Medication Policy and Procedure Subcommittee of the DTC was already in operation, with the DCP as chairperson, to assist in the more timely development and review of medication policy and procedures, and reduce time of the parent DTC.

Deidentified quarterly summary reports of accident and incident forms presented to pharmacy, continued to be provided to the DTC by the Chief Pharmacist. Concern was raised that no outcomes were measured or measurable. From early 1999 each medication incident was sent to the DCP for review.

A new self-directed learning package on medication administration was under development by the DCP and the hospital‘s Learning and Development Department, with the aim of reducing the frequency of medication incidents.

An Adverse Drug Reaction Monitoring System and policy was developed by the DCP and was ratified by the hospital‘s Medical Advisory Committee on the 20th March 2001. Then a Complementary Medicines policy was introduced for consideration (March 2001).

Medication incident reports were considered low in number and concerns were expressed with regard to the low levels of reporting. Concerns were expressed

regarding the effect that a high usage level of agency nursing staff by the hospital may have, as they were often not aware of the hospitals policies and procedures.

In February 2001, concerns arose with regard to any potential liability committee members reviewing medication incidents may have had under the Health Services (Quality Improvement) Act 1994.[19] This was in particular a concern when incidents continued to recur and hence posed the question whether the Act indemnified them or not. A letter was sent to the Health Department of Western Australia to clarify whether the DTC was an approved Quality Improvement Committee. The DTC felt that reviewing incidents was important but it needed wider trend data other than quarterly reports of incidents received and also needed a measure of outcomes achieved. The DTC requested formalising the incident reporting process into a flow chart showing the reporting structure for medication incidents through the various committees; e.g. Pharmacy, Medication Policy and Procedure Sub Committee, Nursing Practice Council, Patient Care Committee and finally to the DTC.

The DTC requested a review of the accident and incident form classifications with a view to standardisation to allow some analysis of trends as well as the creation of a computerised database to assist in strengthening the reporting loop between Committees and specific parties. It was noted it was difficult to get access to appropriate databases and reports. It was also noted that infrequent reviews were occurring as key committees met so infrequently.

The –Medication Quiz", developed by the DCP and Learning and Development was made compulsory for all nursing staff to undertake.

The hospital proposed the formation of an Office of Safety and Quality of Care at Subiaco to promote better clinical care throughout the hospital but initially in Orthopaedic Surgery only. This proposal did not mention anything about a role in medication error prevention and management.

7.3.1.2 NATIONAL DEVELOPMENTS

The Australian Council for Safety and Quality in Health Care was established in January 2000.

7.3.2 FINANCIAL YEAR 2001-2002

7.3.2.1 SUBIACO DEVELOPMENTS

From July 1 2001, the DCP developed and commenced reporting a summary of each incident with suggested recommendations to avoid the incident in the future. This –Summary Medication Incident" form (Appendix 2) was then attached to the Accident and Incident Report form (Appendix 1). This summary was then sent to the relevant Directors for comment and entered onto a new database managed by the Nursing Director. A monthly report was provided for review by the Medication Policy and Procedure Subcommittee and a report tabled from them at the Nursing Practice and Research Council for action by Nurse Mangers if required (Appendix 3). The DTC then received a quarterly compilation report.

An Admission Medication Policy, with added role for a clinical pharmacist in the process was ratified by the DTC.

In April 2002, the Hospital Executive decided that the separate summary form of the incidents by pharmacy and other hospital staff was no longer required and that the Accident and Incident forms were to be signed as read only with comments if deemed relevant.

The DCP requested the need to increase the number of medication incidents reviewed as it was felt a high degree of underreporting was occurring. Nurse Managers were urged to provide a summary on the Accident and Incident forms and pharmacy would add information only if necessary. It was proposed that the Accident and Incident form be redesigned and reduced to a 2 page format. Information from the accident and incident data began to be recorded in a new specific hospital Access™ database.

7.3.2.2 SJOG GROUP DEVELOPMENTS

In early 2002, the National body, SJOGHC, the group responsible for all divisions or hospitals throughout Australia, commenced a review aimed at resolving the issue of r indemnity for committee members.[97]

7.3.3 FINANCIAL YEAR 2002-2003

7.3.3.1 SJOG GROUP DEVELOPMENTS

In October 2002, SJOGHC set up a National Clinical Risk Management and Quality Committee with a view to developing an integrated system for patient safety and quality care.[98] A National Clinical Risk Coordinator was appointed for each division with the Subiaco campus in the western division. The aims of the committee and the appointment included the following:

- To develop a set of National Risk Classification Tools
- Identify priority risk areas
- Implement national standards to ensure consistency
- Clarify accountability and responsibility
- Implement a culture of audit and continuous improvement

The aims of the National Risk Classification Tool were to establish a severity of risk involved and determine a course of action. If the risk was deemed critical or major, then a root cause analysis (RCA) would be required. To this end training in RCA was provided to all senior clinical staff at Subiaco including the DCP.

Allied to this a decision was made to review the benefits of introducing an integrated electronic accident-incident management system to capture all patients‘ incidents.[98]

7.3.3.2 NATIONAL DEVELOPMENTS:

The PHIQS Committee was established in January 2001 to coordinate and lead quality and safety enhancement initiatives in the private health sector. PHIQS in collaboration with the Pharmaceutical Health and Rational Use of Medicines (PHARM) Committee convened a workshop in Sydney on 17-18 October 2002[17] to consider two key areas:

- Continuum of quality use of medicines from hospital to home and

- Organisation structures, including medication advisory committee

PHARM, a multidisciplinary committee, provides expert advice to the Minister for Health and Ageing on the National Strategy for Quality Use of Medicines (QUM). The aim of the workshop, which was attended by the DCP, was to highlight the issues, challenges and priorities to improve safety and quality of the use of medicines in the private health sector.[17]

In July 2002, the ACSQH published the Second National Report on Patient Safety, entitled –Improving Medication Safety"[4]. This landmark report provided key information on why a focus on medication safety was essential, acknowledging the problems that occur with medicines and their causes. As well, this report commenced looking at what could be done or had already commenced to improve medication safety. The material quoted in this report dealt primarily with public hospital patients and its discussion at the PHIQS workshop was an attempt to broaden the scope to include private hospital patients as well. In this regard it was a defining moment and _call to arms' for caregivers to improve medication safety for private hospital patients.

7.3.4 Financial Year 2003-2004

7.3.4.1 SJOG Group Developments

An organisational wide system for adverse incident reporting, meeting Australian Standards, was developed to provide a centralised clinical risk management function to collect common data, use common benchmarks and ensure a standardised accident and incident management approach.[99] This system would collect all incidents from all areas including Infection Control, Facility/Security, Patient and Caregiver incidents.

The National Medication Safety Breakthrough Collaborative (NMSBC) Wave 1 was commenced. The aim of the NMSBC was to improve patient safety and quality of care through medication safety projects funded by the Australian Council of Safety and Quality. St John of God Hospital Murdoch completed Wave 1 and Subiaco successfully applied for inclusion in the following round of Wave 2 projects.[99]

7.3.5 FINANCIAL YEAR 2004-2005

7.3.5.1 SUBIACO DEVELOPMENTS

In 2004-2005 the Preadmission Clinic (PAC) at SJOGHS was expanded to assist in catering with the increased throughput of patients. PAC services were conducted by registered nurses mainly via telephone interviews prior to patient's admission to hospital. Recognising this expanding role, the Pharmacy Department put forward a successful business case to provide a clinical pharmacy service to PAC high risk patients who would be identified using a referral criteria system. This new role involved an admission medication history interview and confirmation with each identified patient, within 24 hours of admission to hospital, to avoid omissions and to clarify any potential errors. The position and role were integrated into the Subiaco NMSBC Wave 2 project to provide it with an opportunity to promote the value of this medication safety initiative.

Following a review of the available electronic systems, the public sector system, AIMS (Australian Incident Management System), was rejected in favour of Riskpro® and roll out and training began to allow recording of all incidents including medication incidents.

The classification of error types was standardised by the St John of God National Quality and Risk Management Committee and introduced to all hospitals including Subiaco. This system classified error on the basis of the action i.e. prescribing, dispensing and administration errors with easily identifiable subcategories (Appendix 8).

With this ongoing review of the hospital's practices and commitment to medication safety, the hospital's risk prevention strategies evolved. This investment in time and resources sat well with the organisation given that one of the Core Values of SJOGHC was "Excellence in Care".

Opportunities to benchmark reportable key performance indicators (KPIs) with other peer group hospitals were then investigated. These included adverse drug reaction reporting numbers along with reported medication incidents. (Appendix 15).

7.3.5.2 SJOG GROUP DEVELOPMENTS

A standardised organisational or group wide manual system for managing incidents (reportable sentinel events and complaints) was developed and implemented. An electronic system was also under development to record this information and improve the ability to provide data analysis and reporting.[100] This new approach was expected to assist in identifying strategies to minimise risks and improve outcomes.

SJOGHC continued to have a number of hospitals participating in the NMSBC. The Collaborative aimed to reduce the number of adverse medication events and the related number of medication related hospital admissions[9] by improving systems and processes and targeting the management of high risk medications.

7.3.5.3 NATIONAL MEDICATION SAFETY BREAKTHROUGH COLLABORATIVE (NMSBC) PROJECT WAVE 2

SJOGHS was involved in the NMSBC Wave 2 medication safety projects that focused on the Continuum of Care aspects of patient care and reflected the Australian Pharmaceutical Advisory Committee (APAC) Guidelines 1998 and 2005. The aims of the Subiaco project were to reduce harm in the surgical patient population on admission and discharge as it was felt at that time they were not as well serviced as medical patients. All surgical patients on four or more medications on the participating surgical wards, (Orthopaedics, General Surgery, Neurosurgery) were recruited. A reconciliation was carried out prior to discharge to identify all current and obsolete medications; a medication green bag was developed to carry and secure all current medications; a Medprofs® medication list was provided to each patient along with counselling on their medications amd copies were faxed to their General Practitioner. Patients were encouraged to attend their doctor for a follow-up visit within two (2) weeks of discharge. The new role of a preadmission pharmacist was incorporated into the project to facilitate a true continuum of care focus at both admission and discharge from hospital as they were considered as high risk times by pharmacy.

A multidisciplinary committee was formed to guide the project with representatives from consumers, general practitioner liaison medical officer, nursing, pharmacy, and safety and quality staff. Surveys were conducted to gain feedback from each group involved.

Many tools were provided by the NMSBC organising committee at their quarterly meetings. One such tool was the introduction of the –NMSBC Harmometer" (Appendix 11) which was adapted by the NMSBC from the NCC-MERP National Coordinating Council Medication Error Reporting Prevention. (Appendix 12). This was considered an extremely valuable tool as it divided harm into a sliding scale of –Potential" and –Actual" harm in a reproducible manner. Four categories were assigned to potential harm (A to D) while five categories were assigned to actual harm. It was suggested by the Subiaco committee that this harm measure should be included in all medication incident reports in the future.

Subiaco demonstrated over the duration of the collaborative that it had a 70% reduction in patients experiencing medication related harm both potential and actual during the discharge process and increased from 5% to 77% the number of patients visiting their GP within 7-10 days of discharge.

7.3.5.4 SUBIACO MEDICATION SAFETY WORKSHOP 2005

Following the success of the NMSBC project in 2004/2005 and to ensure the sustainability of the achievements gained, the hospital undertook to support medication safety further. With collaboration between the Pharmacy Department, Office of Safety and Quality and the Division of Nursing, a workshop of interested parties was held in early 2005. From this three distinct Medication Safety Teams were formed to look at the following projects:

- Ensure the sustainability of the NMSBC achievements including a minimum figure for the provision of medication reconciliation of at least 15% of all discharged patients.
- Improve the legibility and timeliness of when medications charts were written up or rewritten on expiry.
- Develop a set of criteria and format to ensure appropriate timely pharmaceutical review of newly admitted patients to the wards.

7.3.6 Financial Year 2005-2006

7.3.6.1 Subiaco Developments

All medication incidents received in hard copy commenced were entered onto the hospitals new database, by staff of the new Office of Safety and Quality and then were sent to the DCP for review. The DCP still held the responsibility to ensure the incident data was complete and to suggest any actions required to avoid the incident in the future as well to recognise and notify if any trends were occurring.

The medication safety teams successfully achieved their individual aims and many new initiatives were introduced to the hospital. The success of the projects culminated in the presentation of a paper in October 2006 to the national participants of the NMSBC in Sydney on our collaborative achievements to date.

WA Health Department requested Hospital Chief Executive Officer, Dr Shane Kelly, to commence implementing at least some of the components of the National Inpatient Medication Chart (NIMC) (per the 2004 Australian Health Ministers endorsement of the ACSQHC Recommendation that a single standardised medication chart be used in all public hospitals by June 2006)

7.3.62 Group Developments

St John of God Health Care moved in this year from implementing a clinical risk management strategy to consolidating its practice through a nationally consistent approach.[101] This included the introduction and roll out of a web based electronic incident management system throughout the group, improving incident reporting, management, investigation and standardising of reports. This had the added value of improving efficiency by the removal of duplication of effort, as managers had the ability to view investigations and comments on line and allowed the more timely investigation of incidents. [101]

7.3.7 FINANCIAL YEAR 2006-2007

7.3.7.1 SUBIACO DEVELOPMENTS

The Pharmacy Department commenced developing a new medication chart that would encompass the key changes included in the recently launched new NIMC[102] as well as attempt to facilitate the requirement of private hospital practice and the use of the Pharmaceutical Benefits Scheme. This project would be the first time a private hospital in Western Australia attempted to incorporate this change in practice into their medication chart.

In October 2006, it was decided at a meeting between pharmacy and the nursing division that due to the marked increase in the number of reported medication incidents and time involved, a review of each incident by the DCP was no longer feasible. It was decided that only those incidents with a _high or above' risk rating or a harm rating of _D or above' would routinely be sent to the DCP for investigation and review. This review would look at what caused the error, what if any contributing factors were involved and what remedial action should be taken.

In November 2006 an audit was conducted of the medication chart in use at that time to establish some of the current limitations of that chart. In April 2007 another pharmacy audit demonstrated that the times of administration used in the hospital for the administration of medicine varied from ward to ward and from shift to shift. With the approval of the Director of Nursing, pharmacy standardised the times of administration to reflect those used in the NIMC..

7.3.7.2 GROUP DEVELOPMENTS

During this year the Group focus was on moving towards measuring outcomes while consolidating practice in clinical risk management.[103] Since the introduction of the electronic incident management system in the previous year, reports had been produced on incident types and incident severity to guide changes in practice.

