Nurses and information technology

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Nurses and Information Technology

Final Report

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Glossary of Terms

ACT   Australian Capital Territory

AIN   Assistant in Nursing

ASGC   Australian Standard Geographical Classification

CPE   Continuing Professional Education

EN   Enrolled Nurse (registered nurse division 2 in Victoria)

IMS   Information Management System

IR   Inner Regional

IT   Information Technology

MCC   Major Capital City

NSW   New South Wales

NT   Northern Territory

QLD   Queensland

OR   Outer Regional

PC   Personal Carer

RN   Registered Nurse (registered nurse division 1 in Victoria)

RVR   Remote/Very Remote

SA   South Australia

TAS   Tasmania

VIC   Victoria

WA   Western Australia

1   Executive Summary

Synopsis: A study of 10,000 nurses in Australia (44% response rate) on their use of information technology has clearly identified that nurses recognise benefits to adopting more information technology in the workplace. They are however frustrated by limitations of access to the technology; software that is not always fit for purpose; and lack of opportunities for training. The level of use of information technology and information management systems is generally low and confidence in use is low even among those nurses who are users. There is evidence that familiarity, use and confidence in use are slightly higher in nurses who have recent tertiary education. Nurses feel poorly informed about information technology health initiatives and poorly consulted about implementation of these initiatives. Workload, number of computers, inadequate technical support and lack of training are principal barriers to the use of information technology. Technical support is especially poor in more remote locations. Neither the full potential of information technology in the provision of health and aged care nor the recognition by all nurses that information technology is an integral part of nursing will be realised until these limitations are addressed.

1.1   Background

The Australian Nursing Federation was commissioned by the Australian Government to carry out a research study into the use of information technology by nurses in Australia. The objectives of the study were to:

1.   identify the extent to which nurses have access to and use information technology and information management systems;

2.   identify the purposes for which nurses use information technology and information management systems;

3.   identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect*);

4.   understand the barriers that prevent nurses from benefiting from information technology and information management systems;

5.   recommend ways to overcome these barriers and provide opportunities for nurses to better use information technology and information management systems within the Government policy framework; and

6.   prepare a road map for access, education and training to meet the needs of nurses.

1.2   Methodology

The study surveyed 10,000 nurses in Australia. The survey tool, a questionnaire, was developed from key issues identified by:

■   telephone interviews with 26 key stakeholders from the state and territory governments, national nursing and other peak health and aged care organisations;

■   focus groups of representatives of national nursing organisations; and

■   a review of the literature.

Using the member database of the Australian Nursing Federation, 10,000 questionnaires were distributed to nurses in all states and territories of Australia. Members polled included assistants in nursing, enrolled nurses and all levels of registered nurse (levels 1-5)[1]. Stratification of the sample for the survey was by geographic location using the Australian Standard Geographical Classification. The overall response rate was 44% distributed evenly among the four geographic locations (major capital cities; inner regional; outer regional; and remote/very remote). From responses to the demographic questions, the respondents to the survey would appear to be representative of the nursing workforce in Australia.

Access and attitudes to information technology by nurses have been demonstrated by others to be affected by a number of factors including: geographic location; age of nurse; length of time in nursing; level of position; and employment sector. Analysis of the current data was undertaken using all these factors.

1.3   Results

OBJECTIVE 1: Identify the extent to which nurses have access to and use information technology and information management systems.

There was a high adoption of information technology into the nursing workplace. Over 85% of nurses use a computer for some aspect of their work. In remote/very remote areas and among the most senior of registered nurses (levels 3-5[2]) the figures rise to 93% and 95% respectively. No effects of age or length of time in nursing were seen.

Shared work computers were used by 90% of nurses and own work computers by 50% with access to the latter correlated with seniority. Home computer use for work-related purposes was reported by almost three quarters of the respondents who used a computer. The overwhelming reason for working at home was workload, with over half the nurses who worked at home indicating this reason. Lack of access to computers and convenience, were also reported by those nurses who used their home computer for work.

Despite the high rate of adoption, nurses did not exhibit a great deal of familiarity with general computer applications other than email, the internet and word processing. Overall, confidence in the use of computer-based applications was not high. Experience in use of hardware and software was negatively correlated with age. For nurses with experience in the application of information technology, confidence was slightly greater for younger nurses and for those having more recent tertiary education. Experience and confidence with information technology applications associated with administrative functions was also higher for registered nurses (levels 3-5).

In general, registered nurses were most experienced in the use of information technology if they worked in community health, followed by public hospitals and other public facilities. Private hospital and nurses working in aged care had the least experience.

Low levels of experience, confidence and use of computers were seen generally in aged care facilities. In that sector fewer than 20% of assistants in nursing, 45% of enrolled nurses and only 55% of registered nurses (levels 1-2) used a computer. Even at the most senior levels of registered nurse (levels 3-5), 20% did not use a computer at all. These figures compared to 44% (assistants

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1. and 2. See 'Definition of position titles used in the study' (p.14).

in nursing), 84% (enrolled nurses) and greater than 95% of all registered nurses in other sectors who used computers.

Work place policies generally permit nurses access to computers, with fewer than 4% of nurses who use a computer for work-related activity reporting they were not allowed any access to a work computer. However access to computers was a major concern of nurses with over one quarter of all respondents commenting on this theme. Low numbers of available computers was the principal concern.

The degree of access to computer networks (intranet and internet) was highly related to the level of position. Access to an intranet was greater than the internet for many nurses even though their place of work had internet capacity. It was reported by many nurses that restriction to the internet, although not as severe as the stakeholder interviews had suggested, was often based on 'prevention of inappropriate use' rather than financial or access issues.

Results from questions about access and use of computers demonstrated that if more computers were accessible to nurses and they had the time to use the systems, the benefits of using technology in knowledge transfer could be realised more fully.

Security of patient/client data in the workplace was rated high by respondents with a rating of 'good'. The issue of security and confidentiality generated less than 1% of all the thematic comments offered.

OBJECTIVE 2: Identify the purposes for which nurses use information technology and information management systems.

Nurses were asked how frequently they used 20 applications covering patient/client management, clinical use, administration and professional development. The most frequently used health-specific information technology applications were for: accessing patient records and results; applications associated with continuing professional education (CPE); and for communication. However these 'most used' applications were used 'frequently' or 'always' by fewer than 40 percent of total respondents to the study. Nurses who had never used these applications ranged from 18% for CPE to 72% for information technology applications used in the operating theatre.

Applications used for patient management and clinical use tended to be used more frequently by younger nurses and by nurses more recently qualified. The opposite effect was seen in the use of software for administrative functions, such as rostering and finance, which were used more frequently by older nurses who had been nursing longer and registered nurses at levels 3-5.

Although differences were small, nurses in rural and remote areas used patient management and clinical tools less frequently than nurses in other locations and in particular the major capital cities. The exceptions were medication and poisons management where the greatest use was in rural and remote areas.

The type of work undertaken at home was largely for the purposes of professional development, research and communication. In addition registered nurses (levels 3-5) often reported undertaking administrative work at home. Professional development was undertaken by all levels of nurse thus illustrating the opportunities offered by the use of information technology for education and training purposes.

In aged care facilities there was less availability of many applications to assistants in nursing and enrolled nurses. The frequency of use for those nurses for whom applications were available was also lower. For registered nurses there were no sector differences with respect to availability of applications but there were sector differences in the frequency of use. Appointment scheduling in aged care and bed management in community health were of low use while use for consultations in community care and access to results in public hospitals were high.

Use and frequency of use of personal digital assistants (PDA's), telehealth, journals and knowledge-based information technology systems were also examined. Use was generally low with over 60% of nurses never accessing information systems and 71% never accessing telehealth. However 70% of nurses who used computers reported they had used MIMS[3] online and almost 60% had used online journals. For these two applications where use was highest, frequency of use, 'frequently' or 'always', was 34% and 25% respectively.

Only nurses who use computers were asked their opinions about use, and the advantages and disadvantages of computer use in the work place. Nurses agreed that learning about computers was essential and that computer use had improved information access. Overall there was a positive attitude to information technology and the benefits that it could offer to patient / client / resident care.

This acceptance of information technology must be stated with the qualification that many nurses did not equate their use of information technology with the role of caring. Registered nurses (levels 3-5) and those working in community health were more likely to recognise the benefits of integrating information technology into the caring aspects of their role.

In the opinion of those surveyed some benefits of information technology have not been realised. Many nurses expressed frustration that their use of information technology often failed to reduce errors in data entry. For many nurses duplication of data entry had increased although this was least in the aged care sector. The major contributing factors to the frustration were the lack of data entry at the point of care and computer software that was not fit for purpose. Overall, respondents did not consider that the use of information technology in the workplace made their working lives easier; this view was greater among senior registered nurses (levels 3-5).

OBJECTIVE 3: Identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect*)

The survey contained four questions about knowledge of health initiatives. Nurses were asked about whether they were kept aware of general information developments in their workplace and health initiatives at state or territory level. In the workplace, respondents were equally divided with 41% considering they were not kept aware and 45% considering they were. Level of awareness improved with more advanced level of position.

Enrolled nurses and registered nurses (levels 1-2) in aged care reported less awareness than their counterparts in other sectors. Community health nurses considered themselves to be best informed. The data suggest that mechanisms for the presentation of information may need to be addressed.

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3. Mims Online is the web version of MIMS - an Australian pharmaceutical database which offers access to essential information on over 2,300 prescription and non-prescription drugs (http://www.mims.com.au).

More than 65% of nurses considered that a national health record would be beneficial, 23% had no opinion, and less than 10% disagreed. Older nurses and those working for longer were less likely to agree. The responses were unaffected by level of position or sector.

The readiness of nurses to participate in e-health initiatives was tested by asking nurses how they would rate their knowledge of Health*Connect.* Over half the respondents (52%) stated they had never heard of Health*Connect* and of those who had heard of it, only 26% considered their knowledge of Health*Connect* to be average or better. Knowledge was slightly better among registered nurses (levels 2-5) and there were no sector effects. Only 33 respondents provided comments related to this objective. The majority of comments were positive with only one participant commenting negatively about the initiative. The requirement for training and the recognition that using this technology was part of nursing work (and time allocated for its use) was noted by several nurses.

OBJECTIVE 4: Understand the barriers that prevent nurses from benefiting from information technology and information management systems.

In addition to the section specifically entitled 'Barriers to your use of computers', barriers to use of information technology and information management systems were identified through sections on the questionnaire devoted to access, training, technical support and management attitudes. The main barriers to computer use were workload, access to computers, technical support and lack of information technology knowledge. Age, lack of interest in information technology and health and safety issues, were not considered to be barriers to computer use by the vast majority of nurses. Barriers differed according to geographical location, age, length of time in nursing, level of position and sector of employment.

Workload

By far the greatest barrier to effective use of information technology was workload. Over 55% of nurses indicated this to be 'very often' or 'always' a barrier and a further 33% noted that use of computers did not fit into other work demands. Workload was also cited as the main reason that home computers were used for work-related activities.

Workload was also the greatest barrier to accessing training with fewer than 20% of nurses indicating that time and lack of relief staff were 'never' or 'rarely' a barrier. In the thematic analysis many nurses presented the view that information technology created extra work rather than decreased their workload.

Access to computers

Not enough computers was identified by over half the nurses as being a barrier to computer use. Location of computers with respect to point of care was also considered to be a major barrier. Number and location of computers was less of a barrier for nurses who had been in nursing longer.

Technical support

Technical support for information technology systems was more limited as remoteness increased. However even in cities where support was the highest, technical support was mostly limited to eight hours each weekday. In a work environment that operates 168 hours per week (24 hours a day, seven days a week) support that accounts for only one quarter of the time was considered inadequate.

Information technology knowledge

Confidence in information technology use was generally low and half the respondents thought their level of information technology literacy a barrier to use. A quarter considered that knowledge was restricting their career development. Age and length of time in nursing were both negatively correlated to the level of literacy with younger and more recently qualified nurses more literate in the use of information technology.

Age

Age was seen more as a barrier by older nurses. Overall however, very few nurses identified age as a barrier.

Lack of training

Nurses who had worked for less than 10 years had received more pre-registration or pre-enrolment training in information technology than nurses who had worked longer. The opposite occurred for continuing professional education with an increase in the proportion of nurses receiving training through CPE with length of time in nursing. Overall however, fewer than 17% of respondents had received formal training in computer skills or software applications pre-registration or pre-enrolment. Information technology training as continuing professional education had been received by between 12% and 28% of nurses.

Almost half the nurses considered that training in information technology was required for them to better meet the requirements of their role. The level of formal up-skilling was low: very few nurses had received both pre-registration or pre-enrolment training and continuing professional education. Nurses who had already received some training were only around 10% less likely to indicate further training was required for any applications.

When training in information technology was undertaken, the quality and appropriateness of training was considered by nurses to be good. However availability of training courses and the effect of remoteness in access to training were also important. Over half the respondents said that training was not referred to at all in their work place. The majority of nurses were not very well informed about their facility's training policy.

Consultation

Only a quarter of respondents considered that consultation by management, or the provision of in-house information technology support systems to ensure that computers and information technology applications are used in ways that are most suited to nursing practice, was 'good' or 'excellent'.

Geographic location

The Australian Standard Geographical Classification was used as the stratification strategy for the study. The expected differences among the locations and particularly between the urban and remote regions were largely unrealised. For the most part those differences that did exist were attributable to role requirements, differing facilities, or the greater proportion of higher-level registered nurses (levels 3-5) in remote areas. The two major differences that did occur were: access to training and technical support, both of which were poorer in remote areas.

Level of employment

The largest variability to access and use of information technology was associated with the level and sector of employment. Assistants in nursing had the least access to information technology, the most restrictions, the least training, the poorest knowledge and the least support. Enrolled nurses and registered nurses (levels 1-2) improved on all these parameters. Registered nurses (levels 3-5) had most access, support and had the most knowledge. Their administrative responsibilities were reflected in greater familiarity, use, and training in applications developed for management purposes.

Sector of employment

Sector analysis revealed valuable data which offers solutions to barriers to the use of information technology. The greatest barriers of work demands, knowledge and confidence did not differ among sectors. In the public hospital setting the number of computers available, as well as access to computers and management attitudes to training, were a major issue. In the community health setting and also in remote areas, technical support and network issues were identified as being particularly important. Access to and use of information technology in the aged care sector is low even for the most senior registered nurses (levels 4 and 5).

Recognition of the value of information technology in nursing

Less than one third of all nurses and half the registered nurses (levels 3-5) had an employment requirement for information technology skills built into their position description. Results suggest that information technology was often considered to be a management tool and not a tool for clinical care. Three times as many nurses stated that access to and use of information technology would be a consideration in choice of future employment as had considered access to and use of information technology when entering their current position. Results indicated that information technology access and use is already influencing and will continue to influence the decision of nurses entering different sectors of the health industry.

OBJECTIVE 5: Recommend ways to overcome these barriers and provide opportunities for nurses to better utilise information technology and information management systems within the Government policy framework.

Recommendations

1.   That the Australian Government Department of Health and Ageing:

1.1   endorse and authorise publication of the final report of the research project on Nurses and Information Technology on the Department's website (www.health.gov.au), and on the website of the Australian Nursing Federation (www.anf.org.au);

1.2   facilitate dissemination of the report by the Australian Nursing Federation and the University of Southern Queensland through presentation of the findings at nursing conferences, in nursing publications and links with relevant industry websites; and

1.3   approve release of the de-identified data from the survey to state and territory health departments.

2.	That the Australian Nursing Federation, together with Royal College of Nursing Australia, establish a Nursing Informatics Standing Committee of the National Nursing Organisations in order to:

2.1	produce and disseminate a range of resources demonstrating ways that information technology and information management systems can be used for the purpose of nursing care eg identifying case studies and developing best practice guidelines; and

2.3	encourage and facilitate access to information technology and information management systems in the residential aged care setting.

3.	That the Australian Nursing Federation through their state and territory Branches provide the results of the survey conducted as part of the research project to state and territory health departments and other employers of nurses in health and aged care in order to:

3.1	encourage employers of nurses to review systems currently in use for their value to nursing practice, including issues of error reduction, duplication of data and effort, and interoperability between systems;

3.2	inform employers of nurses about the barriers to the use of information technology in nursing and how they might be reduced to ensure that nurses' use of information technology is supported through the availability of twenty-four hour seven day a week availability of technical support and that all nurses have free access to the internet;

3.3	ensure the clinical needs of nurses and workflow issues are fully considered when acquiring, designing, implementing or upgrading information technology and information management systems and involve nurses at all stages, including planning, evaluation, trialing or piloting, workflow review, education and communication strategies; and

3.4	identify the opportunities to increase the use of a wide range of information technology and information management systems and equipment that improve the delivery of nursing care in hospitals, the community and residential aged care facilities including (but not limited to): personal digital assistants, decision support systems, bedside terminals, handheld devices, voice recognition systems, barcode readers, sensors and monitoring systems.

OBJECTIVE 6: Prepare a road map for access, education and training to meet the needs of nurses.

Recommendations

4.	That the Australian Nursing Federation, together with Royal College of Nursing Australia:

4.1	seek research funding to develop national information technology and information management competency standards for nurses;

4.2	promote the inclusion of the developed information technology competency standards in nursing position descriptions and the adoption of a competency model, such as the international computer driving license;

4.3   work with nursing education providers to build a national competency program in all
      pre-registration and pre-enrolment education programs for nurses based on the developed
      national competency standards in information technology and information management; and

4.4   lobby employers of nurses to include information technology and information management in
      nursing orientation / induction / preparation for practice programs; provide dedicated learning
      centres or education hubs in clinical areas to facilitate continuing education opportunities to
      allow nurses to upgrade and maintain their skills and knowledge in information technology and
      information management; and ensure there are funds for backfilling to allow nurses to undertake
      education and training for new information technology and information management systems.

1.4   Conclusion

This study of nurses and information technology has clearly identified that nurses recognise
benefits to adopting more information technology in the workplace. They are however frustrated by
limitations of access to the technology; software that is not fit for purpose; lack of opportunities for
training; and workload preventing access. The level of use of information technology and information
management systems is generally low and confidence in use is low even among users. There is
evidence that familiarity, use and confidence in use is slightly higher in nurses who have recent
tertiary education. Results largely confirm conclusions from smaller studies in Australia and several
larger international studies. Nurses feel poorly informed about information technology health
initiatives and poorly consulted about their implementation. Workload, number of computers and
technical support are the principal barriers to use of computers. Technical support is largely
insufficient especially in more remote locations. Neither the full potential of information technology
in the provision of health and aged care nor the recognition by nurses that information technology
is an integral part of nursing will be realised until these limitations are addressed.

Table 1: Definition of position titles used in the study[4]

Position titles used in study	Indicative position titles from states and territories
Assistant in nursing	Advanced assistant in nursing Assistant in nursing Nursing assistant Personal care assistant/personal carer Student nurse Trainee enrolled nurse
Enrolled nurse	Enrolled nurse Nurse 1 Registered nurse Division 2
Registered nurse (RN1)	Nursing officer 1 Nurse specialist Registered nurse 1 Registered nurse Division 1
Registered nurse (RN2)	Clinical nurse specialist Nurse 3 Nursing officer 2 Registered nurse 2
Registered nurse (RN3)	Clinical nurse consultant (grades 1-2) Clinical nurse educator Nurse 4 Nursing officer 3 Nurse unit manager 1-2 Registered nurse 3
Registered nurse (RN4)	Clinical nurse consultant (grade 3) Nurse 5 Nursing officer 4 Nurse practitioner Nurse unit manager 1-2 Registered nurse 4
Registered nurse (RN5)	Assistant director of nursing Director of nursing Nurses 6-8 Nurse manager Nursing officer 5-7 Registered nurse 5

4. For a breakdown of position titles by state and territory and in public and private sectors refer to Appendix 4.

2   Literature Review

It is important that nursing information systems are planned and implemented to complement and articulate with medical management systems in the health care agency. This means that nurses must be involved at an early stage when computer systems are being contemplated… The challenge is before us. We can accept it and work together to achieve professional goals; the price of letting the opportunity pass is likely to be that we will find others, not nurses, are controlling nursing practice.

(Royal Australian Nursing Federation, 1984)

Access and attitudes to information technology by nurses have been demonstrated by others to be affected by a number of factors including: geographical location; age of the nurse; length of time in nursing; level of position; and employment sector. Analysis of the current data was undertaken using all these factors.

Health care is an information intensive industry, in which quality and timely information is a critical resource. Computer systems are used within most health care entities such as pharmacies, general medical practices, pathology and radiology services and hospitals. However many of the information exchanges between health care providers are still paper based with the attendant inefficiencies of data entry, the difficulty of sharing paper based records between clinicians, loss of the physical record, difficulties in reading handwriting, the potential for error, and the difficulties in extracting information from large paper files. There is also uneven access to information technology across health care and aged care facilities and between the professions.

In hospitals, information systems support patient administration, billing and finance; staff rostering and human resource management; and departmental management, such as pathology, medical imaging and pharmacy. Clinical systems, including systems to support the specific needs for nursing care, are less common.

2.1   National strategies to support health care through information technology

The Australian *National Health Information Strategy* (Health Online) aims to improve the quality of care through better information systems for carers and consumers. Its major project to build the national Electronic Health Record (EHR) is Health*Connect* (Commonwealth of Australia 2001). Health*Connect* is based on information and technology architecture, information and data standards, and a security and privacy framework for application across Australia. It defines an Electronic Health Record as an electronic longitudinal collection of individual health information, entered or accepted by health care providers. The National e-Health Transition Authority (NeHTA) will develop the e-health architecture and the Health*Connect* infrastructure (http://www.nehta.gov.au). A specific information strategy for aged care, Aged Care eConnect, is also under development (www.health.gov.au). These national strategies provide a framework and standards with which other health information initiatives in Australia will need to integrate.

There are similar initiatives in many developed countries to provide electronic health records to support more integrated approaches to care delivery which in almost all countries is still episodic and provider driven. For example in the United Kingdom (UK) the National Program for Information Technology (NPfIT) aims to improve patient care and services through information technology (http://www.npfit.nhs.uk/). Part of this involves training leading to the European Computer Driving License (ECDL).

2.2   Electronic health records

Electronic patient records are a fundamental component of most national health information strategies. Electronic health records allow data and images to be shared across authorised carers of a patient and are expected to facilitate improved communication between clinicians, reduction of errors and loss of data, leading to enhanced quality and safety of care. It is intended that electronic health records will link disparate systems with the core modules of the patient record (Ayres, Soar and Conrick 2006).

The UK aims to make all patient records available electronically by 2010. The NHS Care Records Service (NHS CRS) is being designed so that a variety of health care professionals (for example: GPs, hospital doctors, nurses, and allied health professionals) may share information such as viewing records simultaneously in several locations in order to discuss a patient's test results and ongoing care (http://www.connectingforhealth.nhs.uk/).

2.3   Potential benefits of the adoption of information technology

Potential benefits of information technology use in the health care industry include those anticipated within any other industry or business such as improved efficiency and communication. A goal of information technology within health care is also to improve patient care in a cost effective manner. Medical Health Institute surveys of the use of EHR in the United States of America (USA) and Canada indicate that among physicians and nurses the primary motivation for adoption of information technology is the need to improve clinical processes or workflow efficiency and to improve clinical care. Lack of adequate funding or resources was found to be the principal barrier to use. A major concern for implementation was security and confidentiality of data (http://www.medrecinst.com/).

Information technology is expected to be of benefit in improving patient safety including the reduction of medication errors. O'Farrell (2002) reported that more than 400 errors were noted in Tallaght Hospital in Ireland in 2001. In Britain in the same year it was estimated that more than 10,000 recorded errors in drug administration resulted in 1100 deaths (O' Farrell 2002). Barcode reading in one USA hospital was reported to decrease medication administration errors in individual nursing units by up to 70% and also had a positive effect on nursing satisfaction (Anderson and Wittwer 2004). In Australia, the adoption of information technology is seen as critical to improve quality and safety and reduce the number of adverse events that result in death and disability. The additional hospital bed days from adverse events are estimated to cost the health system in excess of $800 million dollars each year (Australian Health Ministers' Advisory Council 1996).

Not all impacts of information technology adoption are positive. Many of the negative effects may be due to lack of integration among applications or systems which result in duplication of effort. Over 30% of nurses in a study in Brisbane considered that computers detract from patient care

and cause duplication of work (Webster et al 2003). A concern expressed by nurses in the UK is that, in contrast to paper systems that stay with the patient, information technology generally requires input of patient information at a desk away from the bedside. This results in delays in data entry and potential errors (Timmons 2003). Handheld and wireless technologies are expected to better facilitate data entry and retrieval at the point of care (Gururajan, Murugesan and Soar 2005).

2.4 Adoption and use of information technology in health and aged care

There are disparities across the health industry in terms of the extent to which information technology has been embraced. Investment in hospital information technology is managed by health departments in most states and there is a range of products in use for patient administration, diagnostic information management and increasingly for the management of patient clinical information and support for clinical decision making. Most hospitals have systems in place for patient administration. Not all have systems for nursing access such as care planning, documentation and procedures.

Most general medical practices use computers for administrative purposes, but increasingly they are being used for clinical work which includes prescribing medication, medication cross-referencing, and the recording of patient health data in the electronic health record (Nielsen 1997; Western et al 2001). The use of computers during general practice consultations for clinical purposes (patients' health records and prescribing) is becoming widespread. There is concern about how such computer use is viewed by patients however one study in Sydney found favourable responses with patients considering the system was beneficial to the consultation process (Bevis and Callen 2004).

The aged care industry has been slower to adopt information technology with barriers occurring at both the individual and organisational level. Six major categories of barriers to the adoption of information technology were elaborated by Yu (Yu and Comensoli 2004). They were: lack of management/stakeholder support; cultural resistance toward the adoption of information technology; cost considerations; staffing issues; work practices; and the capacity to manage change. While most aged care facilities have computers and high computer literacy among registered nurses, computer use among enrolled nurses is low. Demirjan et al (2004) found an interest among aged care staff in learning more about information technology. Investment in information technology in aged care is increasing with twice as many aged care facilities in NSW using computers for resident information in 2004 as had been the case four years previously (Albert Research 2004). Recent Australian Government initiatives including a cash grant to residential aged care facilities (RACFs) should further stimulate information technology investment.

2.4.1 Knowledge based systems

The internet offers a vast amount of information of variable quality. Smart 'mining' tools are being developed to allow internet searches to yield only appropriate information. Many services exist to collect and disseminate data ranging from small personal collections to large resource hubs. These knowledge-based systems (KBS) are developed to provide clinicians with a vast array of information which can be used in clinical management, organisational management, research, professional development and even personal lives.

Most state departments of health in Australia have developed their own knowledge based systems to suit their own particular environments. For example, in 2001 Queensland Health developed the Clinicians Knowledge Network providing access to information retrieval databases such as Medline, CINAHL and the Cochrane Library (http://ckn.health.qld.gov.au/), as ell as 400 full text journals made available through OVID, MIMS and online texts such as the Merck Manual. Similar intranet systems operate in other states. For example in New South Wales, the Clinical Information Access Project (CIAP; http://www.clininfo.health.nsw.gov.au/); in Victoria, the Clinicians' Health Channel (CHC; http://www.health.vic.gov.au/clinicians/); in Western Australia, the Clinical Information Access Online (CIAO; http://www.ciao.health.wa.gov.au/); and in the Northern Territory, the Clinical Resources on Call (CROC; http://www.hcn.com.au/croc).

2.4.2 Evidence based practice

One application of knowledge based systems is to support evidence based practice. In Canada, one early study of nurses who were trained in how to use literature searches on CD-ROMs reported the nurses were able to answer clients' questions better (Royle et al 1995).

