



A framework for nursing informatics in Australia

A strategic paper

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Royal College of Nursing, Australia

...To benefit the health of the community through promotion and recognition of professional excellence in nursing...

Foreword

This paper sets out a vision and work program for nursing informatics in Australia. It is a program that will meet the challenges, and take up the opportunities, presented by advances in information technology

This paper articulates areas for action based on the priorities for nursing informatics in Australia such as appropriate language, education and ongoing research. It makes recommendations and identifies a work program that is necessary for nursing to embrace the information era created by the new tools of information technology, and establishes strong foundations for taking this work forward. It will also ensure nursing has the data and resources to continue to provide evidence-based, quality, cost-effective and outcome-driven care for patients and clients into the future.

Nursing Informatics Australia, a special interest group of HISA, has developed the paper. NIA is the pre-eminent group of nursing informaticians in Australia and has undertaken this work at the request of and with the sponsorship from the HealthConnect program office of DoHA. I recommend this paper to you, as the development of informatics in health is central to how we continue to deliver care. I also congratulate the authors of this valuable blueprint for the future.

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Summary

INTRODUCTION

The last decade in the health care setting has seen a transformation of work practices and an explosion in information technology systems. This has been supported by a substantial investment in the information management infrastructure in the sector. This degree of spending is evidence of a strong belief by policy makers that information management systems will improve patient care and deliver quality health outcomes.

To maximise a return on a considerable information technology investment in the health sector, it is essential that the nursing profession is engaged in all stages of planning. This will ensure its information and knowledge management needs are met, and that it has the knowledge and skills to engage with and use the new technologies.

The literature and anecdotal reports reveal that, if the nursing profession is not involved in the planning stages of technology development, and if appropriate training and support is not provided to nurses, the health sector will not receive the potential benefits and a huge amount of financial and human resources will be wasted because implementations fail.

BACKGROUND TO THE FRAMEWORK

NIA entered into an agreement with the Commonwealth Department of Health and Ageing to ensure effective input from nursing clinicians and nursing informatics specialists to the *HealthConnect* program. The overall objective of the agreement was to:

- Convene a workshop to formulate the conference outcomes into a strategic framework paper that provides recommendations for developing the building blocks for electronic health records that will meet the needs of the nursing profession.

This report provides the key findings and recommendations of the workshop and consultations.

NURSING ENGAGEMENT

Earlier this year, a workshop was held at the Royal College of Nursing Australia conference to gain support and input from the general nursing profession and to inform this paper. The workshop was convened by Dr Moya Conrick (Griffith University) with members of the Health*Connect* team. This was followed by a Nursing Informatics Conference in Brisbane, which involved nurses from a broad section of government and non-government areas, and the public and private sectors. At both of these conferences nurses were willing to engage and to be involved with the Health*Connect* program although all thought greater consultation would be required.

On 21–22 August 2004, a strategic planning meeting was convened to explore the issues for nursing informatics and the building blocks for electronic health records. This was informed by the previous conferences. Summit participants were drawn from each state, and rural and remote Australia. They included acknowledged experts in health informatics and were broadly representative of expert clinicians, Aboriginal health care workers, community nurses, administrators, academics, and the public and private sector nurses. This expert group developed this framework (membership of this group is provided at Appendix 2).

GOALS AND OBJECTIVES OF THIS PAPER

This framework's goal is to present a strategy for the development of nursing informatics and the building blocks for electronic health records in Australia. It provides clear direction for government on the education and information needs of nursing, and the engagement of nurses across all practice settings. It also points to areas where nursing participation must be sought, particularly in the development and deployment of information technology across health care. It advises on ways to improve the health informatics capacity of the current nursing workforce, and identifies strategies for developing long-term capacity to sustain the nursing workforce into the future.

Some of the recommendations in this paper relate specifically to government initiatives such as Health*Connect* and must be implemented within that project.

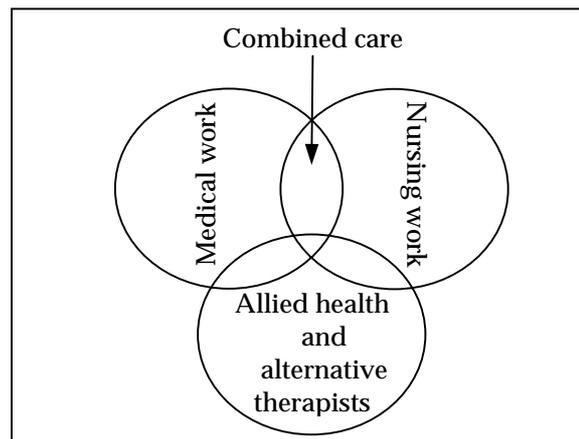
Others are essential for, and must be contained in, any specifications for IT procurement in health care.