7.3.8 Financial Year 2007-2008

7.3.8.1 Subiaco Developments

In February 2008, the DCP and the Pharmacy Department launched the new approved inpatient medication chart throughout the hospital, with educational tools to assist staff understand the rationale for change and assist in the changeover. The chart encompassed many of the elements of the new NIMC in use in the public sector nationally and was the subject of a poster presentation at the SHPA Federal Conference in 2008.[104].

7.3.8.2 Group Developments

In March 2008, the first meeting of the SJOGHC national _Medication Reference Group' (MRG) was held with representatives from all hospitals in Australia within the SJOGHC group.[105] The Subiaco hospital was represented by the DCP. The aims of this MRG were to promote a Group wide focus to:

- Manage medications in accordance with evidenced based best practice
- Facilitate audit and review of medication errors and significant adverse events and to identify risk reduction strategies
- Explore new technologies such as e-prescribing
- Facilitate standardisation of clinical policies, procedures and forms to improve medication safety.

7.3.9 Financial Year 2008-2009

7.3.9.1 Subiaco Developments

In September 2008, the DCP developed an electronic survey tool to survey all hospital caregivers including medical practitioners, nurses and pharmacists, to assess their attitude to the new recently introduced medication chart. This survey allowed scope for free text comments as well as a graded assessment of each section of the chart. This survey tool was considered very useful in seeking solutions for the Pharmacy Department when designing a better chart that was receptive to the needs of the end users. In June 2009, Pharmacy launched it's newer improved version of the inpatient medication chart following the identification of the deficiencies and shortcomings of the 2008 chart version.

In conjunction with this launch, Pharmacy also introduced a separate and new Medication Reconciliation form to assist the process of reconciliation at admission and at discharge.[106] This initiative placed the hospital in the forefront of private hospitals as medication reconciliation was on the national and international medication safety agenda. A ward based Signature Identification Register was developed and circulated at the same time, to ensure the easy identification of signatures of all staff involved in medication management on a ward. This was a direct request of the WA Health Department Licensing Unit following an audit conducted in September 2008.

7.3.9.2 GROUP DEVELOPMENTS

The SJOGHC Group commissioned each hospital to undertake an omissions medication audit on up to 30% of all inpatients who had been on medication for the 24 hours previous.[107] The aim was to get some values around the actual extent of the problem, given the most common medication incident type reported each year are administration errors of omissions, at between 25-30% of all reports.

The SJOGHC Group, including Subiaco, engaged in the National Institute for Clinical Studies and Private Hospital VTE Prevention Programme project, to develop a Venous Thromboembolism Risk Assessment Tool and screening process based on the current ANZ Guidelines.

7.3.10 FINANCIAL YEAR 2009- 2010

7.3.10.1 SUBIACO DEVELOPMENTS

In August 2009, a multidisciplinary committee chaired by the DCP introduced the first private hospital version of the WAMSG new Anticoagulation Chart. This public sector state wide initiative was already in existence in the major tertiary public hospitals in the Perth metropolitan area. This chart combined the prescription and administration of a high risk class of medication, on the same chart with evidence based guidelines to assist in a standardised management of anticoagulants.

The hospital was granted a full four year accreditation by the Australian Council Healthcare Standards (ACHS). The hospital has been accredited since the inception of ACHS in the mid-eighties.

The Subiaco Medication Safety Committee, monthly multidisciplinary meetings began in September 2009, chaired by the Director of Safety and Quality and with two pharmacy representatives including the DCP as members. The aim of the committee was to review programs, strategies and incidents to reduce medication errors and raise awareness of medication safety in the hospital by concentrating on system changes and promoting cultural changes regarding behaviours that inhibit improving medication safety. The Committee reported to the Quality and Patient Care and Risk Management Committee and provided minutes to the DTC.

7.3.10.2 Group Developments

A review of the medication error reports and classification types was conducted by the SJOGHC. This review was conducted between the hospital's Safety and Quality Department and the National Risk Manager. Pharmacy was not asked to comment on this review despite the ongoing review of all highlighted incidents!! So gaps still exist!

7.4 DISCUSSION

The following discussion focuses on the medication safety landscape and how that has changed over the same period as well as how that has influenced what has happened at SJOGHC and SJOGHS

7.4.1 Current Status of Medication Safety in Australia

In 2005, a study demonstrated that despite 10 years having passed since the Quality in Australian Health Care Study,[9] the risk from medication misadventure was still the same. This was despite the formation of the Australian Council for Safety and Quality in Health Care in 2000. A top down approach alone was not then enough to prevent harm from medicines and that a bottom up approach involving the health care worker was now deemed essential.[109]

7.4.1.1 AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

In 2006 the Australian Commission on Safety and Quality in Health Care (ACSQHC) was formed to replace the previous Council (ACSQH).[102] The new Commission reported to the Health Ministers and had a remit across public and private health care sectors as well as acute and primary care. Amongst its committee structure a Private Hospital Sector Committee was established. The role of ACSQHC[102] was to:

- Coordinate and lead improvements in safety and quality in health care
- Collect, analyse and disseminate information
- Recommend national standards for quality improvement
- Report on the status of safety and quality
- Provide strategic advice to Health Ministers

The ACSQHC has nine priority programmes of which Medication Safety is one.

In April 2009 the National Medication Safety and Quality Scoping Study Report was endorsed, which included the establishment of a Medication Reference Group and the need to provide a national focus for medication safety and quality.[110] The major identified areas were:

- Medication accuracy at transitions in care/medication reconciliation.
- Development of standardised initiatives e.g. NIMC.
- Standards for user applied labels for medicines in hospitals.
- Guidance on safe e-medication management systems.
- To share information nationally via alerts and bulletins.

Currently the ACSQHC is working on all of these areas and has been very productive. Two examples of the Commission‘s collaborative approach to solutions are medication reconciliation and standardised user applied labels on injectable medicines, fluids and lines.

7.4.1.1.1 MEDICATION RECONCILIATION

As the lead technical agency for Australia, the ACSQHC announced in April 2010 their collaboration with the WHO High 5s Medication Reconciliation Project.[111] The ACSQHC has recruited and is managing hospital sites in Australia for this international study, including private hospitals such as the Epworth Hospital, a private hospital in Victoria.[111] Tools such as a National Medication Management Plan and a _Match Up' medicines resource have been produced by the Commission to assist the communication deficits during the transition of care which lead to unintended changes to medication order.[86,112]

7.4.1.1.2 USER –APPLIED LABELLING OF INJECTABLE MEDICINES FLUIDS AND LINES

In August 2010, the ACSQHC produced a set of recommendations called –User – applied Labelling of Injectable Medicines, Fluids and Lines".[86] This national initiative to promote safer use of injectable medicines, comprises a standard colour system to identify the target route of administration of the medication to be administered. This work, added to an initiative completed in Perth at the Royal Perth Hospital and SJOGHS, led to the establishment of an Australian Standard for labelling in 2002.[113]

7.4.1.2 MEDICATION ERROR AND PREVENTION DEVELOPMENTS IN AUSTRALIA

The Windows into Safety and Quality in Health Care 2008 Study stated that –medications are the most prevalent health therapy in Australia. In any two week period, around seven in ten Australians will have taken at least one medicine. For older Australians that increases to nine in ten".[114]

A review of Australian studies in medication safety for this Study to update the available data from the Second National Patient Safety Report (2002)[4], concluded that medication related admissions were approximately 2-3% accounting for 190,000 admissions per year at a cost of $660 million with approximately 50% still preventable.[80] The review further highlighted that up to 30% of admissions of patients greater than 75 years were medication related.[80] This increased to 74% for oncology admissions and it was noted there was a five-fold increase in adverse drug reaction associated admissions over 1981 to 2002.[80] This review shows no great improvement since the original work undertaken on medication related admissions in

the 1990s.[9] A paper by Aronson[115] in 2009 classified medication error into four different categories. They included

- Knowledge based (Lack of knowledge)
- Rules based (Bad or misapplied rules)
- Action based (Slips such as wrong drug chosen)
- Memory based (Lapses- forget to ask)

A further study[74] reviewed twenty nine errors and classified 21/29 as slips and lapses across prescribing, dispensing and administration errors, whilst eight were considered knowledge based prescribing errors. The major contributing factors determined were inadequate knowledge, communication problems and lack of familiarity with the patient. A review of administration errors commented that poor communication and environmental factors such as stress and high workload contributed to administration errors.[116]

7.4.1.3 ELECTRONIC MEDICATION MANAGEMENT SYSTEMS

Many hospitals in Australia have a computerised provider order entry system which accommodates ordering tests and reviewing results on line.[117] The use of electronic medication management systems (eMMS) in hospitals has been advocated as an additional component to this.[117] eMMS has been studied and has been advocated as a strategy to reduce medication errors, in particular prescribing errors and improve patient safety.[117] Systems like this should replace paper medication charts; allow electronic prescribing, administration and clinical pharmacist review. The experience of an eMMS introduction to a mental health unit at St Vincent‘s Hospital, Sydney, using the Hatrix MedChart™ with limited decision support, did reduce some prescribing errors related to incorrect documentation and did eliminate incomplete and unclear orders.[118] Anecdotal evidence following a visit to the Royal Darwin Hospital in June 2010, another Hatrix site, suggested omission errors of administration were almost entirely eliminated due to the alarm warning system in use with this system.

The advent of eMMS does impact on work flow and communication patterns for doctors‘ nurses and clinical pharmacists and considerable time and resources must be committed to ensure successful outcomes.[117]

7.4.2 Current Status of International Medication Safety Activity

Medication error prevention is not just an Australian priority. It has been a focus in many developed countries for some years.

7.4.2.1 Salamanca Declaration

The first meeting of the International Network of Safe Medication Practice Centres was held in Salamanca, Spain on November 17-19, 2006.[119] This group evolved into the International Medication Safety Network (IMSN). The participants recognised that:

- Medication errors were an important system based public health issue and part of the patient safety agenda
- Harm from medications arose from adverse drug reactions and medication errors
- Confidential, non-punitive independent medication error reporting and learning systems needed to be introduced
- Healthcare workers and patients in all countries were facing similar adverse events arising from common underlying causes of error.
- Collaboration between countries was essential to share learning
- Patient's interest was the highest priority.

Their objectives were centred on prevention of medication error by promoting the empowerment of the patient, open disclosure of adverse events by manufacturers, dissemination of information, development of medication safety policies and guidelines and appropriate education of caregivers.

In 2005, Yu et al concluded that there was an urgent need for agreement on standard nomenclature to describe medication related incidents due to the multiplicity of definitions, terms and meanings in existence.[120] This was seen as essential to enable meaningful analysis of medication incident data and for the development of prevention strategies.[120]

7.4.2.2 World Health Organisation (WHO)

In January 2004, the WHO passed a resolution to bring experts together to improve patient safety in all areas including use of medicines. In October 2004, WHO launched the World Alliance for Patient Safety with the slogan "First do no harm".[121]

This was the first time that all agencies came together to advance the patient safety goal. In developed countries it was noted than 1 in 10 patients hospitalised were harmed, but in developing countries this was much higher.[121]

7.4.2.2.1 WHO HIGH 5S PROJECT

This worldwide collaboration commenced in 2006 and includes Australia, UK, Canada, USA and others to reduce the frequency of 5 problems in 5 countries in 5 years.[87] Two of the priority topics involve medications:

1. Assuring medication accuracy at the transition of care (led by Canada)[87] and
2. Concentrated injectable medicines e.g. potassium, opioids etc. (led by UK)

The ACSQHC has as mentioned earlier, recruited hospitals across both public and private to participate in the medication reconciliation project.[86]

7.4.2.3 IMSN POSITION PAPER ON PHARMACOVIGILANCE AND MEDICATION ERROR

In October 2009, the IMSN published a position paper that redefined medication safety as being a two sided coin with adverse drug reactions on one side and medication errors on the other.[122] The paper stated that both should be reported in a non-punitive voluntary manner and that results be analysed and evaluated collaboratively to ensure that measures are in place to prevent their recurrence. An example of this in action is the sharing of information freely between the Institute for Safe Medication Practice (ISMP) (medication errors) and US Food and Drug Administration (adverse drug reactions). IMSN is a link with other major international medication safety jurisdictions and showcases their work including USA, Canada, UK, Australia, Spain, WHO.etc. Other areas of interest to IMSN are a Global Label Project to eliminate look alike, unclear and cluttered labelling led by the United Kingdom.[122]

7.4.2.4 NATIONAL PATIENT SAFETY AGENCY (UK)

The United Kingdom based National Patient Safety Agency provides Rapid Response Reports which are brief timely guidelines that alert the National Health System there to a problem or issue from the incidents reported to the National Reporting and Learning Service. In February 2010, a Rapid Response Report was published on ~~"r~~educing harm from omitted and delayed medications in hospital".[24] The core of this project is the need to achieve a reduction in interruptions to and a

streamlining of the medication administration process. It incorporates the identification of critical medications and development of guidelines with regard to actions to be taken if a medicine is delayed or omitted.[24]

7.4.2.5 THE INSTITUTE OF SAFE MEDICATION PRACTICE (ISMP)

The ISMP in Philadelphia, USA, is a non-profit organisation dedicated to medication error prevention and safe medication use.[123] It has a worldwide reputation for providing timely and impartial medication safety information. ISMP collaborates with many agencies including the Food and Drug Administration and the American Hospital Association within the USA and others overseas. The ISMP places a major focus on communication and education on medication errors. To this end it produces _medication safety alerts' which are reputed to be the best in the world.[123]

The ISMP Canada branch exists to facilitate the collecting and analysing of medication incidents and developing recommendations to enhance patient safety.[124] (web address) The Institute sees itself as the leader in researching the causes of medication errors. Current areas of interest include the use of dangerous abbreviations in prescribing, medication reconciliation and a Bar-Coding project.[124] They have developed a Medication Safety Self-Assessment Tool which is used by an organisation to assess their own medication safety climate against set criteria and any risk they may be exposed to. This powerful tool has been adapted for use in Australia by the ACSQHC.

7.5 CONCLUSION

The development of medication safety as a concept has made significant progress over the past decade both at a national and international level. The speed of access and the collaboration and sharing of ideas worldwide ensures that every effort is being taken to address medication related harm at all levels. The ACSQHC continues to lead and facilitate projects and provide a conduit to state based medication safety groups who directly influence health care workers in those states.