Access to technology must be supported by training (Griffiths and Riddington 2001). Griffith's study looked at nurses' general use of computers and of three databases, CINAHL, MEDLINE and the Cochrane Library. Results showed limited confidence in use of computers and low frequency of use of all databases. Computer use was higher by those nurses who had a home computer or familiarity with higher education. The authors concluded that provision of access is not sufficient and that training is required if nurses are to make use of electronic resources to contribute to evidence based practice. In Scotland a study of 608 midwives from 22 maternity units found use to be 23.4% at home but 69% at work. The greatest use was for access to patients' data. The Cochrane Library was used regularly by 27% to support evidence based practice (Hillan, McGuire and Cooper 1998). The nurses stated that the computers would be used more if they were more accessible and if they had better skills to use the resource. Webster's research (Webster et al 2003) concluded that in order for evidence based practice to become the norm and to really influence patient care more training was required.

Westbrook researched the use of the CIAP (Clinical Information Access Project) knowledge based system in New South Wales and found nurses were less likely than physicians to have heard about it (58% versus 71%) and those nurses who knew about it were also less likely to use it (71% versus 82%). Nurses used the system less than doctors for access to clinical knowledge (79% versus 70%) but more than doctors for continuing education (60% versus 45%); 93% of doctors and 84% of nurses indicated they thought CIAP had the potential to improve patient care; and 54% doctors and 34% nurses reported they had direct experience of CIAP resulting in improved patient care. The authors noted that access to resources was positively correlated with number of patient admissions and concluded this demonstrated that clinicians used the system to inform direct patient care questions (Westbrook, Gosling and Coiera 2004).

2.4.3 Telehealth

Telehealth has been defined as delivery of health services over a distance using telecommunications (General Practice Computing Group 2004). Applications for telenursing include home monitoring of physiologic parameters, video consultation, and enabling self management of chronic illness. Clinical information can be shared with other professional colleagues including national and international experts. It has been estimated in the USA that up to 50% of all home care visits could be replaced by telenursing. In the UK, 15% of in-home care episodes reported the need for telecommunications technology. Up to 2000 articles on telenursing are available on the International Council of Nurses web site (http://www.icn.ch/matters_telenursing.htm).

Increased telehealth investment is planned by most state and territory governments in Australia. In Queensland there are almost 200 videoconferencing sites within health facilities.

Home telecare is rapidly evolving as a means of providing care in home or community settings with the primary role of providing support for the patient rather than the health professional. The application for this methodology is particularly attractive in rural and remote areas. In a trial in Sydney and Wagga Wagga patients with little or no computer background were able to use the system on a daily basis after only one hour of training. All but one of the 22 patients on the trial and all but one of the fourteen general medical practitioners (GPs) were satisfied with the system (Celler, Lovell and Basilakis 2003). In Celler's review of 175 articles on telecare and telemedicine in chronic disease management however few looked at cost-effectiveness (Celler et al 2003). One study from the USA did find that for patients with congestive heart failure (CHF) readmission charges were 86% lower on the telecare group (US$5,850 versus US$44,479), with fewer CHF-related emergency department visits (Jerant, Azari and Nesbitt 2001).

2.4.4 Wireless and handheld technologies

Clinicians are increasingly using PDAs (Personal Digital Assistants) for patient tracking, medical reference, and drug dosage, as well as personal use. Almost three-quarters of physicians in the USA were found to use handheld technology such as a PDA (De Groote and Doranski 2004). A limitation is the ease or otherwise of connecting to hospital and other databases. One survey revealed that handheld technology was used more for administrative functions rather than for clinical purposes (http://www.himss.org/pressroom/ASP/releaseDetail.asp?ContentID=23146). In the USA over half a million nurses are reported to be using PDAs. The barriers to using PDAs were reported to be: cost, confidentiality issues and ease of reading in addition to similar factors such as age and education. Benefits were: quick access to information, convenience, point of entry of patient data and flexibility (Davenport 2004).

In Australia, the Royal District Nursing Service (RDNS) has been testing handsets using infrared or Bluetooth connectivity to connect Palm-top devices to their server. While costs were low for this solution, the Palm-top screen hardware was considered too small for ease of point of care data entry and the speed inefficiencies made email and internet impractical. Different hardware was used that enabled the RDNS to communicate with their nurses in the field via email without having them come into the office and also provide field access to the RDNS intranet site and the internet (Jackson and Dewar 2004).

2.4.5 Use of the internet

Barriers to internet use in the clinical setting include: lack of administrative support; negative attitudes toward computer technology; lack of expertise; and time constraints in the workplace (Estabrooks et al 2003). One study reported that nurses felt ill equipped to conduct effective data searching on the internet (Lakeman 1998); while another study cited time, lack of confidence, and nurses' attitudes as barriers to use of a networked computer in the practice setting (Royle et al 2000). There have been suggestions that the introduction of internet access to nurses will encourage time wasting (Duffy 2000) because unlike other technologies, internet use is somewhat difficult to regulate (Hynes-Gay and Nagle 2000).

In 2004 another study was undertaken in the north of England to determine the use of the internet in a clinical nurse setting (Morris-Docker et al 2004). Over a one year period the use by about 90 nurses of the internet was monitored. It was found that the majority of nurses used the technology during quiet periods throughout the day and night for a combination of work and non-work-related activities. Use was for email and search related activities but with very little use of library based resources. The authors concluded that use was appropriately integrated into clinical activity. 'Information enthusiasts' were identified who helped enhance the development of information search and retrieval skills by other less frequent users. Interviews with the nurses identified factors relating to the organisation, workplace culture and training which influenced internet use. The study demonstrated how engagement with information technology had progressed since a study in 1997 where just over half the nurse participants showed positive attitudes to the technology (Simpson and Kendrick 1997).

2.5 Internet access in rural and remote areas

A Rural Health Support, Education and Training (RHSET) project noted that while remote health services may have internet access, there was a lack of education and management support (Kildea and Barclay 2004). A survey by the Council of Remote Area Nurses of Australia in 2000 found that 74% of rural area nurses considered that the quality of connectivity affected their ability to access the internet (Taylord Services 2000). In 2005, the National Rural Health Alliance recommended: 'that advanced practice rural and remote area nurses have access to reliable and relevant information technology, including the internet, as well as access to appropriate training and mentoring in information technology skills and technical support (National Rural Health Alliance 2005).

2.6 Barriers to the adoption of information technology

Barriers to adoption of information technology include: employee resistance to change; perceptions of information technology use as an administrative task and consequently either of lower priority than care delivery or even as outside the scope of practice of clinicians; high work-loads that provide little time for adopting new practices; and scepticism of the benefits of information technology.

Evaluating nurses' attitudes toward computer use is an area that has received attention in the literature (see Curtis et al 2002; Marasovic et al 1997; Darbyshire 2000). A variety of instruments have been developed to determine nurses' attitudes. For example: *Nursing Computer Experience Questionnaire (*SNCEQ; Staggers 1994); *10 Item Multiple Choice Test Basic Computer Terminology*

(Birx; Castleberry and Perry 1996); *Nurses' Attitudes Toward Computer Use Instrument* (Burkes 1991); *Nurses' Attitudes Toward Computers Questionnaire* (Stronge and Brodt 1985); and A*ttitudes Toward Computing in Nursing* (Thomas 1990).

Generally nurses accept computerisation and recognise the value. Attitudes to the adoption of information technology are affected by: age, gender, education, employment satisfaction and years in nursing. Those with exposure to higher education and computer experience are more positive thus demonstrating a need for training and education that is targeted (Darbyshire 2000).

Some studies found that nurses became less favourable toward the technology as time progressed. The greatest reason for the change was related to confidentiality of records. This may be due to software design problems rather than computers per se (Sleutel and Guinn 1999). Other criticisms were: password difficulties; access to equipment; navigability; technical support; and printing ease. Users saw some of the use as duplication rather than replacement for other processes.

In most cases refusal to use information technology is not an option available to nurses. Forms of resistance include minimising use and extensive criticism. Timmons (2003) found that this resistance was not because the advantages of the technology were not understood but that its use was not seen as conducive to patient care. Lack of access to information technology at the point of care was a fundamental problem. One particularly interesting observation was that siting of the terminals often resulted in patients and visitors wondering why the nurses were 'wasting time'. Reliability issues, 'crashes', slow systems or downtime of systems were other reasons for uptake reluctance (Timmons 2003).

Incorporating the use of a computerised information system into clinical practice requires not only overcoming any resistance to change, but also encouraging nurses to be willing users and creative operators of information technology (Levy and Williams 1999). Levy found that on the whole, nurses have positive attitudes toward computer use and recognised that manual processes are inefficient. However concern was expressed about the accuracy of systems.

The results about attitude appear to be quite universal. A 2003 study assessed the computer knowledge, attitude, and skill of 169 nurses working at the People's Hospital Beijing Medical University (BMU). Computer knowledge, attitude, and skill were measured using a nurses' computer knowledge questionnaire (NCKQ); nurses' computer attitude scale (NCAS); and nurses' computer skill scale (NCSS); respectively. Data analysis showed the overall computer knowledge and skill of nurses were at moderate levels and computer attitudes were neutral. Nurses' computer skills were significantly and positively correlated with both computer knowledge and computer attitude; however no significant correlation was found between computer knowledge and computer attitude (Liu et al 2000).

The issue of age and attitude is quite a contentious one. Expectations are that older nurses are less knowledgeable about information technology and less likely to embrace it. Chan et al (2004) undertook a small survey consisting of 70 respondents (Chan, Brew and de Lusignan 2004a). They attempted to determine the influence of age and nursing area of practice (practice nurses, district nurses and health visitors) on the use of information technology in Sussex Primary Care Trust in the United Kingdom (UK).

The questionnaire covered issues such as: access, training, confidence, and use of information technology. Practice nurses had more computers at their disposal, but all had good access. Older nurses (over 50) had received more formal training but were less confident and used the computers less, still preferring paper based information resources. The study also showed that sharing facilities and varying clinical systems meant that, with the exception of email, many nurses made infrequent use of the applications provided or to access libraries, read journals or access online resources. (Chan, de Lusignan and Brew 2004c).

Webster and colleagues surveyed nurses at the Royal Brisbane and Royal Brisbane Women's Hospitals Queensland, Australia. Computer use at work was noted by 98.5% of the 590 respondents, who agreed that computers made life easier and were of value to nursing practice. However over one third of the nurses considered that computers detracted from nursing care and created duplication (Websteret al 2003). Past experience with computers and their use both in the workplace and at home made a major contribution to a positive attitude toward adoption (Stricklin, Bierer and Struk 2003). Furthermore when compared to previous studies by the same team of authors, nurses have made enormous gains in acquiring information technology skills and access to computers (Chan, de Lusignan and Pritchard 2004b; Pritchard, de Lusignan and Chan 2002). Consequently new studies are of great interest to determine the current attitudes of nurses.

Two large studies have been undertaken in the UK in the last couple of years. The first was undertaken in 2004 on behalf of the Royal College of Nursing UK which, in recognition of the information technology investment made into the NHS, wished to raise awareness and develop nurses' knowledge and skills. Over 15,000 nurses, midwives and health workers were polled with 2,020 responses received. It was acknowledged that the respondents may not have been representative of the general nurse, midwife and health worker workforce at large however they were likely to be interested in information technology and therefore offered an important overview of the current situation. The authors summarised the findings by stating that nurses value the new technology which they see as beneficial to themselves and their patients. However nurses do not consider they receive adequate information; are not consulted sufficiently to ensure systems are designed appropriately; nor do they receive adequate training. In addition they want equity of access (Nursix 2004a, 2004b). These results appear to have immediate relevance to the situation in Australia.

In 2004, another Royal College of Nursing UK survey was undertaken to determine the information needs of nurses (Royal College of Nursing UK 2005). Questionnaires from 1,800 respondents were evaluated to explore access to computers and the internet; awareness of information technology sources; desired training and improvements; and use of information technology for evidence based practice. The report concluded that access to computers and the internet is still limited; nurses in the independent sector have less access to information; and there is a very high demand for more information skills training.

An Australian thesis titled: *The study of Queensland nurses' attitude and behaviour toward computerisation in the workplace* was completed in 2004 (Ho 2004). Preliminary data of the survey of just over 300 nurses in Queensland published previously (Ho and Hovenga 1999) suggested that the information technology industry lacks a sound understanding of the needs of their end users.

More than half of the respondents maintained that computerisation reduces the quality time of both nurses and patients because it forces nurses to spend more time in front of the computer in non clinical activities.

The importance of attitude to the adoption of technology is not however limited to nurses. If health service managers fail to see the benefits of information technology they are unlikely to be particularly responsive to requests for its introduction and use. In a revealing study in Victoria Australia it was found that middle and senior managers exhibited a lack of understanding of information technology options and benefits to the industry. Although information technology was being used to provide a supporting infrastructure for users it was not pivotal for organisational strategic advantage (Orr et al 2001).

2.7   Nurse information technology competencies

Various international studies have attempted to define the information technology competencies that are required for nursing. For example, one study aimed to identify minimum information technology performance standard expectations for nurses' competencies in the Singapore health care industry. A needs assessment was conducted with a panel representing nursing education, nursing management, and nursing practice. The findings of this study could provide suggestions on how to improve the current diploma and advanced diploma nursing programs curricula to meet present workforce demands (Yee 2002).

In the USA a national survey of nurse administrators found that the ability to use email effectively, operate basic Windows applications, and search databases was considered critical information technology skills for new nurses. Nursing specific software, such as bedside charting and computer activated medication dispensers, were also considered critical. The authors suggest that nursing faculties need to incorporate information technology skills into undergraduate nursing curricula (McCannon and O'Neal 2003). Naturally competency development is somewhat of a 'moving feast' as technology changes rapidly. Staggers et al produced 281 validated competencies for four general levels of nursing practice (Staggers, Gassert and Curran 2002). These were later refined by Curran for nurse practitioner education and practice (Curran 2003).

A recent paper aimed at identifying those competencies required for the nursing profession in Taiwan also provides a literature review of past studies. In the most recent study, 94 competency items were sorted into seven domains and these in turn were ranked by experts for importance; concepts of hardware, software, and networks (6); principles of computer applications (2); skills of computer usage (5); program design (7); limitations of the computer (4); personal and social issues (3); and attitude toward the computer (1). Interestingly attitude ranked number one. This study provides a comprehensive list for nursing professionals to assess their computer competence. (Jiang, Chen and Chen 2004) The authors also note that although nurses do not need a high degree of computer expertise, their performance will be much more efficient if they have effective computer skills.

Another paper from Taiwan in 2004 studied basic computer competence among public health nurses (Yang et al 2004). The authors assessed Word, Excel, PowerPoint, and Windows operating systems and internet applications. The study found that, in agreement with other cited studies, competence is affected by frequency of use and time using a computer, training, education,

employment, position and age. No differences were found due to geographical location (urban, rural, mountain areas and offshore islands), although type of education which varies across these locations did have an effect. The researchers concluded that a greater emphasis on computers at work was necessary to increase the usefulness of computers for distance learning programs for nurses. Furthermore, while recognising that age is not a significant barrier to acquiring skills, older nurses would benefit from special curricula tailored to their needs.

McDaniel et al (1998) investigated the computer skills of 607 hospital nurses using a self assessment method. Their results revealed that 18% of the nurses rated themselves as 'novices'; 38% as 'beginners'; and 31% considered themselves as 'competent'.

Saba et al (2004) provides highlights of the informatics competencies that were proposed as the nursing informatics field advanced. Also provided is an overview of the American Nurses Credentialing Center (ANCC) nursing informatics credentialing process and the new process for international certification titled: *Nursing Informatics Competency Recognition Certificate*. The Nursing Informatics Special Interest Group of the International Medical Informatics Association (IMIA/NI-SIG) approved this certificate at their general assembly meeting during 2003 in Rio de Janeiro, Brazil. The certification is based on a professional portfolio that demonstrates expertise in this field for nurses outside the USA and Canada (Saba, Skiba and Bickford 2004).

In both Australia and New Zealand, nursing informatics groups were established before the establishment of multidisciplinary health informatics bodies. Nursing Informatics (www.nursing-informatics.com) was set up in 2000 to offer registered nurses an online tool for self assessment of their competencies as a professional development exercise. A paper funded by the Australian Government Department of Health and Ageing and published in 2004 by Nursing Informatics Australia, a special interest group of the Health Informatics Society of Australia (HISA), outlines the informatics vision for nursing in Australia (Conrick et al 2004). The group emphasise the need for the nursing profession to be engaged in all stages of planning for information technology in health. The specific focus of the study was on Health*Connect* but includes details on the education and information needs of nursing, and the engagement of nurses across all practice settings. The report also advises on ways to improve the health informatics capacity of the current nursing workforce and identifies strategies for developing long-term sustainable capacity. As part of the initiative for adoption of a successful electronic health record system Nursing Informatics Australia recommends that a comprehensive standard nursing language must be adopted to underpin electronic communications and nursing work. Furthermore a comprehensive national education program must be provided for nurses.

A report from Nursing Informatics Australia states that:

> *'Nursing education and training programs at undergraduate and postgraduate level must include nursing informatics as a core component of the curriculum. It is essential that beginning practitioners have base competencies in nursing informatics; in particular, they should understand the importance and use of clinical information systems. This provides a basis for the further development of nursing informatics knowledge and skill that must be integrated into the continued development of nursing practice.'*

Another key recommendation was the development of a nationally agreed set of basic nursing informatics competencies that all nurses need to acquire. It was recommended these competencies are incorporated in all undergraduate curricula and be used as the basis for staff development programs.

They suggest the international computer drivers licence (ICDL) could hold a key to community development of computer literacy and competency. The ICDL is a series of computer literacy tests which provide an internationally recognised computer accreditation in basic computer operations. In Australia the ICDL is issued and endorsed by the Australian Computer Society.

Specialisation in nursing informatics exists with courses offered at various universities. However for a nursing culture to embrace technology, nursing informatics has to be integrated into all aspects of nursing. Hebert (2000) in a Canadian study suggested that nursing informatics is already incorporated into the four domains of nursing namely: professional/ethical practice, reflection, problem solving and enabling identified in the Australian Nursing and Midwifery Council (ANMC) national competency standards for registered nurses (http://www.anmc.org.au).

2.7.1 Training

The HISA Health Informatics Education Report (Soar et al 2003) makes seven recommendations. Among them are recommendations to establish a National Health Informatics Education Advisory Committee; to establish a health informatics *Continuing Practicing Professional Certificate;* and to provide health informatics education support within Health Online. The UK NHS has recognised the need for staff training in the use of information technology and has implemented a training program for its NHS staff, adopting the European Computer Driving Licence (ECDL®) as the reference standard. This means that all NHS staff will receive relevant training in information technology and be working toward a standard, transferable qualification no matter where they work (http://www.ecdl.co.uk/nhs/nurses.pdf).

One of the more recent studies of information technology use by nurses in residential aged care facilities (RACFs) was by Yu in 2005. She surveyed nursing staff at 10 RACFs of the Uniting Care South Eastern Region (NSW, Australia). Her findings included a self estimated computer ability of 58.5% as average, above average or excellent. Over 70% of respondents (n=95) considered the time-consuming nature of a paper-based record system to be a major problem, followed by the large storage space required (51%), lack of legibility (40%), difficulty of retrieving the previous records (31%), difficulty of updating resident information (29%), and misuse of resident information (11%).

Although very few nurses were unhappy using a paper system, the vast majority were overwhelmingly supportive of adopting information technology and recognised that training would be beneficial. They saw information technology as allowing more time to be spent on the direct care of residents 70%), improving resident information management (55%), saving time on documentation (53%) and improving work processes (49%). Negative aspects of information technology included access to computers, a lack of expertise, and a lack of information technology support. Privacy was a concern but lower down the list (Yu 2005).

The literature demonstrates that use of information technology in the nursing workplace is increasing rapidly, driven in part by strategies to adopt electronic health records. Telehealth, mobile devices and internet use are all becoming part of delivering health services in Australia. Furthermore knowledge based information systems have been rolled out across the country and evidence based practice is being promoted. Many barriers to adoption have however been identified both nationally and internationally. Employer and employee attitudes, access to computers, workload and competency appear to be universal barriers. Past negative experiences with computers also play a role. These barriers if not addressed may affect engagement of the nursing community with the technologies despite the benefits they offer.

3 The 'Nurses and Information Technology' study

3.1 Study aim

The aim of the study was to explore the use of information technology and information management systems by nurses in Australia and identify the barriers to current and future use.

3.2 Study objectives

Six specific objectives were identified. They were to:

1. identify the extent to which nurses have access to and use information technology and information management systems;

2. identify the purposes for which nurses use information technology and information management systems;

3. identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect)*;

4. understand the barriers that prevent nurses from benefiting from information technology and information management systems;

5. recommend ways to overcome these barriers and provide opportunities for nurses to better use information technology and information management systems within government policy frameworks; and

6. prepare a roadmap for access, education and training to meet the needs of nurses.

3.3 Defining information technology

For the purposes of the research *information technology* was defined as computer-based systems that assist in the management and processing of information to support health care and health care delivery. This definition includes systems for: management of patient/client information; clinical planning and care delivery; patient/client and staff education; clinical research; and support services such as diagnostics, therapeutics and administration.

3.4 Ethics

The research was approved by the University of Southern Queensland's Human Research and Ethics Committee. A Plain Language Statement and a Consent Form was sent to each of the stakeholders prior to the stakeholder telephone interviews and given to the participants at the beginning of the focus groups. Participation required receipt of the signed form. Additionally, a Plain Language Statement and a Consent Form outlining the study was enclosed with the survey questionnaires sent to 10,000 nurses randomly drawn from the Australian Nursing Federation's membership database (Appendix 1). Informed consent was implied if the participant completed the survey questionnaire and returned it for inclusion in the study.

3.5 Project steering group

A project steering group was established. The group assisted with identification of the stakeholders, reviewed the survey tool, and generally advised the research team throughout the study. The membership of the steering group is listed at the beginning of this report.

4 Methodology

4.1 Data collection methods

A triangulated approach to data collection was undertaken in this study and both quantitative and qualitative data were collected. Qualitative data collection involved interviews with stakeholders and a focus group with representatives of the National Nursing Organisations (NNO). The terms of reference and membership of the National Nursing Organisations can be found at: http://www.anf.org.au/nno/pdf/NNO_Glossary_of_Terms.pdf. Both qualitative and quantitative data were collected through a national survey of registered and enrolled nurses and assistants in nursing. A further focus group was held with key stakeholders to finalise the recommendations made in this report.

4.1.1 Stakeholder interviews

Telephone interviews were undertaken with 26 key stakeholders including both state and territory government representatives and national nursing and other peak health and aged care organisations. The purpose of the stakeholder telephone interviews was to identify what issues stakeholders considered important with regard to information technology in nursing. A semi-structured questionnaire was developed that mapped the objectives of the study (Appendix 2.1) to a series of broad questions (Appendix 2.2). Questions for the telephone interviews were developed by the research team based on the objectives of the study and the advice of the Project Steering Group. During the telephone interviews emphasis on particular areas changed according to the sector represented by the person being interviewed. Furthermore, a convergent process of interviewing was undertaken to enable the research team to introduce questions that had arisen in previous interviews or to address gaps in the data.

4.1.2 Focus groups

A focus group was held with representatives from 24 national nursing organisations. Nominal group technique was used to identify issues and barriers to access to information technology (O'Neil and Jackson 1983). This technique involves a structured workshop which allows for both individual and group processes in decision making while overcoming a number of critical problems typical of interacting groups (Delbecq and Vande Ven 1971). Members of the research team have found from their considerable experience in the use of nominal group technique that valuable and useful data can be obtained from focus groups. The workshop began with silent generation of key areas of research need. Following this, ideas from the group were listed on a chart and discussed for clarification and evaluation. Ideas were then thematically analysed by the facilitators and all participants were given the opportunity to prioritise the key research areas. Those issues were grouped and ranked and solutions to those issues and barriers discussed.

Results from both the focus group and the stakeholder consultations were individually analysed before being combined to provide issues and themes and possible solutions which assisted in the generation of the survey instrument (Appendix 3).

4.1.3 The survey tool

The survey instrument, a questionnaire, was developed through an iterative process involving input from the semi-structured telephone interviews with stakeholders, the focus group and the literature. Once a draft was developed, a series of iterations of the questionnaire followed during further consultations with the project steering group.

4.1.4 Piloting the survey tool

The questionnaire was piloted with nurses who were members of the Centre for Rural and Remote Area Health (CRRAH); and then with a group of 10 nurses attending an educational program at the Queensland Nurses' Union (ANF Queensland Branch) in Brisbane. As a result of this process small modifications were made to ensure that the questions could be understood and answered by all respondents.

4.2 The survey instrument

A final questionnaire was produced (Appendix 3) which consisted of 78 questions divided into the categories of:

- background,
- access and use of computers,
- uses of information technology,
- access to the internet,
- knowledge of health information technology initiatives,
- position requirements for information technology,
- training and education in information technology,
- barriers to use,
- technical support,
- management attitudes and support,
- security and confidentiality,
- professional organisation support, and
- free comment about information technology in the workplace.

4.3 Sampling

The membership database of the Australian Nursing Federation was used to randomly select survey participants. The membership database of the Australian Nursing Federation is a readily accessible source of contact details for a large proportion of the nursing and midwifery workforce in Australia. The database also allowed for stratification. The state and territory branches of the ANF had established information distribution systems that allowed for dissemination of the survey.

The Australian Nursing Federation is the largest professional and industrial organisation for nurses and midwives in Australia with more than 150,000 members across the country. Members are registered nurses of all levels including clinical nurses and directors of nursing, midwives, enrolled nurses (registered nurse division 2 in Victoria), assistants in nursing and personal care assistants, Classification titles vary between the states and territories (see Appendix 4 for alternative classifications used by different states and territories). Consequently for the purposes of the research, classifications were grouped to ensure consistency in interpreting results (see table 1 p.14).

All financial members of the Australian Nursing Federation were eligible for inclusion in the stratification process. Respondents were drawn from the membership databases of the Australian Nursing Federation Branches including the Queensland Nurses' Union (ANF Queensland Branch) and the New South Wales Nurses' Association (ANF NSW Branch). More information on the Australian Nursing Federation can be found on their website: www.anf.org.au.

A stratified random sampling design was employed. The four strata employed were those designated by the Australian Standard Geographical Classification (ASGC) - major capital city, inner regional, outer regional, and remote/very remote (Australian Bureau of Statistics 2001).

Ten thousand nurses were surveyed, with 2,500 from each geographic stratum. The expected response rate of 50% meant that approximately 5,000 surveys (1,250 surveys from each geographic region) were expected to be returned. For most omnibus analyses, this number of participants provides sufficient power to detect small effect sizes with an alpha level set at $p=<0.05$ with power of 0.80. Additionally, the large sample size enabled sufficient power for multiple post-hoc analyses to be conducted with adequate controls included for family-wise error. It also provided sufficient power, in most circumstances, to conduct analyses such as the examination of sectors within each employment level without loss of sensitivity. The breakdown of nurses surveyed across jurisdictions is presented in table 2.

Table 2: Number and percentage of nurses within jurisdictions surveyed

	MCC		IR		OR		RVR		TOTAL
	n	%	n	%	n	%	n	%	
ACT	41	83.7	4	8.2	2	4.1	2	4.1	49
NSW	870	31.1	892	32.1	571	20.5	450	16.2	2783
QLD	431	16.5	595	22.7	902	34.4	69	26.4	2619
SA	189	25.1	40	5.3	245	32.5	279	37.1	753
TAS	0	0	253	55.7	143	31.5	58	12.8	454
NT	0	0	1	0.2	126	20.3	495	79.6	622
VIC	754	41.3	682	37.4	362	19.8	27	1.5	1825
WA	215	24.0	33	3.7	149	16.6	498	55.6	895
TOTAL	2500		2500		2500		2500		10000

MCC = Major Capital City, IR = Inner Regional, OR = Outer Regional, RVR = Remote/Very Remote

Stratification by Australian Standard Geographical Classification results in an unequal proportion of representation within states and territories. Tasmania and the Northern Territory for example have no MCC and Victoria and the Australian Capital Territory have very few nurses within RVR locations.