SCOPE OF THE PAPER

NIA would like to emphasise that this paper is not a funding document, although some preparatory work has been carried out on a submission for an Informatics Management Centre for Nurses (Appendix 5). Rather, it provides recommendations and a clear direction for the development for nursing informatics and the nursing building blocks for electronic health records. It also included recommendations for capacity building across all nursing practice areas. Nursing understands the crucial nature of these issues and is keen to develop a business case to further this engagement process.

In developing this paper, NIA recognises that the nursing profession is a diverse groups of health professionals who work in a variety of different health care settings, in a multiplicity of roles, and with a broad range of responsibilities. NIA also recognises that in most health care settings, nurses do not work alone or in isolation from the rest of the health care team. However, it believes that there is a component of health care that is uniquely related to nursing (see Figure 1).

Figure 1: Nursing's relationship with other health professionals



Source: Conrick 2003a.

In this paper, 'nursing' is taken in its broadest sense. It includes practitioners from around fifty subgroups of professionals, each with their own unique set of expert nursing skills and knowledge. They come from very diverse geographical areas

and organisations. The paper recognises that nursing work covers all areas where nurses are engaged, whether working in a team or independently.

Commonwealth, state and territory governments, professional nursing bodies, nursing education providers, vendors and individuals and organisations planning or implementing information technology projects in nursing should use this action plan.

Many nursing organisations, service providers and nursing representative bodies are concerned about the lack of visibility of nursing in the information agenda, and the minimal capacity of nurses to respond to, or engage in, specific health informatics initiatives. Although nurses are the primary source of information about changes in their patient's condition, and their communication extends across all other care providers, they are involved in IT implementations more by serendipity than as the target group. The development of nurses' informatics skills and knowledge has been piecemeal, uncoordinated and sorely lacking in most instances. This paper addresses the major issue for the nursing profession with a vision for the future, a set of priorities for action, and a set of recommendations.

PRIORITY AREAS FOR ACTION

The establishment of an Informatics Management Centre for Nurses is crucial to the development of nursing informatics in Australia. As a priority, the Commonwealth should fund a business case to develop the centre and the major work items listed below. Nursing informatics must be united and the work rationalised. If this does not occur, we can expect a further fragmenting of the response to eHealth initiatives, a further disengagement of nurses, and waste of the time, effort and money invested in stand-alone projects that do not meet the needs of nursing generally, and which cannot be incorporated into or augment the government vision for eHealth in Australia.

While the centre is crucial to a national nursing response to eHealth initiatives, there are fundamental building blocks on which all implementations must be built also need to be addressed urgently.

At this time, there are many vendors implementing or developing nursing systems that are targeted specifically for local use, and their ability to do this is a

selling point for their product. Nursing is at risk of continuing service delivery in a fragmented manner that is unable to traverse locations or geographical settings. It will perpetuate and exacerbate funding issues and nursing's ability to achieve quality, cost-effective patient outcomes on a statewide or national basis. These are major issues in terms of the Australian Health Information Council's vision for Australia's health information systems and its perceived 'opportunity to create one of the world's best health care systems' (Coats 2004).

There is significant work to be carried out for nursing to reach equivalence with other major clinical groups in informatics but, unlike these groups, nursing has never been funded. Nursing has watched with interest and learned the lessons of the past. If Australia is to 'create the world's best health care system' (AHIC 2004) then nursing, as the largest group of health care workers, must receive adequate funding to address the issues outlined in this paper.

ACTION PLAN

NIA has developed an action plan and recommendations on key areas. However, the overarching and strong recommendation is that funding be provided for the establishment of an Informatics Management Centre for Nurses to oversee the implementation of the Framework for Nursing Informatics (see section 6 and Appendix 5). This is seen as a crucial step in NI collaboration and consolidation, and as a means of rationalising resources.

The Informatics Management Centre for Nursing would provide governance, oversee the implementation of a business plan based on the recommendations in this paper, and provide research directions in nursing informatics. The areas addressed in this paper vary; some are tackled easily but require goodwill, while others require ongoing support and funding.

The following table is coded to demonstrate the priorities for nursing and so differs from the order of the recommendations in the body of this Framework. A full list of recommendations is provided as Appendix 6. In the table nursing is again taken in its broadest sense and incorporates all acute, community and aged care settings.