SJOGHC has embraced the need for collaboration and sharing of ideas and as a major private health care provider in Catholic Health in Australia, is happy to lead in ensuring their private hospitals are aware of the methods to reduce harm to their patients. SJOGHS as the major flag ship for the Group, takes pride in taking the lead to trial and implement current medication safety projects to gain experience in providing a safer health care environment for patients by reducing the risk of harm from medications.

CHAPTER 8 CONCLUSION: LEARNING FROM THE PROJECT THEN AND NOW

The undertaking and completion of this project mimics the evolution and growth of medication safety in a private health care setting. At the outset, following the publication in 2002 of the Second National Report on Patient Safety –Improving Medication Safety"[4] it was apparent that there was a growing awareness of medication safety in public sector Australian hospitals. Given that private hospitals accounted for a third of all admitted patient episodes in Australia, this sizeable group could not be ignored. Later that year a first step was taken when the PHIQS workshop was convened[17] with representatives from most private hospitals attending. Following this meeting it became obvious that medication safety practices at St John of God Hospital Subiaco and other private hospitals were not aligned very well with public sector hospitals and that a number of deficiencies existed requiring urgent attention.

Medication incidents or adverse events in a hospital setting encompass adverse drug reactions and medication errors. Adverse drug reactions are either predictable side effects or idiosyncratic events that are unpredictable. On the other hand medication errors are generally a result of a system breakdown in the medication management cycle whether that be at the point of prescribing, dispensing or administration by different health professions. Collection of information on medication errors is common in most hospitals but their review and use is the key to learning from previous incidents. This study hoped to address some of those shortcomings.

Medication incidents were reported and collated at SJOGHS in 2002 but did not make a discernable difference to practice and health care workers were not aware of common issues or trends. A silo effect was apparent as data was collected and not shared in a common hospital system. The collection of this data by date of incident rather than date of review by the pharmacist, allowed the assessment of whether the day, time and location of the error had any relevance as to its cause. Standardisation of classifications used allowed comparative data to be prepared over time or bench marking to occur with other similar sized institutions. The use of a classification system based on the origin of the error in the medication management cycle i.e. prescribing by a medical practitioner, dispensing by a pharmacist, administration by

a nurse accommodated the different professional roles. Administration errors predominated which is not surprising given that the majority of medication incident reports were completed by nursing staff and this encapsulates their primary medication function. The most frequent administration error reported was an error of omission of a medication. Dispensing errors collected by nursing staff underreported the actual number of dispensing errors occurring in the hospital as the Pharmacy Department collected its own data on ‗near misses', i.e. incidents that did not leave the department in addition to those that did. It was noted though that the dispensing incident classifications provided did not capture all types of dispensing errors so new dispensing classifications were created to better reflect the process of dispensing.

Similarly clinical pharmacists collected pharmacist intervention data on changes to drug therapy they made and these were not reported centrally. These interventions reflected a better indication of the frequency of prescribing errors occurring in the hospital compared to the number of incidents reported by nursing staff. The provision of an integrated live electronic system for reporting all types of errors in a hospital is essential to achieve a true reflection of the risk faced and this system must be easily accessible and intuitive for all staff to use.

Given that medication incidents were considered a breakdown in a system, the need to understand the reason why that occurred was seen as an integral part in developing a system change to prevent those incidents recurring. Systems can be affected by multiple factors which include organisational, work environment, team, individual, and task factors as well as patient characteristics. Assessing these contributing factors, allows one to build an image of what happened at the time of the incident. The collation of a set of contributing factors by group discussion with the relevant sections of the pharmacy department created a series of contributing factors for both medication incidents and dispensing errors. It was noted that some of the contributing factors were common to both types of errors as they dealt with human factors such as tiredness, inattentiveness, distractions etc. These factors could be attributed to any of the most frequent dispensing errors noted e.g. selection of medication error or a labelling error as well as nursing administration errors where doses are missed. Much can be learnt from the study of contributing factors to develop a safer medication climate regardless of what point in the medication management system is under review.

The clinical significance of a particular incident both to the patient and to an organisation can be more adequately assessed if a risk stratification and harm model is in place. Risk was assessed as a function of the consequences of a particular incident with the frequency or likelihood of the incident occurring or recurring. This provided a graded risk rating from Low to Extreme A and allowed a hierarchical notifications system to be implemented based on the incident‘s seriousness. Risk was primarily the organisation‘s risk and the effect it would have on the organisation. On the other hand a harm measure was predominantly a measure of harm to the patient. This classification system was divided into potential and actual harm. This is apparent when dispensing errors were assessed as clinically significant to the pharmacy department but from a hospital perspective were rated only to have a potential for harm. In contrast while the majority of administration errors by nursing staff had the potential for harm, some did cause actual harm.

With the increasing research focus on medication errors and as our knowledge about them increases and evolves, so do the strategies available to reduce or minimise their incidence. At a local level, as SJOGHS realised the need to improve their medication safety practices, the Pharmacy Department and the Hospital committed to embracing more fully practices more commonplace in public hospitals. These included having an active Drug and Therapeutics Committee, commencing a designated Medication Safety Committee in the hospital and the provision of evidence based and clear medication polices and guidelines. Other initiatives have been embraced such as the use of standardised medication charts incorporating the use of the Pharmaceutical Benefits Scheme and the National Inpatient Medication chart. In addition a strong focus has been placed on medication reconciliation at the transitions of care as a key component to reducing the potential for error. This has meant a realisation that an accurate confirmed medication history on admission and subsequent reconciliation with what the doctor has ordered on the medication chart is now an essential part of safe medication practice. Allied to this the education of the patient about their medications by providing oral and written information and the provision of details of medications changes are necessary to alert those heath care workers who care for the patient upon discharge. To facilitate this, the hospital has employed more clinical pharmacists to support patient service areas that are deemed

as high risk for medications. These include a Preadmission Clinic role and high risk areas such as Intensive Care, Oncology ward and day procedure areas.

Finally, attempts to introduce an electronic medication management system with decision support (Hatrix MedChart™) on a trial basis have failed to date, owing to the high costs involved. Successful implementation of an iPharmacy™ computer system similar to that in use in the public hospitals has provided a uniform material management system and the ability to provide uniform labels for all aseptically prepared products.

The national survey of private hospital practices in medication safety highlighted some substantial variances in service levels provided. Three influences were studied in particular to assess their affect on medication management. These included the location of the pharmacy service, the ownership of the pharmacy service and whether clinical pharmacists were employed or not. It became apparent that it was significant that On Site pharmacies had a policy on medication safety, reported a higher mean number of medication incidents and were more involved in the review of medication incidents than Off Site pharmacy services. Hospital Owned pharmacies were significantly more likely to be On Site and that Off Site pharmacies were more likely to be Contracted Out services. Hospital Owned pharmacies were likely to employ almost three times more clinical pharmacists than Contracted Out pharmacy providers. Whilst it is easy to understand why Hospital Owned On Site pharmacies would have far greater involvement and motivation to engage in hospital approved medication safety initiatives, Contracted Out Off Site pharmacies could still provide innovative solutions to ensure service levels are delivered by greater use of technology e.g. telepharmacy. Pharmacy providers who employed clinical pharmacists were significantly more likely to be involved in the review of medication incidents and have been proven to aid in reducing medication errors.

Medication safety has grown to become an international phenomenon. Two of the World Health Organisations top five priority areas to improve patient safety worldwide involve medication usage. They include assuring medication safety at the transition of care (between community and the hospital and back again) and a review of the use of concentrated injectable medicines such as potassium. The formation of the International Network of Safe Medication Practice Centres in 2006 centralised

efforts and objectives on an international level These included recognition that medication errors were an important system based public health issue, harm from medications arose from adverse drug reactions and medication errors, that patients in all countries were facing similar adverse events arising from common underlying factors and that collaboration was essential.

In Australia the formation of an active Australian Commission on Safety and Quality in Health Care has provided leadership to all hospitals both private and public. This has included taking a lead in some international strategies e.g. medication reconciliation as part of the WHO High 5's project. At state level the formation of Medication Safety Groups has led to many medication safety initiatives being driven at a more local state level. In Western Australia, the WAMSG has developed and implemented a state wide Anticoagulation Chart with evidence based guidelines attached for use in tertiary public hospitals as well as SJOGHS. The willingness of some private hospitals groups to embrace fully the concept of medication safety becomes evident when SJOGHC established a national Medication Reference Group to lead all their hospitals along a common path and this has been complemented recently by the formation of a Medication Safety Committee at the Subiaco campus.

Medication safety is now in a state of evolution which is responsive to sentinel events and national initiatives. It is now an accepted part of practice not only in this hospital where this study was based, but throughout the St John of God Health Care group who now see medication safety as a key focus, as organisations move towards risk minimisation to reduce harm to their patients, reduce any financial liability and provide safer environments for patients and staff.

CHAPTER 9 RECOMMENDATIONS

The major recommendations from this study are summarised as follows:

- Retain a –No Blame" culture in the organisation
- Promote the reporting of all medication incident types as a means for shared learning
- Refine the Riskpro™ classification of dispensing errors to more suitably reflect the type of dispensing errors seen in practice.
- Have a uniform way medication errors are documented regardless of the system used to collate them by using standardised nomenclature and descriptors. This would provide the opportunity for reports to be generated to allow comparison and benchmarking with other hospitals of a similar size to occur. This lead should be taken nationally by the ACSQHC.
- It is vital to avoid the –silo" effect of hospitals working in isolation of each other or private in isolation of public hospital practice
- Adopt a standardised approach to recording medication errors to allow comparison between public and private hospital practice particularly between hospitals of a similar size. This development could potentially open the door to solutions to the problem, given a bigger pool of data and resources involved in their management and review.
- Essential to have a risk stratification structure to assess the risk associated with an incident or incidence of the incident recurring and to have a priority system to alert hospital management quickly of the higher categories of risk.
- Similarly the harm suffered by a patient as a result of an incident whether it be potential or actual harm should be investigated for each incident and a priority alert system be in place to alert hospital managers.
- Appropriate clinical governance is assigned to the process of medication error review. This should include appropriate resources to collect and analyse the data, prepare reports on a regular basis and provide information to all relevant committees.

- Ensure clinical pharmacist involvement in the collection of medication errors along with medical and nursing staff.
- Ensure that a review by a senior clinical pharmacist is carried out for all designated medication errors, e.g. those that cause _actual harm' or have a risk rating of _high or above'. This could be extended to include all dispensing type errors and prescribing errors.
- Have an energetic multidisciplinary Medication Safety Committee that will work to try and minimise the risk from medications across a hospital or organization.
- Expect that the Pharmacy service provider regardless of the ownership or location model in place, is actively involved in assisting the organisation to reduce the risk from medication error. This would entail the employment of adequate numbers of clinical pharmacists per ward as per the accepted industry standards.
- Need for professional bodies such as SHPA to research and develop staffing models per bed number per patient acuity specifically for private hospital pharmacy service practice.
- Contracted pharmacy service contracts are written to better reflect medication safety initiatives and a commitment to resource it to agreed standards.
- The Private Hospitals Association take more of a lead role to encourage new and novel ideas in private practice and provide forums for their presentation, dissemination and discussion.
- Visiting Medical Officers when accredited to attend a particular private hospital, accept that they will embrace and become partners in all of the medication and patient safety initiatives undertaken by that hospital.
- The Australian College of Health Care Standards use the medication safety criteria in their EQUIP surveys to ensure private hospitals meet a minimum safety net for medication safety.
- That Health Insurance companies that promote and value medication safety are more readily aligned with a private hospital or group of hospitals.
- That individual hospitals advertise and assure their patients that their hospital is striving to reduce the risk from medications and seeks their assistance and

partnership in attempting to reduce adverse outcomes and the subsequent financial cost to the community.

- Electronic medication management systems with complete decision support need to be investigated. Despite the major investment in physical and human resources to educate, train and install a massive system change, the results of the outcomes achieved to date in the USA and now in Australia and New Zealand merit serious consideration. At the Royal Darwin Hospital, results have shown that almost all _omission' errors and _given not signed' administration errors have been removed after the introduction of the Hatrix MedChart system following a site visit in 2010.
- Essential that the concept of pharmacovigilance is promoted in all hospitals as an active role made up of medication errors on one hand and adverse drug reactions on the other.

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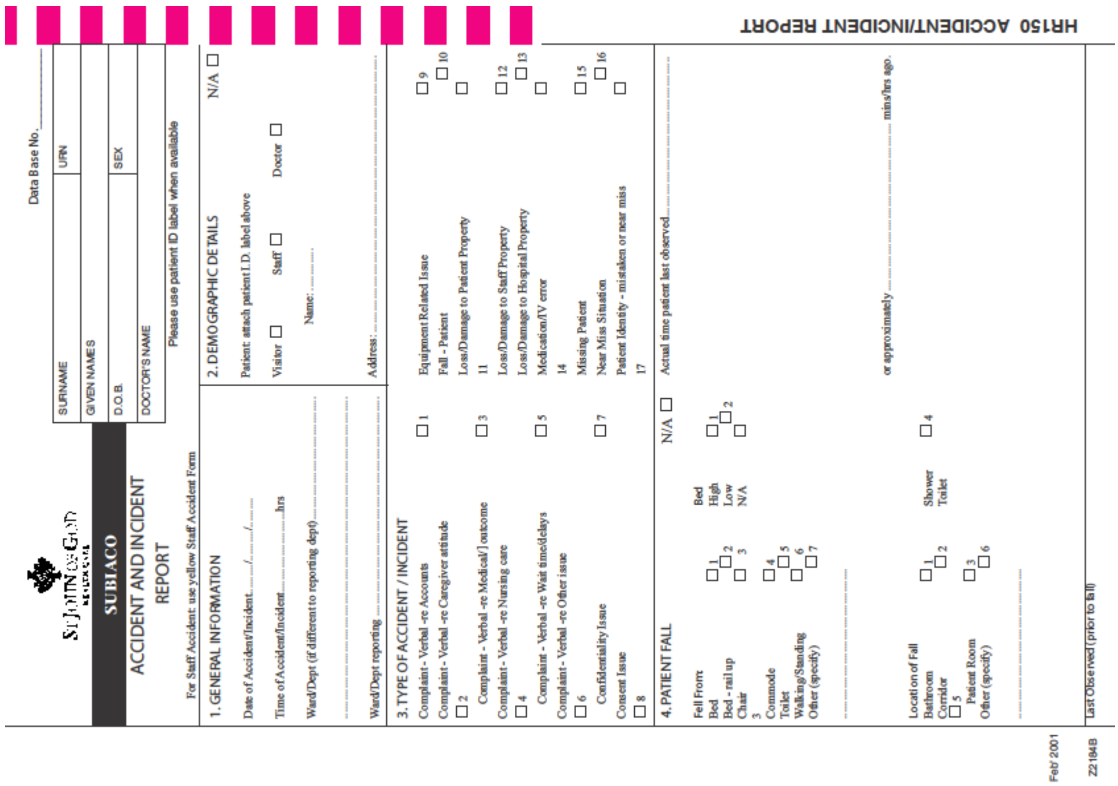
LIST OF APPENDICES

APPENDIX 1: ACCIDENT AND INCIDENT REPORT FORM (HR150).