4.4   Distribution

In order to ensure confidentiality the following processes were adopted:

■   The Branches of the ANF each generated a coded list of all their members matched to the postcode of each member. Each state and territory had a unique prefix to their six digit number (eg ACT numbers ran from 100,001 to 101,596). The numbers on the list could be matched by the ANF Branches to the names and addresses of members.

■   From the lists provided by the ANF Branches the research team at the University of Southern Queensland (USQ) selected postcodes to meet the stratification requirements and generated a list of those selected.

- The code numbers of the selected nurses were sent to the respective ANF Branches to generate an address label for each nurse from the Branch membership database.

- Small labels bearing the code numbers were printed out at USQ and affixed to the back of each questionnaire to allow for identification during the scanning process.

- Survey packages containing the questionnaire, a covering letter, a plain language statement/ consent form, a reply paid envelope and a pen were sealed at USQ, labelled with the same code as the questionnaire it contained, and sent by courier to the ANF Branches.

- The ANF Branches added the member's address label and the Branch return address to each envelope and mailed them.

- Any undelivered questionnaires were returned to the ANF Branch, which in turn informed the research team of the code on that envelope.

- Questionnaires that were returned in prepaid envelopes to USQ by participants bore only the member code and no other identifying information.

- After a three-week period the research team distributed a second mail out following the same procedure with the exception that the ANF Branches were sent lists of codes of only those nurses from whom no response had been received.

- At no stage did the research team have access to any information which could link a respondent's code number to the respondent's name.

- At no stage did the Australian Nursing Federation have access to survey data from which respondent codes could be determined.

4.5   Data entry

The questionnaires were automatically scanned for entry of quantitative data using TeleForm (Verity Inc. 2005 Sunnyvale: California). Data from the two free text questions were entered manually. All scanned questionnaires were verified for scanning errors and corrections manually entered.

4.6   Data analysis

Analysis was undertaken using SPSS on an item-by-item basis using descriptive and inferential statistical tools as appropriate to the scale of measurement.

4.6.1   Quantitative data

Dichotomous and categorical variables were described using frequencies and proportions. Continuous variables were described using means with 95 percent confidence intervals. Each question was analysed on the basis of all responses. Following this, the influence of the following variables were compared for assistant in nursing and enrolled nurse. Public hospital, private facilities, other public, aged care and community health were compared for registered nurse levels 1-2 and registered nurse levels 3-5).

- age (continuous variable),
- length of time in nursing (continuous variable),
- geographic region (major capital city vs inner regional vs outer regional vs remote/very remote),
- level of position (assistant in nursing vs. enrolled nurse vs. registered nurse levels 1, 2, 3, 4 and 5),
- health sector (public residential aged care, private residential aged care and all other facilities).

As stated earlier, the sample was stratified according to geographic location. Because of this, some analyses involving other variables in the design required pooling of data to create sufficient power.

Detection of significant differences in proportions between two dichotomous or categorical variables was achieved by the use of cross-tabulations using the $\chi 2$ test of significance and Fisher's exact test of significance if expected cell frequencies in a 2 x 2 matrix were less than five. Numbers in some analyses were quite large and as a result there was a propensity in the data for many comparisons to be significant despite quite small effect sizes. The Phi-coefficient or Cramer's V (in the case where one or both variables have more than two levels) provides an indication of the strength of the relationship between two categorical variables. It was decided that a main effect would only be reported if: p=<0.05 and the Phi coefficient or Cramer's V was 0.10 or greater. In this and all other reported analyses, Bonferroni adjustments to alpha levels were made to control for family-wise error rates in any post-hoc comparisons conducted.

Comparisons between dichotomous or categorical variables and continuous variables were achieved through the use of univariate analysis of variance (ANOVA). To ensure that reported differences were meaningful, an *F* statistic was considered significant if: p=<0.05 and the associated partial n^2, an indication of the amount of variance explained by the relationship between the variables in the analysis, was 0.01 or greater.

If both variables being compared were continuous in nature, a Pearson correlation coefficient was used to describe the strength of the relationship. Consistent with other analyses, a relationship was considered meaningful if p=<0.05 and Pearson's r=$\geq$0.10.

4.6.2 Qualitative data

A number of questions were designed to collect qualitative data. Question 75 asked members to identify the nursing organisation/s of which they were members and Q76 offered respondents the opportunity to identify what their professional organisation could do for them with respect to information technology. Answers from these questions were collated and sent without further analysis to all the professional organisations to which respondents identified themselves as being members.

For the qualitative question (Q78: *Are there any other comments that you wish to make about information technology in your workplace?*) a thematic analysis was undertaken following standard methodology. Qualitative data from the surveys were transcribed verbatim and emerging themes and patterns of meaning were identified. Data were analysed using six cycles: content analysis, coding of texts, comparison through the process of indexing, re-analysis through text search, re-interpretation of the data, and re-confirming preliminary analysis. To increase the reliability of the emergent themes using the above analytical procedure, two experienced research staff conducted separate data analyses and compared the findings. The two research staff came to a consensus as to the emergent themes.

5 Results

5.1 Survey responses and stratification

The response rate was 44% from which quantitative data could be used on 4330 surveys or 43.3%. Responses ranged from 39.06% for Queensland (QLD) to 55.10% for the Australian Capital Territory (ACT). All but New South Wales (NSW) and Queensland returned in excess of 49%. The response rate was 28.73% for the first mail out and 15.28% for the second. A summary of responses to the survey by state or territory are presented in table 3.

Table 3: Number of nurses surveyed and their response rates

	ACT	NSW	QLD	SA	TAS	NT	VIC	WA	TOTAL
ANF members	1596	50810	30559	9836	3761	1256	41175	11127	150130
Members surveyed	49	2783	2619	753	454	622	1825	895	10000
Percent surveyed	3.07	5.48	8.57	7.66	12.07	49.13	4.43	8.04	6.66
First mail return	23	642	670	251	158	225	586	319	2873
Percentage	46.94	23.07	25.58	33.33	34.80	36.17	32.11	35.64	28.73
Second mail return	4	445	353	141	66	86	313	125	1528
Percentage	8.16	15.99	13.48	18.73	14.54	13.02	17.15	13.97	15.28
Total Returns	**27**	**1087**	**1022**	**392**	**224**	**306**	**899**	**444**	**4401***
Percentage	55.10	39.06	39.02	52.06	49.34	49.20	49.26	49.61	44.01

* Includes 71 late returns used for qualitative data only

Owing to stratification by geographical code there are variations in the proportion of survey responses within states and territories compared to the actual proportion of nurses in each jurisdiction taken from Australian Institute of Health and Welfare figures for 2004. This comparison is given in table 4. States or territories with the larger proportion of outer regional and remote/very remote nurses are over represented in the survey and those with larger proportions of metropolitan or inner regional based nurses are under-represented.

Table 4: Responses within states and territories

	ACT	NSW	QLD	SA	TAS	NT	VIC	WA	TOTAL
Returns as a % of survey returns	0.61	24.62	23.19	8.91	5.07	6.96	20.41	10.05	100
Nurses as a % of national nurses*	1.56	30.38	16.54	9.26	2.48	0.95	27.34	11.49	100

*AIHW 2006 *Nursing and Midwifery Labour Force 2004* p.18

Stratification for the survey was by Australian Standard Geographical Classification (ASGC). The proportions of returns were slightly higher for the inner regional (IR) and outer regional (OR) and lower for major capital city (MCC) and remote/very remote (RVR). Some respondents did not enter their postcode and/or their location and the decision was made to leave these as missing values. Responses by stratifications are given in table 5.

Table 5: Australian Standard Geographical Classification of respondents

	n	%	Valid %*
Major Capital City (MCC)	961	22.2	22.8
Inner Regional (IR)	1163	26.9	27.6
Outer Regional (OR)	1148	26.5	27.3
Remote/Very Remote (RVR)	935	21.6	22.2
Total	**4207**	**97.2**	**100.0**
Missing values	123	2.8	
Total	**4330**	**100**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question. In this table, 4207 of the 4330 respondents could be assigned an ASGC code.

The number of respondents by Australian Standard Geographical Classification (ASGC) across the state and territories is given in table 6 and shows the disproportional returns from the ASGC codes across jurisdictions. Almost 75% of respondents from the Northern Territory (NT) were from the RVR and 96% of those from ACT from the MCC.

Table 6: Distribution by Australian Standard Geographical Classification of respondents by state and territory

| JURISDICTION | ASG CODE | | | | |
	MCC	IR	OR	RVR	TOTAL
ACT	25	0	1	0	26
NSW	301	403	264	68	1036
QLD	144	252	330	244	970
SA	86	24	127	141	378
TAS	0	118	82	18	218
NT	4	4	67	222	297
VIC	309	335	201	11	856
WA	92	27	76	231	426
Total	**961**	**1163**	**1148**	**935**	**4207**

5.2   Demographics

Demographic data from the study were compared to national statistics from the Australian Institute for Health and Welfare (2005) which were for the year 2003. It should be noted that there is limited information available about the assistant in nursing workforce in any sector and most national statistics are only presented for enrolled nurses and registered nurses.

5.2.1   Sex

Data on sex of the respondent is given in table 7. The proportion of male respondents was 7.2% of all nurses and also 7.2% for enrolled nurses and registered nurses. For the 162 assistants in nursing respondents the proportion of males was 6.8%.

Table 7: Sex of the respondents

SEX	n	%	Valid %*
Male	306	7.1	7.2
Female	3961	91.5	92.8
Total	4267	98.6	100
Missing	63	1.4	
Total	**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

There was no significant difference in proportion of males across the ASGC with results ranging from 6.1% in the OR to 8.7% in the RVR (table 3.6).

Table 8: Sex and Australian Standard Geographical Classification

	ASG CODE				
SEX	MCC	IR	OR	RVR	TOTAL
Male	65	85	70	81	301
Female	893	1072	1076	852	3893
Total	**958**	**1157**	**1146**	**933**	**4194**
% Male	6.78	7.34	6.10	8.68	7.17

There were no significant differences across level of position and the proportion of males (table 8).

Table 9: Level of position and sex

SEX		**LEVEL OF POSITION**						
		AIN	EN	RN1	RN2	RN3	RN4	RN5
Male	Count	11	31	85	60	39	25	43
	%	6.8	4.9	6.1	6.9	9.5	9.8	12.0
Female	Count	151	608	1316	807	370	229	314
	%	93.2	95.1	93.9	93.1	90.5	90.2	88.0
Total	**Count**	**162**	**639**	**1401**	**867**	**409**	**254**	**357**

5.2.2 Age

Age was derived from year of birth. The mean ages of females and males were 45.51 and 43.57 years respectively. There was no significant age effect across ASGC code. Data of age by sex are presented in table 9.

Table 10: Age of respondents

SEX	n	MINIMUM	MAXIMUM	MEAN	SD
Male	302	21	66	43.57	9.2
Female	3922	19	72	45.41	9.7
Total	**4226**	**19**	**72**	**45.28**	**9.7**
Missing	104				
Total	**4330**				

Female respondents were statistically significantly older than males by 1.8 years. Data of age by sex broken down into age groups are presented in table 10 along with the proportion of all nurses across the age groupings. Fifty-seven percent of respondents were 45 years of age or older and the greatest proportion of respondents (39.5%) was in the 45-54 age group.

Table 11: Sex and age of nurses

SEX		AGE GROUPS					
		<25	25-34	35-44	45-54	55-64	>64
Male	Count	5	49	103	107	37	1
	% within age groups	4.9	9.1	8.7	6.4	5.4	2.2
Female	Count	98	487	1075	1565	652	45
	% within age groups	95.1	90.9	91.3	93.6	94.6	97.8
Total	**Count**	**103**	**536**	**1178**	**1672**	**689**	**46**
	% within age groups	**2.4**	**12.7**	**27.9**	**39.6**	**16.3**	**1.3**

Comparison of the survey respondents at the level of assistant in nursing with enrolled nurses and registered nurse is given in table 11. Assistants in nursing had a higher proportion of nurses 45 or older (61.6%) compared to the other nurses (56.5%). The same table also provides a comparison with the AIHW data for 2003. Fewer of the enrolled nurse and registered nurse respondents were less than 35 (15.3% versus 23.3%) and more were older than 44 (56.5% versus 46.4%) compared to the national AIHW figures. Registered nurses level 1 were the youngest of all the nurses and the more senior registered nurses (levels 4 and 5) were the oldest of the registered nurses.

Table 12: Comparison of age of respondents with data from the Australian Institute of Health and Welfare

		AGE GROUPS				
		<25	25-34	35-44	45-54	>55-64
Survey Data	EN and RN	2.4	12.9	28.2	39.5	17.0
	AIN	3.8	10.7	23.9	35.8	25.8
AIHW*	EN and RN	4.1	19.2	30.1	32.1	14.3

* AIHW 2005 *Nursing and Midwifery Labour Force 2003*

5.2.3 Employment

Almost 80% of the respondents to the survey were employed as a registered nurse (table 12).

Table 13: Level of position

	n	%	Valid %*
Assistant in Nursing (AIN)	162	3.7	3.8
Enrolled Nurse (EN)	642	14.8	15.2
Registered Nurse 1 (RN1)	1406	32.5	33.3
Registered Nurse 2 (RN2)	869	20.1	20.6
Registered Nurse 3 (RN3)	409	9.5	9.7
Registered Nurse 4 (RN4)	256	5.9	6.1
Registered Nurse 5 (RN5)	357	8.2	8.5
Other	117	2.7	2.8
Total	**4218**	**97.5**	**100.0**
Missing	110	2.5	
Total	**4328**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Note: States and territories have their own classification structures for nursing. The definition of position titles used in the study can be found on p.14

Years worked as a nurse and length of time in nursing showed that 62.8% of assistants in nursing had been in the workforce for 10 years or less. The comparative figure for enrolled nurses was 26.2% and for registered nurses (level 1) 23.5%. More senior registered nurse positions were related to length of service with 50% of registered nurses at levels 3, 4 and 5 being in nursing in excess of 25 years.

Table 14: Level of position and length of time in nursing

YEARS IN NURSING		LEVEL OF POSITION							
		AIN	EN	RN1	RN2	RN3	RN4	RN5	OTHER
1-5	Count	51	120	186	48	18	16	9	7
	% within level	32.7	19.4	13.7	5.6	4.4	6.3	2.5	6.9
6-10	Count	47	42	133	80	33	12	22	10
	% within level	30.1	6.8	9.8	9.3	8.1	4.7	6.2	9.9
11-15	Count	19	43	148	98	47	19	24	6
	% within level	12.2	6.9	10.9	11.4	11.5	7.5	6.8	5.9
16-20	Count	13	71	172	130	62	31	45	11
	% within level	8.3	11.5	12.7	15.1	15.2	12.2	12.7	10.9
21-25	Count	9	93	218	127	60	48	62	22
	% within level	5.8	15.0	16.1	14.8	14.7	18.8	17.5	21.8
26-30	Count	7	107	194	167	85	57	75	19
	% within level	4.5	17.3	14.3	19.4	20.9	22.4	21.2	18.8
31-35	Count	6	88	168	128	59	38	63	13
	% within level	3.8	14.2	12.4	14.9	14.5	14.9	17.8	12.9
36-40	Count	2	42	94	51	26	26	36	6
	% within level	1.3	6.8	6.9	5.9	6.4	10.2	10.2	5.9
40+	Count	2	13	45	30	17	8	18	7
	% within level	1.3	2.1	3.3	3.5	4.2	3.1	5.1	6.9
Total		**156**	**619**	**1358**	**859**	**407**	**255**	**354**	**101**

Twenty percent of respondents reported having more than one job. Fewer senior nurses at registered nurse (level 3) and above had more than one job and the ones that did, tended to have a job outside of nursing. In comparison, two thirds of the assistant in nursing to registered nurse (level 2) who had a second job did so in nursing. Significantly fewer RVR nurses had more than one job.

Full and part time permanent positions were divided almost equally. Permanent positions constituted 89.5% of all positions with 7.5% of respondents employed on a casual basis and only 3% on a temporary basis. With increasing age there was a transfer from permanent full time to permanent part time employment, with 30% or less working full time by the time they were 35 years of age.

Although the majority of nurses worked Monday to Friday, nearly 40% worked a mixture of weekends and weekdays. Nurses working weekends were younger than those who worked Monday to Friday only and those on a mixture of weekend and weekday shifts. More senior nurses worked fewer weekends and mixed shifts.

Thirty six respondents identified themselves as being of Aboriginal or Torres Strait Islander origin. Significantly more of these were working in RVR and OR than in MCC.

Table 15: Aboriginal or Torres Strait Islander origin

	n	%	Valid %*
No	4192	96.9	99.1
Aboriginal	30	0.7	0.7
Torres Strait	6	0.1	0.1
Total	**4228**	**97.7**	**100.0**
Missing	100	2.3	
Total	**4328**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Almost 5% of respondents indicated that English was not their first language. Over 55% of non-English first language speakers were working in MCC. There was a higher proportion of non-English first language speakers working as assistants in nursing (table 17).

Table 16: English as first language

	n	%	Valid %*
No	196	4.5	4.6
Yes	4046	93.5	95.4
Total	**4242**	**98.0**	**100.0**
Missing	86	2.0	
Total	**4328**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Table 17: English as first language and level of position

		LEVEL OF POSITION						
		AIN	EN	RN1	RN2	RN3	RN4	RN5
No	Count	23	20	69	26	21	15	16
	% within level	14.5+	3.1	4.9	3.0	5.2	5.9	4.5
Yes	Count	136	615	1330	836	386	240	336
	% within level	85.5	96.9	95.1	97.0	94.8	94.1	95.5
Total	**Count**	**159**	**635**	**1399**	**862**	**407**	**255**	**352**

+ different from all other locations

Over 60% of respondents worked in hospitals, 20% in private facilities and 12% in residential aged care. Nurses working in public hospitals were younger than their colleagues in other sectors, while nurses in residential aged care and community health were older than nurses employed in hospitals.

Nearly 80% of assistants in nursing and 23% of enrolled nurses worked in residential aged care. More registered nurses (level 1) worked in hospitals (74%) than in other sectors.

Table 18: Main workplace

	n	%	Valid %*
Hospital, public	2269	52.4	54.0
Hospital, private	309	7.1	7.4
Mental health facility, public	108	2.5	2.6
Mental health facility, private	13	0.3	0.3
Outpatient, public	41	0.9	1.0
Outpatient, private	4	0.1	0.1
Day procedure, public	16	0.4	0.4
Day procedure, private	17	0.4	0.4
Residential aged care, public	194	4.5	4.6
Residential aged care, private	342	7.9	8.1
Hospice, public	11	0.3	0.3
Hospice, private	1	0.0	0.0
Other residential care, public	28	0.6	0.7
Other residential care, private	21	0.5	0.5
Community health, public	414	9.6	9.9
Community health, private	25	0.6	0.6
Defence force, public	4	0.1	0.1
Government department, public	28	0.6	0.7
Government department, private	2	0.0	0.0
Doctors rooms, public	13	0.3	0.3
Doctors rooms, private	63	1.5	1.5
School, public	16	0.4	0.4
School, private	4	0.1	0.1
Commercial/industrial/business, public	3	0.1	0.1
Commercial/industrial/business, private	2	0.0	0.0
Tertiary education,[5] public	25	0.6	0.6
Tertiary education, private	1	0.0	0.0
Other public	241	5.5	5.6
Other private	50	1.1	1.1
Total	**4266**	**98.5**	**100.0**
Missing	64	1.5	
Total	**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Over 80% of respondents classified themselves as *carers or clinicians*. Managers were significantly older than carers, clinicians or nurse educators. There were fewer carers and more clinicians in RVR, more managers in RVR and more researchers in MCC. Managers were in more senior positions of registered nurse (levels 3-5).

5. Includes higher and vocational education or other training establishment

Table 19: Main role in nursing

	n	%	Valid %*
Carer	1380	31.9	32.8
Clinician	2005	46.3	47.7
Educator	198	4.6	4.7
Manager	477	11.0	11.3
Researcher	17	0.4	0.4
Other	130	3.0	3.1
Total	**4207**	**97.2**	**100.0**
Missing	121	2.8	
Total	**4328**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Over 40% of nurses started work more than 25 years ago and only 10% in the last five years. Male nurses had, on average, been in nursing fewer years than females. Results show that many persons enter nursing at a mature age. For example, 28.6% (n=114) of nurses who started work five or less years ago are over the age of 45 and would have been at least 40 when they started work as a nurse. There was no significant difference in age of the nurse and geographical location of employment.

Table 20: Frequencies of year started work

Year started work	Cumulative Percent
1960	1.0
1970	12.4
1980	44.9
1990	71.4
2000	90.0
2005	100.0
Total	**4244**
Missing	84
Total	**4328**

There were 192 pre-registration student respondents (4.4%), 68% of whom were student registered nurses undertaking a university degree. Students were younger and university students were the youngest. However it should be noted that nearly 75% (n=143) of nurses who were students were over 35 years of age. Of the enrolled nurses and assistants in nursing who were in pre-registration programs, 33% had been nursing less than five years, while 44% had been nursing for over 10 years.

Table 21: Pre-registration (pre-enrolment) student status

	n	%	Valid %*
No	4045	93.5	95.5
At university	131	3.0	3.1
At TAFE	61	1.4	1.4
Total	**4237**	**97.9**	**100.0**
Missing	91	2.1	
Total	**4328**	**100.0**	

Table 22: Student status and age group

	n	%	Valid %*
<25	14	7.3	7.3
25-34	35	18.2	18.2
35-44	70	36.5	36.5
45-54	59	30.7	30.7
55-64	14	7.3	7.3
Total	**192**	**100.0**	**100.0**

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.3 Access and use of information technology

5.3.1 Level of experience and confidence in use of information technology

The experience and confidence in using a wide variety of information technology hardware and software applications was determined. Overall results are shown in table 23.

Table 23: Experience and confidence in using hardware and software

| | n | PROPORTION OF RESPONDENTS IN EACH CATEGORY | | | | | |
		Very confident	Confident	Little confident	Not confident	Don't know	No experience
Type1							
Computer	4251	16	42.7	28.4	10.7	0.3	1.9
Mouse	4254	34.2	43.7	16.0	4.2	0.2	1.8
Keyboard	4245	28.4	43.7	19.7	5.8	0.3	2.0
Internet	4233	21.8	34.9	23.7	10.9	1.5	7.1
Word processing	4226	20.7	33.3	21.0	13.5	2.7	8.8
Email	4236	24.3	35.2	19.4	10.4	1.9	8.8
Type 2							
Windows	4213	12.3	26.1	25.5	17.5	6.2	12.3
CD/DVD	4218	14.7	25.1	24.1	18.4	4.6	13.1
Touch screen	4199	14.4	29.1	21.3	14.6	5.0	15.5
Intranet	4183	15.8	27.8	22.7	12.9	3.8	17.1
Spreadsheet	4219	7.9	15.1	24.6	27.7	5.3	19.3
Type 3							
Evidence based practice	4167	6.0	16.5	22.1	21.8	7.6	26.1
Database	4193	4.4	10.9	21.6	28.8	7.8	26.4
Data projector	4185	4.7	10.1	17.5	27.7	10.3	29.7
PowerPoint	4219	8.9	13.0	17.6	23.0	7.1	30.4
Pen/memory stick	4185	10.1	13.2	15.3	21.2	8.6	31.5
Reference tools	4152	2.9	7.7	15.9	26.2	11.2	36.1
Statistical software	4160	1.4	4.2	9.1	24.0	13.0	48.3
Apple	4136	1.7	3.3	8.1	20.1	14.3	52.7

Generally nurses in IR and OR had less experience in use while RVR tended to have more confidence, although differences among sectors were small in magnitude.

For every information technology application, nurses who stated they had no experience were significantly older than those who had experience. The difference in age was 2-7 years. Nurses were significantly younger at every level of confidence compared to the next level. The difference in age for each level of confidence was 1-2 years.

Length of time in nursing was inversely related to experience in use and confidence for many of the categories. Nurses with shorter periods of time in the profession had more experience and more confidence with information technology.

Difference in experience with use of information technology applications according to level of position was large. For example, for computer use, those with no experience ranged from 20% for assistants in nursing to 1% for registered nurse (level 1). The confidence of the nurses who did have experience increased from assistant in nursing through to registered nurse (level 2).

Assistants in nursing and enrolled nurses in public aged care facilities tended to have more experience than those working in the private aged care sector. However for the assistants in nursing and enrolled nurses that did have experience there were no differences in confidence among the three sectors.

In general, registered nurses who were most experience in the use of information technology applications were those who worked in community health, followed by public hospitals and other public facilities. Private hospital and aged care respondents had the least information technology experience. Registered nurses (levels 3-5) working in aged care were less experienced than other sector registered nurses (levels 3-5) and all registered nurses working in aged care were consistently less confident than nurses in other sectors.

Eighty three per cent of all respondents (n=4330) stated they used a computer for work related activities. There was no significant age difference but a significant ASGC effect. Approximately 10% more nurses working in RVR used computers than in other geographical areas. Huge difference in level of job occurred: 80% of assistants in nursing, 25% of enrolled nurses and 12.1% of registered nurses (level 1) did not use a computer for work related purposes.

Across sectors, nurses working in aged care reported the least access followed by those in private facilities. As seniority increased, so did access in all sectors. Within aged care facilities there were less than 20% assistants in nursing, 50% enrolled nurses and 55% registered nurses (levels 1-2) who used a computer compared with 44% assistants in nursing, 83% enrolled nurses and 90% registered nurses (levels 1-2) who worked in other sectors.

Respondents were asked how much they agreed with several statements about use, benefits and disadvantages of computer use in the workplace. Respondents agreed that learning about computers was essential and that computer use had improved information access. Responses were equally divided as to whether information technology had reduced duplication and error or made life easier. These responses are shown in table 24.

Table 24: Proportion of respondents who agreed with statements

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean*
Avoid using computers whenever possible	2.9	8.8	15.7	37.0	35.5	3.8
Learning about computers is essential	48.3	43.5	3.9	1.4	1.7	1.6
Use of IT reduces error	6.9	24.1	45.4	18.2	5.3	2.8
Use of IT reduces duplication	8.3	23.6	30.7	28.0	9.5	3.0
Use of IT had made life easier	11.1	31.4	26.3	22.8	8.4	2.8
Use of IT had improved information access	30.3	48.7	11.9	6.6	2.5	2.0

* Calculated on strongly agree = 1 through to strongly disagree = 5

Older nurses were more likely to avoid using computers, less likely to consider learning was essential, more likely to disagree that computers reduced errors and duplication, or made life easier and improved access.

Nurses newer to the profession were less likely to avoid computers as were the senior registered nurses (levels 3-5) who also agreed that learning was essential and that computers had increased access to information. Registered nurses (levels 1-2) were less likely to agree with the statement that computers had reduced errors and duplication.

5.3.2   Access to computers

There were 3602 respondents who indicated they used a computer for work related activities. Half the respondents used their own work computer. The highest computer use for work related activities was with shared work computers where only 11% of respondents 'never' used this resource. Little access was made through libraries or internet cafés. Nurses who had their own work computer were older than those who did not and nurses who shared a work computer were younger than those who did not. The frequency of computer use was also related to age, with younger nurses using a shared computer more frequently than older nurses.

Table 25: Place of access for use of a computer for work related activities

	n	Never	< 1/week	1/week	> 1/week	1/day	> 1/day
			PROPORTION OF RESPONDENTS USING A COMPUTER				
Home	3538	24.1	27.3	12.6	20.9	8.1	7.0
Own work computer	3209	49.2	4.1	2.7	7.8	4.2	32.0
Shared work computer	3417	11.3	12.0	9.3	23.0	9.6	34.8
Work library	3296	68.8	21.1	5.2	3.4	1.0	0.5
Local library	3339	77.4	19.2	2.4	0.6	0.2	0.1
Internet café	3339	93.2	5.5	0.7	0.4	0.1	0.1
Other	804	93.0	2.1	1.0	1.2	0.5	2.1

Almost three quarters of these respondents stated they used a home computer 'sometimes' for work related activities. Nurses employed in RVR and senior registered nurses (levels 3-5) were more likely to use a home computer and their own work computer. Registered nurses (levels 1-2) accessed a shared computer more than other levels of registered nurse and at this level, public hospital and private facility access was greater than other sectors. Registered nurses (levels 1-2) working in community health had more access to their own work computer than registered nurses (levels 1-2) in other sectors. At the other end of the scale, hospital registered nurses (levels 1-2) were the least likely to use their own work computer. Registered nurses working in community health also use their computers more frequently. Nurses working in aged care access and use a work computer least.