Recommendation	Stakeholders	Risk if inaction	Urgency for nursing	Likely funder
1. Informatics Management Centre for Nurses	Nursing/DoHA/states/private providers/consumers	Medium	Urgent	DoHA/AHIC/NeHTA
2. Nursing language standards	DoHA/states/nursing/other health providers/software developers/vendors/private providers/consumers	High	Urgent	NeHTA/DoHA
3. Capacity building	DoHA/states/nursing/other health professionals/private providers/vendors/consumers/software developers	High	Urgent	AHIC/DoHA/States
4. Nursing knowledge repository	DoHA/states/nursing/ consumers/private providers/other health professionals/vendors	High	Urgent	NeHTA/DoHA
5. Nursing practitioner identification	DoHA/states/nursing/private providers/consumers	High	Urgent	NeHTA/DoHA
6. Event summaries and referral	DoHA/nursing/private providers/consumers	High	Urgent	DoHA/NeHTA
7. Governance	DoHA/sates/nursing/private providers/consumers	High	Urgent	DoHA
8. Change management	DoHA/states/nursing/private providers/consumers	High	Medium	DoHA/AHIC/NeHTA/states
9. Incentives for the uptake and use of ICT	DoHA/states/nursing/private providers/consumers	High	Medium	DoHA/AHIC/NeHTA/states
10. Continuous clinical practice improvement cycle	DoHA/states/nursing/ consumers/private providers	Medium	Medium	DoHA/states
11. Nursing information repository	DoHA/states/consumers/nursing/other health professionals/vendors	Medium	Medium	DoHA/states
12. Feeder systems for Health <i>Connect</i>	DoHA/nursing/consumers/software developers	High	Low	DoHA
13. Consumer support	DoHA/states/consumers/nursing/other health professionals/private providers	Medium	Low	DoHA/states

RESOURCES

There is a range of existing resources, including structures and systems, available to assist in achieving the recommendations, aims and objectives of this paper. These are listed and briefly described at Appendix 3.

1. Nursing in the Australian health care system

Nursing, with in excess of 250,000 members, is the largest single group of health professionals who directly influence the quality and outcomes of most health services. Nursing is one of the few professional groups caring for patients around the clock, seven day a week, across all settings. It is also the only group to have a philosophy of continuity of care. Nursing has the capacity to influence a patient's episode of care, in terms of safety and quality outcomes, in a manner that sets it apart from other health professionals.

Historically, nurses have been the interface between all other professionals and, currently, nursing is poised to become the central unifying component of the health care delivery system in the 21st century (Queensland Nursing Council 2002). This is illustrated by the major strides that have been made in the delivery of health care, and the recognition of advanced practice roles for nurses.

Nurses are usually the first to observe and report changes in a patient's condition. They alert other health professionals to these changes and often begin stabilisation measures before other practitioners arrive. Nurses communicate with all members of the health care team and have the authority and capacity for contemporaneous reporting within the structures of the health care system.

Nurses are found in the most remote and isolated places in Australia and in most health facilities. Groups such as community nurses, rural and remote nurses and nurse practitioners are the primary health care providers who are particularly involved with the continuity of patient care.

1.1 CONTINUITY OF CARE

A distinction needs to be made here between regular, ongoing sources of care (or longitudinal care), and the concept of continuity of care. Whereas a medical practitioner may be seen as the major primary care provider, in longitudinal care nurses embrace the continuity-of-care concept as both an aim and a philosophy that affects the delivery of care.

Continuity always involves transitions on the part of individuals, such as well to ill, home to hospital, and the gaps they may encounter along the way. These

transitions are a focus of nursing practice, as continuity mainly affects populations with complex health issues. During times of transition, the nurse is very often the health professional most involved in evaluation, planning and delivering the changes in care that may be required. If nursing is not able to report changes in patient's condition in a timely manner, using a language that is standardised and therefore understood by the health care team, then gaps in the care record will become a major problem. In terms of a national electronic health record, this will severely curtail the continuity of the record and so adversely affect patient care.

2. What does nursing offer HealthConnect?

The focus of HealthConnect is the effective communication of information across the continuum of care. A range of nursing professionals will be affected by the introduction of HealthConnect and electronic health records (EHR). In particular, primary health care providers like community nurses, rural and remote nurses and nurse practitioners, will be regular users of HealthConnect record.

Although nursing has had serendipitous involvement, and nurses have been engaged as trial managers and so on, *nursing* as a profession has not been the target of any research and development activity in HealthConnect. However, the nursing profession has much to offer HealthConnect. As key stakeholders and participants in the care delivery processes, nurses are well positioned to take a lead role in supporting the evaluation of the value, feasibility and implementation of HealthConnect.