ST JOHN OF GOD HEALTH CARE

SUBIACO

ACCIDENT AND INCIDENT REPORT

For Staff Accident: use yellow Staff Accident Form

Data Base No.____________

SURNAME	URN
GIVEN NAMES	
D.O.B.	SEX
DOCTOR'S NAME	

Please use patient ID label when available

HR150 ACCIDENT/INCIDENT REPORT

1. GENERAL INFORMATION

Date of Accident/Incident......../......../........

Time of Accident/Incident.......................hrs

Ward/Dept (if different to reporting dept).......................

Ward/Dept reporting.......................

2. DEMOGRAPHIC DETAILS N/A ☐

Patient: attach patient I.D. label above

Visitor ☐ Staff ☐ Doctor ☐

Name: ....

Address: ....

3. TYPE OF ACCIDENT / INCIDENT

Complaint - Verbal -re Accounts ☐ 1
Complaint - Verbal -re Caregiver attitude ☐ 2
Complaint - Verbal -re Medical/] outcome ☐ 3
Complaint - Verbal -re Nursing care ☐ 4
Complaint - Verbal -re Wait time/delays ☐ 5
Complaint - Verbal -re Other issue ☐ 6
Confidentiality Issue ☐ 7
Consent Issue ☐ 8
Equipment Related Issue ☐ 9
Fall - Patient ☐ 10
Loss/Damage to Patient Property ☐ 11
Loss/Damage to Staff Property ☐ 12
Loss/Damage to Hospital Property ☐ 13
Medication/IV error ☐ 14
Missing Patient ☐ 15
Near Miss Situation ☐ 16
Patient Identity - mistaken or near miss ☐ 17

4. PATIENT FALL N/A ☐

Fell From: Bed ☐ 1, Bed - rail up ☐ 2, Chair ☐ 3, Commode ☐ 4, Toilet ☐ 5, Walking/Standing ☐ 6, Other (specify) ☐ 7 ....

Bed: High ☐ 1, Low ☐ 2, N/A ☐

Actual time patient last observed.......................

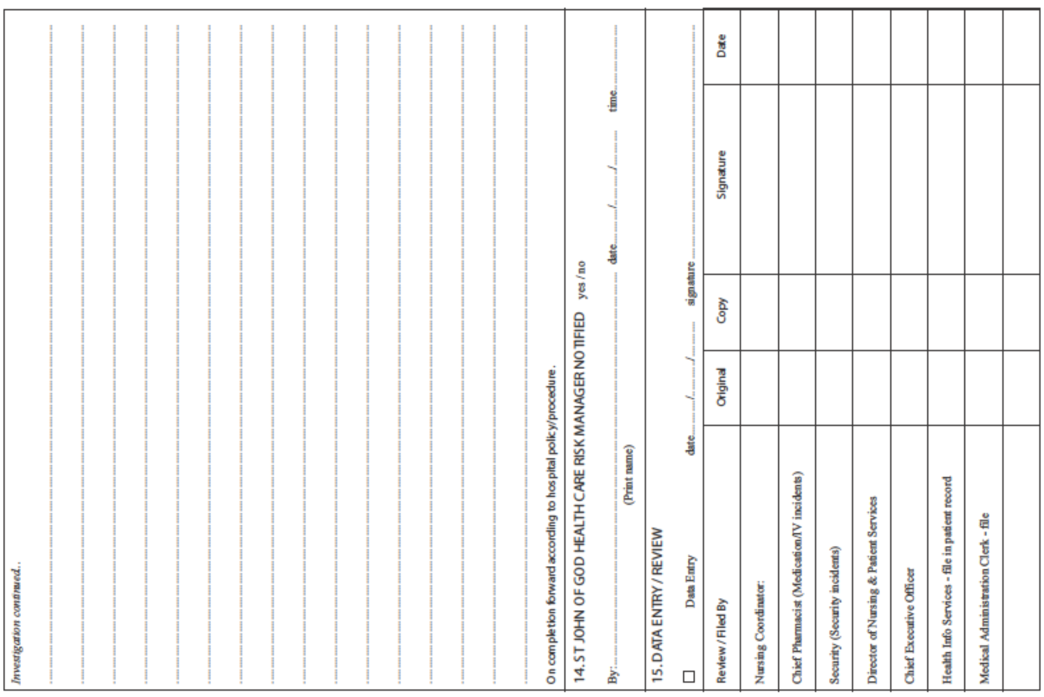
or approximately .... mins/hrs ago.

Location of Fall: Bathroom ☐ 1, Corridor ☐ 2, Patient Room ☐ 3, Shower ☐ 4, Toilet ☐ 5, Other (specify) ☐ 6 ....

Last Observed (prior to fall)

Feb/ 2001

Z2184B



Investigation continued..

On completion forward according to hospital policy/procedure.

14. ST JOHN OF GOD HEALTH CARE RISK MANAGER NOTIFIED yes / no

By:....................... (Print name) date......../......../........ time..........

15. DATA ENTRY / REVIEW

☐ Data Entry date......../......../........ signature ....

Review / Filed By	Original	Copy	Signature	Date
Nursing Coordinator:				
Chief Pharmacist (Medication/IV incidents)				
Security (Security incidents)				
Director of Nursing & Patient Services				
Chief Executive Officer				
Health Info Services - file in patient record				
Medical Administration Clerk - file				

5. MEDICATION / IV

Extra dose given ☐ 1

Incorrect fluid

☐ 2

Incorrect I.V. rate ☐ 3

Not given ☐ 4

Not ordered ☐

5

Given but not signed for ☐ 6

Wrong dose

☐ 7

Wrong patient ☐ 8

Wrong route

☐ 9

Previous drug reaction, but given ☐ 11

Other (specify) ☐

12

.....

6. PATIENT DETAIL N/A ☐ ☐ 10

Diagnosis.....

.....

Condition at time of accident/incident

Rational ☐ 1 Disorientated ☐ 4 Usually oriented? Yes / No (circle)

Sedated ☐ 2 Other (specify) ☐ 6 .....

7. WHAT HAPPENED

(Describe accident/incident. If the incident is a Patient fall or Medication/IV event, give only any additional facts to those documented above. Ensure facts are also documented in the Patient's Health Record)

.....

.....

.....

.....

.....

.....

.....

.....

.....

8. Details of Person Reporting Accident / Incident

Name (print).....

Signature.....

Date...../...../.....

Contact Phone No.....

9. Details of Witness Not witnessed ☐

Witness.....

Description: Staff ☐ Doctor ☐

Another Patient ☐

Visitor ☐

Address (if visitor).....

10. IMMEDIATE ACTION TAKEN

.....

.....

.....

.....

.....

.....

11. MEDICAL PRACTITIONER & TREATMENT ADMINISTERED N/A ☐

Name of Medical Practitioner Notified..... N/A ☐

Date...../...../..... Time..... By Whom.....

Treatment / Assessment / Orders:

None ☐ 1

First Aid (simple dressings/lotion/bandage etc) ☐ 2

Observations ☐ 3

X-Ray ☐ 4

Sutures ☐ 5

Surgery ☐ 6

Emergency Treatment ☐ 7

Medication ☐ 8

Other ☐ 9

Notes:

.....

Signature/name of examining Doctor N/A ☐

12. NATURE OF INJURY N/A ☐

No injury / Reaction ☐ 1

Abrasion

☐ 2

Bruise ☐ 3

Burn ☐ 4

Concussion ☐

5

Fracture (specify)..... ☐ 6

13. INVESTIGATION

(to be completed by the Department Manager. *Note: ¡ seek advice from Nursing Coordinator before documenting investigation of any significant incident for which the hospital may have some legal liability. ¡ If Patient/Visitor fall or injury in the grounds, ensure full description and photographs are taken of accident scene)*

Specifically this activity/section should:

- confirm all relevant facts are recorded
- record additional relevant information and contributing factors uncovered from investigation/follow up
- record your understanding of what happened, the significance of the incident and the outcome
- record follow up action or progress as necessary (use additional paper if required)
- please date, write your name, designation, and sign every entry.

.....

.....

.....

.....

.....

.....

APPENDIX 2: SJOGHS SUMMARY MEDICATION INCIDENT FORM.

SUMMARY MEDICATION INCIDENTS

UMRN _____ SURNAME _____ GIVEN NAMES _____

Medication Error Type _____

Pharmacy Description of Incident

Pharmacy Recommendation

Care Centre Director Outcome

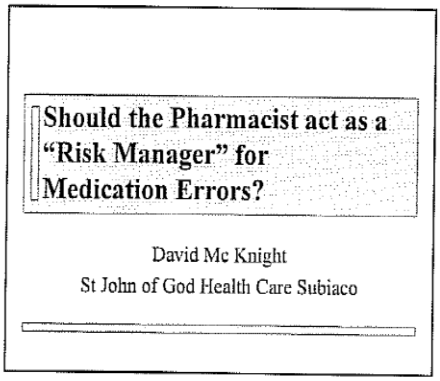
Status _____

APPENDIX 3: SAMPLE OF MEDICATION INCIDENT SUMMARY REPORT FOR MEDICATION POLICY AND PROCEDURE SUB-COMMITTEE.

Report on the Medication Incidents for the period

Accid. ID:	*Descriptions:*	*Department*	*Incident Date*	*Description of Medication Incident*	*Pharmacy Recommendation*	*Medication Policy/Procedure Sub-Committee Outcomes*
1889	Extra Dose Given	52	12/11/2001	Pharmacist in Dispensary noticed that Clexane charted 40mg S/C Daily, had times written up for 0800 and 2000 hours and that Clexane 40mg was administered bid (twice daily) for 8/11/01 to 11/11/01 inclusive. Doctor informed. Patient had been on Heparin s/c 5000 twice daily and nurse carried these times forward. Subsequent staff paid attention only to the times stated and not the frequency prescribed by the doctor.	1. Original order must ALWAYS be checked before administration of any medication and nursing staff should NOT rely on the times stated by a colleague. 2. Incident occurred during a period when no clinical pharmacy service was available to this ward due to staff shortages in the pharmacy department. David McKnight 20/11/2001.	S D Terry 26/11/01
1923	Other	51	12/11/2001	Medication chart went missing from ward requiring doctor to provide new order for Vitamin K. Medication chart did not arrive in Dispensary. Pharmacist on duty after hours when contacted by After Hours Nurse Manager dispensed Vitamin K without chart and left in corridor box for collection. On call pharmacist and after hours pharmacist both confirmed medication chart did not arrive in dispensary as chute was turned off.	1. Pharmacy record/log the time of arrival and departure of all medication charts to and from dispensary. 2. Engineering can flush the chute system to try and find missing canisters. 3. Wards to consider logging medication charts that leave the ward. David McKnight 22/11/2001	S D Terry 26/11/2001
1889	Other	52	12/11/2001	Pharmacist in Dispensary noticed that Clexane charted 40mg S/C Daily, had times written up for 0800 and 2000 hours and that Clexane 40mg was administered bid (twice daily) for 8/11/01 to 11/11/01 inclusive. Doctor informed. Patient had been on Heparin s/c 5000 twice daily and nurse carried these times forward. Subsequent staff paid attention only to the times stated and not the frequency prescribed by the doctor.	1. Original order must ALWAYS be checked before administration of any medication and nursing staff should NOT rely on the times stated by a colleague. 2. Incident occurred during a period when no clinical pharmacy service was available to this ward due to staff shortages in the pharmacy department. David McKnight 20/11/2001.	S D Terry 26/11/01
1914	Not Given	54	13/11/2001	Dose of Clexane 40mg S/C missed at 1830 hours on 13/11/01 for DVT Prophylaxis due to patient being busy when nurse arrived and then dose was forgotten. Error picked up on ward round morning of 14/11/01 and given then as per Doctors orders. Clinical Pharmacist and Nurse Manager have addressed the issue at ward level.	1. Incident highlights the need for nursing staff to check all medication charts at the beginning and end of every shift to ensure all medications administered. David McKnight, 22/11/01.	Ongoing education to remind staff of the need to check medication charts. J Wibrow 26/11/01

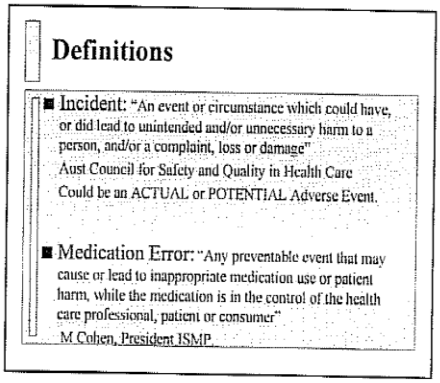
APPENDIX 4: "SHOULD THE PHARMACIST ACT AS A RISK MANAGER FOR MEDICATION ERRORS?" SOCIETY OF HOSPITAL PHARMACISTS WA STATE BRANCH CONFERENCE 2002 SEPT 6-8; PERTH.



Should the Pharmacist act as a "Risk Manager" for Medication Errors?