Of all nurses who use a computer for work, over 90% have access to email, internet or intranet at work although the location of access differs. For example, nurses who use a shared work computer are more likely to have limited access to the internet and use another location, such as

the library. Overall, the same patterns emerged with more access and use by senior registered nurses. Registered nurses (level 1) working in community health had greater access than did other registered nurses and overall in aged care, access and use was low.

Continuing professional education and training, administration and communication were the principal reasons for undertaking work at home. Use of a home computer to do administrative work increased with the level of position. Nurses were given four options for reasons for using a home computer for work related purposes. These were: workload, access, authorisation, and management attitude. Over 50% of those nurses who used a home computer for work related activities cited their workload as the reason (table 26). This factor was over twice that of any other reason.

Table 26: Use of home computer

	n	% of total	% total 'don't use'
Professional education and training	1735	48.2	69.9
Research	1288	35.7	51.8
Communication	813	22.6	32.7
Administration	518	14.4	20.8
Clinical care	249	6.9	10.0
Patient care	200	5.6	8.0
Other	151	4.2	6.0
Don't use	1121	31.1	
Total responses	**3603**		

Table 27: Reason for home computer use for work related activities

	n	% of total	% total 'don't use'
My workload means that I have to work at home	1244	34.5	51.5
Do not have enough physical access	562	15.6	23.3
Don't have the authorisation to use what I want	429	11.9	17.7
Discouraged from accessing	147	4.1	6.1
Other reasons	546	15.2	22.6
Don't use	1192	33.1	
Total respondents	**3603**		

Workload was cited as the reason for using a home computer least by nurses who had been in nursing for less than 11 years. There were highly significant effects of the level of position on reasons for working at home. Workload was cited more with seniority while access was negatively correlated with level of position. Registered nurses (level 2) were more likely to list lack of authorisation to access the computer at work than any other position level. There were no differences in the reasons home computers were used across the sectors of aged care, public hospitals, private facilities or community health.

A little over half of the respondents who used a computer for work related purposes stated they had a personal email address at work. A further 15% stated they chose not to use the allocated email address. Nurses who did not have personal email were younger than those that did and nurses who had personal email but did not use it were younger than those that used it. Nurses in RVR were more likely to have personal email. The proportion of nurses with a personal email address at work increased with level of position. Nurses working in aged care up to registered nurses (level 2) were least likely to have a personal email and those working in community health were most likely. At the level of registered nurse (level 3-5) there were no sector differences.

5.3.3 Use of information technology applications

Nurses were asked if information technology applications were available to them for work related purposes and, if so, how frequently the applications were used. There were 23 applications listed, divided into the areas of patient/client management, clinical use, administration, and 'other'. The proportion of nurses who reported that an application was unavailable to them was ranged from 3.3% to 16.6%; while 'never used' ranged from 18.4% to 72.3%. The most frequent uses were: accessing patient records; accessing patient results; continuing professional education; and communication, with 'frequent' or 'always' recorded by 44.2%, 40.9%, 35.7% and 40.7% of nurses respectively.

Table 28: Purpose of use of computer for work related purposes

	PROPORTION OF RESPONDENTS WHO USE COMPUTERS FOR WORK RELATED PURPOSES					
	Never	Rarely	Occasionally	Frequently	Always	Not available
Patient Client Management						
Accessing patient records	27.9	7.9	13.2	23.1	21.1	6.8
Appointment scheduling	59.1	6.9	6.9	7.8	9.0	10.4
Bed management	52.8	5.0	7.9	12.4	11.4	10.4
Patient assessment	48.5	5.8	8.1	13.0	13.8	10.8
Theatre applications	72.3	3.5	2.7	2.7	3.0	15.9
Clinical use						
Documentation	68.9	2.8	3.2	5.2	7.2	12.7
Medication management	69.6	3.5	5.0	4.5	4.4	13.0
Poison management	71.3	7.7	6.9	1.6	1.1	11.5
Consultations	61.5	5.5	9.3	7.2	5.6	11.0
Results	33.5	5.6	13.1	20.5	20.4	6.9
Ordering	64.5	4.3	6.3	6.5	5.8	12.7
Accessing policies	22.5	11.1	28.9	21.5	12.9	4.0
Accessing evidence based practice	28.5	12.5	27.8	17.5	9.2	4.5
Administration						
Reporting	47.4	4.6	9.4	13.6	13.5	11.6
Rostering	54.3	4.8	7.0	8.8	12.4	12.8
Finance	67.2	3.7	3.6	3.9	4.7	16.8
Policy development	43.5	7.6	17.3	11.0	10.5	10.0
Complaints	60.2	8.1	9.4	3.8	5.6	12.9
Recruitment	65.1	4.6	7.0	3.6	4.7	15.0
Other						
Continuing professional education (CPE)	18.4	11.3	31.2	24.8	10.9	3.3
Communication	27.2	9.1	18.2	23.1	17.6	4.7
Accreditation	54.9	7.9	11.3	8.8	6.3	10.7

Significant negative correlations were found between age of nurse and 'results' and 'bed management' indicating that use of these applications was more associated with younger nurses. A similar trend was found for other applications with the exception of those associated with administrative functions, such as finance, recruitment and rostering. These were positively correlated with age, indicating increased use by older nurses.

Although differences in magnitude were small, significant effects were found across the ASGC. Nurses in RVR used patient management and clinical tools less frequently than nurses in other locations and, in particular, in MCC. The exceptions were medication and poison management where RVR had the highest frequency of use. For administrative applications, CPE, communication, and accreditation applications, nurses in RVR had the greatest use.

Generally, use for assistants in nursing and enrolled nurses was lower than for registered nurses. For administrative functions, there were differences across the grades of registered nurse, with registered nurses (levels 3-5) the highest users.

Nurses in facilities other than aged care tended to use applications more frequently than those in aged care. Additionally, nurses in private aged care used applications more frequently than respondents in public aged care.

Table 29: Use of different applications for work related purposes

	Never	Rarely	Occasionally	Frequently	Always	Mandatory
GPS	97.9	1.0	0.7	0.3	0.1	4.0
Personal digital assistant or table computer	95.6	1.2	1.1	1.0	1.1	10.5
Patient client monitoring	55.4	4.7	12.0	14.9	13.0	62.7
Diagnostic result access	58.4	5.8	12.9	14.2	8.7	33.9
Delivery	55.3	3.7	7.5	17.8	15.7	69.5
Telehealth	71.0	10.1	14.0	3.9	1.0	7.0
MIMS on-line	30.6	12.6	33.0	17.5	6.3	5.3
Joanna Briggs Institute	56.3	11.2	22.6	7.6	2.3	6.6
Cochrane Library	56.0	13.0	21.3	7.8	1.9	2.3
Patient management	71.8	3.5	6.2	9.1	9.4	63.1
Staff management	83.6	3.1	3.0	4.6	5.7	53.5
Financial management	91.5	1.9	2.5	2.5	1.7	26.6
Journals	42.6	16.0	27.1	11.6	2.7	2.7
Information systems	61.9	8.4	16.7	10.5	2.5	3.6
Community Client Health Profile	92.3	2.6	2.3	1.9	1.0	10.1

Clinical uses such as patient/client monitoring, diagnostic result access and delivery were used most frequently by just under half of the nurses who used computers. The application that was used the most was MIMS Online, although most use was only on a 'rare' or 'occasional' basis.

Younger nurses were more likely to use clinical applications and those applications related to management applications were more frequently used by older nurses. There were no significant trends for knowledge and information applications such as the Cochrane Library or CIAP (Clinical Information Access Program: NSW Health), CKN (Clinicians Knowledge Network: QLD Health) etc. Use of telehealth, GPS, patient management and information systems were all greater in RVR. In contrast, diagnostic result access was highest in the MCC.

Registered nurses (levels 2-5) used online journals, staff management, Cochrane Library and information systems such as the Clinical Information Access Project (CIAP) and Clinical Resources on Call (CROC) more than assistants in nursing, enrolled nurses and registered nurses (level 1). However the overall use of any of the technologies was recorded as 'rarely' at best. Financial management systems were used most by registered nurses (levels 3-5).

In the aged care sector, use was lowest for virtually all information technology applications. Clinical applications such as monitoring, results and delivery were higher in the hospital systems. Use of personal digital assistants (PDAs) was virtually non existent, even in community health where it might have been expected to be higher.

The level of confidence in using information technology applications surveyed was generally low, although younger nurses were more confident in use. Length of time working as a nurse was significant only for financial and staff management where nurses who had been longer in nursing were more confident. The aged care sector had the least use and confidence for most of the applications.

5.3.4 Access to and use of intranet and internet

Almost three quarters of nurses stated their facilities had access to the intranet and over 80% to the internet. A further 14.2% and 7.8% of respondents respectively did not know if their facility had access. There was a significant age effect with nurses who knew about access to the intranet or internet being younger than those who did not know or those that said their facility had no access. Assistants in nursing and enrolled nurses were more likely to not know if their facility had internet and intranet access.

Table 30: Location for accessing email, intranet and internet

	Email %	Internet %	Intranet %
Home	40.4	49.4	4.9
Own work computer	32.0	27.2	28.2
Shared work computer	41.6	37.7	54.6
Work library	2.7	8.5	6.9
Local Library	1.6	5.3	1.4
Internet café	2.8	2.3	0.1
Other	0.6	0.5	0.2
Don't access anywhere	8.0	6.6	6.6

A low proportion of aged care facilities in which the respondents worked had access to the internet and an even lower proportion access to an intranet. Private aged care had the lowest access.

Sixty-five percent of the respondents did not know how their place of work connected to the internet. Of those that did know 50% noted broadband. Nurses working in RVR were more knowledgeable about the type of connection. Dial-up, ISDN and satellite connections were more prevalent in the RVR than other geographic locations.

Most access to the intranet and internet was at the nurse's work station. Significant effects were detected for location of access and level of position and were similar for both the intranet and internet. Access to both networks was lower for level of nurse (AIN - RN level 1) and access to the internet was 10% lower than that for the intranet at these levels. For registered nurses (levels 3-5) access

was similar across sectors. For lower level registered nurses internet access was below 60% for all sectors while registered nurses (level 1-2) who worked in aged care had lowest access of all the sectors.

Table 31: Location at work of access to the intranet and internet

	INTRANET		INTERNET	
	n	%	n	%
Workstation	2638	82.4	2263	64.4
Manager's office	668	20.9	737	21.0
Personal mobile device	32	1.0	47	1.3
Library	477	14.9	475	13.5
Remote access	118	3.7	106	3.0
Other	201	6.3	257	7.3
I have no access	139	4.3	529	15.1
Total*	**3203**		**3513**	

*proportion of respondents who stated their facility had access (3203 intranet; 3513 internet)).

Nurses were given three different options for the reason they accessed the intranet and internet. They could tick more than one option. The greatest reason was for clinical use (table 32).

Table 32: Purpose for accessing the intranet and internet

	INTRANET		INTERNET	
	n	%	n	%
Clinical use	1847	57.7	1753	49.9
Patient management	1128	35.2	733	20.9
Administration	1291	40.3	733	20.9
Other	395	12.3	610	17.4

1005 nurses listed a total of 1108 other purposes for accessing the intranet and internet. Over half of these (a combined total of 662) were for communication (81and 56 for intranet and internet respectively), education (48 and 125), information (56 and 71) and research (47 and 208).

There was a significant effect of age and use of the intranet for clinical use with nurses using the facility 2.5 years younger than those who did not. There was also a significant effect for the use of the internet for administration with those in nursing less than 10 years less likely to use the internet for administration than those who had been in nursing over 15 years. Overall use was around 30% and 40% for management and administrative functions respectively for registered nurses (levels 3-5) as compared to less than 20% for nurses at lower levels. Nurses working in aged care used the networks the least for all purposes.

Sixty percent of nurses who had access to the intranet were not restricted to purpose or hours as compared to 55% who were restricted to some degree from using the internet. There was no significant effect of degree of restriction to using the intranet and age, however there was for use of the internet. Those nurses who were not restricted were older while nurses who had been nursing for fewer years were subjected to greater restrictions. For internet access only 30% of public hospital nurses had no restrictions imposed as compared to over 40% for all other sectors. The restrictions to and frequency of downloading files from networks showed exactly the same pattern as the degree of restriction. More nurses had to seek authorisation to download from the internet than the intranet.

Table 33: Degree of restriction to using the intranet and internet

	INTRANET			INTERNET		
	n	%	Valid %*	n	%	Valid %*
Not allowed at all	46	1.4	1.5	321	9.1	10.4
Restricted to purpose	879	27.4	29.5	1230	35.0	39.7
Restricted to hours	109	3.4	3.7	143	4.1	4.6
Not restricted	1943	60.7	65.3	1405	40.0	45.3
Total	**2977**	**92.9**	**100.0**	**3099**	**88.2**	**100.0**
Missing	226	7.1		414	11.8	
Total	**3203**	**100.0**		**3513**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.4   Knowledge of current health information technology initiatives

An objective of the study was to determine the preparedness of nurses to participate in information technology initiatives and in particular with Health*Connect.* To that end the survey offered four questions about knowledge of information technology health initiatives.

5.4.1 Information technology developments within the workplace

As shown in Table 34 the respondents were almost equally divided in whether they agreed they were kept aware of general information technology developments in the workplace with 41% considering that they were not kept aware of workplace development and 45% considering they were. There were no significant age, length of time in nursing or ASGC effects. The assistant in nursing, enrolled nurse and registered nurse (levels 1 and 2) were less knowledgeable than registered nurses (levels 3-5). Registered nurses in aged care (levels 1 and 2) were the least informed of registered nurses in any sector and registered nurses working in community health (levels 1 and 2) were best informed. At registered nurse (level 3) and above there were no significant differences for awareness across the sectors.

Table 34: Awareness of information technology development in the workplace

	n	Valid %*
Strongly agree	268	6.3
Agree	1633	38.7
Disagree	989	23.4
Strongly disagree	751	17.8
No opinion	583	13.8
Total responses	**4224**	**100.0**
Missing	106	
Total	**4330**	

Table 35: Benefit of national electronic health records

	n	Valid %*
Strongly agree	846	20.1
Agree	1997	47.4
Disagree	259	6.1
Strongly disagree	141	3.3
No opinion	972	23.1
Total responses	**4215**	**100.0**
Missing	115	
Total	**4330**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.4.2 Adoption of a national electronic health record

There was general agreement that the adoption of a national electronic health record would be beneficial to health care (table 35). Older nurses and nurses who had been in nursing longer were less likely to agree as to the benefit of adopting a national EHR system. There were no significant differences for level of position or sector.

5.4.3 Knowledge of Health*Connect*

Over 50% of the respondents stated they had never heard of Health*Connect* and only 12.2% acknowledged they had an average or better knowledge (table 36). Older nurses and those who had been in nursing longer had better knowledge of the existence of Health*Connect.* The least knowledgeable nurses were registered nurses at level 1.

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Table 36: Knowledge of Health*Connect*

	n	Valid %*
Excellent	19	0.4
Good	119	2.8
Average	382	9.0
Poor	908	21.4
Very poor	556	13.1
Never heard of it	2256	53.2
Total	**4240**	**100.0**
Missing	90	
Total	**4330**	

5.4.4 Knowledge of state and territory health initiatives

Knowledge of state and territory health initiatives was rated as being average by over 40% of respondents and 'good' or 'excellent' by 14%. Nurses in RVR were more knowledgeable than those in MCC and IR; those in OR were more knowledgeable than the IR. The degree of knowledge of health initiatives increased with level of position with registered nurses (levels 3-5) more knowledgeable than assistants in nursing, enrolled nurses and registered nurses (levels 1-2). Community health registered nurses (levels 1-5) were better informed than registered nurses in other sectors in their knowledge of health initiatives in their state or territory.

5.5 Employment requirement for information technology skill

Five questions were developed to determine the situation regarding nurses' information technology skills and their current and future employment.

5.5.1 Employment requirement for information technology skills

Just over 30% of nurses stated that a requirement for information technology skills was built into their position description. Only 10% stated they did not use information technology in their role. There were significant effects by level of position. Less than a quarter of registered nurses (level 1) had information technology skills in their position description as compared to 50% or more for registered nurses (levels 3-5). There were also significant sector effects. Nurses in aged care had a slightly lower demand for information technology in their position descriptions and community health nurses the highest demand. Less than 1% of respondents stated they received financial reward for use of information technology.

Table 37: Requirement for information technology in position and level of position

		LEVEL OF POSITION						
		AIN	EN	RN1	RN2	RN3	RN4	RN5
No	Count	61	399	946	542	196	104	167
	% within level	39.4	63.4	68.4	62.7	48.5	41.1	47.6
Yes	Count	10	102	313	288	202	137	171
	% within level	6.5	16.2	22.6	33.3	50.0	54.2	48.7
Don't use IT	Count	84	128	124	34	6	12	13
	% within level	54.2	20.3	9.0	3.9	1.5	4.7	3.7
TOTAL	**Count**	**155**	**629**	**1383**	**864**	**404**	**253**	**351**

5.5.2 Importance of access to and use of information technology in choice of employment

Nearly half the respondents stated that information technology access and use was not at all important in the choice of their current position. There was a significant negative correlation between age and importance of information technology in that younger nurses were more likely to consider information technology important. Registered nurses (level 1) considered importance to be less than registered nurses (levels 3-5).

5.5.3 Importance of information technology in remaining in current employment

The importance of access to and use of information technology in remaining in their current position was considered to be 'very' or 'somewhat' important by 35% of the respondents. Older nurses tended to consider it more important when choosing to remain in their current position. More registered nurses (levels 2-5) stated it would have influence than did registered nurses (level 1). Community health nurses were more likely to state that access to information technology would influence their decision to stay in their current position than nurses in other sectors.

5.5.4 Importance of access to and use of information technology in choice of future employment

Almost 50% of nurses said information technology was important in choice of future employment. Registered nurses (level 1) rated the level of importance lower than registered nurses (levels 2-5), assistants in nursing and enrolled nurses. Community health nurses considered the importance higher than other sectors.

5.6 Training and education in information technology

A large component of the survey was devoted to past training and future requirements for training[6] in information technology. Respondents were asked for their training background in eleven different applications. The applications ranged from use of hardware such as keyboard skills to basic techniques such as file management; and from common applications such as word processing and email through to specialised applications such as administration systems and information management. In the text below these are referred to as 'applications'.

Depending on the application between 4.0% and 16.9% of the total respondents had training during their pre-registration or pre-enrolment education and between 12.6% and 28.2% had training as continuing professional education since they commenced their employment (table 38). In all cases the proportion of nurses who had training as continuing professional education exceeded pre-registration or pre-enrolment training figures.

For each application the number of nurses who ticked both boxes ie had training both pre-registration or pre-enrolment and as continuing professional education was between 59 and 154.

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6. Past training was defined as being received during pre-registration or pre-enrolment education and as continuing professional education. The term 'training' was used throughout the questionnaire for the specific short activities of skill acquisition in the information technology applications.

Table 38: Training pre-registration or pre-enrolment and as continuing professional education

	Training pre-registration/enrolment		Training as continuing professional education	
	n	%	n	%
Keyboard skills	662	15.3	1019	23.5
File management	262	6.1	584	13.5
Word processing	577	13.3	1223	28.2
Spreadsheets	331	7.6	829	19.1
Databases	360	8.3	729	16.8
Email	523	12.1	1202	27.8
Library searches	732	16.9	890	20.6
Internet	523	12.1	982	22.7
Patient management	355	8.2	1052	24.3
Administration systems	190	4.4	655	15.1
Information management	174	4.0	545	12.6

Nurses who had received training during pre-registration or pre-enrolment education were younger for most applications other than those whose training was specific to administration and management. For example, the data analysis for the application of word processing indicates that the mean age of nurses was four years less for those who had pre-registration or pre-enrolment training than those who did not (41.5 years versus 45.8 years). In contrast for the same application, nurses who benefited from continuing professional education were older (48.1 years) than those who had not (44.1 years).

For applications associated with management functions there was little pre-registration or pre-enrolment training. In contrast, there was a significant increase for those longer serving nurses with regard to continuing professional education. Registered nurses (level 1) had more pre-registration training in library searches than other position levels. For continuing professional education there were significant effects for every application with the proportion of nurses undergoing training increasing up to the level of registered nurses (level 3).

Of those respondents who received training, group training was the most common format (taken by 13.9%), followed by face to face training (6.2%), self taught (5.6%) and distance learning (0.8%). On average, training was either undertaken at work during work hours (9.8%) or away from work in own time (10%). A much smaller proportion of training occurred at work in own time (1.5%) or away from work in work time (2.4%). The proportion of nurses being trained by a colleague, an in-house trainer based outside the place of work, an in-house trainer based inside the workplace, or a commercial trainer were 3.4%, 4.1%, 5% and 9.1%, respectively.

The majority of nurses considered the training they received met their current needs for most applications. On average, 68% considered their training met their needs and was given at an appropriate time (70%).

Training paid for by self or by employer were the most common sources of payment with 40% of training met from this source in both categories. Nurses who had been in nursing for 10 years or less were less likely to have had employer funding for training.

Table 39: Employer support of information technology training by level of position

		LEVEL OF POSITION						
		AIN	EN	RN1	RN2	RN3	RN4	RN5
No	Count	21	62	128	53	19	11	15
	% within level	13.9	9.8	9.2	6.2	4.7	4.4	4.3
Yes employer pay full	Count	3	66	143	168	105	82	95
	% within level	2.0	10.5	10.3	19.7	26.2	32.5	27.4
Yes employer pay part	Count	2	20	46	34	32	34	35
	% within level	1.3	3.2	3.3	4.0	8.0	13.5	10.1
Yes I pay full	Count	4	51	115	56	49	19	28
	% within level	2.6	8.1	8.3	6.6	12.2	7.5	8.1
Yes I pay part	Count	0	6	22	21	8	5	12
	% within level	0.0	1.0	1.6	2.5	2.0	2.0	3.5
Don't know	Count	121	426	932	522	188	101	162
	% within level	80.1	67.5	67.2	61.1	46.9	40.1	46.7
TOTAL	Count	151	631	1386	854	401	252	347
	% within level	100.0	100.0	100.0	100.0	100.0	100.0	100.0

On average, 44% of respondents considered they needed further training with a range from 30.1% for keyboard skills to 51.6% for databases. Most common applications such as use of the keyboard, email and internet were least likely to be seen as required skills; while spreadsheets, databases and management systems were noted by half of the respondents as areas in which they required training.

A quarter of respondents considered their level of computer literacy was restricting their career, while 41.7% considered there was no career restriction. There was a small significant negative age effect with older nurses less likely to consider the degree of computer literacy was affecting their career. Nurses who had been in nursing for less than five years were more likely to consider their level of computer literacy was restricting their career.

Although there was virtually no discouragement of training (1.7%), over half the respondents said that training was not referred to at all. Nurses in work places where they stated training is encouraged were older than those in work places where it was not referred to at all. Analysis of registered nurses (levels 1-2) showed that the level of encouragement in private facilities (24.3%), aged care (29.8%), public hospital (33.8%) and other public facility (39.2%) were all lower than in community health (53.4%). At registered nurse (levels 3-5) there were no significant effects across sectors.

The majority of nurses were not very informed about the training policy at their workplace (60% 'don't know'). Of those that did know, 20% stated their employer would not pay for training and 55% said their employer would pay at least in part. More senior nurses (registered nurse levels 3-5) were aware of workplace training policy and in general, the more senior the nurse the more likely the employer would pay in full or in part.

Respondents preferred face to face training but were also agreeable to workshops. The preferred training location was at the place of work. Nurses who selected 'self taught' were younger than most other nurses. Older nurses preferred training to be outside work than at work. Older nurses preferred face to face training in comparison to workshops.

5.6.1 Formal information technology qualifications

Less than 10% of respondents indicated they had formal qualifications in information technology. Qualifications ranged from attendance at one day courses in word processing to a Bachelor of Technology degree in computer studies. Certificate I in some aspect of information technology was identified by 30 nurses as were Certificates II (25), III (9) and IV (4). A further 97 respondents indicated 'certificate' but no level. Two respondents stated they had a Computer Driving Licence.

5.6.2 Barriers to accessing training

Respondents were given a number of factors that could be barriers to their access to training. As many factors as applied could be selected. Workload issues such as time (56%) and lack of relief staff (61%) were identified by the majority of respondents as being a major barrier to training. Computer access (27%), lack of support (38%) and money (35%) were also identified by large numbers of respondents (table 40).

Other barriers that nurses gave showed that in RVR and to a lesser extent in OR, remoteness was noted as a barrier. In all areas 'training not offered' featured many times as the barrier to training. Lack of relief staff was more of a barrier in RVR than in MCC whereas computer access was more of a barrier in MCC than in RVR. 'My time' was considered a major barrier by all levels of nurse. For the other barriers the degree to which they affect nurses was greatest at lower position levels.

Table 40: Barriers to accessing training

	Very often or always	Sometimes	Never or rarely
My time	56.4	27.3	16.4
Money	35.2	23.0	41.8
Lack of support	38.1	27.1	34.9
Lack of relief	61.2	20.5	18.4
Computer access	26.8	22.8	50.4
Lack of interest	13.3	29.4	57.3
Other barriers	3.1	0.6	1.6
Skills are not required	25.6	22.8	51.6

When asked if they would be interested in training toward a national competency in information technology such as a computer driving licence, only 5% said 'no', 71% said 'yes' and 21% did not know. Respondents who said they would not take advantage of a national competency were older. Fewer assistants in nursing were interested in a course than any other position level.

Table 41: Interest in national competency in information technology

	n	%	Valid %*
No	215	5.0	5.1
Yes	3087	71.3	73.1
Don't know	921	21.3	21.8
Total	**4223**	**97.5**	**100.0**
Missing	107	2.5	
Total	**4330**	**100.0**	

Only a quarter of nurses indicated they would be interested in undertaking a health informatics university course. Respondents who said they were not interested were older than both those that responded 'yes' and 'don't know'.

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.7 Barriers to the use of information technology

Respondents were given a number of factors that could be barriers to use of information technology. As many factors as applied could be selected. 'Work demands' was seen to be the major barrier followed by the numbers of computers, lack of information technology support and knowledge. At the other end of the scale concerns of health, the nurse's age, interest, and discouragement by others was 'never' or 'rarely' a restriction by over 80% of the respondents. Password issues were raised by several people indicating that timeliness in issuing passwords and the number required were both issues.

Table 42: Barriers to use of computers

	n	Never	Rarely	Sometimes	Very often	Always
Too many work demands	3370	11.7	5.8	26.2	34.3	22.0
Not fit with other demands	3257	26.4	13.8	26.5	24.3	9.0
Not enough computers	3340	30.5	16.0	28.2	15.7	9.6
Lack IT support	3231	25.4	19.6	31.9	15.9	7.2
IT knowledge	3321	30.7	16.7	32.4	13.8	6.4
Lack encouragement	3215	38.6	21.6	20.8	12.3	6.7
Location of computer	3254	43.1	15.7	21.4	12.7	7.1
Confidence	3302	32.2	17.9	31.6	13.2	5.1
Seniors take priority	3208	45.9	17.6	16.1	11.3	9.0
Computer too slow	3177	32.5	27.1	27.2	9.7	3.6
Resentment by clients	3140	43.5	20.2	23.0	9.3	3.9
Log on time	3205	45.9	23.3	19.5	7.6	3.7
Unreliable network	3167	38.7	29.8	22.3	6.7	2.4
Attitudes of IT department	3063	47.4	24.5	17.6	6.1	4.5
Staff turnover	3091	51.1	20.7	17.7	6.7	3.8
No credit card	2933	84.1	4.2	2.4	1.7	7.7
Discouraged by others	3145	58.9	22.8	12.1	4.4	1.9
No interest	3092	70	12.5	13.0	3.1	1.4
Age	3168	77.5	10.3	7.9	3.0	1.3
Health and safety	3066	86.0	8.6	4.0	0.8	0.6

Note: The barriers in table 42 are ranked in order of the magnitude of the 'very often' and 'always' combined response

Younger nurses were more likely to report barriers such as the number of computers, access and the attitudes of others. The largest barriers of 'too much work' and 'not fitting in with other demands' were not age dependant. Nurses with a longer time in nursing consider that number and location of computers are less of a barrier. However the longer the time in nursing, the more information technology knowledge, age, confidence and information technology support are significant barriers. There were significant sector differences for many barriers although the differences were small.

Nurses in RVR were less likely to consider the 'number of computers', 'priority of senior staff' or 'no interest' as restrictions and more likely to experience 'unreliable or too slow network', 'lack of information technology support', 'attitude of information technology staff' and 'staff turnover'. Workload was the greatest restriction in IR and OR.

Not enough computers was greatest in aged care and not enough computers and location of computers were greatest in the public hospitals, while hardware issues such as network reliability, speed and log on time were greater in community health. Encouragement by fellow staff and management and resentment by clients were also greater barriers in public hospitals.

5.8   Technical support

Five questions were asked about the availability of technical support for computer hardware and software for the respondents within their work organisation. Results for both hardware and software were almost identical and are reported as combined data.

Although less than 6% of respondents stated there was no policy for technical support in place, approximately 40% did not know if such a policy existed. Nurses who indicated they did not know if a policy existed were younger. However knowledge increased with length of time in nursing and from assistant in nursing to registered nurse (level 3). There were 56% 'don't know' responses for respondents who had been nursing for 0-5 years; 43% for those nursing over a 6-15 year period; and 35% for longer periods thereafter. Within sectors, registered nurses' knowledge of the existence of a policy was greatest in community health and lowest in aged care. Knowledge was greater in all sectors for registered nurses (levels 3-5) as compared to registered nurses (levels 1 and 2).

Table 43: Technical support policy exists within organisation

| | HARDWARE | | | SOFTWARE | | |
	n	%	Valid %*	n	%	Valid %*
No	243	5.6	5.8	243	5.6	5.9
Yes	2288	52.8	54.7	2193	50.6	52.9
Don't know	1655	38.2	39.5	1711	39.5	41.3
Total	**4186**	**96.7**	**100.0**	**4147**	**95.8**	**100.0**
Missing	144	3.3		183	4.2	
Total	**4330**	**100.0**		**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Approximately 30% of respondents did not know who provided technical support. Of those that did know, just over 50% stated that technical support was in house. Contractors (16%) and health service (32%) provided the balance. Nurses who had been nursing for less time were less likely to know who provided the support. The number of in-house service providers decreased from MCC to RVR and the amount of support from contractors and the health service increased. Public facilities had more in-house or health service support than other sectors. The aged care and private sectors had a greater reliance on contractors and virtually no support from the health service which was the principal supporter for community health.

Table 44: Provider of information technology support

	HARDWARE			SOFTWARE		
	n	%	Valid %*	n	%	Valid %*
In-house	1561	36.1	37.4	1526	35.2	36.8
Contractor	474	10.9	11.4	441	10.2	10.6
Health service	921	21.3	22.1	892	20.6	21.5
Don't know	1216	28.1	29.1	1285	29.7	31.0
Total	**4172**	**96.4**	**100.0**	**4144**	**95.7**	**100.0**
Missing	158	3.6		186	4.3	
Total	**4330**	**100.0**		**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.8.1   Level of technical support

Thirty-five percent of respondents did not know what level of support they received during the week and approximately half the remainder reported that support was limited to day hours. Of the nurses who were aware of support, 78% indicated that support was limited to the day time and only 11% stated they had 24 hour support. Nurses employed in RVR were more knowledgeable about support than in other locations. Weekday support limited to the hours of 9-5 increased and more extended support reduced as the nurse becomes more remotely located.

Table 45: Level of weekday technical support

	HARDWARE			SOFTWARE		
	n	%	Valid %*	n	%	Valid %*
None	155	3.6	3.7	155	3.6	3.7
Limited (eg 9-5)	2103	48.6	50.1	2017	46.6	48.7
12 hours a day	135	3.1	3.2	149	3.4	3.6
24 hours a day	310	7.2	7.4	320	7.4	7.7
Don't know	1493	34.5	35.6	1499	34.6	36.2
Total	4196	**96.9**	**100.0**	4140	**95.6**	**100.0**
Missing	134	3.1		190	4.4	
Total	**4330**	**100.0**			**4330**	**100.0**

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Table 46: Level of technical support on weekends

	n	%	Valid %*
None	1722	39.8	41.3
Limited day hours	160	3.7	3.8
12 hours a day	27	0.6	0.6
24 hours a day	259	6.0	6.2
Don't know	2003	46.3	48.0
Total	**4171**	**96.3**	**100.0**
Missing	159	3.7	
Total	**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

Weekend support for both hardware and software was extremely limited although almost 50% of respondents did not know if it existed. Excluding the 'don't knows', 75% indicated there was no support at all. Nurses employed in MCC had more weekend support than did other locations.

Only 30% of respondents considered information technology support to be 'good' or 'excellent'. Nurses in MCC considered support to be better than all other locations and nurses in IR considered support to be better than those in RVR. For example, 31% of enrolled nurses and 27% of registered nurses (level 1) considered information technology support to be 'poor' or 'awful' compared to 20% of registered nurses (level 3) and 14% of registered nurses (level 4). Support in private facilities was rated higher and was considered by nurses in that sector to be very close to 'good'.

5.9   Management attitudes and support

Respondents were asked to rate the extent of consultation by management and other in-house support services to ensure that computers and applications meet the practice needs of nurses and midwives. Twenty-seven percent of respondents considered that this was 'excellent' or 'good' and 27% as 'poor' or 'awful'. Information technology consultation by management was considered to be worse by respondents in the aged care sector at the level of registered nurse (levels 1 and 2). At a more senior level, nurses working in the private sector rated consultation highest and community health nurses rated consultation by management the lowest.

The support from employers in health and safety issues was surveyed. There were equal numbers of respondents at both ends of the scale. If 'don't know' are not considered one third of respondents stated that support on this issue was 'poor' or 'awful'.

Table 47: Rating of management attitude and support

	n	%	Valid %*
Excellent	200	4.6	4.8
Good	946	21.8	22.7
Fair	1030	23.8	24.7
Poor	753	17.4	18.0
Awful	393	9.1	9.4
Don't know	850	19.6	20.4
Total	**4172**	**96.4**	**100.0**
Missing	158	3.6	
Total	**4330**	**100.0**	

Table 48: Support by management for health and safety issues

	n	%	Valid %*
Excellent	195	4.5	4.7
Good	930	21.5	22.2
Fair	1064	24.6	25.4
Poor	767	17.7	18.3
Awful	307	7.1	7.3
Don't know	919	21.2	22.0
Total	**4182**	**96.6**	**100.0**
Missing	148	3.4	
Total	**4330**	**100.0**	

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.10   Security, confidentiality and privacy issues

Table 49: Rating of security

	n	%	Valid %*
Excellent	672	15.5	16.0
Good	1815	41.9	43.1
Fair	855	19.7	20.3
Poor	266	6.1	6.3
Awful	68	1.6	1.6
Don't know	533	12.3	12.7
Total	**4209**	**97.2**	**100.0**
Missing	121	2.8	
Total	**4330**	**100.0**	

Only 8% of respondents considered the level of security of patients or clients records to be 'poor' or 'awful'. Even when the 'don't knows' are removed this figure is still less than 10%. Rating of workplace policies in security and confidentiality was high with 58% of respondents rating it 'good' or 'excellent'. Public hospital nurses rated policies the lowest.

* Valid percent is the proportion of that group as a percentage of the total respondents to that question

5.11   Free comments about information technology in the workplace

An open-ended question provided nurses the opportunity to provide other comments on information technology in the workplace. A total of 4616 different comments were made. A coding framework was developed from these data and 13 themes and 40 sub-themes were identified, quantified and grouped according to the number of comments (table 50).

Table 50: Themes from qualitative analysis

Theme	Components	Number of comments
Access	Factors affecting access to hardware including: number of computers, their location, speed, local/ wide area networks, Internet and geographical issues	1123
Employment uses for IT	Requirements of IT past, present and future	580
Fit for purpose	Factors related to compatibility and interoperability of software and hardware that affect adoption of IT	504
IT and caring	Views on how IT and the profession of caring are (in)compatible	475
Education and training	Comments on training and barriers to training	410
Benefits and disadvantages	Nurses perceptions on the benefits and disadvantages of IT in the workplace	358
Perceptions of use	Comments related to enjoyment, fear, frustration, enthusiasm, interest and experience of using IT	298
IT support	Hardware and software technical support issues	296
Management attitudes	Management attitudes to adoption and training	295
Work environment	Work environment issues including health and safety	96
Cost	Comments regarding finance	50
Confidentiality/security	Comments on security and confidentiality	38
Health initiatives	State/Territory and Australian Government initiatives	33

6 Discussion

6.1 Survey responses

The overall response rate was 44%. The survey was lengthy and this high response rate suggests this topic is one which is very important to nurses. The second mail out resulted in 15% of the total 44% return and demonstrated the value of this approach. The number of responses will permit additional future analysis both within and among jurisdictions.

The large response rate allowed for very powerful analysis by Australian Standard Geographical Classification and by age, length of time in nursing and level of position. However it should be noted that by choosing Australian Standard Geographical Classification as the means of stratification the proportion of nurses polled within each state/territory was variable ranging from 3% of the nurses in the Australian Capital Territory to 49% in the Northern Territory.

Ideally a 25% response from each of the four geographical locations should have been achieved. This was not quite achieved, however deviation from 25% was less than 3% for all areas and the data provide a reliable representation of the four locations.

All results from this study may be viewed as being representative of the ANF membership. When compared to the national workforce data, the survey respondents in general are representative, although it is recognised that assistants in nursing and the private sector are under-represented. Based on all the evidence presented it is suggested that results may be considered to provide an accurate picture of the status of nursing and information technology in Australia.

The overall results of the study demonstrate major effects with regard to use of information technology among nurses in Australia around: length of time in nursing, level of position, and sector of employment. Differences within the major stratification variable of geographic location were few and those that occurred were invariably small.

6.2 Experience and confidence in use of information technology

The first specific question about information technology in the survey (Q17) asked respondents to describe their experience with, and level of confidence in, using 19 different pieces of hardware and software applications. All the applications could be classified as general tools rather than health industry specific applications.

The aim of the question was to provide a general overview of the respondents' information technology use, an assumption being that confidence in use is strongly correlated with exposure to and frequency of use. Having any experience in use ranged from less than half of the respondents for Apple operating systems to almost 100% for computers generally. In some of the more specialised applications such as the use of spreadsheets and databases, it is not surprising that experience was low. As expected for most hardware and software components there were also clear differences in response related to level of position.

The small differences in the Australian Standard Geographical Classification are considered to be due to a combination of age, seniority and the requirement of the position for the application. Age and experience were related and nurses who had no experience were significantly older than those who

had experience. The difference in age was 2-7 years across the applications. The length of time in nursing was also considered, as demographic data had shown that many older nurses were in fact new to nursing. Data were not collected on educational background or prior work experience outside of nursing. However as experience in the information technology applications was negatively related to the length of time in nursing, this suggests that newer nurses who as a group had recently undertaken university education had more exposure to information technology.

Experience in use of applications across different employment sectors showed some major trends. Nurses in aged care in general had less experience in the use of applications. Nurses working in private aged care indicated an even lower level of experience using information technology although the nurses in that sector who do have experience tend have more confidence in use than nurses working in the public sector. Applications for which there was low experience in use also tended to have low confidence in use among the nurses who did have experience.

For virtually all applications both *younger* and *newer* nurses expressed greater confidence. The mean age between *very confident* and *not confident* for computer use by age was 8 years. Differences in experience and confidence in use was evident for most applications by level of nurse.

A major finding was that the overall confidence of the most confident nurses in the most familiar of applications only just exceeded *confident* (a rating of 2). This was the first indication that exposure to applications by nurses was not as high as perhaps is desirable. Gender and age effects on responses about confidence could be influencing the results, however this is beyond the scope of this report. Further investigations could be undertaken to ascertain if these are an influence.

There is therefore a mixed effect in confidence of nurses and in experience with the applications. In general nurses who have spent fewer years in nursing are more experienced and confident with information technology presumably as a result of more recent university education providing access or training in information technology. However across position levels the more senior registered nurses (levels 3-5) are both more experienced and confident than nurses at the more junior levels. This effect is most likely to be due to the large number of less senior nurses (enrolled nurses and registered nurse at level 1) who have been in nursing a long time.

A basic assumption of this study is that the use of information technology in nursing will continue to increase. Recommendations resulting from the data analysis have been made assuming that in future there will be a requirement for nurses to have high level skills in the use of information technology. Overall the response to this question on confidence illustrated that although newer nurses are more familiar with information technology, presumably in part because of their exposure to and use of information technology during their education, there is large room for improvement if nurses are to fully utilise information technology in their workplace.

Having ascertained experience and confidence both in and out of the workplace the last few questions in the section on background looked at whether computers were used at all by respondents for work and if they were used what were the nurses' attitudes to use.

Only 13.7% of nurses stated they did not use a computer at all, regardless of location, for work related purposes. This result reinforced the assumption of a high uptake of information technology in the workplace, particularly in remote areas where less than 7% of respondents did not use a

computer. However there was substantially less computer use in the aged care and private sectors and even at the most senior levels of nurse almost 20% of the nurses working in aged care did not use a computer at all. Further research should be undertaken to evaluate the impact on the standard of care and cost-effectiveness of an increase in computer use in these sectors, particularly the aged care sector which has an extensive reporting requirement to the Australian Government.

One of the principal objectives of this study was to determine the readiness of nurses to participate in e-health initiatives. Participation that is voluntary and attitudes that are positive are desirable and in order to determine this, questions were asked to ascertain the attitudes of nurses toward the adoption of information technology. Overall the attitude of nurses toward information technology was positive by all respondents who currently used information technology for work-related activities. Nurses generally did not avoid using information technology, recognised the need to learn about information technology because of its potential to improve: access to information, communication and care.

Unfortunately the vast majority of respondents did not agree that information technology had made their lives easier. Furthermore, they did not consider that the use of information technology had reduced duplication or errors. Further examination should occur (at local, state and national levels) to ascertain why current applications have not reduced errors or duplication of data entry.

From comments made by stakeholders, focus group participants and respondents, the lack of interoperability between applications, reliance on a mixture of paper and electronic formats and incompatibility across health services are problematic. An example of the comments made by the respondents is:

> *There is no system integration. XXXX was just another reporting system, but it didn't replace the four other paper-based systems. What is the point if it only makes more work to keep nurses from patients? After 20 years of technology growth, I now spend more time filling out paper work and far less time face to face. The more computers become available: why is it I am filling out more paperwork?*

In general, sectors where access to information technology and computer use was the highest had the lowest view of the current benefits. It is not clear at this stage whether this lack of enthusiasm is related to education or training, lack of clinical applicability of the applications, past experience or other factors. When combined with results from confidence in use of information technology the results suggest that the more nurses use information technology and computers the more frustrated they are with their practical application. Comments from nurses substantiate this view and suggest there are a number of contributory factors. Some applications may not be fit for purpose; for example an application may be incompatible with other applications requiring duplication of data entry. There are also access issues, such as the point of entry of data not being at the point of care. In addition the competence of the nurses in data entry may not be to the required standard due to lack of training.

The results about the driving force behind information technology adoption in the workplace indicated that nurses consider that office and patient administration were the principal drivers. However patient care was ranked third suggesting that the respondents had a positive attitude to the use of information technology in the clinical setting.

Overall the responses to the statement on benefits of information technology yield a very important result in that nurses are seen as a receptive audience to the incorporation of information technology in the workplace. Benefits were acknowledged by all nurses, however the application of these benefits to practice, in the opinion of these respondents, has not been realised. It is critical therefore to address the issues that reduce the use and performance of information technology. A starting point would be to explore why information technology is perceived by nurses not to significantly improve errors or duplication or make their life substantially easier.

The research evaluated the use and confidence in use of both generic information technology applications and those that were health specific. Nurses were also given the opportunity to indicate their own use of complex computerised medical equipment. The overall results demonstrated that high levels of experience and confidence in use of information technology was confined to basic computer and common applications such as email, internet and word processing. Experience and confidence in other tools and applications were limited for the most part to more senior personnel. Low use, experience and confidence in information technology were seen right across the aged care sector. Additionally, use in other private facilities such as private hospitals and day procedure establishments were substantially lower than in the public sector. Increased exposure and confidence was seen with younger nurses and with those having more recent university education.

6.3   Access to computers

About 85% of nurses used a computer at work and almost three quarters of those used their home computer at some time for work purposes. The more senior registered nurses (levels 3-5) appear to have a greater need to use home computers for work purposes. Additionally, nurses in remote and very remote areas have a higher use of home computers than in other sectors. This may reflect the more senior level of nurses in remote and very remote areas but may also reflect that for many remote area nurses, home and work are closely linked as they may be on-call 24 hours a day, seven days a week.

Results suggest that over 50% of nurses below registered nurse (level 3) do not have their own work computer ie a computer at work to which they have sole access. This contrasts to the 80% of registered nurses (level 3) and above who have their own work computer.

Community health registered nurses (levels 1 and 2) have higher access to computers than nurses in other sectors indicating that information technology is a significant component of their role. Forty-two percent use a work computer more than once a day compared to less than 20% for other sectors.

The survey results show that nurses in the aged care sector had lower rates of access to information technology and information management systems than did their colleagues in other sectors. Lower numbers of registered nurses (levels 3-5) in aged care had any access at all to a computer and almost one third of registered nurses (levels 3-5) who had some access did not have access on their own work computer and accessed through a shared machine. Frequency of use on any computer by nurses in aged care is also lower than other sectors. In other words, few computers are available and there is a lower rate of use for those that are available. It is suggested that the philosophy of information technology use in the aged care industry will have to change at all levels if information technology is going to be used at anywhere near the level of other sectors.

Overall access to an intranet was greater than that for the internet which is consistent with comments from stakeholders, focus group and respondents.

The type of work that was undertaken at home was largely continuing professional education, research, communication and administration. A main factor influencing the type of work was level of position with more registered nurses (levels 3-5) involved in administration work. Continuing professional education was undertaken at all levels, illustrating the opportunities that are offered by the use of computers for education and training purposes.

Workload and access were the main reason for working at home and it can be assumed from respondent comments that this work was undertaken in an unpaid overtime capacity. While workload was cited by all nurses it was higher for registered nurses (levels 3-5). As this nurse noted:

We are expected to access information as evidence for standards which are to be written by nursing staff on our ward. The theory is that we will complete our work early and use this 'free' time to go to the library and learn skills of journal searching. Due to the acuity of patients in the area, and consistent staff shortages, or poor skill mix (many junior staff on a shift requiring senior support), this 'free' time never occurs resulting in nurses having to use their own time to collect the required data.

Over two thirds of the nurses who use a home computer did so for continuing professional education. This was also listed as the greatest 'other' reason for using a home computer. Continuing professional education is an activity and not a reason, however it may be presumed that this activity is undertaken at home because of factors such as insufficient time or facilities to do it at the work place.

At least 73%, possibly as high as 96% of respondents, are not restricted by policy to access a computer at work, which confirms other reasons for access restriction. While the need for authorisation was slightly higher for newer and less senior registered nurses, the differences were very small. These results when combined with the lack of difference by sector and Australian Standard Geographical Classification suggest that policy does not appear to be the major factor in access to information technology. Other barriers such as availability and workload are far greater.

The overall conclusion from the section of the survey on access and use is that if more computers were accessible to nurses and they had the time to use the systems the enormous benefits of the technology in transferring knowledge could be realised more fully. It is apparent that managers must work with clinical nurses so that barriers to access information technology such as: computers, software programs and the internet, all of which support best evidence based practice in health care, can be addressed.

6.4   Use of information technology

The use of 23 health industry information technology applications was assessed. Those respondents who never accessed applications ranged from low figures for generic applications such as 'continuing professional education' (18%) to high (72%) for applications that were specific to only certain specialisations (eg applications used in the operating theatre) or administration (eg finance). However it was surprising that use of even the most used applications was not particularly high. The most frequent uses were accessing patient records, patient results, continuing professional

education, and communication, with 'frequent' or 'always' combined use recorded by 44.2%, 40.9%, 35.7% and 40.7% of nurses respectively. All these figures equate to less than 40% of total respondents to the study. This suggests quite definitively that there is room for expansion in the use of information technology in nursing practice.

Other than applications associated with an administrative function, there was a negative correlation of frequency of use of applications with age. Younger nurses had a tendency to use applications more often although as expected, the seniority of the respondent had a major impact on use of applications that were required for administration.

Distinct trends among Australian Standard Geographical Classification appeared for frequency of use. Clinical and patient management functions were used less as location changed from major capital cities to remote/very remote areas. The exceptions to this trend were use of 'poisons' and 'medication management' software which although used very infrequently, were used more in remote areas. The general trend for lower use of applications in remote locations may result from fewer in-patient facilities. Greater use of information technology for applications by nurses in major capital cities could be indicative of larger facilities with more on-line systems.

Administration, education and communication applications were used more in the more remote areas. There are probably several factors influencing this result, not the least being the increased proportion of registered nurses (levels 3-5) who work in those areas. Consequently increased administrative use could be attributed to level of nurse whereas increased use for communication and consultation could be attributed to necessity due to location.

Access to and frequency of use of applications was highly related to seniority of nurses. Assistants in nursing and enrolled nurses have poor access to and low use of most applications. However for none of the application is the frequency of use high. The results do not suggest that use of computers for these functions is the norm for the majority of nurses.

Comparison among sectors showed the availability of applications was probably a reflection of the need for use. For example, community health nurses were least likely to use applications related to bed management, patient results and ordering diagnostic investigations. In contrast, clinical documentation and medication management was highest in aged care. It was suggested by respondents that the use of administration and management systems in aged care, which was lower than other sectors, was reflective of the sector's adoption of technology rather than need.

Frequency of use also reflects the level of responsibility of nurses in different sectors. For example, administrative reporting is much more commonly used by registered nurses (levels 1-2) in community health than all nurses at that level in other sectors. For most registered nurses (levels 3-5) it would be expected that the need for administrative functions would be universal. This indeed was the case although as may be expected there were some sector differences according to need. For example, community health registered nurses (levels 3-5) used staff management software less frequently.

The use of several more novel systems or innovative systems were assessed but found not to have been taken up in nursing in any great numbers to this date. For example, navigational satellite technology had been used by only 72 nurses (half of these in remote/very remote locations). Only 148 had ever used a Personal Digital Assistant (PDA) and these respondents were distributed

evenly among geographical location and level of nurse. This result was surprising as a higher adoption of this technology could have been expected.

The same could be said for access to information systems developed and made available by state or territory health departments. While use increased with level of nurse and remoteness, they were only used at all by 40% of nurses and only 13% on a frequent basis. Taking into account nurses who did not have access to a computer, this means that only 10.8% of the respondents (which represent 50% of the entire nursing workforce in Australia) are using the systems developed by health departments to assist them in their role. Further research is required to determine if this lack of use is purely to do with the barriers identified in this study or whether there are other factors involved.

Telehealth was used by 1,000 nurse respondents; mostly by registered nurses (level 2) or higher. Use was more frequent in rural and remote areas.

Trends for other applications, including all the knowledge and information systems, were very similar. In most cases, clinical applications were used more by newer nurses and registered nurses (level 1) and information systems by registered nurses at level 2 and above. Overall usage of the Cochrane Library, on-line journals or the various health department information access systems was very low.

Confidence in using the applications indicated that confidence was directly related to frequency of use. For example, patient monitoring frequency of use and confidence of use was highest in public hospitals, then private, other public, community health and aged care in that order. The results suggest that health and aged care employers, including State and Territory Governments, must work with nurses to adopt strategies to increase the use of a wide array of information technology and information management systems that improve the delivery of health care. These systems include, but are not restricted to, personal digital assistants, and a wide variety of information systems.

6.5   Access to the intranet and internet

Access to local area networks (LAN) and wide area networks (WAN) are essential to enable rapid transfer of information within facilities and across organisations. The future use of shared resources such as electronic health records will demand even greater inter-connectivity than exists today.

Presence in the workplace of either an intranet or internet was at least 75% and could be a further 10% higher if the 'don't know' respondents were included. Those who did not know whether their place of work had access to networks were older; however more experienced (and presumably older) registered nurses (levels 3-5) were more knowledgeable about the presence/absence of these systems.

Access to the networks was highly related to level of position. Assistants in nursing in establishments that had network access had only a 50% chance of being able to use the facility. In those facilities that had access, access to the intranet was denied to 10% of registered nurses (level 1), while access to the internet was denied to 20% of registered nurses (level 1). For registered nurses (level 3) denial of access was 5% and 10% for intranet and internet respectively, indicating that access increased with level of experience and seniority.

Use of an intranet and the internet varied. Greatest uses were for communication, education, information and research. There was greater use by level of nurse as access increased however, when access was available, younger and shorter serving nurses used the networks primarily for clinical work while longer serving nurses used the networks primarily for administration. More nurses in the major capital cities also used the intranet for clinical purposes probably reflecting LAN access in the large public facilities. Access to the internet for all use was lower for registered nurses (levels 1-2) in aged care.

Passwords were required by the majority of nurses for network access. All the analyses by age, length of time in nursing, Australian Standard Geographical Classification, level of nurse and sector suggested the requirement for passwords increased with management responsibilities. The results suggested that in shared work station environments nurses may not require a password or use common (station) passwords.

Access to an intranet was greater than access to the internet for many nurses even though their place of work had both facilities. The data indicated that restriction was not as severe as had been suggested by stakeholders. However it is still disturbing that there are restrictions for some nurses. While it is recognised that access sometimes is denied on the grounds of cost or physical location of hardware, the contention is that access to an intranet and the internet should be promoted as much as possible. Prevention from access on the grounds of 'inappropriate use' is considered 'insulting' by nurses and should have no relevance if there are normal workplace practices in place to deal with inappropriate behaviour. From the study no reason is identified for health and aged care employers, including State and Territory governments, to restrict access to network facilities on the grounds of inappropriate use.

6.6   Knowledge of health information technology initiatives

One of the objectives of this study was to determine how prepared nurses were to engage with new information technology initiatives. Nurses were first assessed for their knowledge of current initiatives within their workplace, within their state or territory, and at a national level.

Based on the statement that *I am kept aware of general information technology developments within my workplace,* the responses were equally divided between nurses who thought they were aware and those who thought they were not aware of current health information technology initiatives. Older and longer serving nurses tended to consider they were better informed, however this could be attributable to seniority of position.

Knowledge of health initiatives at state and territory level also was not high. Senior and community health nurses were more knowledgeable. In general, nurses above registered nurses (level 2) agreed they were kept better informed; however even 30% of these nurses either *disagreed* or *strongly disagreed* with the statement they were kept informed. Registered nurses (levels 3-5) being more knowledgeable is not surprising in view of their managerial roles.

Community health nurses, who have been shown in this study to engage with information technology more than nurses at the same level in other sectors, were the most informed about both workplace and state or territory initiatives. Nurses in aged care were least informed.