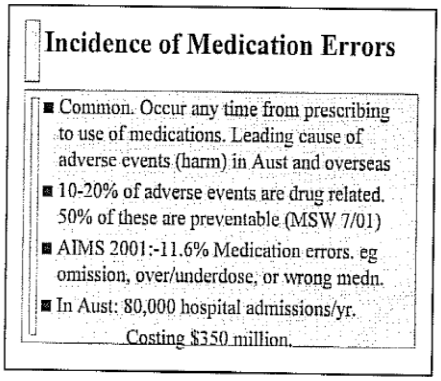
David Mc Knight

St John of God Health Care Subiaco



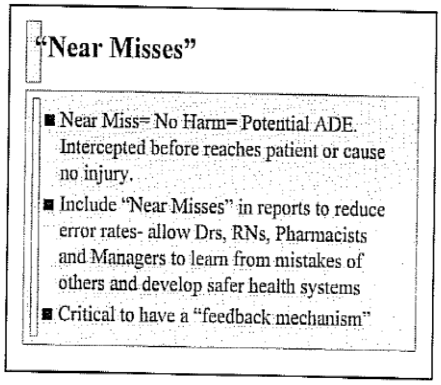
Definitions

- Incident: "An event or circumstance which could have, or did lead to unintended and/or unnecessary harm to a person, and/or a complaint, loss or damage"
  Aust Council for Safety and Quality in Health Care
  Could be an ACTUAL or POTENTIAL Adverse Event.
- Medication Error: "Any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the health care professional, patient or consumer"
  M Cohen, President ISMP



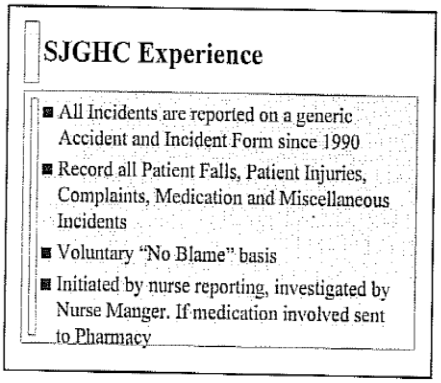
Incidence of Medication Errors

- Common. Occur any time from prescribing to use of medications. Leading cause of adverse events (harm) in Aust and overseas
- 10-20% of adverse events are drug related. 50% of these are preventable (MSW 7/01)
- AIMS 2001:-11.6% Medication errors. eg omission, over/underdose, or wrong medn.
- In Aust: 80,000 hospital admissions/yr. Costing $350 million.



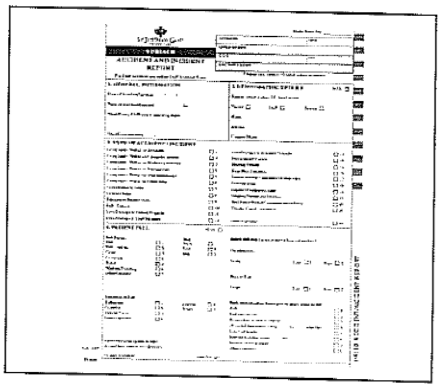
"Near Misses"

- Near Miss= No Harm= Potential ADE. Intercepted before reaches patient or cause no injury.
- Include "Near Misses" in reports to reduce error rates- allow Drs, RNs, Pharmacists and Managers to learn from mistakes of others and develop safer health systems
- Critical to have a "feedback mechanism"



SJGHC Experience

- All Incidents are reported on a generic Accident and Incident Form since 1990
- Record all Patient Falls, Patient Injuries, Complaints, Medication and Miscellaneous Incidents
- Voluntary "No Blame" basis
- Initiated by nurse reporting, investigated by Nurse Manger. If medication involved sent to Pharmacy

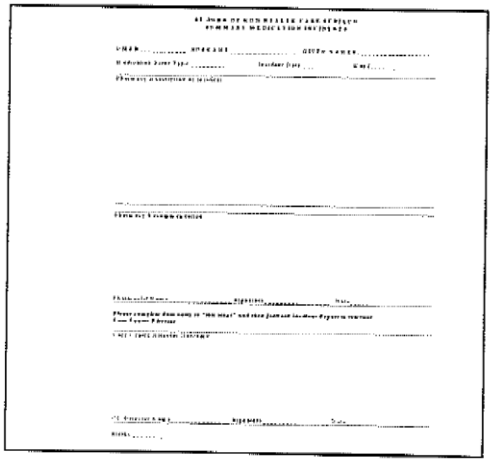


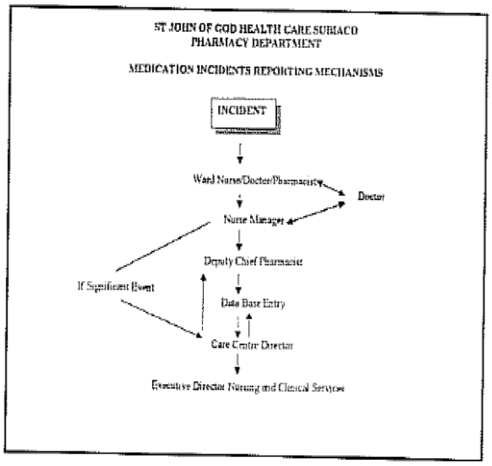
Accident and Incident Reports SJGHC 2001/2002

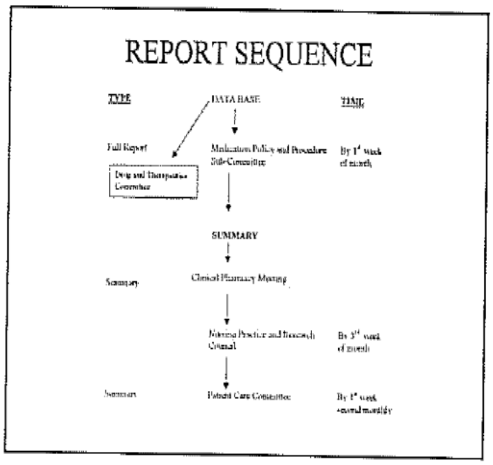
- 905 A and I forms submitted
  2.13% of Total Admissions
- 184 Medications Incidents reported
  20.3% of all incidents
  0.43% of Total Admissions
- Medication Incidents reviewed by Pharmacy and reports sent to D and T Comm since 1995

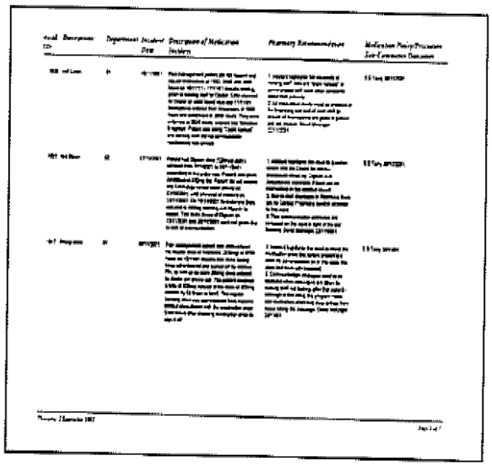
Practice Change in 2001

- Concerns raised as to what outcomes achieved to improve medication safety for patients
- Process change proposed by Pharmacy
- DCP to review each medication incident report
- Summary and recommendations entered into database and Reports provided for various committees for review.







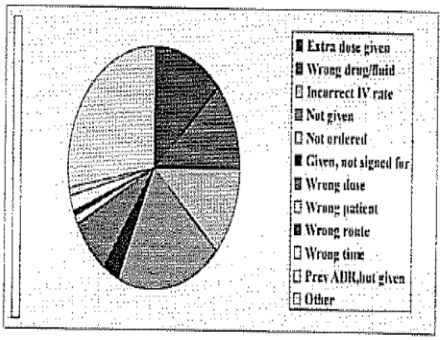


Medication Incidents 2001/2002

- 184 MI reviewed by DCP
- 190 medications involved

- 21% (40) Drug not Given
- 14% (25) Extra Dose Given
- 12% (21) Incorrect IV Rate
- 10% (18) Incorrect Drug Given
- 8 % (15) Wrong Dose Given
- 29% (53) Others

Medication Incidents 2001-2002

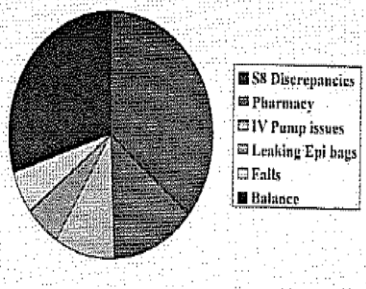


Breakdown of "Others"

- 10% (19)Schedule 8 discrepancies
  - Not booked out (5), missing (8), empty (6)
- 4% (7)Pharmacy Problems
  - Delay (3) Missing chart (1) Disp error (3)
- 3% (5) IV Pump Issues
- 2% (3) Leaking Epidural Bags
- 2% (3) Falls

Breakdown of "Other" category

(53 Incidents; 29% of total)



Medications Involved

- 22% (41) Narcotics
- 16% (31) Antibiotics
- 15% (28) Cardiovascular
- 10% (19) IV Fluids
- 4% (7) Insulin
- 4% (7) NSAIDs
- 3% (6) Epidural Fluids

Benefits Seen By this Process

- One person summarising all medication incidents and giving recommendations
- Early recognition of trends in reports
- Ease of dealing with legal issues eg S8s
- Database entry provided reports for committees and record of any outcomes
- Summary monthly of highlighted issues to Nurse Mangers (stakeholders)

Benefits Seen By This Process

- All Pharmacist recommendations endorsed by Med Pol and Proc S-Committee
- Each incident had an entry by relevant Care Centre Director- better outcomes seen.
- Hospital wide approach Vs Unit approach
- Strategies to correct/change practice were coordinated by DCP
- DCP had easy access to all relevant committees required to implement change.

Examples of Changes Implemented

- Regular Insulin doses missed- new chart designed - separate regular and sliding scale
- IV pump faults- implement an Asset Register and tracking of all pumps sent for maintenance- ? Remove from circulation?
- Nursing Policy Review/Creation eg IV Administration, PCA, Extravasation, ADR
- Updated information in Pharmacy Ward Manual eg Iron I.V. Admin. Guidelines

Examples of Changes Implemented

- OSH issues- glass vials break in Lamson Chute eg change packaging or supplier
- Involvement in preparation of Medication Quiz package for all nurses
- Provision of education, - address meetings, talks, memos etc
- Provision of aids to prevent similar name mixups eg Oxycontin/oxycodone
- Patient medication drawers empty on D/C.

Disadvantages of Pharmacist Involvement

- Very time consuming- approx 9.5% of DCP time, incl investigation, reports, meetings
- Reports often poorly written, inaccurate, requiring prolonged investigation eg shifts
- Often many days of little efforts to get one incident completed
- Revised Quality Improvement Act, liability concerns raised by reviewing committees

Disadvantages of Pharmacist Involvement

- Reports arrived in ad hoc manner, often days since incident- leading to backlog of work in pharmacy and late data entry.
- Some incident forms did not get to pharmacy review or database entry at all
- Some sent to Executive first- slows process
- Endorsed practice changes do not seem to be getting through as similar incidents still reoccur regularly. Is it worth it?

Conclusion

- Coordinated hospital wide approach
- Easy to see trends
- DCP easy access to effect change.
- Pharmacist easily accepted in role of Medication Safety expert.
- Very time consuming
- Often difficult to sustain change in hospital
- Process changed due to QI Act concerns and unwilling to resource DCP for role.

Where To From Here?

- Need to consider: Why it occurred? Who was responsible? And a severity ranking.
- Requires adequate resourcing not ad hoc
- Motivated multidisciplinary team of review
- Remove concerns re QI Act.
- Clinical pharmacist ideally suited to act as a medication safety expert.

APPENDIX 5: CURTIN UNIVERSITY OF TECHNOLOGY HUMAN RESEARCH ETHICS COMMITTEE (HR 29/2004) APPROVAL.

MINUTE

Curtin
UNIVERSITY OF TECHNOLOGY

To	Mr David McKnight 28 Hornsey Road, Floreat, WA, 6014
From	Max Page, Executive Officer, Human Research Ethics Committee
Subject	Protocol Approval **HR 29/2004**
Date	10 March 2004
Copy	Mr Jeff Hughes, Pharmacy Graduate Studies Officer, Division of Health Sciences

Office of Research and Development

Human Research Ethics Committee

TELEPHONE 9266 2784
FACSIMILE 9266 3793
EMAIL T.lerch@curtin.edu.au

Thank you for your application submitted to the Human Research Ethics Committee (HREC) for the project titled "MEDICATION INCIDENTS IN A PRIVATE HOSPITAL: FREQUENCY, TYPE, CAUSES AND OUTCOMES".

Your application has been reviewed by members of the HREC reviewing panel who have recommended that your application be approved, hence you are authorised to commence your research as stated in your proposal. However please note that all recommendations for approval are referred to the next meeting of the HREC for ratification. In the event the Committee does not ratify the recommendation, or would like further information, you will be notified. The next meeting of the HREC is on 20/04/2004.

Approval of this project is for a period of twelve months **9/03/2004** to **8/03/2005**. *Please remember that a copy of the questionnaire to be utilised in Phase 3 of the research must be provided to HREC for review as soon as it is finalised.*

Applicants should note that it is the policy of the HREC to conduct random audits on a certain percentage of projects that have been approved. These audits may be conducted at any time following the commencement of the project. In cases where the HREC considers that there may be a risk of adverse events, or where participants may be especially vulnerable, the HREC may request the chief investigator to provide an outcomes report including information on follow up of participants.

When the project has finished or if at any time during the twelve months changes/amendments occur, or if a serious or unexpected adverse event occurs, the attached FORM B is to be completed and returned to Ms Tania Lerch, (Secretary, HREC) C/- Office of Research & Development as soon as possible. The approval number for your project is **HR 29/2004**. *Please quote this number in any future correspondence.*

Please find attached your protocol details together with the application form/cover sheet.

Tania Lerch

MP Maxwell Page
Executive Officer
Human Research Ethics Committee

Please Note: The following standard statement must be included in the information sheet to participants:
This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784.

APPENDIX 6: MEDICATION INCIDENTS MANAGEMENT QUESTIONNAIRE FOR AUSTRALIAN PRIVATE HOSPITALS.

Medication Incidents Management Questionnaire for Australian Private Hospitals

Hospital and Patient Demographics

Name of Institution: .....

State: _____ **Postcode:** _____

1. How many beds in your hospital?
   < 100 ☐ 100-150 ☐ 150-200 ☐ 200-250 ☐ > 250 ☐

2. Average Level of occupancy (over past 12 months)
   < 70% ☐ 71-80% ☐ 81-90% ☐ > 90% ☐

3. What specialties do you cater for- please tick
   - ☐ Orthopaedics
   - ☐ Cardiology
   - ☐ Urology
   - ☐ Oncology
   - ☐ Obstetrics and Gynaecology
   - ☐ Paediatrics
   - ☐ General Surgery
   - ☐ Gastroenterology
   - ☐ Neurology
   - ☐ Plastics

   Other (Please list)

4. Does the hospital have:
   ☐ Emergency Department ☐ Adult ICU ☐ Neonatal ICU ☐ CCU

5. Does your hospital cater predominantly for
   medical > surgical ☐
   surgical > medical ☐
   surgical = medical ☐

6. Average Length of stay? (over past 12 months)
   Surgical patients: ☐ ≤ 1 day ☐ 1-3 days ☐ 4-5 days ☐ ≥ 6 days
   Medical patients: ☐ ≤ 1 day ☐ 1-3 days ☐ 4-5 days ☐ ≥ 6 days

7. Is it co-located with a public hospital?
   ☐ Yes ☐ No If yes which one? _____

David McKnight 2005 1

Risk Management Processes

1. Does your hospital have a policy on medication safety? Yes ☐No ☐
   If yes, could a copy be made available? Yes ☐No ☐

2. Are medication incidents reported at your hospital? Yes ☐No ☐
   If yes, do they form part of a hospital wide incident reporting mechanism including falls, equipment failures etc Yes ☐ No ☐

3. How are medication incidents collected:
   ☐ Hard copy report form
   ☐ Electronic report form

   If a hard copy report form is used could a copy be made available for review
   Yes ☐ No ☐
   If an electronic report form is used could a copy be made available for review
   Yes ☐ No ☐

3. Who undertakes the initial review of each report?
   ☐ Senior Nurse
   ☐ Nurse or Unit Manager
   ☐ Director
   ☐ Pharmacist
   ☐ Other, please list: _____

4. Following the initial review of the report to whom are incident reports sent?
   ☐ Director
   ☐ Medication Safety Officer
   ☐ Project Officer
   ☐ Safety & Quality Officer
   ☐ Other, please list: _____

5. Do you have a Quality and Safety Coordinator or equivalent at your hospital?
   Yes ☐ No ☐ If yes, title please: _____

6. Are reported medication incidents placed on a database?
   Yes ☐ No ☐

7. What system do you use? ☐ AIMS ☐ Excel database
   ☐ Other, please list: _____

8. Who manages the database input?_____

9. Are reports produced? Yes ☐ No ☐
   If yes, how often: Monthly ☐ Quarterly ☐ Six monthly ☐ Annually ☐
   Ad-hoc basis ☐

10. What type of reports are generated?
    Types of errors ☐ Frequency of errors ☐ Contributing factors ☐
    Severity ☐ Other ☐ Please list _____

11. Are medication incident reports reviewed by a hospital committee?
Yes ☐ No ☐
If yes what is the name of the reviewing committee? _____

12. What action(s) does the committee take if any?
Table report only☐ Suggest practice change ☐ Authorise staff education ☐
Other ☐ Please list: _____

12. How many medication incidents were reported in the last 12 months in your hospital? _____

13. How did the number of medication incidents report in the last 12 months compare with previous years?
More ☐ Less ☐ Same ☐ Do not know ☐

Involvement of Pharmacy Services

14. Does your hospital have a pharmacy service?
Yes ☐ **Go to *Question 15***
No ☐ ***End of Questionnaire*** - Thank you for your participation

15. If yes, are pharmacy services provided from a department
On site ☐ Off site ☐

16. Is the pharmacy department owned by the hospital ☐ or contracted out ☐

17. Are clinical pharmacists employed by the pharmacy service provider to ensure optimal medication management for hospital patients?
Yes ☐ **Go to *Question 18***
No ☐ **Go to *Question 22***

18. How many clinical pharmacists are employed to provide clinical pharmacy services to the wards in your hospital? _____

19. What percentage of the hospital's wards are serviced by the clinical pharmacists?
☐ < 25% ☐ 25-50 % ☐ 51-75% ☐ 75-100% ☐

20. Are the clinical pharmacists in your hospital on your wards full time
Yes ☐ No ☐

If No, are they part-time clinical pharmacists with other duties eg dispensing, aseptic dispensing, purchasing and distribution
Yes ☐ No ☐ Unknown ☐

21. Are your clinical pharmacists involved in any of the following activities that may help to reduce medication errors at your hospital:
☐ Preadmission Clinics
☐ Admission History interviews
☐ Daily medication chart review

☐ Discharge Counselling
☐ Medication list provision
☐ Management of trials
☐ Design of medication and other therapy charts
☐ Provide medication guidelines
☐ Advise on nursing policy development
☐ Provide in-service education to nursing staff

22. Is your pharmacy service provider involved in the routine review of medication incidents?
Yes ☐ No ☐ If Yes who is responsible for this review:
☐ Chief or Director or Manager of Pharmacy
☐ Deputy Chief
☐ Coordinator of Clinical Pharmacy services
☐ Clinical pharmacist
☐ Other
☐ Unsure

23. If medication incidents are routinely reviewed by a clinical pharmacist or equivalent what is their role and responsibility?
- ☐ No applicable
- ☐ Recognition of trends
- ☐ Advice on remedial actions required to be taken
- ☐ Assist in education or change process to reduce further error
- ☐ Other

24. What FTE clinical pharmacist is associated with this function?
1fte ☐ 0.75fte ☐ 0.5fte ☐ 0.25fte ☐ <0.25fte ☐ unknown ☐

25. Do your clinical pharmacists collect their own drug intervention data ie changes they make to patients therapy?
Yes ☐ No ☐ Unknown ☐
If yes is this data part of your medication incident reporting data
Yes ☐ No ☐

26. Are dispensing errors that leave the pharmacy and arrive on wards and departments collected as pharmacy dispensing errors in your medication incident reporting process
Yes ☐ No ☐

27. Does your pharmacy self record "near miss" dispensing errors, ie errors discovered prior to the item leaving the pharmacy department?
Yes ☐ No ☐
If Yes, is this data collected added to hospital medication incident data?
Yes ☐ No ☐

Thank you for your assistance in completing this questionnaire.

APPENDIX 7: COVERING LETTER TO PRIVATE HOSPITALS REQUESTING SUPPORT FOR THE SURVEY.

Division of Health Sciences

Curtin University of Technology

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Phone (08) 93826957

School of Pharmacy

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 7369
Facsimile +61 8 9266 2769

CRICOS Provider Code 00301J

Dear Colleague

Survey of the Management of Medication errors in Australian Private Hospitals

Australian healthcare is a comprehensive and highly technical service with well trained and motivated staff within all disciplines, however errors do occur in this industry. These are usually as a result of system failures. Safety in healthcare is highly valued by patients and their families as well as healthcare professionals. For optimal healthcare delivery, a complex mixture of safe systems of care and safety conscious personnel must be blended together.

Medication safety has become a major focus for the Commonwealth Department of Health and Ageing under the auspices of the Australian Council for Safety and Quality in Healthcare since January 2000. Medication errors can usually be attributed to faults in the medication systems rather than the individual. Medication errors are considered common in the healthcare system. They can occur at any time during the continuum of care in a hospital setting from admission to discharge of a patient involving the prescribing dispensing and administration of medication. Medication errors are considered the leading cause of adverse events in Australia and overseas. 10-20% of adverse events in hospitals are drug related with 50% or more being considered preventable. In Australia medication error is estimated to be responsible for 80,000 hospital admissions and cost $350 million per year.

ACSQHC have provided two National Patient Safety Reports to health ministers to date in July 2000 and a second in July 2002 focusing on minimizing medication incidents. This latter report highlighted many issues including the beneficial role of clinical pharmacists in medication error reduction, individual patient medication supply, use of computerized dispensing and decision support and transfer of information between hospitals and the community. Also identified was the need for a multidisciplinary approach and the need to identify the causes and contributing factors leading to medication incidents.

In October 2002 the Private Health Industry Quality and Safety Committee met in Sydney to discuss the issues pertinent to the private sector. It was identified that the success of the government's initiatives required private health to be fully involved and in particular data was needed on medication incidents in the private health arena.

In 2004 many private hospitals were involved in both Wave 1 and Wave 2 projects for the National Medication Safety Breakthrough Collaborative to improve medication safety in our hospitals.

As part of my Masters in Pharmacy research project entitled "Medication Incidents in a Private Hospital : Frequency, types, causes and outcomes" I am undertaking a survey to ascertain information on how medication incidents are collected and managed in Australian Private Hospitals and what role if any associated pharmacy departments play in the process. The Curtin University of Technology Human Research Ethics Committee (HR 29/2004) has approved the questionnaire and project.

My research project and associated questionnaire attempts to build on the work commenced during the Collaborative and provide some data to satisfy the need identified by PHIQS on the current practices of private hospitals in management of medication incidents.

I would be very grateful to you if you could spare the time to complete the attached questionnaire and return to me in the stamped addressed envelope. Please note that for the purposes of data-analysis and publication at data will be grouped and no reference will be made to individual institutions. Results of the survey will be available for downloading from the Curtin University School of Pharmacy website once finalised or can be provided on request.

Please return the completed survey to David Mc Knight using the enclosed pre-paid envelope by the 18th November 2005, if possible. If you have any further questions please contact me on (08) 93826957 or my supervisor Jeff Hughes (08) 9266 7367.

Thank you for your assistance in advance.

Kindest regards

David Mc Knight Post Grad Dip Hosp Pharm, FPS
Masters in Pharmacy Candidate

Jeff Hughes MPharm, MPS
Senior Lecturer,
School of Pharmacy,
Curtin University of Technology, Bentley, WA

APPENDIX 8: SJOGHC CLASSIFICATION OF PRESCRIBING, DISPENSING AND ADMINISTRATION ERRORS.

ST JOHN OF GOD
HEALTH CARE

SJGHC INCIDENT CATEGORY DESCRIPTIONS

NOTE: The use of these categories is not for the purpose of determining "cause and effect".
It is to be used to code what is factual at that time.
Where there is uncertainty about interpretation, the Quality Coordinator is the contact person.
At National Office is the contact person is the National Clinical Risk Coordinator.

INCIDENT CATEGORIES

Code - Category 1	Code - Sub category 1.1	Code - Sub subcategory 1.1.1
M - *MEDICATION*	M1 - Administration	M1.1 - Wrong medication
		M1.2 - Wrong frequency
		M1.3 - Wrong time
		M1.4 - Wrong route
		M1.5 - Wrong patient
		M1.6 - Wrong infusion rate
		M1.7 - Reaction to medication
		M1.8 - Self inflicted overdose
		M1.9 - Given without order
		M1.10 - Given but not signed for
		M1.11 - Incorrect labelling
		M1.12 - Expired medication
		M1.13 - Omission
		M1.14 - Wrong dose
		M1.15 - Damaged product
		M1.16 - Theft or loss
		M1.17 - DDA discrepancy
		M1.18 - Transcription error
		M1.19 - Previous drug reaction given
		M1.20 - Extravasation
		M1.21 – Extra dose
	M2 - Pharmacy Dispensing	M2.1 - Wrong medication
		M2.2 - Wrong frequency
		M2.3 - Wrong time
		M2.4 - Wrong route
		M2.5 - Wrong patient
		M2.6 - Incorrect labelling
		M2.7 - Expired medication
		M2.8 - Omission
		M2.9 - Wrong Dose
		M2.10 - Damaged product
		M2.11 - Theft or loss
		M2.12 - DDA discrepancy
		M2.13 - Previous drug reaction dispensed

Code - Category 1	Code - Sub category 1.1	Code - Sub subcategory 1.1.1
M - *MEDIC-ATION contd*	M3 - Prescribing by Doctor	M3.1 - Wrong medication
		M3.2 - Wrong frequency
		M3.3 - Wrong time
		M3.4 - Wrong route
		M3.5 - Wrong patient
		M3.6 - Previous drug reaction prescribed
		M3.7 - Omission
		M3.8 - Wrong dose
		M3.9 - Administration information incorrect/unclear
		M3.10 - Discharge prescription error
		M3.11 - Treatment not cancelled
		M3.12 – No order provided

Code - Category 1	Code - Sub category 1.1
N -*NUTRITION*	N1 - No meal or feed ordered
	N2 - Wrong meal or feed ordered
	N3 - Meal or feed not delivered
	N4 - Wrong meal or feed delivered
	N5 - Fed when nil by mouth
	N6 - Wrong meal or feed given
	N7 - Aspiration of feed or fluid
	N8 - Assistance with feeding not provided
	N9 - Contamination of food or fluid
	N10 - Expired or out of date
	N11 - Out of hours meal or feed not available
	N12 - Difficulties with packaging
	N13 - Other

APPENDIX 9: CLINICAL SERVICES DOCUMENTATION FORM.

CLINICAL SERVICES DOCUMENTATION **Pharmacist:**

Date																
Clinical Service Ward																
MCR Medication chart review (all charts)																
COUNSELLING Patient/ parent																
INF Information / research provision																
PC / CN / Authority																
Interventions																
ADR Complete documentation for a new ADR																

INTERVENTION DETAILS

DATE	WARD	UMRN	DRUG	Reason	Type	Outcome	DESCRIPTION

REASON FOR INTERVENTION

6.1	Drug has a documented ADR
6.2	Drug given > 72 hours without serum levels taken
AH	Admission History
ADV	Adverse effects from drug
AF	Administration Facilliation
CON	Contraindicated drug
D	Dose frequency/time incorrect
DC	Discharge Counselling
HOS	Hospital policy/protocol
INT	Drug interaction
PC	Prescribing clarification (significant)
PR	Pathology results
TDM	Therapeutic drug monitoring
TR	Therapeutic reason
O	Other

TYPE

A	Addition of drug
C	Cessation of drug
D	Dose change
R	Route of administration change
S	Substitution of drug
T	Time of administration change (not frequency)
O	Other
P	Path test

OUTCOME/BENEFIT

P	Improved patient care
C	Cost benefit

APPENDIX 10: MEDICATION INCIDENTS PHARMACY SUMMARY.

ST JOHN OF GOD HOSPITAL SUBIACO
PHARMACY DEPARTMENT

MEDICATION INCIDENTS

INCIDENT DATE	DATA BASE No.	WARD	UR No.	ERROR TYPE	CAUSED BY	CONTRIB'G FACTORS	MEDIC'N ORDERED	MEDIC'N ADMIN.	HARM RAT-ING	RISK RAT-ING	DATE OF REVIEW	TIME (MINS)

Description of incident: _____

Description of incident: _____

Description of incident: _____

Description of incident: _____

Description of incident: _____

Description of incident: _____

Description of incident: _____

Description of incident: _____

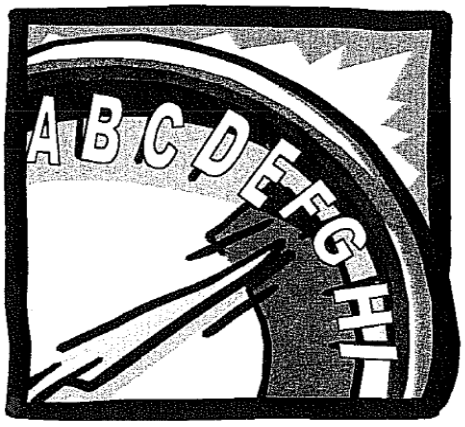
H:\davids files\DATA\WORD\Medication Incidents\Medication Incidents Pharmacy Summary Form\medinrf4.docCreated by: DavidMcKnight

APPENDIX 11: NATIONAL MEDICATION SAFETY BREAKTHROUGH COLLABORATIVE "HARMOMETER".