Workload was noted by the respondents to be the main barrier to use of information technology so it is possible that information about health initiatives is made available but that current workloads prevent nurses accessing that information. It is also possible that information is made available in a manner that is not conducive to easy access by nurses. Both of these reasons were provided in the qualitative data in the study. Whatever the reason, the results suggest there needs to be a change in the presentation of health information technology initiatives in order to engage nurses.

Computers and other aspects of information technology are becoming an integral part of health care. If nurses are going to fully engage with information technology initiatives they need to be treated as key stakeholders in those initiatives. Throughout the study, comments were made by stakeholders and respondents alike that the nurses' voice is not even requested let alone heard.

There was general agreement that adoption of a national electronic health record would be beneficial to health care. Comments by respondents on the availability of a national electronic health record included:

> *Electronic medical records would encourage a more 'seamless' system for documentation. Less duplication and access for all health professionals to clinical information which cannot be provided by patients or families particularly in emergency situations Emergency departments can access potentially life saving information. Test results can be accessed. Patient health notes can be accessed after hours; the advantages are endless. The fact that it is not available is probably causing poor outcomes for patients every day.*

> *An electronic health record is a good idea but will there be the support and time for nurses who will yet again bear the load of yet another system to eat into our patient care hours?*

There were no Australian Standard Geographical Classification, level of nurse, or sector effects, however older and longer serving nurses were slightly less convinced that electronic health records would be beneficial. Whether this reflected a lack of confidence in the technology or the worth of such records is unclear and would be interesting to determine.

Over half the respondents stated they had never heard of Health*Connect* and those that had knowledge considered their knowledge of Health*Connect* to be poor. During interviews with stakeholders very senior health professionals, including senior nurse managers working in areas in which the initiative was being trialled, professed to being poorly informed. Some stakeholders remarked that nurses are not kept informed because it is considered by developers that the principal beneficiaries to Health*Connect* are doctors. This response demonstrates that the work of modern nurses may be poorly understood. If one lesson is to be learned that is valid from department to institute through to national level it is that the introduction of information technology initiatives must be undertaken both with consultation and with information.

It is apparent from the data the majority of nurses were unaware of proposed systems such as Health*Connect*. The lack of awareness of major new information technology systems suggests that nurses are not consulted during the design and early implementation stage. A recommendation to come out of the study is that all levels of government should review their current processes to ensure that the Chief Nursing Officers (however titled) or their delegates are consulted when health information technology systems are being planned and implemented thus ensuing input from the largest group of health professionals into the design and implementation of any new system.

6.7   Employment requirements for information technology

Familiarity and confidence in use of many aspects of information technology appear to be a requirement for many nurses and these skills requirements are predicted to increase. It was of interest therefore to determine what requirements for information technology were built into position descriptions. It was surprising that only 30% of nurses stated that a requirement for information technology skills was built into their position description. Also surprising was that there was no relationship between this requirement for information technology and the length of time in nursing.

The study did find that over 50% of registered nurses (level 4) and registered nurses (level 5) had a requirement for information technology skills built into their position description. The implication of this finding is that information technology is considered to be a management tool and not one of clinical care. In view of the use of information technology related functions by all levels of nurse it would appear that this situation needs to be addressed. Adding the required level of information technology competence to position descriptions would be a major contribution to recognising the importance of information technology in nursing.

Nurses stated there was no remuneration for information technology skills in the workforce unless the position was information technology specific or the nurse had a post graduate qualification in information technology. It is apparent that nurses use information technology and are expected to use it but they are not compensated for their knowledge. This lack of remuneration for skills and knowledge could explain the low levels of nurses currently holding a formal qualification in information technology. An option to increase nurses' information technology skills would be for employers of nurses to appropriately remunerate those who have completed information technology training.

Access and use of information technology was considered to be important in choice of current employer by 15% of the respondents. Younger nurses and those who had been in nursing for shorter periods were more likely to consider that information technology was important. Registered nurses (levels 3-5) also considered this more important. As this cadre of nurses were more likely to have information technology requirements built into their position description this finding was to be expected. Almost 35% of the respondents considered that information technology access and use was important to the decision to remain in their current employment and 50% stated it would influence their choice of future work. As seniority increased so did the degree of importance. This result may be explained by the fact that information technology is becoming an indispensable tool for the responsibilities that accompany seniority.

The data support the contention that information technology access and use is already influencing and will continue to influence the decision of nurses entering different sectors of the health industry. Nurses working in community health and 'other' public sector areas are already more likely than nurses in other sectors to take information technology into account when making a decision to remain in their current employment or when choosing a future employer. Employers who cannot offer access to information technology may be disadvantaged in the recruitment and retention of employees. It is apparent from these findings that access to and use of information technology in all sectors of nursing is a factor that will influence both recruitment and retention of the nursing workforce.

6.8   Education and training in information technology

An unexpected statistic was that while 90% of nurses use computers or other information technology applications only one third of nurses had any formal training.

> When computers were first introduced to the clinical areas in the late 1990s, there was very little information about their use and no assessment made of whether staff knew how to access information. Training was to be offered two years later, but never commenced. Only now are staff offered training via a computer program.

The vast majority (over 90%) of the few nurses who had received training had done so either before registration or enrolment as a nurse or as continuing professional education. Only 10% of respondents had training at both times. This indicates that very little formal up-skilling has occurred in an environment which is changing dramatically in relation to information technology.

> My bachelors degree offered no computer training (or communication training) so I attended the information technology module of the university preparation program prior to commencing my degree studies; so all my computer knowledge is centred around study and has regressed once I graduated.

The nurses who had received training either pre-registration or pre-enrolment or as a result of continuing professional education were asked a series of questions about the format of their last training, where it was given, by whom and when the training occurred.

As the number of nurses who had received training as part of continuing professional education exceeded those who had been trained pre-registration by a ratio of about 2:1 we would expect nurses who had received training to be older and in nursing longer. This was the case for applications other than the three management applications where more recent training of newer nurses was noticed.

The most common form of training was group training at work during work hours and longer than three years ago. Training costs were divided between the employer or being self funded by the nurse. Training was given by colleagues, in-house and commercial trainers and varied according to geographic location. Nurses in more remote locations tended to be trained either at a commercial level or by in-house trainers not residing in the nurse's institution.

Almost three quarters of the nurses who had received training considered that it was adequate to the needs of their current position and given at an appropriate time. The small numbers of assistants in nursing who were trained were the exception as fewer considered training was given at the most appropriate time. Training quality and appropriateness was therefore not perceived as a major problem however the number of nurses being exposed to training is a major issue.

Questions on skill requirements for their current position, formal qualifications and the effect that computer literacy has on a nurse's career development were asked of all nurse respondents regardless of whether they had received formal training or not. Almost half the respondents considered they needed training. Nurses who felt they needed training to better meet the requirements of their position were older, had been nursing longer and were at senior levels. The exceptions were for administration

and management training for which older, more experienced nurses had already received training. These nurses were no more likely to feel they required further training than younger, less experienced nurses. If nurses had received prior training either pre-registration or pre-enrolment or through continuing professional education the need for further training was reduced by about 10% for most applications.

The results suggest that education and training should begin at the pre-registration or pre-enrolment level. Thus, schools of nursing (or their equivalent) in the higher education sector should ensure the national information technology competency program is built into the undergraduate curriculum.

Similarly, once nurses enter the workforce, employers should make available continuing professional education to ensure that nurses have the ability to use the applications in the work environment. To ensure this happens employers should include an information technology education and training component for all nursing staff in their training budgets, including funds for back filling of staff on training as lack of relief staff was noted to be a major barrier to training.

Across the sectors, nurses (assistants in nursing and registered nurses level 1) working in private aged care facilities expressed the least demand for training. Only around 20% stated they required training. These results probably reflect the current use of information technology in aged care. Junior nurses had no use for information technology skills and therefore had little need for training. However at the level of registered nurse 3-5 in aged care, nurses had the highest demand with 50% stating that more training was required.

Less than 10% of respondents had formal qualifications in information technology despite a long list of formal qualifications supplied ranging from attendance at one day courses in word processing to a Bachelor of Technology degree in computer studies.

A quarter of respondents thought their level of literacy was restricting their career development particularly younger nurses with less time in nursing. Apart from assistants in nursing there were no position level differences or effects by Australian Standard Geographical Classification or sector. Nurses were overwhelmingly interested in training toward a national competency although older nurses were slightly less interested in this or in a health informatics course. The results of this study support the Nursing Informatics Australia's recommendation that a national competency program should be available (Conrick et al 2004).

Although there was virtually no active discouragement of training, over half the respondents said that training was not referred to at all in their work place although the majority of nurses were not very well informed about their facility's training policy. All the data suggest that training in information technology takes a very low profile among employers and employees alike.

Learning styles differ and this was shown by the responses to the preferred methods of training. These varied according to age and the results should be considered by employers when planning future programs.

Barriers to training were assessed. After workload and lack of relief staff the largest barrier was that training was not offered.

I have been scheduled twice to attend (information technology training) during work time but due to lack of senior staff and people on sick leave etc I have been re-allocated to the ward area.

Quite frankly, I would love to have time to learn more and have time to use the computers, but we are so busy and so understaffed we only have time to do the basics. Often it's easier to open a MIMS than to get into the computer. Our system is slow and overloaded. If they want us to use computers the management need to put time and money into teaching and up-skilling staff - especially older staff - who are not familiar with computers. But first you need MORE NURSES!!!!

Barriers, although high, decreased with level of nurse. Remoteness was a factor. Sector differences were apparent with nurses employed in aged care most likely to say they could not access a computer. This contrasted to nurses employed in community health who were the least likely to report this as a barrier.

6.9   Barriers to the use of information technology

An interesting aspect to the nurses' responses to barriers to the use of information technology is the comparisons that may be made. For example, age was 'never' a barrier for 77% of nurses as compared to work demands and number of computers which were 'never' a barrier for only 12% and 30% of the respondents respectively.

Geographic location had a major effect on barriers to the use of information technology. Reliability of network, information technology support, attitude of information technology staff and staff turnover all were greater barriers for nurses employed in remote locations.

The level of restriction and the level of nurse provided results which confirmed data obtained from earlier questions. For example, nurses who identified that they shared a computer also considered the number of computers as being a barrier, whereas those with their own work computer did not.

Although still a barrier, registered nurses (levels 3-5) were less likely to identify 'did not fit with other demands' and 'too much other work' as barriers to computer use suggesting that use was recognised as part of their role.

The use of computers in our workplace remains divisive with staff. There are those who insist it is not necessary for them to learn, we should be on about nursing. I personally see them as a valuable tool if: training is adequate, equipment is adequate and access is adequate.

'Work demands' was also less of a barrier in community health and in 'other' public sector areas where it is speculated that information technology is seen by nurses and their employers to be an integral part of the role. Several nurses considered however that patients / clients / visitors / relatives resented seeing nurses sitting at a computer as they saw this as not being engaged in nursing work.

Sector analysis revealed some valuable data which may offer focussed solutions to barriers. For example, in the public hospital setting the number of available computers as well as access to computers should be addressed as a priority.

We have an inequality in our workplace in that all medical staff are given access to the internet (provided with passwords) on arrival at the workplace. Nurses however are not allowed access unless you are a senior nurse ie an educator, CNM (clinical nurse manager) or CNS (clinical nurse specialist).

Respondents also considered that management attitudes to training needed to be addressed. In the community health setting (and also remote areas) attention needed to be focussed on information technology support and network issues.

It is apparent from the results of this study that barriers vary according to geographic location and sector of employment. Thus a 'one size fits all' approach to overcoming the barriers identified in this report will not overcome the identified barriers. If the use of information technology is to increase in nursing, then employers must take action on all of the barriers in this study (regardless of the percentage of the occurrence). It is also clear that increasing the number of information technology resources is of little value unless the reasons for the lack of use of the current ones are addressed.

6.10   Technical support

Technical support is a huge issue in information technology and one about which a great deal of concern was expressed by respondents to this study. Stakeholders identified that lack of support and attitudes of information technology staff to nurses' problems were barriers to the use and uptake of information technology and questions were designed to ascertain if these opinions were borne out by the nurses themselves.

Results showed that knowledge of the existence of policies about information technology support by the respondents to the survey was poor especially in public hospitals and aged care. Knowledge of the existence of information technology support policies was greater for more registered nurses (levels 3-5) which is perhaps not surprising considering the greater likelihood of them being in a managerial role. However the data do suggest that overall the provision of information about information technology support policies is not at acceptable levels.

For those nurses who did know about policies it would appear that few organisations or institutions did not have a policy on information technology support. From an overview of all the different analyses by age, sector, length of time in nursing and so on, it appears that for the large sectors such as public hospitals, policies do exist.

If policies (and accompanying procedures) are not known, regardless of whether they exist or not, it is not surprising that views on support are poor. It would be of benefit if all nurses who use information technology are made aware of policies. In many cases this is probably a very simple matter of providing information in an easily accessible and suitable format.

As long as there is a policy in place it is of less concern that the provider of support was not known. All the data from this question indicated that the provider of information technology support changed with size and location of the workplace, sector of the industry and whether institutions were private or publicly funded. Geographic differences were seen for service providers with more health service and contractor provision as remoteness increased. Larger public hospitals in

metropolitan areas had the most in-house support. Smaller private aged care would be more dependant on contractors and other public facilities and community health on the health service technical staff.

Knowledge about the hours in which information technology support was available was the same as for knowledge about the existence of support. Nurses with less time in the profession and younger nurses were less knowledgeable.

Results demonstrated that as remoteness increased organisations in which nurses worked restricted information technology support to day time hours. Facilities in capital cities had some 24 hour support however even in the cities where the support was the highest, 70% of nurses indicated that support was limited to 8 hours each day Monday to Friday. Only 20% of nurses indicated that their place of work offered any technical support at weekends. The only sector that had appreciable weekend support was the private sector (other than aged care) where 24 hour support mainly from contractors was available.

Many nurses' workplaces operate 24 hours a day seven days a week and support for 40 out of a possible 168 hours is not particularly satisfactory. This view is supported by the degree to which nurses indicated this was a barrier. In the thematic analysis this issue featured prominently. The study recommends that all employers increase the extent of information technology technical support available to meet potential demand. For example, 24 hour 7 day-a-week health and aged care services should provide access to 24 hour help desks to assist nurses and other shift workers to troubleshoot any problems that arise outside of standard operating hours.

The rating of the quality of support yielded very interesting results. Registered nurses (levels 3-5) in general thought support was better than did lower level nurses. Remoteness brought with it a fall in perception of adequacy of quality. Registered nurses (levels 3-5) in the private sector, which was shown to benefit from more 24 hour contractor provided support, rated support to be high.

6.11   Management attitudes and support

Respondents were asked to rate the extent of consultation by management and other in-house support services to ensure that computers and information technology applications are fit for purpose. Only a quarter of respondents considered that consultation and other in-house support services were 'excellent' or 'good'. This rose to over a third if those nurses who were unable to comment were excluded. This view was held by all nurses regardless of Australian Standard Geographical Classification, age and length of time in nursing.

An example of a positive comment was:

I have a very positive workplace when it comes to information technology information or programs. Full support and encouragement it always available; a fabulous place to work.

An example of other comments on management attitudes and support was:

Higher management needs to be educated regarding the importance of computers. If this is not done from District Management level up, how can one expect that staff at the grass roots level can be appropriately supported with information technology?

Registered nurses (level 1) considered the level of consultation to be lowest. This cadre of nurses constitute the largest proportion of nurses in the workforce and one could argue they provide the largest amount of clinical care. Consideration of the views of these nurses could be beneficial.

Engagement of staff with change, especially radical change in practice, must be introduced with care and consideration. Stakeholders and participants in the focus groups highlighted lack of engagement as an issue. There was concern that too much information technology is driven by what doctors want and not what the key users of the applications (ie the nurses) need. Many comments were offered including: that many applications were inappropriate to practice; that computers were not located in the correct place; and that interoperability was not considered. Examples of comments included:

The triage and diagnosis categories are not appropriate in most cases. The coding for discharge diagnosis takes hours to complete, as a diagnosis has to be searched for, taking too much time. Don't have the time in a busy ED!

I am concerned that computer based access to medical records does not account for technical, access and power problems, particularly after hours. When the last system was introduced I was unable to access medical records of an unconscious patient, and a patient with chest pain.

During the day (there are only 2-3 computers on each ward) the ward clerk and the doctors usually monopolise the computers and nurses have to jostle for access - even to input patient nurse dependency data, or access patient test results.

There were many comments by respondents illustrating inefficient practices caused by lack of consultation. It would appear that administrators and information technology staff do not ask nurses the simple question 'how would this work best for you?' Registered nurses (levels 3-5) in the private sector rated consultation highest which is consistent with their views on information technology support. The study highlights the need for all employers to recognise the importance of nurse employees being involved in decision making processes and: a) taking steps to involve them at all the strategic planning and implementation stages when introducing or updating information technology and information management systems, and b) including them in the development of education and training when new information technology or information management systems are introduced.

6.12   Security, confidentiality and privacy issues

Security issues were raised by a number of stakeholders and participants in the focus groups. Concerns were expressed that security of information is a factor in nurses' reluctance to use information technology. As a result of these concerns, nurses were asked in the survey how they rated security of patient / client data in their workplace. Overall the rating was high with the majority rating security of patient / client data as 'good'. When nurses were asked to provide general comments, the issue of security and confidentiality generated less than 1% of the comments and was rated as the lowest theme.

Some small sector differences in relation to security and confidentiality of patient/client data occurred and remote / very remote nurses considered polices to be poorer than did registered nurses in other locations. Nurses employed in public facilities also considered security to be poorer than those employed in the private sector or in aged care. The respondents were not asked whether patient/client data were stored currently in an electronic format.

6.13   Thematic analysis

Over a third of the respondents submitted comments in free text at the end of the survey. The comments ranged from one or two sentences to several appended pages of text. By far the largest number of comments referred to access issues and in particular to the shortage of computers and their location away from the point of care of patients.

The employment demands for information technology indicated that use is expanding which emphasises the need for training and education - another theme that generated a large number of comments.

Themes had been identified from the stakeholder and focus group which informed the survey. It was therefore not surprising that the themes identified during the stakeholder and focus group consultations reappeared in the comments offered by the respondents to the survey. There was however one previously unidentified theme that featured prominently. This was labelled 'information technology and caring' and revolved around the issue of whether information technology is part of nursing.

> *Our ward computer is in an open area at the workstation and some people consider that if a person is sitting at the computer they are 'wasting time' ie they must be 'playing games'. Some people do not have the concept that the computer is a working tool.*

While nurses are unlikely to dispute that diagnostic and delivery equipment are a part of nursing many do not yet see this for many other applications. Information technology must be integrated into nursing in a manner that assists nurses to see it is assisting them at the point of care. Too often information technology is seen as a hindrance and detracting from the well being of patients. Correcting this perception is a huge challenge.

6.14   Stakeholder and focus groups

Information obtained from the stakeholder and focus groups were an essential component of this research. Stakeholders and members of the groups identified issues which, for the most part, were in line with those of the surveyed nurses. The groups identified: access, technical support and education and training as major issues affecting access to and use of information technology. The respondents concurred with these views. Concerns by stakeholders and focus groups about the aged care sector were also realised.

Overall lack of access: access to networks and restrictions in use, were slightly better than those that the stakeholders and focus groups suggested they would be. Security and privacy which were featured quite prominently by the stakeholders and focus groups was considered to be of low significance by the nurses.

Perhaps the largest variance between the stakeholder and focus groups' views and the surveyed nurses came with the geographic location. Large differences had been expected and it was based on this expectation that the choice of stratification by Australian Standard Geographical Classification was made. Differences did occur. Issues of remoteness with access to training and to technical support are real and need to be addressed. However for the most part geographic differences were small and barriers are consistent across all sectors.

7 Conclusion

This study of nurses and information technology has clearly identified that nurses recognise benefits to adopting more information technology in the workplace. They are however frustrated by limitations of access to the technology, software that is not always fit for purpose, lack of opportunities for training and workload preventing access. The level of use of information technology and information management systems is generally low and confidence in use is low even among users. There is evidence that familiarity, use and confidence in use is slightly higher in nurses who have recent tertiary education. Results largely confirm conclusions from smaller studies in Australia and several larger overseas studies. Nurses feel poorly informed about information technology health initiatives and poorly consulted about their implementation. Workload, number of computers and inadequate technical support are the principal barriers to use of information technology. Technical support is largely insufficient especially in more remote locations. Neither the full potential of information technology in the provision of health and aged care nor the recognition by nurses that information technology is an integral part of nursing will be realised until these limitations are addressed.

7.1 Recommendations

1. That the Australian Government Department of Health and Ageing:

1.1 endorse and authorise publication of the final report of the research project on Nurses and Information Technology on the Department's website (www.health.gov.au); and on the website of the Australian Nursing Federation (www.anf.org.au).

1.2 facilitate dissemination of the report by the Australian Nursing Federation and the University of Southern Queensland through presentation of the findings at nursing conferences, in nursing publications and links with relevant industry websites; and

1.3 approve release of the de-identified data from the survey to state and territory health departments.

2. That the Australian Nursing Federation, together with Royal College of Nursing Australia, establish a Nursing Informatics Standing Committee of the National Nursing Organisations in order to:

2.1 produce and disseminate a range of resource demonstrating ways that information technology and information management systems can be used for the purpose of nursing care eg identifying case studies and developing best practice guidelines;

2.2 identify sources of funding for nurse researchers to investigate the impact of information technology and information management systems on nursing care; and

2.3 encourage and facilitate access to information technology and information management systems in the residential aged care setting.

3. That the Australian Nursing Federation through their state and territory Branches provide the results of the survey conducted as part of the research project to state and territory health departments and other employers of nurses in health and aged care in order to:

3.1 encourage employers of nurses to review systems currently in use for their value to nursing practice including issues of error reduction, duplication of data and effort, and interoperability between systems;

3.2 inform employers of nurses about the barriers to the use of information technology in nursing and how they might be reduced to ensure that nurses' use of information technology is supported through the availability of twenty-four hour seven day a week availability of technical support and that all nurses have free access to the internet;

3.3 ensure the clinical needs of nurses and workflow issues are fully considered when acquiring, designing, implementing or upgrading information technology and information management systems and involving nurses at all stages, including planning, evaluation, trialing or piloting, workflow review, education and communication strategies; and

3.4 identify the opportunities to increase the use of a wide range of information technology and information management systems and equipment that improve the delivery of nursing care in hospitals, the community and residential aged care facilities including (but not limited to): personal digital assistants, decision support systems, bedside terminals, handheld devices, voice recognition systems, barcode readers, sensors and monitoring systems.

4. That the Australian Nursing Federation, together with Royal College of Nursing Australia:

4.1 seek research funding to develop national information technology and information management competency standards for nurses;

4.2 promote the inclusion of the developed information technology competency standards in nursing position descriptions and the adoption of a competency model, such as the international computer driving license;

4.3 work with nursing education providers to build a national competency program in all pre-registration and pre-enrolment education programs for nurses based on the developed national competency standards in information technology and information management; and

4.4 lobby employers of nurses to include information technology and information management in nursing orientation / induction / preparation for practice programs; provide dedicated learning centres or education hubs in clinical areas to facilitate continuing professional education opportunities to allow nurses to upgrade and maintain their skills and knowledge in information technology and information management; and ensure there are funds for backfilling to allow nurses to undertake education and training for new information technology and information management systems.

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9 Appendices

1.   Plain language statements, consent forms and cover letters

1.1   Plain language statement and consent form for focus group

The University of Southern Queensland in partnership with the Australian Nursing Federation (ANF) is undertaking a study into the information technology and information management system needs of nurses. The study has been funded by the Australian Government. The objectives of the study are to:

a)   Identify the extent to which nurses have access to and use information technology (IT) and information management systems (IMS);

b)   Identify the purposes for which nurses use IT and IMS;

c)   Identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect*);

d)   Understand the barriers that prevent nurses from benefiting from IT and IMS;

e)   Recommend ways to overcome these barriers and provide opportunities for nurses to better utilise IT and IMS within the Government policy framework;

f)   Prepare a roadmap for access, education and training to meet the needs of nurses.

The study will involve you participating in a focus group. The aim of the focus group is to identify issues surrounding information technology and information management systems from the perspective of nurses and organisations that represent the nursing profession.

In addition to the collection of written documentation the focus group will be tape recorded and the tapes transcribed verbatim. We will then undertake a thematic analysis of the transcriptions. The themes emerging from the focus group and from interviews with other key stakeholders will form the basis for a questionnaire to be sent to approximately 10,000 nurses.

When we write up the study we will not use any place or person names that could identify you, your employer or where you live. You are free to withdraw from the study at any time. To do this you need to contact any one of the named personnel. If you do withdraw, we will not use the information given by you in the focus group.

Any questions regarding the study can be directed to any of the following researchers at Centre for Rural and Remote Area Health (CRRAH), University of Southern Queensland, Toowoomba, Queensland: Professor Desley Hegney, Telephone: 07 4631 5456, hegney@usq.edu.au, Dr. Rob Eley, 07 4631 5477, eleyr@usq.edu.au, Dr. Tony Fallon, 07 4631 5455, fallon@usq.edu.au or Dr Liz Buikstra 07 4631 5443, Buikstra@usq.edu.au.

Any concerns you may have about ethical issues in this study should be directed to the Human Research and Ethics Committee, University of Southern Queensland. Phone: 07 4631 2956.

Consent Form

I (name) _____

of (address) _____

have had the study 'Nurses and Information Technology' explained to me. I have read the Plain Language Statement and agree to participate in the study. I am aware that my participation is voluntary, and that I can withdraw from the study at any time by contacting Drs. Buikstra, Eley, Fallon or Professor Hegney. I agree that the information I contribute to the study can be published as long as I cannot be identified in any way.

Signed _____ Date _____

Witness Signed _____ Date _____

Please complete and return this form before the end of the focus group.

1.2   Plain language statement and consent form for stakeholders

The University of Southern Queensland in partnership with the Australian Nursing Federation (ANF) is undertaking a study into the information technology and information management system needs of nurses. The study has been funded by the Australian Government.

The objectives of the study are to:

a)   Identify the extent to which nurses have access to and use information technology and information management systems;

b)   Identify the purposes for which nurses use information technology and information management systems;

c)   Identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect)*;

d)   Understand the barriers that prevent nurses from benefiting from information technology and information management systems;

e)   Recommend ways to overcome these barriers and provide opportunities for nurses to better utilise information technology and information management systems within the Government policy framework;

f)   Prepare a roadmap for access, education and training to meet the needs of nurses.

The study will involve you participating in a telephone interview. The aim of the focus group/telephone interview is to identify issues surrounding information technology and information management systems from the perspective of nurses and providers of IT/IM services within the health care environment. As we will also be undertaking a literature review, we will have some idea of what nurses in other countries say about information technology and information management systems. We will use these findings to generate a discussion about how these might apply to Australian nurses as well as exploring the issues from your perspective.

All telephone interviews will be tape recorded and the tapes transcribed verbatim. We will then undertake a thematic analysis of the transcriptions and the themes will form the basis for a questionnaire to be sent to approximately 10,000 nurses.

To ensure confidentiality, at the time of the focus group/interview we will ask you to choose a pseudonym rather than using your real name. When we write up the study we will not use any place or person names that could identify you, your employer or where you live. You are free to withdraw from the study at any time. To do this you need to contact any one of the named personnel. If you do withdraw, we will not use the information given by you in the focus group/interview.

Any questions regarding the study can be directed to and of the following researchers at Centre for Rural and Remote Area Health (CRRAH), University of Southern Queensland, Toowoomba, Queensland: Professor Desley Hegney, Telephone: 07 4631 5456, email hegney@usq.edu.au, Dr. Rob Eley, 07 4631 5477 email eleyr@usq.edu.au Dr. Tony Fallon, 07 4631 5455, fallon@usq.edu.au

Any concerns you may have about ethical issues in this study should be directed to the Human Research and Ethics Committee, University of Southern Queensland. Phone: 07 4631 2956.

Consent Form

I (name) _____

of (address) _____

have had the study 'Nurses and Information Technology' explained to me. I have read the Plain Language Statement and agree to participate in the study. I am aware that my participation is voluntary, and that I can withdraw from the study at any time by contacting. Drs. Eley or Fallon or Professor Hegney. I agree that the information I contribute to the study can be published as long as I cannot be identified in any way.

Signed _____ Date _____

Witness Signed _____ Date _____

Please fax the completed form to CRRAH on 07 4631 5452

1.3   Plain language statement for nurses

The University of Southern Queensland (USQ) is working as a consultant to the Australian Nursing Federation (including the NSW Nurses' Association and the Queensland Nurses' Union) to carry out an Australian Government funded research project involving nurses in the public and private health sectors throughout Australia. The aim of the project is to provide information that will support policy and strategic planning at all levels from individual facilities to government with regard to the use of information technology in nursing.

We would like you to participate in this important research. Participation will involve completion of the attached questionnaire. You do not have to participate in this research. If you do not wish to participate, please do not return the questionnaire. Your participation or otherwise will in no way effect your entitlements as a member of the ANF.

To ensure that responses are confidential and anonymous we are using the following system:

1.   The ANF will provide a code number for each of their individual members;

2.   The participants in the research will be randomly selected by USQ from the list of codes sent to us;

3.   USQ will then advise the ANF of the codes selected;

4.   USQ will send the survey packages in a plain envelope with the selected code number marked on the outside of the envelope to the ANF;

5.   The ANF will match the code to the participant and affix the name and address of the participant to each of the survey packages;

6.   The 'return to sender' address for undelivered mail will be that of the ANF;

7.   The ANF will notify USQ of any 'return to sender' mail by code, to allow us to delete that code number from the research;

8.   Participants will complete the survey form and return it in a supplied reply paid envelope to USQ;

9.   After three weeks, the USQ will advise the ANF of the codes of the non returned surveys and we will send a second package to the ANF for posting to those people;

10.   At no stage will the ANF have access to the data on the returned questionnaires which could link your survey to their database of names and addresses;

11.   At no stage will USQ have access to personal information of participants from the ANF's databases.

Neither the report which USQ will supply to the ANF and to the Government, nor any subsequent publications of the research results will contain data which could identify individual respondents or health facilities. All of the questionnaires will be kept in a locked filing cabinet in the USQ office for a period of five years, after which they will be shredded and disposed of as confidential waste.

Completion and return of the questionnaire denotes consent to participate, however, if you wish to withdraw from the research at any time, you can do so by contacting Dr. Eley or Professor Hegney who will remove any information you have given the research team from the research. Please note that in order to do this you will need to identify yourself by the code used on the questionnaire as we have no database of names.

Any questions regarding the research can be directed to any of the following researchers at the Centre for Rural and Remote Area Health (CRRAH), University of Southern Queensland, Toowoomba, Queensland: Dr. Rob Eley, 07 4631 5477, eleyr@usq.edu.au or Prof. Desley Hegney, 07 4631 5456, hegney@usq.edu.au or to Ms Victoria Gilmore at the Australian Nursing Federation, 02 6232 6533, professional@anf.org.au Any concerns you may have about ethical issues in this research should be directed to the Human Research and Ethics Committee, University of Southern Queensland, phone: 07 4631 2956.

1.4 Cover letter for nurses

15th July, 2005

Dear ANF Member,

You may be aware that the Australian Nursing Federation (including the NSW Nurses' Association and the Queensland Nurses' Union) has been funded by the Australian Government Department of Health and Ageing to undertake a project investigating the use of information technology (IT) and information management systems (IMS) by nurses. The Centre for Rural and Remote Area Health at the University of Southern Queensland has joined the ANF as a research partner on the project.

The aim of the project is to provide information that will support policy and strategic planning at all levels from individual facilities to government. This aim will be achieved by addressing the following specific objectives,

a)   Identifying the extent to which nurses have access to and use of IT and IMS;

b)   Identifying the purposes for which nurses use IT and IMS;

d)   Identifying the readiness of nurses to participate in e-health initiatives such as Health*Connect;*

e)   Understanding the barriers that prevent nurses from benefiting from IT and IMS;

f)   Recommending ways to overcome these barriers and providing opportunities for nurses to better utilise IT and IMS within the Government policy framework;

g)   Preparing a roadmap for access, education and training to meet the needs of nurses.

A major component of the project is to collect information directly from nurses by the use of a survey. The survey targets nurses employed in both the public and private health sectors throughout all States and Territories and across all geographical areas of Australia.

As you can see from the information contained in the attached *Plain Language Statement*, every effort has been made to ensure that confidentiality is maintained. At no stage will the ANF, employers or the Government have access to information that could identify respondents or the health facility at which they work. Similarly, at no stage will the USQ have access to personal membership information contained on the ANF databases.

The attached *Plain Language Statement* provides details of how the survey will be conducted. It would be greatly appreciated if you could take the time to read this document before deciding whether to participate in this important study.

We encourage you to complete the enclosed survey and return it in the enclosed reply paid envelope by **10th August 2005**. Completion of the survey is estimated to take around 30 minutes.
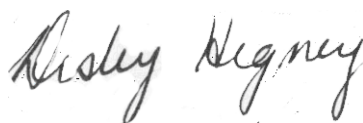
The coded identity number on returned surveys will be entered into a prize draw. The winner will either receive $250 through their ANF branch or may nominate a charity to receive the prize.

Thank you for giving consideration to our request.

Yours sincerely,

Jill ILIFFE
Federal Secretary
Australian Nursing Federation

Professor Desley HEGNEY
Chair of Rural Nursing
University of Southern Queensland

1.5   Reminder letter for nurses

15th August, 2005

Dear ANF Member,

In July, you should have received a package asking you to participate in a survey of nurses throughout Australia regarding your professional use of information technology. The University of Southern Queensland (USQ) has been engaged by the Australian Nursing Federation (including the NSW Nurses' Association and the Queensland Nurses' Union) to undertake this important research that is funded by the Australian Government Department of Health and Ageing.

At the time of writing this letter, we had not received from you a completed questionnaire. It may be that you never received the first package, or it may be that you did receive it and decided not to participate in the study.

In case you have not received the first package or have misplaced it and you wish to participate in the study, we are sending you another package. If you wish to participate in this research could you complete the enclosed questionnaire and return it in the supplied reply-paid envelope by the **9th September, 2005**. Completion of the survey is estimated to take around 30 minutes.

If you do not wish to participate in this research, please disregard this letter and the enclosed documentation.
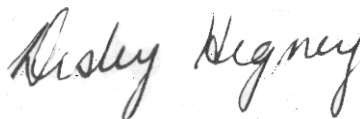
You may be concerned about confidentiality. Please don't be. The surveys contain a code which is part of the process of stratification across geographical location and is linked to postcodes and not names. Some people get a little anxious about codes as they are concerned that they can be identified. We assure you that for this research whilst USQ has the codes, the ANF alone has names and addresses. At USQ we do not have access to those names and addresses and we have sent the pre-packed envelopes to the ANF for labelling and postage. The surveys are returned to USQ. We can also assure you that at no stage will the ANF, your employer or the Government have access to any data from the questionnaire that you fill out.

Thank you for giving consideration to our request.

Yours sincerely,

Jill ILIFFE
Federal Secretary
Australian Nursing Federation

Professor Desley HEGNEY
Chair of Rural Nursing
University of Southern Queensland

PS Returned surveys will be entered into a prize draw. The winner will receive $250 cash or we will donate an equivalent amount to a charity of your choice.

2. Mapping of objectives to stakeholder questions and themes

2.1 Objectives

1. To identify the extent to which nurses have access to and use information technology and information management systems.

2. To identify the purposes for which nurses use information technology and information management systems.

3. To identify the readiness of nurses to participate in e-health initiatives such as Health*Connect* (including Medi*Connect*).

4. To understand the barriers that prevent nurses from benefiting from information technology and information management systems.

5. To recommend ways to overcome these barriers and provide opportunities for nurses to better utilise information technology and information management systems within the Government policy framework.

6. To prepare a roadmap for access, education and training to meet the needs of nurses.

2.2 Matrix mapping stakeholder questions to objectives

Broad Question	Background Information Question	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
What do the terms IT/IM mean in a nursing environment?							
	How do you define IT in the nursing environment?	What do the terms IT/IM mean in a nursing environment?	What do nurses in your organisation use IT for?	What e-health initiatives are in operation?			
	How do you define IM in the nursing environment?	Do you use any wireless technologies?	What are the benefits offered by the technology?	What e-health initiatives are in operation?	How prepared are nurses in your organisation to access and use electronic health records?		
	What does each of the following terms mean to you/ our organisation/ your members/ workforce?						
What do you think are the issues regarding IT/IM for nurses and nursing?							
	How accessible are the IT/IM systems for the nurses in your organisation?				Are there any issues regarding security?		
	Are there accessibility issues within your organisation that affect your nurses using IT/IM systems to their intended capacity?				Are there any barriers regarding ability of your nurses in using the IT? If so, what are the issues?		
					Are there issues with respect to institutional/ state/national strategies that affect your organisation in its use of IT/IM?		
					Are there issues regarding autonomy within the nursing environment?		

Matrix mapping stakeholder questions to objectives continued

Broad Question	Background Information Question	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
What has your organisation done about IT and/or what is it planning to do?							
	What IT/IM changes have occurred in your organisation in the last 5 years?						
	What is proposed for the next 5 years?						
	How did/do you communicate about your IT systems to the nurses in your organisation?				Have these changes met with any problems? If so what?	How is your organisation addressing concerns of security with the use of the new technologies?	What policies have been affected regarding education and training of nurses?
	How do you obtain input from clinical nurses with regard to proposed and operating IT/IM systems?						
What strategies need to be put in place regarding IT/IM for nurses?						What strategies has your organisation adopted, prepared, put in place or proposed to meet the needs of nurses in their management and caring roles?	What strategies has your organisation adopted, prepared, put in place or proposed to address education and training to meet the needs of nurses in adopting and implementing new systems?
						What state/ national strategies need to be developed and /or implemented to overcome barriers to adoption of IT/IM by nurses?	
What skills/ competencies do nurses need, at different levels, to work with IT/IM?							

Matrix mapping stakeholder questions to objectives continued

Broad Question	Background Information Question	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
	What skills and competencies do nurses need?				Are there specific barriers with respect to attitude, skill and competency of your nurses to work with IT? If so, what are these?		How can the gaps between learning and desired competency be addressed?
	Are there specific skills and competencies that nurses need in nursing in this day and age that differ from those 10 years ago?				Is there a gap between university acquired competency in IT and that expected/ required by the industry?		
					How does that gap manifest itself?		
What do you need from IT (nursing wise) for your organisation to work more effectively?							
	Apart from what you have given to us in response to the other questions, what do you need from IT to make your organisation to run more effectively?						
	Are there specific applications?						
	Is there specific hardware?						
	Is there anything else?						

2.3   Themes generated from interviews with focus groups and stakeholders

	Focus Group	Stakeholder
Attitudes to IT used by nurses		
By management	- Nursing is not seen as a high priority - Shifting of workload and costs particularly to middle managers - Management sends everything by email but does not provide equipment or time for us to access those emails	- Management attitudes, strategies and policies eg equitable distribution - Lack of support or prevention of use by other medical staff - Management doesn't see benefit - Lack of understanding of and even interest in nurses' preferences
By nurses	- Lack of interest in gaining any knowledge of IT - Knowledge of IT but lack of interest in using IT - Lack of confidence - Fear of IT/IMS by nurses to use applications - Increased pace of life. Learning IT seems as another time demand and has a low priority - Denial of the need to use - Attitude or perception that IT is not reliable (never delivers what it should) - The fear that their information is going to go somewhere where it shouldn't - Straight fear of IT	- Lack of understanding of IT - Lack of interest - Resistance to change - Age and education of nurses affects attitude to IT - Spectrum of interest within each cohort of nurses - Difficult to use - Concern about damaging the system - Fear of use - Too many anecdotes swaying opinion - Some evidence from surveys of negative attitudes - Lack of motivation by some nurses - Difficult to reconcile that time spent using a computer is patient care - nurses are used to observation being the important part of care - Nurses need to think about what they need to know
Remuneration	- Incentives - lack of rewards	- Remuneration for IT knowledge only if have formal qualification - No reward for TAFE course unless employed for a specific project - Agency nurses don't really care
In general	- Expectation of immediacy (electronic communication) - Accessing information is not seen as legitimate nursing work for bedside nurses - Over-reliance on use of especially email - changing work environment dynamics - no-one talks to each other any more!! Appears that if it hasn't been written down it hasn't happened (Big Brother) - Too impersonal - Excess communication electronically leads to overload. Everyone gets everything and not targeted sufficiently - Nursing visibility in health care is low	

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Access to computers - Issues/ barriers		
Access portals		- Email - internet - intranet - teleconferences - Phone - Cell Phone - Interactive video - Laptop/notebook Computer - Personal Digital Assistant (PDA) - Tablet PC - other user interfaces.
Time constraints	- Time constraints for access to machines and programs in the clinical setting - Time taken to input the data during direct patient care - Time it takes to retrieve/find the data you want. Sometimes easier to find a piece of paper - Work flow issues - Time management issues - may use IT effectively, however don't have time to use it - Time taken to boot computer and access information takes away time from clients	- Time requirement to input data - Time is the big constraint
Lack of awareness of benefits	Lack of awareness of benefits of access, especially internet databases on research evidence	Lack of obvious benefits or relevance
Computers	Not enough hardware provided for access (not enough computers)	- Limited access to equipment/number of terminals - Many computers don't have full range of applications on them
Space	No physical space to put extra computers	
Policy/work-place practices	- IT communications from management to clinical nurses who then gate keep as to what goes on further down the line of levels of nurses - Level of access to inter and intra net - Organisational and professional silos ie people hang on to data - Access denied / forgetting passwords	- Cultural issues - eg people locking up equipment - No or poor migration plan from paper to electronic - Inability to achieve workflow integration - Lack of a strategy or implementation plan for adoption
Lack of knowledge	people don't know how to work the equipment they have	
Technical issues		- Difficult to provide email addresses because of high turnover of staff - Firewalls cause some restrictions to staff - Reliability of technology - Systems sometimes don't provide the services they claim - Advances so fast that sometimes not able to provide or even evaluate technical requirements required to underpin

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Access to computers - Issues/ barriers		
Financial issues	■ Cost of the program to implement the whole system effectively ■ Wasted resources	■ Funding or resources ■ Difficulty in building a strong business case
Benefits of use		■ Minimum benefits directly for nurses (!!!!) ■ Telehealth ■ Forums ■ Professional development ■ Security of data ■ Integration of information ■ Increased efficiency ■ Time saving ■ Improved patient care ■ Free up human resources ■ Communication, faster, convenient, ease of use ■ Benefits must be real and not just another layer ■ Benefits must be communicated ■ Ability to monitor key performance indicators
Champions		■ Nurses need to be proactive ■ Champions
Changing nursing environment	■ Tendency for proliferation of data collection because the systems are able to collect data	■ Is it changing the way nurses practice? ■ Software for patient care management (TrendCare) has changed nursing procedure
Communication in workplace	■ The use of the collected data; how is it fed back to the staff? Is it fed back to them in a way they understand and as it relates to the clinical environment ■ Nurses who don't have direct access to a computer may be missed out of the loop	■ Not enough communication ■ Communication is essential ■ UK nurses surveys identify lack of communication ■ Communication done through local management and special groups
Confidentiality	■ Privacy and confidentiality ■ Need for nurses and midwives to realise that the right of access to confidential information does not confer the right to look at it or use it	■ Lack of security of confidential information when sending/receiving ■ Concern about unauthorized use of mobile/ wireless devices that have been lost or stolen ■ Some issues but largely ill founded ■ Some real issues with patient records ■ Using manager's computer allows access to information that shouldn't be seen ■ Multiple users with same log in and password ■ Strict protocols required ■ Hacking is a concern
Degree of engagement		■ Varies considerably ■ Benefit needs to be seen ■ Barriers need to be removed ■ Nurses can still avoid using IT in most environments if they still choose. ■ In future nurses won't be able to avoid use of IT

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Access to computers - Issues/ barriers		
Differences: State		▪ Policy regarding internet access in health service ▪ Champions vary
Differences: Geographical		▪ Remote have access issues ▪ Remote health staff often greater IT responsibility ▪ Support a major issue
Differences: Level		▪ EN, RN 1, 2, NM, have different access according to perceived need ▪ Rationale inappropriate use/security ▪ Rationale cost ▪ Level 1 only have access to email if there was a specific job - would have to make a fair case ▪ All RNs have intranet but not internet
Differences: Sector		▪ All have own need ▪ Emergency and intensive care heavily reliant on IT ▪ Operating theatres very advanced ▪ Attitude by management differs ▪ Wealth of sector an issue ▪ Acute care - advanced ▪ Community health use IT more ▪ Aged Care - sector far behind, cost, culture and training all issues ▪ Private practice nurses have broader role and more access but also have less education and CPE opportunities
Differences: Job		▪ Academics, clinicians, administrators, managers etc
Differences: Age		▪ Younger ones in general use more
Differences: doctor vs nurse		▪ Doctors get orientation nurses don't as assumed they know it
Drivers for adoption		▪ Medical versus health drivers
Duplication of effort	▪ Systems/applications/storage devices don't even talk to each other so there is a lot of duplication because of that ie lack of compatibility	Hospital and primary care may have system but outreach doesn't so everything is duplicated and paper based
Evidence based practice		▪ Knowledge systems generated in most States ▪ EBP is new platform ▪ Restricted use in locations where cost of access prohibitive
Future applications		▪ Electronic ordering of tests ▪ Point of care clinical systems
Health and safety	▪ Physical (eg eye strain, posture and back strain) - mental (eg concentration, minimal distraction required)	

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Access to computers - Issues/ barriers		
Health*Connect*		▪ Very little known even in areas where trialled ▪ Most people will not have heard of it
Incentives for adoption	▪ Unless benefits seen there is no incentive to use	▪ Incentives for training or use of IT required
Informatics and informaticians		▪ Neglected area ▪ Required to be core part of curriculum ▪ Difficult to get people to accept that nurses need to know IT ▪ Need to demonstrate clinical applicability
Internet and intranet	▪ Not networked to other parts of the same health system	▪ Cost of internet can be restrictive ▪ Use can lead to time wasting ▪ Access varies by organisation ▪ Restriction to use at certain levels ▪ All facilities that a nurse needs are on the intranet ▪ Intranet resources are determined by someone else and not by any nurses. Internet is own choice ▪ Intranet not always easy to use (same true for internet) as populated by techies. ▪ Very little clinical input into development of intranet ▪ Restrictions are due to cost, security and job requirement (security from viruses)
Policies		▪ QH have anti PDA policy
Politics	▪ Insufficient funding for change management from above. No point in spending money on hardware if support for implementing it is not allocated ▪ It's all about what GPs want and not nurses. Very little nurse visibility	▪ National and state cooperation required ▪ Time putting policy into practice ▪ Funded commitment to education, training and support is required
Management support issues	▪ Inadequate support from senior management (for upgrades, to maintain, to get enough licences etc) ▪ Lack of recognition for need for application development support from IT department	▪ Management support for nurses involvement in decision making is often very slow
Recruitment and retention	▪ Knowledge systems generated in most States ▪ EBP is new platform ▪ Restricted use in locations where cost of access prohibitive	▪ IT affects recruitment and retention ▪ Nurse can be discriminated against in recruitment process if they have to apply online and don't have access or email address or ability ▪ Retention of technical people an issue as private pays better

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Software application issues		
Interoperability	• Multiple programs with no linking • Lack of compatibility of systems for patients transferring. Real costs to heath care • Interface problems of software limit efficiency and effectiveness of service delivery within organisations (eg for emergency to ward) or across organisations (eg acute to primary health care) • Interface structure • Change technologies for storing results which can not always be read elsewhere which leads to redoing tests	• Difficulty in finding an non fragmented solution among vendors or IT platforms • Incompatibility across systems and sectors within same health system • Lack of interoperability with other devices or systems • Recognition of existing use required • Lack of integration leads to duplication, time wasting • Lack of understanding by management and developers • Seamless integration required • Lack of integration leads to frustration • Too many systems operating with same services
Fit for purpose	• Available programs do not fit the need of nurses in a clinical environment • IM applications often not intuitive (user friendly) for users and don't allow user to miss data and then go back in later • Inappropriate data systems design	• Unable to find a solution that meets application or technical requirements • Administration or medical and not health drivers • Lot of time wasted • IM applications not intuitive • Software often designed poorly for nurses use
Consultation		• Lack of consultation leads to issues with use and acceptance • lack of recognition of value of nurses • input desirable for optimum practicality • input essential for acceptance • other studies demonstrate importance • lack of consultation combination of money, time, management understanding • IT people don't like to work with anyone other than IT • Nurse informaticians important to bridge the gap between developers and users • Workshop and management structure generate input
Standards and terminology	• Terminology not consistent across clinical environments using the same applications and even in the same site • Nursing standards = nursing data sets to enable nurse to communicate • Interfaces are often too confusing as no standard. Icons differ for same programme	• Lack of structured medical terminologies • Health services need minimum standard protocols
Technical issues - hardware	• Reliability of connectivity - systems go down	• Age and compatibility of technology • Connectivity issues • Slow data transfer rates to/from the host system • Delays in data synchronization with host systems or applications • Interference with medical devices • Inconsistent connectivity when roaming within the healthcare facility • Stifled by network speeds

Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
	Software application issues	
Interoperability	▪ Multiple programs with no linking ▪ Lack of compatibility of systems for patients transferring. Real costs to heath care ▪ Interface problems of software limit efficiency and effectiveness of service delivery within organisations (eg for emergency to ward) or across organisations (eg acute to primary health care) ▪ Interface structure ▪ Change technologies for storing results which can not always be read elsewhere which leads to redoing tests	▪ Difficulty in finding an non fragmented solution among vendors or IT platforms ▪ Incompatibility across systems and sectors within same health system ▪ Lack of interoperability with other devices or systems ▪ Recognition of existing use required ▪ Lack of integration leads to duplication, time wasting ▪ Lack of understanding by management and developers ▪ Seamless integration required ▪ Lack of integration leads to frustration ▪ Too many systems operating with same services
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Themes generated from interviews with focus groups and stakeholders continued

	Focus Group	Stakeholder
Software application issues		
Workforce		▪ Rural support staff leave
Workplace practice	▪ Computers often don't fit in with what people do and instead give them another layer of things to do ▪ Major changes in IT demands on middle managers (eg recruitment) without any reduction in other work demands ▪ Data entry of mundane issues (eg laundry) done by nurses because there isn't anyone else to do it	
Uses of IT		▪ Accreditation ▪ Administrative and financial applications (ordering, imprest) ▪ Clinical data repositories ▪ Clinical management ▪ Communications ▪ Electronic signatures ▪ Evidence based practice ▪ Electronic health records ▪ Human resource applications (rostering, payroll, leave) ▪ Information databases for patients and their families ▪ Knowledge based systems ▪ Medication management, ordering and prescribing ▪ MIMs online ▪ Operating theatre lists ▪ Patient complaints ▪ Patient rounds ▪ Professional development ▪ Research and analysis applications ▪ Recruitment ▪ Staff Management ▪ Surgical report through MediCap ▪ Swipe card access ▪ Telenursing ▪ Training
Web sites		
Wireless technologies		▪ More funding for medics rather than nurses ▪ Very ad hoc use

2.4 Solutions to key themes identified by focus group

2.4.1 Solutions for not enough hardware provided for access

Additional hardware

- Access to computer to input data
- Extra hardware for more hardware and space to put them

Alternative hardware

- Alternative modalities (not enough space)
- Palm held computers
- Voice recognition on smart phone
- Provision of tablets for handwriting
- Flexibility in the type of hardware provided
- Flexibility to include home based use of IT as a legitimate part of work

Finance

- IT upgrade to be a standard budget item
- Funding to purchase more computers and space to put them

Policy and planning

- Change in management
- Planning for the future; space is an issue

2.4.2 Solutions to time constraints for access in clinical setting and time taken to input data during direct patient care

Workload

- Recognise that time is required for IT
- Ensure that time on the computer is seen as a priority
- Recognise IT as part of the work load and fit it into planning
- Recognition of time it takes and adjusting workload accordingly
- Client attributable time (time management)
- Integrate with workload

Planning

- Incorporate IT into work plan after recognising the need

Consultation

- Planning that involves nurses in the way and place that systems are established

Workforce

- Increase staffing levels to allow for time to input data
- Increase staffing decrease or change clinical role
- Increase clinical resources to increase time for IT access
- A dedicated person to arrange update and provide information appropriate to particular area
- Paying people appropriately for the work they do ie better use of admin personnel
- Workload issue
- Employ data entry staff

Hardware

- Wireless and voice recognition technology

Interoperability/integration

- Avoid doubling up on data entry through good computer networking
- Link programs and data sets so that data only has to be added once
- Point of care data entry

Fit for Purpose

- Relevance of data collected
- Involvement of nurses in development
- Develop clinical systems with nursing input to make them nurse friendly
- User friendly
- Intuitive
- Nurses involved in program development to ensure user friendly
- Software relevant to the clinical role

Miscellaneous

- In emergency room and triage there is no solution to the issue as there are always more patients waiting

2.4.3 Solution for lack of training and education in information technology

Competency

- Inclusion of IT in competence and CPE programs
- Minimum competencies

Relevance

- Promotion of relevance and need to nurses
- Education in benefits and relevance of IT skills

Undergraduate

- Start education at undergraduate level - education which focuses on the place of IT and IMS in the planning and delivery of care and health outcomes
- Nursing Informatics in Education programs at UG and PG level
- Health related IT applications in undergraduate program

Support

- Acknowledgement and recognition of the role of IT and IMS and the duty of nurses and midwives embedded in lifelong learning packages, competency standards and codes of conduct
- Educational programs set by workforce not coercive but flexible enough to cater for different needs and learning styles of nurses
- Exposure post education and training "what you don't use you lose"
- Support for ongoing educational support after hours and weekends
- Availability of time to attend education / training

Finance and planning

- Adequate budgeting and planning

- Targeting of training in IT to needs of nurses and midwives, especially older workers

- Support for training with resources for back filling

- Equity of access to education that is relevant to the clinical setting

- Training in IT being built in to annual workplace training plans

- Long term plan for education to provide ongoing learning environment and support (in terms of budget)

- Ownership of IT support - allocation of support staff to area, not from a band of support staff on rotation

- Consider a significant number of staff are transient eg agency

- Training for all staff and not just those working day shifts

Type of training

- Home based education packages to develop basic to intermediate computer skills

- To be taught by person who has used program

- Run education programs outside normal working hours particularly weekends as there is usually more available time

- Provision of adequate education / training in specific organisational systems incorporated into orientation and linked to annual credentialing

- Creative not standard educational models including follow up and short sharp sessions

Recognition of value

- Use of clinical information systems [needs to be] legitimised by inclusion in job descriptions

- IT accused of being impersonal. Requires training for correct etiquette

3. Nurses and Information Technology Survey

USQ
UNIVERSITY OF SOUTHERN QUEENSLAND

Centre for Rural and Remote Area Health

AUSTRALIA

AUSTRALIAN NURSING FEDERATION

Nurses
and
Information
Technology
SURVEY 2005

CONFIDENTIAL

Nurses and Information Technology Survey continued

YOUR BACKGROUND

1. Sex   Male ☐   Female ☐

2. Year of birth   19 ☐☐

3. Select the category that BEST describes the classification or level of your job in your state.

☐ AIN/AAIN/NA/Carer   ☐ RN3/CNC/NO3/N4

☐ EN/N1/RN Division 2 in Victoria   ☐ RN4/NUM1-3/NO4/N5

☐ RN/RN1/NO1/N2/RN Grade 1-2 in Victoria   ☐ RN5-7/NM1-9/NO5-7/N6-8/DON

☐ RN2/CNS/NO2/N3   ☐ Other [＿＿＿＿＿＿＿]