Medication Safety BREAKTHROUGH COLLABORATIVE

"How are you measuring harm?"

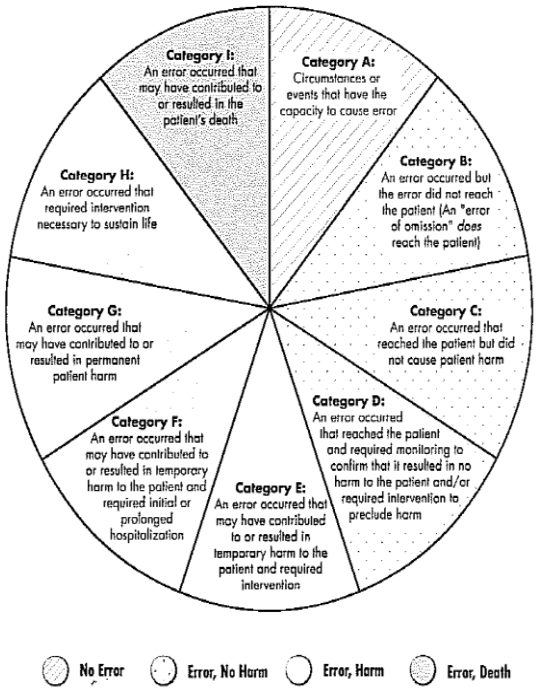
"The NMSBC Harmometer"



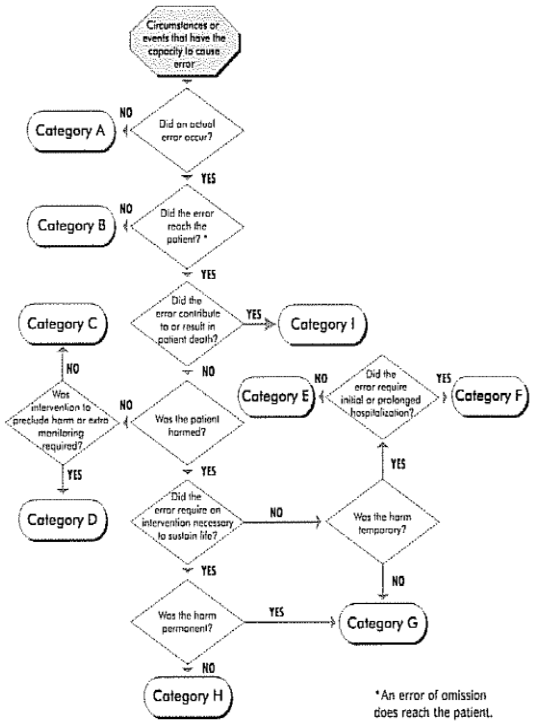
Definitions	Examples from NMSBC teams
	Ideal System – Measuring Potential
A = No error/Harm – but potential injurious circumstances	**A** = "Administration of drug not signed for"
B = Error occurred, didn't reach the patient	**B** = "Duplicate orders identified by pharmacist"
C = Error reached the patient, not Harmful	**C** = "Warfarin given 2 hours after prescribed time"
D = Not harmful, increased Monitoring	**D** = "Administration of breakthrough doses of narcotics"
	Current System – Measuring Actual
E = Additional treatment, intervention, temporary harm	**E** = "IV Therapy given too rapidly- Pt requiring lasix"
F = Prolonged hospitalisation, temporary harm	**F** = "Patient over warfarinised"
G = Permanent harm	**G** = "Renal impairment caused by administration of Gentamycin when patient fluid depleted"
H = Near death event	**H** = "Acute bradycardia (Code Blue) caused by administration of a double dose of Beta- blocker"
I = Death	**I** = "10mmol KCL administered undiluted into a central line instead of saline flush"

APPENDIX 12: NCC MERP INDEX.

NCC MERP Index for Categorizing Medication Errors



NCC MERP Index for Categorizing Medication Errors Algorithm



Full-size copies are available: INDEX—www.nccmerp.org/010612_color_index.pdf; ALGORITHM—www.nccmerp.org/010612_color_algo.pdf

National Coordinating Council for Medication Error Reporting and Prevention Definitions

Harm
Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting therefrom.

Monitoring
To observe or record relevant physiological or psychological signs.

Intervention
May include change in therapy or active medical/surgical treatment.

Intervention Necessary to Sustain Life
Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation, etc.)

APPENDIX 13: LIST OF PRIVATE HOSPITALS WHO PARTICIPATED IN THE QUESTIONNAIRE.

Appendix 13

State	Participating Hospitals in Questionnaire	Health Provider
New South Wales	Albury Wodonga Private Hospital	Ramsay
	Berkeley Vale Private Hospital	Ramsay
	Figtree Private Hospital	Ramsay
	Lake Macquarie Private Hospital	Ramsay
	North Shore Private Hospital	Ramsay
	Nowra Private Hospital	Ramsay
	Port Macquarie Private Hospital	Ramsay
	St George Private Hospital	Ramsay
	Strathfield Private Hospital	Ramsay
	Tamara Private Hospital	Ramsay
	Warners Bay Private Hospital	Ramsay
	Calvary Health Care Sydney Hurstville Community	Catholic Health
	St Vincent's Private Hospital	Catholic Health
Victoria	Cabrini Private Hospital	Catholic Health
	St John of God Hospital Bendigo	Catholic Health
	St John of God Hospital, Ballarat	Catholic Health
	St John of God Hospital, Geelong	Catholic Health
	St John of God Hospital Berwick	Catholic Health
	Epworth Eastern Hospital	Healthscope
	Freemasons Hospital	Healthscope
	Linacre Private Hospital	Healthscope
	Northpark Private Hospital	Healthscope
Queensland	Greenslopes Private Hospital	Ramsay
	John Flynn - Gold Coast Private Hospital	Ramsay
	Pindara - Gold Coast Private Hospital	Ramsay
	Mater Adult Woman's & Children's Health Servics	Catholic Health
	Mater Misericordiae Hospital Mackay	Catholic Health
	Mt Olivet Community Services-Mt Olivet Hospital	Catholic Health
	Peninsula Private Hospital	Healthscope
Western Australia	Hollywood Private Hospital	Ramsay
	Mercy Hospital Mount Lawley	Catholic Health
	St John of God Hospital, Subiaco	Catholic Health
	St John of God Hospital Geraldton	Catholic Health
	Bethesda Hospital	Healthscope
South Australia	Wakefield Hospital	Ramsay
	Calvary Health Care Adelaide Ltd	Catholic Health
	St Andrew's Hospital	Healthscope
Tasmania	Hobart Private Hospital	Healthscope

St John of God Hospital Subiaco Risk Rating Matrix and Descriptors

Consequence x Likelihood = Risk Rating
The "Likelihood" is the likelihood of the incident with its consequences occurring again.

Descriptor	Clinical Incidents	Non-clinical & OHS Incidents
Almost certain	Daily	Weekly
Likely	Weekly	Monthly
Occasionally	Monthly	3-5 times a year
Unlikely	3-5 times a year	1-2 times a year
Rare	0-2 times a year	Less than one per year

CONSEQUENCES (Qualitative)

NEGLIGIBLE

Patients:
- No injuries and no treatment required, &/or
- LOS not impacted, &/or
- No impact on well being, &/or
- Reportable near miss on accident / incident form

Contractors/Visitors
- No injuries and no treatment required, &/or
- Reportable near miss on accident / incident form, &/or
- Contracted service delivery maintained

Caregivers
- No injuries and no treatment required, &/or
- Staffing levels don't impact on service provision, &/or
- Internal dispute resolution within department involving 1 employee, &/or
- Lack of current qualifications detected immediately prior to service delivery, &/or
- Skill capability maintained but not developing, &/or
- Hazard form completed

Facility/Security
- No loss of service (0-1 hour), &/or
- Environment: nuisance releases,

Reputation and Public Confidence and Complaints
- Minimal impact on SJGHCs reputation, &/or
- Unsubstantiated, low impact or no news item, &/or
- Consumer or caregiver annoyance, &/or
- No impact on reduction of dissatisfaction levels (via satisfaction surveys)

Finance and Administration
- Contained within 1 cost centre / department, &/or
- Within delegated authority of department manager, &/or
- Does not exceed budget, &/or
- Within 1 financial year, &/or
- Reportable near miss (genuine recognition of error)

Organisational Accreditation / Licensing
- Full accreditation granted with recommendations to be actioned
- Compliance with Diocesan regulations and practice

January 2007

St John of God Hospital Subiaco Risk Rating Matrix and Descriptors

Likelihood	Consequence				
	Critical 5	Major 4	Moderate 3	Minor 2	Negligible 1
Almost Certain 5	Extreme A 25	Extreme A 20	Extreme B 15	High 10	High 5
Likely 4	Extreme A 20	Extreme A 16	High 12	High 8	Medium 4
Occasionally 3	Extreme A 15	Extreme B 12	High 9	Medium 6	Low 3
Unlikely 2	Extreme B 10	Extreme B 8	Medium 6	Low 4	Low 2
Rare 1	Extreme B 5	Extreme B 4	Medium 3	Low 2	Low 1

All Department of Health Reported Sentinel Events are to be rated as an Extreme A

Action Required:

Extreme A Risk
Immediate action required. Recommendation to initiate Root-cause analysis (RCA) investigation submitted to CEO where appropriate. National Clinical Risk Coordinator/ National Risk Manager to be notified. **(Medical malpractice flowchart on Intranet/National Office/Legal/Medical Malpractice)**

Extreme B Risk
Immediate action required and monitored by Directors.
Initiate investigation, corrective action and preventative measures.
National Clinical Risk Manager to be notified

High Risk
Manager responsibility, Director involvement where appropriate

Medium Risk
Managers responsibility.
Link action requirements with department planning processes

Low Risk
Managers responsibility through routine procedure review and quality activities.

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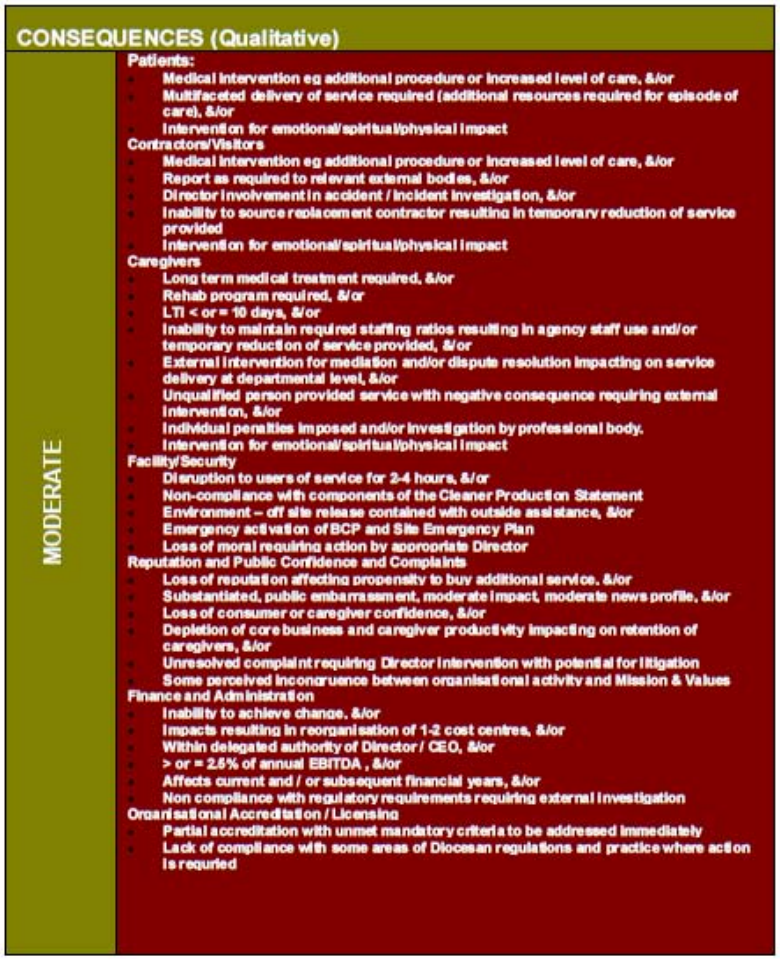

CONSEQUENCES (Qualitative)

MODERATE

Patients:
- Medical intervention eg additional procedure or increased level of care, &/or
- Multifaceted delivery of service required (additional resources required for episode of care), &/or
- Intervention for emotional/spiritual/physical impact

Contractors/Visitors
- Medical intervention eg additional procedure or increased level of care, &/or
- Report as required to relevant external bodies, &/or
- Director involvement in accident / incident investigation, &/or
- Inability to source replacement contractor resulting in temporary reduction of service provided
- Intervention for emotional/spiritual/physical impact

Caregivers
- Long term medical treatment required, &/or
- Rehab program required, &/or
- LTI < or = 10 days, &/or
- Inability to maintain required staffing ratios resulting in agency staff use and/or temporary reduction of service provided, &/or
- External intervention for mediation and/or dispute resolution impacting on service delivery at departmental level, &/or
- Unqualified person provided service with negative consequence requiring external intervention, &/or
- Individual penalties imposed and/or investigation by professional body.
- Intervention for emotional/spiritual/physical impact

Facility/Security
- Disruption to users of service for 2-4 hours, &/or
- Non-compliance with components of the Cleaner Production Statement
- Environment – off site release contained with outside assistance, &/or
- Emergency activation of BCP and Site Emergency Plan
- Loss of moral requiring action by appropriate Director

Reputation and Public Confidence and Complaints
- Loss of reputation affecting propensity to buy additional service, &/or
- Substantiated, public embarrassment, moderate impact, moderate news profile, &/or
- Loss of consumer or caregiver confidence, &/or
- Depletion of core business and caregiver productivity impacting on retention of caregivers, &/or
- Unresolved complaint requiring Director intervention with potential for litigation
- Some perceived incongruence between organisational activity and Mission & Values

Finance and Administration
- Inability to achieve change, &/or
- Impacts resulting in reorganisation of 1-2 cost centres, &/or
- Within delegated authority of Director / CEO, &/or
- > or = 2.5% of annual EBITDA , &/or
- Affects current and / or subsequent financial years, &/or
- Non compliance with regulatory requirements requiring external investigation

Organisational Accreditation / Licensing
- Partial accreditation with unmet mandatory criteria to be addressed immediately
- Lack of compliance with some areas of Diocesan regulations and practice where action is required