4. Do you have more than one paid job?

☐ No   ☐ Yes, but not all are in nursing   ☐ Yes, and all are in nursing

All further questions and answers relate to your MAIN nursing job ONLY

5. What is the postcode and location (town/locality) of your place of work?

☐☐☐☐   [＿＿＿＿＿＿＿＿＿＿＿＿]

6. In your job are you employed ...?

☐ Permanent full-time (35-40 hours/week)   ☐ Temporary full-time

☐ Permanent part-time   ☐ Temporary part-time

☐ Casual

7. In your job are you a ...?   *(please select only one)*

☐ Continuous shift worker (all three shifts)   ☐ Morning and evening shift worker

☐ Day shift worker   ☐ Evening and night shift worker

☐ Evening shift worker   ☐ Other [＿＿＿＿＿＿＿]

☐ Night shift worker

8. Over the last six months, have you worked mainly ...?

☐ Weekends   ☐ Mon-Fri   ☐ Mixture

9. Are you of Aboriginal or Torres Strait Islander origin?

☐ No   ☐ Yes, Aboriginal   ☐ Yes, Torres Strait Islander

10. Is English your first language?   ☐ Yes   ☐ No (if No, please specify your first language)

[＿＿＿＿＿＿＿＿＿＿]

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Nurses and Information Technology Survey continued

All questions and answers relate to your MAIN nursing job ONLY

11. What type of workplace best describes your MAIN place of work?
(please select only one)

	Public	Private
Hospital..	☐	☐
Psychiatric hospital/Mental health facility............................	☐	☐
Outpatient clinic...	☐	☐
Day procedure centre...	☐	☐
Residential aged care centre..	☐	☐
Hospice...	☐	☐
Other residential care facility..	☐	☐
Community health centre...	☐	☐
Defence Force facility...	☐	☐
Government department..	☐	☐
Doctors' rooms/medical practice...	☐	☐
School...	☐	☐
Commercial/industrial/business..	☐	☐
Tertiary institution (higher and vocational education or other training)...............	☐	☐
Other..... [ ]	☐	☐

12. Which of the following BEST describes the type of care delivery you provide? *(please select only one)*

☐ In-patient	☐ Developmental disability service
☐ Outpatient	☐ Aboriginal or Torres Strait Islander health service
☐ Both in- and outpatient	☐ Other clinical
☐ Residential	☐ Non-clinical nursing
☐ Community based	☐ Other [ ]

13. How would you best describe your MAIN role in nursing? *(please select only one)*

☐ Carer	☐ Educator	☐ Researcher
☐ Clinician	☐ Manager	☐ Other [ ]

14. In what year did you FIRST begin working as an AIN, EN or RN? ☐☐☐☐

15. For how many years since you first began work as an AIN, EN, or RN have you worked? ☐☐

16. At the present time are you a pre-registration student?

☐ No	☐ Yes, at university	☐ Yes, at TAFE or other college

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17. How would you describe your level of confidence in the use of the following? *(please tick only one box per line)*

	Very confident	Confident	A little confident	Not confident	Don't know	Have no experience with
Computer..	☐	☐	☐	☐	☐	☐
Mouse...	☐	☐	☐	☐	☐	☐
Keyboard...	☐	☐	☐	☐	☐	☐
Touch screen...	☐	☐	☐	☐	☐	☐
Data projector...	☐	☐	☐	☐	☐	☐
CD/DVD ROM..	☐	☐	☐	☐	☐	☐
USB/memory sticks/flash drive......................	☐	☐	☐	☐	☐	☐
Word processing (e.g. Word)..........................	☐	☐	☐	☐	☐	☐
Spreadsheet (e.g. Excel)...............................	☐	☐	☐	☐	☐	☐
Database (e.g. Access).................................	☐	☐	☐	☐	☐	☐
Reference tools (e.g. Endnote)......................	☐	☐	☐	☐	☐	☐
Evidence based practice resources (e.g. Cochrane Library)	☐	☐	☐	☐	☐	☐
Email (e.g. Outlook, Groupwise)....................	☐	☐	☐	☐	☐	☐
Presentation (e.g. PowerPoint)......................	☐	☐	☐	☐	☐	☐
Statistical software (e.g. SPSS)....................	☐	☐	☐	☐	☐	☐
Windows operating system............................	☐	☐	☐	☐	☐	☐
Apple Mac operating system.........................	☐	☐	☐	☐	☐	☐
Internet ₁..	☐	☐	☐	☐	☐	☐
Intranet ₂...	☐	☐	☐	☐	☐	☐

   ₁ Int**ER**net is used for access to the World Wide Web (www).
   ₂ Int**RA**net is a system of networking within your organisation/place of work and includes WAN(wide area network).

18. Do you use a computer AT ALL (at any location) for work related activities? ☐ Yes ☐ No

> *If you do not use a computer at all for work related activities, go straight to Question 30*

19. Indicate how much you agree with the following statements.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I avoid using computers whenever I can..........................	☐	☐	☐	☐	☐
Learning about computers is essential for nurses working in today's health service..................	☐	☐	☐	☐	☐
The IT that I use in my workplace reduces errors in handling patient or client data..................	☐	☐	☐	☐	☐
My use of IT reduces duplication of data entry and storage...............	☐	☐	☐	☐	☐
The use of IT in my workplace has made my job easier................	☐	☐	☐	☐	☐
IT has improved my access to information........................	☐	☐	☐	☐	☐

20. Rank what you believe is the main driving force for the adoption of IT in your workplace?
(if you believe that there are more than one, rank them 1, 2, ...6, with 1 being the main one)

Patient/client care	☐	Patient/client admin	☐	Don't know	☐
Income generation	☐	Saving money	☐		
Office administration	☐	None of the above	☐		

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Nurses and Information Technology Survey continued

YOUR ACCESS AND USE OF COMPUTERS

21. How often do you use a computer for <u>ANY</u> WORK-related purposes in these locations?
(tick one box for each location that applies)

	Never	Less than once a week	Once a week	Several times a week	Once a day	More than once a day
Home	☐	☐	☐	☐	☐	☐
Own work computer	☐	☐	☐	☐	☐	☐
Shared work computer	☐	☐	☐	☐	☐	☐
Work library	☐	☐	☐	☐	☐	☐
Local library	☐	☐	☐	☐	☐	☐
Internet cafe	☐	☐	☐	☐	☐	☐
Other (specify)	☐	☐	☐	☐	☐	☐

[   ]

22. At which location do you use the following for WORK-related purposes?
(tick all that apply)

	Email	Internet	Intranet
Home	☐	☐	☐
Own work computer	☐	☐	☐
Shared work computer	☐	☐	☐
Work library	☐	☐	☐
Local library	☐	☐	☐
Internet cafe	☐	☐	☐
Other (specify) [ ]	☐	☐	☐
I do not access in any location	☐	☐	☐

23. If you use your home computer for WORK-related activities what sort of work do you do at home?
(tick all that apply)

☐ Professional development/education and training

☐ Clinical care

☐ Patient/client care

☐ Administration

☐ Research

☐ Communication

☐ Other [   ]

☐ N/A, I don't use a computer for work-related purposes

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24. Why do you use your home computer for *WORK-related* activities?
(tick all that apply)

☐ My workload means that I have to work at home

☐ I do not have sufficient physical access to a computer at work

☐ I do not have the authorisation to access the programmes I need at work

☐ I am discouraged from accessing a computer for this purpose at work

☐ Other [   ]

☐ N/A, I do not use a computer at home for work-related purposes

25. At your MAIN place of work, how does your employer's policy restrict your access to a computer?

If access is never allowed, tick here.................. ☐

| **If access is never allowed, please go to Question 27** |

Access is allowed all the time............................. ☐ Yes   ☐ No

If yes, is authorisation required each time.......... ☐ Yes   ☐ No

Access is allowed only within certain hours....... ☐ Yes   ☐ No

If yes, is authorisation required each time......... ☐ Yes   ☐ No

26. Do you have a PERSONAL email address at work?

☐ Yes

☐ No, because I am not allowed an address

☐ I am allowed an address but I do not use it

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Nurses and Information Technology Survey continued

USES OF INFORMATION TECHNOLOGY

27. How often do you use a computer for the following *WORK-related* purposes?
(tick one box per line for each of the applications)

	Never	Rarely	Occasionally	Frequently	Always	Not available to me
Patient/client management						
Accessing patient records	☐	☐	☐	☐	☐	☐
Appointment scheduling	☐	☐	☐	☐	☐	☐
Bed management (admission/transfer/discharge)	☐	☐	☐	☐	☐	☐
Patient/client assessment and documentation (e.g. RCS)	☐	☐	☐	☐	☐	☐
Theatre applications	☐	☐	☐	☐	☐	☐
Clinical use						
Clinical documentation (TPR, BP, fluids, discharge)	☐	☐	☐	☐	☐	☐
Medication management (administration and/or supply)	☐	☐	☐	☐	☐	☐
Poison management (e.g. POISINDEX)	☐	☐	☐	☐	☐	☐
Consultations (with patients/clients, other health professionals)	☐	☐	☐	☐	☐	☐
Results (pathology, laboratory, radiology)	☐	☐	☐	☐	☐	☐
Ordering (diagnostic tests, meals, medications, consultations, referrals)	☐	☐	☐	☐	☐	☐
Accessing policies and procedures	☐	☐	☐	☐	☐	☐
Accessing evidence based practice	☐	☐	☐	☐	☐	☐
Administration						
Administrative reporting	☐	☐	☐	☐	☐	☐
Staff management (rostering)	☐	☐	☐	☐	☐	☐
Finance (billing and payroll)	☐	☐	☐	☐	☐	☐
Development of policies and procedures	☐	☐	☐	☐	☐	☐
Patient/client complaints	☐	☐	☐	☐	☐	☐
Recruitment	☐	☐	☐	☐	☐	☐
Other						
Continuing professional education	☐	☐	☐	☐	☐	☐
Communication (within workplace/professional organisations/ networking with larger community)	☐	☐	☐	☐	☐	☐
Accreditation	☐	☐	☐	☐	☐	☐
Other (please specify) [_____]	☐	☐	☐	☐	☐	☐

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28. How often do you use any of these systems for *WORK-related* purposes? *(tick one box for each line that applies and indicate whether use is mandatory or optional for you)*

	Never	Rarely	Occasionally	Frequently	Always	Mandatory	Optional
GPS/nav sat	☐	☐	☐	☐	☐	☐	☐
PDA or tablet computer	☐	☐	☐	☐	☐	☐	☐
Patient/client monitoring (eg. Heart Rate Monitor)	☐	☐	☐	☐	☐	☐	☐
Diagnostic result access (eg. x-ray)	☐	☐	☐	☐	☐	☐	☐
Delivery (Ivac, IMED)	☐	☐	☐	☐	☐	☐	☐
Telehealth/telemedicine	☐	☐	☐	☐	☐	☐	☐
MIMS online	☐	☐	☐	☐	☐	☐	☐
Joanna Briggs Institute	☐	☐	☐	☐	☐	☐	☐
Cochrane Library	☐	☐	☐	☐	☐	☐	☐
Patient/client management or clinical systems (eg. Ferret, Chime, cerner, EDIS, POCCS, TrakHealth, IBA, iSoft, JADE)	☐	☐	☐	☐	☐	☐	☐
Staff management (eg. PeopleSoft, OneStaff, Perspex, TrendCare, ExcelCare)	☐	☐	☐	☐	☐	☐	☐
Financial management (eg. Oracle financials, SAP, PeopleSoft, JD Edwards, CIM)	☐	☐	☐	☐	☐	☐	☐
On-line professional journals	☐	☐	☐	☐	☐	☐	☐
Information access or knowledge-based systems (eg. CIAP, CKN, CHC, CROC, CIAO)	☐	☐	☐	☐	☐	☐	☐
Community Client Health Profile (CCHP)	☐	☐	☐	☐	☐	☐	☐
Other (eg. CCTV)	☐	☐	☐	☐	☐	☐	☐

29. Indicate your confidence in using the applications that you identified in Question 28.

	Very confident	Confident	Quite confident	Not confident	Don't know
GPS/nav sat	☐	☐	☐	☐	☐
PDA or tablet computer	☐	☐	☐	☐	☐
Patient/client monitoring	☐	☐	☐	☐	☐
Diagnostic result access	☐	☐	☐	☐	☐
Delivery	☐	☐	☐	☐	☐
Telehealth/telemedicine	☐	☐	☐	☐	☐
MIMS online	☐	☐	☐	☐	☐
Joanna Briggs Institute	☐	☐	☐	☐	☐
Cochrane Library	☐	☐	☐	☐	☐
Patient/client management or clinical systems	☐	☐	☐	☐	☐
Staff management	☐	☐	☐	☐	☐
Financial management	☐	☐	☐	☐	☐
On-line professional journals	☐	☐	☐	☐	☐
Information access or knowledge-based systems	☐	☐	☐	☐	☐
Community Client Health Profile	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

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Nurses and Information Technology Survey continued

YOUR ACCESS TO THE INTRANET AND INTERNET

30. Regardless of whether you use it or not, does your facility have an intranet/WAN and/or the internet?
Note: WAN(wide area network) is a computer network that spans a relatively large geographical area. Typically, WAN consists of two or more local-area networks (LANs

IntRAnet	IntERnet
☐ Yes ☐ No ☐ Don't know	☐ Yes ☐ No ☐ Don't know

If your facility does not have access to either the internet or intranet, go to Question 38

31. How does your place of work connect to the internet?

☐ Dial up   ☐ Broadband   ☐ ISDN   ☐ ADSL   ☐ Satellite   ☐ Don't know

32. Where do YOU have use of the intranet/internet at your place of work? *(tick all that apply)*

IntRAnet	IntERnet
☐ Your workstation	☐ Your workstation
☐ Your clinical manager's office	☐ Your clinical manager's office
☐ Personal mobile device	☐ Personal mobile device
☐ The library	☐ The library
☐ Remote access	☐ Remote access
☐ Other [ ]	☐ Other [ ]
☐ I have no access	☐ I have no access

If YOU have no access to either the internet or intranet in your place of work, go to Question 37

33. For what purpose do you use the intranet/internet? *(tick all that apply)*

IntRAnet	IntERnet
☐ Clinical use	☐ Clinical use
☐ Patient/client management	☐ Patient/client management
☐ Administration	☐ Administration
☐ Other [ ]	☐ Other [ ]

34. Do you require a user name and password to access the intranet/internet?

IntRAnet	IntERnet
☐ Yes ☐ No	☐ Yes ☐ No

35. What is the degree of your restriction with regard to access to the intranet/internet?

IntRAnet
☐ Not allowed at all   ☐ Restricted to certain purposes   ☐ Restricted to certain hours   ☐ Not restricted

IntERnet
☐ Not allowed at all   ☐ Restricted to certain purposes   ☐ Restricted to certain hours   ☐ Not restricted

36. How often can you download files from the intranet/internet?

IntRAnet	IntERnet
☐ Never ☐ Whenever needed ☐ Sometimes	☐ Never ☐ Whenever needed ☐ Sometimes

37. At your job level are you required to seek authorisation before downloading material from the intranet/internet?

IntRAnet	IntERnet
☐ Yes ☐ No	☐ Yes ☐ No

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Nurses and Information Technology Survey continued

YOUR KNOWLEDGE OF CURRENT HEALTH I.T. INITIATIVES

38. I am kept aware of general IT developments within my workplace.

☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree   ☐ No opinion

39. I believe that the adoption of a national electronic health record initiative will be beneficial to health care.

☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree   ☐ No opinion

40. How would you rate your knowledge of Health*Connect*?

☐ Excellent   ☐ Good   ☐ Average   ☐ Poor   ☐ Very poor   ☐ Never heard of it

41. How would you rate your knowledge of health initiatives in your State or Territory?

☐ Excellent   ☐ Good   ☐ Average   ☐ Poor   ☐ Very poor

JOB REQUIREMENT FOR I.T.

42. Is the requirement for IT skills built into your job description?

☐ Yes   ☐ No   ☐ N/A, I do not have to use any IT in my job

43. Do you get any financial reward/allowance for your use of IT?

☐ Yes   ☐ No   ☐ N/A

44. How important was the access to and use of IT in your choice of joining your current employer?

☐ Very important   ☐ Somewhat important   ☐ Not too important   ☐ Not at all important   ☐ N/A

45. How important will your access to and use of IT have on you remaining with your current employer?

☐ Very important   ☐ Somewhat important   ☐ Not too important   ☐ Not at all important   ☐ N/A

46. How important would access to and use of IT be in your choice of future employers?

☐ Very important   ☐ Somewhat important   ☐ Not too important   ☐ Not at all important   ☐ N/A

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Nurses and Information Technology Survey continued

YOUR TRAINING AND EDUCATION IN I.T.

Tick **ALL** those that apply to the following questions

Columns:
- (a) Keyboard skills
- (b) File management
- (c) Word processing
- (d) Spreadsheets
- (e) Data bases
- (f) Email
- (g) On-line library searches
- (h) Use of the internet
- (i) Patient/client management and clinical systems
- (j) Administrative systems
- (k) Information management

47. During your pre-registration/enrolment education, did you receive any formal training in IT in any of these listed areas?

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

48. Since being employed as a nurse/midwife have you undertaken any continued professional education in any of these areas?

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

> *If you have never received any specific IT training, go to Question 56*

49. What was the format of the most recent training you received in each of the IT skills you placed ticks in above?

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Face to face	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Group training	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Distance learning program (paper/on-line)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Self taught (on-line/books)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

50. Where was this IT training held?

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
At workplace during work hours	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
At workplace in your own time	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Away from workplace during work hours	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Away from workplace in own time	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

51. Who gave this IT training?

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Colleague	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In-house trainer based outside your workplace	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In-house trainer based at your workplace	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Commercial trainer (including TAFE or other training institution)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

52. How long ago was your most recent IT training?

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Less than 6 months ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6 months - 1 year ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
1 - 3 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Longer than 3 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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Nurses and Information Technology Survey continued

Tick **ALL** those that apply to the following questions

		(a) Keyboard skills	(b) File management	(c) Word processing	(d) Spreadsheets	(e) Data bases	(f) Email	(g) On-line library searches	(h) Use of the internet	(i) Patient/client management and clinical systems	(j) Administrative systems	(k) Information management
53. Was the IT training adequate to meet the needs of your *current* job?	Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	No	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
54. Was the IT training given at a time that was appropriate to its use in the workplace?	Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	No	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
55. Who paid for the training?	Employer, in full	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Employer, in part	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Self, in part or in full	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Other (please identify)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Don't know	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
56. Tick all the skills in which you feel you require IT training in order to better meet the requirements of your job.		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

57. Do you have any formal qualifications in IT such as a certificate, a degree or post graduate qualification of computer competency?

☐ Yes   ☐ No

If yes, please specify

58. Do you believe that the level of computer literacy that you hold is restricting your career development?

☐ Strongly agree   ☐ Agree   ☐ Neither agree nor disagree   ☐ Disagree   ☐ Strongly disagree

59. Within your workplace is IT training ...?

☐ Mandatory   ☐ Encouraged   ☐ Discouraged   ☐ Not referred to

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60. Will your employer support any future training in IT?

☐ Yes, and my employer will pay in full   ☐ Yes, but I will pay in full   ☐ No

☐ Yes, and my employer will pay in part   ☐ Yes, but I will pay in part   ☐ Don't know

61. What is your preferred method of training for IT?
(please select one box only)

☐ Self taught   ☐ Distance learning on-line

☐ Outside of work   ☐ Distance learning with books

☐ At work   ☐ No preferences

☐ Face-to-face   ☐ Other [_____]

☐ Workshops   ☐ Don't know

62. Which of the following prevent you from accessing training in IT at your workplace?
(tick one box for each line for any factors that apply)

	Never	Rarely	Sometimes	Very Often	Always
My time	☐	☐	☐	☐	☐
Money	☐	☐	☐	☐	☐
Lack of support	☐	☐	☐	☐	☐
Lack of relief staff	☐	☐	☐	☐	☐
Computer access	☐	☐	☐	☐	☐
Lack of interest	☐	☐	☐	☐	☐
Other [_____]	☐	☐	☐	☐	☐
Skills in IT are not required in my current job	☐	☐	☐	☐	☐

63. If training towards a national competency (e.g. Computer Driving Licence or equivalent) was offered by your employer, would you take it?

☐ Yes   ☐ No   ☐ Don't know

64. Would you consider undertaking a university health informatics course?

☐ Yes   ☐ No   ☐ Don't know

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12

BARRIERS TO YOUR USE OF COMPUTERS

If you do not use a computer because it is not required in your current job, go directly to Question 66

65. Do any of the items listed below restrict your use of a computer in your workplace?
(tick one box for each line for any factors that apply)

	Never	Rarely	Sometimes	Very Often	Always
Not enough computers	☐	☐	☐	☐	☐
Location of computer I am supposed to use	☐	☐	☐	☐	☐
Time to log on is too long	☐	☐	☐	☐	☐
Unreliable connections to the network	☐	☐	☐	☐	☐
Response time of the computer	☐	☐	☐	☐	☐
Working in front of a computer does not fit with my work demands	☐	☐	☐	☐	☐
Patients/clients/relatives/visitors are resentful of me at the computer	☐	☐	☐	☐	☐
More senior staff take priority	☐	☐	☐	☐	☐
Discouragement by others in my workplace	☐	☐	☐	☐	☐
Too many other work demands	☐	☐	☐	☐	☐
My age	☐	☐	☐	☐	☐
My IT knowledge	☐	☐	☐	☐	☐
My confidence in use	☐	☐	☐	☐	☐
Lack of IT support	☐	☐	☐	☐	☐
Lack of encouragement by management	☐	☐	☐	☐	☐
Attitudes of IT department	☐	☐	☐	☐	☐
Staff turnover	☐	☐	☐	☐	☐
I don't have a credit card to pay for on-line training	☐	☐	☐	☐	☐
I don't have any interest in using a computer	☐	☐	☐	☐	☐
Concerns about my own health and safety	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

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TECHNICAL SUPPORT

66. Does your organisation have a policy in place if there are problems with the computer system either you or others are using?

Hardware
☐ Yes   ☐ No   ☐ Don't know

Software
☐ Yes   ☐ No   ☐ Don't know

67. Who offers IT support?

Hardware
☐ In-house   ☐ Health service
☐ Contractor   ☐ Don't know

Software
☐ In-house   ☐ Health service
☐ Contractor   ☐ Don't know

68. What level of technical support is provided from Monday to Friday?

Hardware
☐ None   ☐ Limited to day hours (e.g. 9-5)   ☐ 12 hours a day   ☐ 24 hours a day   ☐ Don't know

Software
☐ None   ☐ Limited to day hours (e.g. 9-5)   ☐ 12 hours a day   ☐ 24 hours a day   ☐ Don't know

69. What level of technical support is provided on weekends?

Hardware
☐ None   ☐ Limited to day hours (e.g. 9-5)   ☐ 12 hours a day   ☐ 24 hours a day   ☐ Don't know

Software
☐ None   ☐ Limited to day hours (e.g. 9-5)   ☐ 12 hours a day   ☐ 24 hours a day   ☐ Don't know

70. I believe that the IT support in my workplace is ...

Hardware
☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

Software
☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

MANAGEMENT ATTITUDES AND SUPPORT

71. How do you rate the extent of consultation by management and/or your in-house IT support services to ensure that the computers and applications in your workplace are most suited to your practical needs as a nurse or midwife?

☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

72. How would you rate the support and recognition that is offered by your employers with respect to health and safety issues with using computers in your workplace?

☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

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SECURITY/CONFIDENTIALITY/PRIVACY

73. How would you describe the level of security of confidential information such as patient/client records in your workplace?

☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

74. How would you describe your workplace policies that ensure security and confidentiality of data?

☐ Excellent   ☐ Good   ☐ Fair   ☐ Poor   ☐ Awful   ☐ Don't know

PROFESSIONAL ORGANISATION SUPPORT

75. What professional nursing organisations are you a member? *(optional)*

76. Is there anything more that your professional organisation(s) can do to support you with respect to knowledge and information about IT (e.g. broker training, provide IT chat rooms)?

☐ Yes (if Yes, please specify)   ☐ No

77. Have you ever accessed these web sites at work, at home or from any other location?
(tick one box for each line for any web sites that apply)

	Yes	No, Even though I could / I don't know about them	I don't know how to access	I can't access	I have no time to access
Your membership organisation (e.g. ANF/CRANA/AARN)	☐	☐	☐	☐	☐	☐
Evidence based practice online (e.g. CIAP/JBI/Cochrane)	☐	☐	☐	☐	☐	☐
Journals or databases (Medline/CINAHL)	☐	☐	☐	☐	☐	☐
Aged Care Standards and Accreditation Agency	☐	☐	☐	☐	☐	☐
Health*Connect*/ Department of Health and Ageing/ State or Territory Health Departments	☐	☐	☐	☐	☐	☐
Nursing chat rooms, e-forums	☐	☐	☐	☐	☐	☐

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78. Please insert any other comments that you wish to make about IT in your workplace?
(to facilitate data transfer, please print or write as clearly as possible)

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Please return this questionnaire in the reply-paid envelope provided by the date specified in the accompanying letter.

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Thank you for your time and contribution in filling out this survey.

Your participation is greatly appreciated.

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4. Nurses titles definitions and classification by state and territory

4.1 Definition of abbreviations

Abbreviation	Position
AAIN	Advanced Assistant in Nursing
ADON	Assistant Director of Nursing
AIN	Assistant in Nursing
AN	Assistant Nurse
CNC	Clinical Nurse Consultant
CNE	Clinical Nurse Educator
CNS	Clinical Nurse Specialist
COM/FCH	Community / Family Child Health Nurse
DDON	Deputy Director of Nursing
DON	Director of Nursing
EN	Enrolled Nurse (RN Division 2 in Victoria)
EN ME	Enrolled Nurse with Medication Endorsement
EP	Exemplary Practice (NT)
N	Nurse
NA	Nursing Assistant / Nursing Attendant
NO	Nursing Officer
NP	Nurse Practitioner
NS	Nurse Specialist
NUM	Nursing Unit Manager
OHC	Occupational Health Clinical
OHS	Occupational Health and Safety
RN	Registered Nurse (RN Division 1 in Victoria)
SN	Student Nurse
SOHCN	Senior Occupational Health Clinical Nurse
SRN	Senior Registered Nurse
TEN	Trainee Enrolled Nurse

4.2   Classification Map - Public Sector

Job level used in survey	NSW	ACT	QLD	NT	SA	TAS	WA	VIC
AIN	AIN TEN	PC TEN	AIN SN					NA
EN	EN	EN	EN	N1	EN	EN	EN	EN RN D2
RN1	RN1	RN1	NO1	N2	RN1 NS RN	RN1	RN1	RN D1
RN2	CNS	RN2	NO2	N3	RN2	RN2	RN2	CNS
RN3	CNC G1/2 NUM 1/2	RN3	NO3	N4	RN3	RN3	RN3	RN3
RN4	CNC G3 NUM 3 NP	RN4 NP	NO4	N5	RN4	RN4	RN4	RN4
RN5	NM	RN5	NO5/7	N6/8	RN5	RN5	RN5	RN5/7

4.3   Classification Map - Private Sector

Job level used in survey	NSW	ACT	QLD	NT	SA	TAS	WA	VIC
AIN	AIN TEN	AIN	AIN TEN		TEN	TEN	TEN	NA
EN	EN	EN	EN	EN	EN	EN	EN	EN RN D2
RN1	RN1	RN1	RN1	RN1	RN1 OHS RN1	RN1	RN1	RN D1
RN2	CNS	RN1	RN1	RN1	RN2 OHS RN2 SOHCN	RN1	RN1	CNS
RN3	CNC CNE	RN3	RN3	RN3	RN3 OHS RN3	RN3	RN3	RN3
RN4	NUM	RN4	RN4	RN4	RN4	RN4	RN4	RN4
RN5	ADON DON	RN5	RN5	RN5	RN5	RN5	RN5	RN5/7