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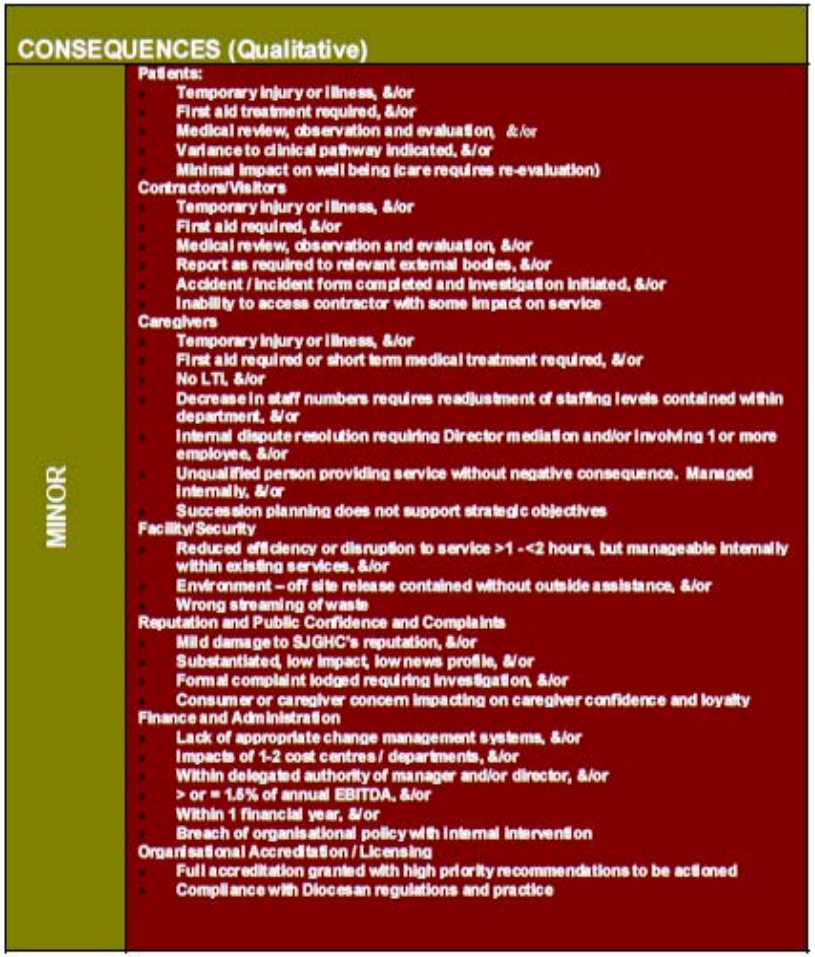


CONSEQUENCES (Qualitative)

MINOR

Patients:
- Temporary injury or illness, &/or
- First aid treatment required, &/or
- Medical review, observation and evaluation, &/or
- Variance to clinical pathway indicated, &/or
- Minimal impact on well being (care requires re-evaluation)

Contractors/Visitors
- Temporary injury or illness, &/or
- First aid required, &/or
- Medical review, observation and evaluation, &/or
- Report as required to relevant external bodies, &/or
- Accident / incident form completed and investigation initiated, &/or
- Inability to access contractor with some impact on service

Caregivers
- Temporary injury or illness, &/or
- First aid required or short term medical treatment required, &/or
- No LTI, &/or
- Decrease in staff numbers requires readjustment of staffing levels contained within department, &/or
- Internal dispute resolution requiring Director mediation and/or involving 1 or more employee, &/or
- Unqualified person providing service without negative consequence. Managed internally, &/or
- Succession planning does not support strategic objectives

Facility/Security
- Reduced efficiency or disruption to service >1 -<2 hours, but manageable internally within existing services, &/or
- Environment – off site release contained without outside assistance, &/or
- Wrong streaming of waste

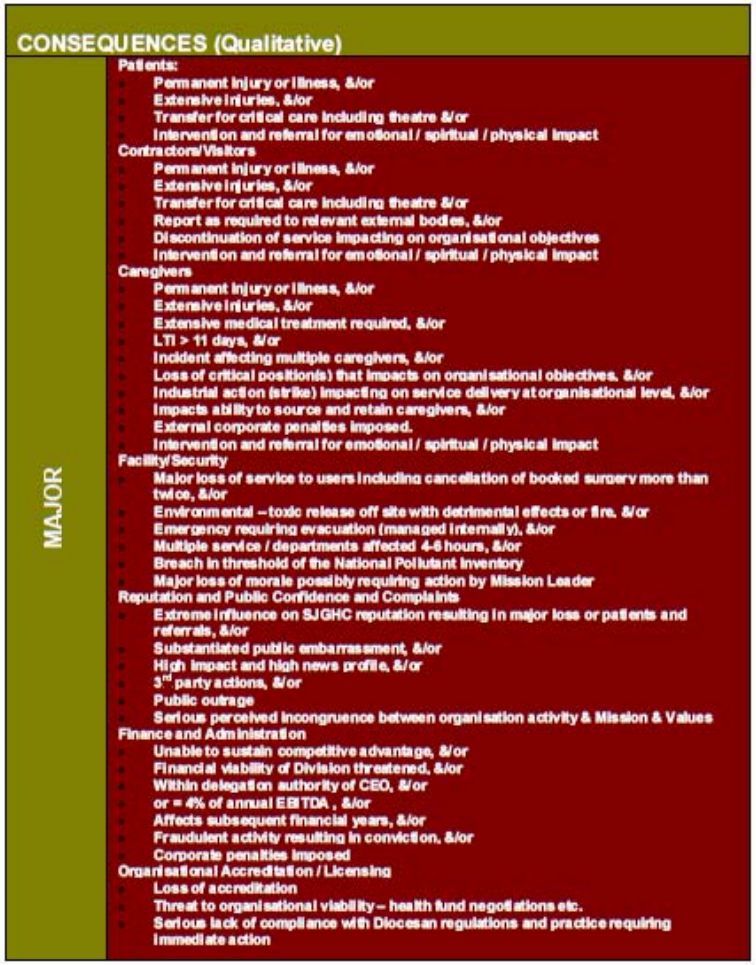
Reputation and Public Confidence and Complaints
- Mild damage to SJGHC's reputation, &/or
- Substantiated, low impact, low news profile, &/or
- Formal complaint lodged requiring investigation, &/or
- Consumer or caregiver concern impacting on caregiver confidence and loyalty

Finance and Administration
- Lack of appropriate change management systems, &/or
- Impacts of 1-2 cost centres / departments, &/or
- Within delegated authority of manager and/or director, &/or
- > or = 1.5% of annual EBITDA, &/or
- Within 1 financial year, &/or
- Breach of organisational policy with internal intervention

Organisational Accreditation / Licensing
- Full accreditation granted with high priority recommendations to be actioned
- Compliance with Diocesan regulations and practice

January 2007

CONSEQUENCES (Qualitative)	
CRITICAL	**Patients:** • Unexpected death, &/or • Severe permanent disability or injury, &/or • Requiring rehabilitation and permanent placement, &/or • Reportable sentinel event &/or • Litigation, &/or • Coronial and/or other professional body enquiry • Intervention for emotional / spiritual / physical impact to extended family **Contractors/Visitors** • Unexpected death, &/or • Severe permanent disability or injury, &/or • Report as required to relevant external bodies, &/or • Loss of contracted service provider impacting on core business. &/or • Discontinuation of multiple services due to inability to source contractor • Intervention for emotional / spiritual / physical impact to extended family **Caregivers** • Death or unexpected death. &/or • Severe or permanent disability or injury. &/or • Hospitalisation of multiple caregivers with morbid consequences. &/or • Discontinuation of multiple services impacting on organisational viability. &/or • Industrial Commission involvement with significant non-budgeted cost related to organisational penalty • Intervention for emotional / spiritual / physical impact to extended family **Facility/Security** • Complete loss of service or output> 6 hours. &/or • Environment – toxic release off site with detrimental effect. &/or • Emergency requiring evacuation (external intervention). &/or • EPA intervention **Reputation and Public Confidence and Complaints** • Extreme influence on SJGHC reputation resulting in profound loss of patients and referrals. &/or • Substantiated public embarrassment. &/or • Very high impact, very high profile widespread multiple news. &/or • 3rd party actions. &/or • No longer a values-based, customer-focussed organisation • Serious perceived incongruence between organisational activity and Mission & Values **Finance and Administration** • Major organisational cost implications (recovery and revenue). &/or • Lack of implementation of strategic plan affects organisational viability. &/or • Exceeds CEO delegation authority requiring external intervention. &/or • > or = 5% of annual EBITDA. &/or • Affects current and subsequent financial years. &/or • Conviction of Executive / Board member resulting in closure of service **Organisational Accreditation / Licensing** • Inability to source insurance / service providers impacting on organisational viability • Serious lack of compliance with Diocesan regulations and practice requiring immediate action



CONSEQUENCES (Qualitative)	
MAJOR	**Patients:** • Permanent injury or illness, &/or • Extensive injuries, &/or • Transfer for critical care including theatre &/or • Intervention and referral for emotional / spiritual / physical impact **Contractors/Visitors** • Permanent injury or illness, &/or • Extensive injuries, &/or • Transfer for critical care including theatre &/or • Report as required to relevant external bodies, &/or • Discontinuation of service impacting on organisational objectives • Intervention and referral for emotional / spiritual / physical impact **Caregivers** • Permanent injury or illness, &/or • Extensive injuries, &/or • Extensive medical treatment required. &/or • LTI > 11 days, &/or • Incident affecting multiple caregivers, &/or • Loss of critical position(s) that impacts on organisational objectives. &/or • Industrial action (strike) impacting on service delivery at organisational level, &/or • Impacts ability to source and retain caregivers, &/or • External corporate penalties imposed. • Intervention and referral for emotional / spiritual / physical impact **Facility/Security** • Major loss of service to users including cancellation of booked surgery more than twice, &/or • Environmental – toxic release off site with detrimental effects or fire. &/or • Emergency requiring evacuation (managed internally), &/or • Multiple service / departments affected 4-6 hours, &/or • Breach in threshold of the National Pollutant Inventory • Major loss of morale possibly requiring action by Mission Leader **Reputation and Public Confidence and Complaints** • Extreme influence on SJGHC reputation resulting in major loss or patients and referrals, &/or • Substantiated public embarrassment, &/or • High impact and high news profile, &/or • 3rd party actions, &/or • Public outrage • Serious perceived incongruence between organisation activity & Mission & Values **Finance and Administration** • Unable to sustain competitive advantage, &/or • Financial viability of Division threatened. &/or • Within delegation authority of CEO, &/or • or = 4% of annual EBITDA , &/or • Affects subsequent financial years, &/or • Fraudulent activity resulting in conviction, &/or • Corporate penalties imposed **Organisational Accreditation / Licensing** • Loss of accreditation • Threat to organisational viability – health fund negotiations etc. • Serious lack of compliance with Diocesan regulations and practice requiring immediate action

APPENDIX 15: AUSTRALIAN COUNCIL ON HEALTHCARE STANDARDS- REPORTED CLINICAL INDICATORS TO JUNE 2006.

ST JOHN OF GOD
HOSPITAL
SUBIACO

ACHS Reported Clinical Indicators

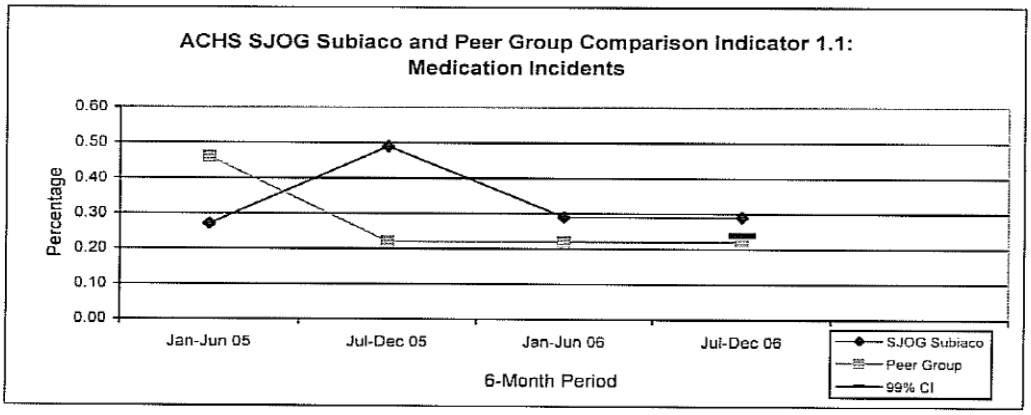
For the periods
July 2000 to December 2006

Prepared by: Karen Fitzsimmons
Safety & Quality Department

HOSPITAL WIDE CLINICAL INDICATORS

1.1 Medication Incidents

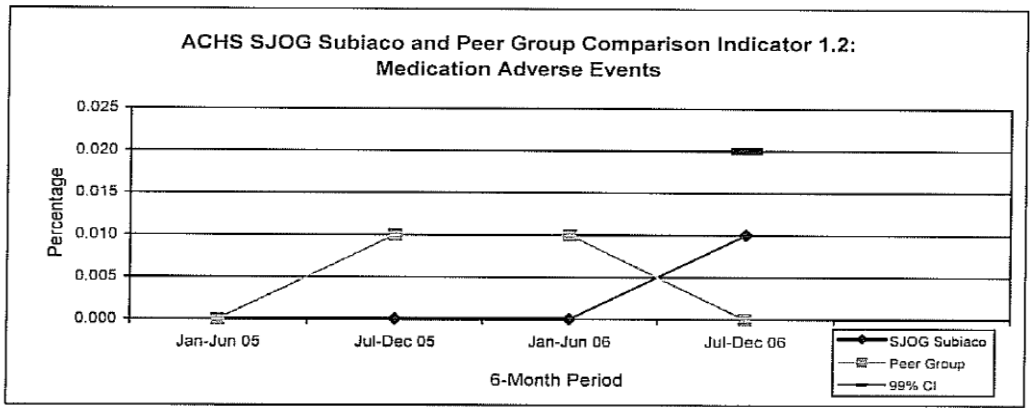
Numerator: Total number of medication incidents
Denominator: Total number of occupied bed days



Note: The current Subiaco rate is both higher than the Peer Group comparison and outside the 99% confidence interval. This is most likely due to good reporting of incidents. This indicator has been removed by the ACHS for 2007.

1.2 Medication Adverse Events

Numerator: Total number of medication incidents, resulting in an adverse event
Denominator: Total number of occupied bed days



Note: The current Subiaco rate is higher than the Peer Group comparison but within the 99% confidence interval.