Value and feasibility evaluation includes consumer empowerment, better decision-making, a reduction in unnecessary tests, time savings, flexible integrated care, acceptability, usefulness, and alignment to business processes. Nurses' understanding of the health care environment and processes positions them to assess achievements in these areas. This knowledge base can also assist in the determination, collection, analysis and reporting of benefits (which also measure value). Nurses are in a strong position to guide the evaluation of their contribution to the changes in health outcomes expected in the long term from HealthConnect.

As a key contributor of data and most consistent user of an EHR, nurses are well placed to be actively involved in the design evaluation to ensure the design meets their information needs. From a care integration perspective, design evaluation should consider the effectiveness of nursing contributions in meeting other stakeholder needs. In conjunction with design are the business and data aspects of the EHR. Only nurses can define the business context, information flow and practices of what nursing information is required where, and only nurses can evaluate the effectiveness of this design component.

From the technical evaluation perspective, nursing's contribution is fundamental to the definition of the performance metrics to measure the effectiveness of the

technical application and infrastructure. Technical evaluation must consider the ability of the infrastructure to support care delivery and fit with work practices, particularly in primary health care settings where many nurses practise.

Nurses' contribution to the definition of key components (such as the policy framework, consent models, person identification processes and access control determination) is also crucial to the success of *HealthConnect*. The debate on these aspects will be an important change management activity. Measuring the effectiveness of these components is important and includes ensuring the policy frameworks, identification processes and security profiles enable access to, and appropriate flow of, information. As a key stakeholder, nursing has a fundamental role in any evaluation of the effectiveness of stakeholder communications.

Nurses can offer advice on all aspects of defining the building blocks of *HealthConnect*. In conjunction with other health care providers, nurse informaticians can ensure the applicability of these building blocks in areas such as information architecture and standards, privacy, security, unique identification, event summary definition, provider registration, central medicines repository, medication currency and the development of clinical archetypes. Some of these areas are also crucial to the success of the Clinical Information Project.

Nurses can also support *HealthConnect* by advising on and building informatics workforce capacity. Employers and nurses need incentives and support to facilitate or undertake health informatics education and/or professional development.

3. International comparisons

Nursing Informatics Australia (NIA) is well connected internationally and collaborates with the International Medical Informatics Association (IMIA), NI group, its members, working groups, the International Council of Nurses (ICN) and other informatics groups. An example of this collaboration is the initiation and development of an ISO TC215 standard: Integration of a reference terminology model for nursing (ISO/FDIS 18104) (ISO 2002). This model supports the representation of nursing concepts and the integration of this reference terminology model with other models for the health care domain. It reflects attempts at harmonisation with evolving terminology and information model standards outside the nursing domain.

This collaboration is also evident in the development of an international nursing minimum data set (i-NMDS) that aims to identify the elements and conceptual definitions needed to enable the i-NMDS to be used to describe nursing care around the world. This project builds on and supports work already under way in a number of different countries, as well as on the work with the International Classification for Nursing Practice.

It was evident at the recent International Medical Informatics Conference (Medinfo2004) held in San Francisco that a number of individual nurses are participating at various levels of decision-making and standards development in the USA, Canada, the UK, South Korea, Sweden, Denmark, New Zealand, Switzerland and Japan, as they are in Australia. However, a stark difference between Australia and many of these countries is the support from government that they receive. Many of these countries have supported the development and/or trial of languages and data sets that enable nurses to better manage and document patient care, as well as to communicate effectively across the profession and within the health care team.

In terms of education, we also lag behind our international colleagues. For example, the European Commission funded the multinational Nightingale consortium to undertake a four-year project that identified the nursing profession's 'user needs', developed nursing informatics curricula and implemented the curricula at a number of demonstration (training) centres across

Europe. Courseware and other resource materials were also developed to support this education program (Mantas 1998).

Although there has been collaborative work undertaken in nursing informatics internationally, currently we lack an infrastructure to do so nationally. We also lack the structure to harness greater professional nursing participation and to influence health informatics adoption and initiatives. Australia has emerged as a world leader in the sharing of clinical information between providers via the *HealthConnect* program; however, nursing has not been involved to the extent that it should. The program requires greater nursing participation and a structured program to support nursing and to ensure its success in nursing informatics capacity building. Without these measures, nursing will not be fully engaged and *HealthConnect* and Australian Health Information Council (AHIC) projects will be jeopardised. The nursing workforce is essential to the health care industry, and nurses' acceptance of technology is key to the success of many informatics initiatives.

4. The nursing workforce

Australia's nursing workforce consists of registered and enrolled nurses whose scope of practice will vary based on education, levels of competence and authorisations to perform specific duties/tasks. In 2001, the Australian nursing workforce consisted of 228,230 nurses of whom 80 per cent were registered nurses and 20 per cent were enrolled nurses. According to the ABS Census (2001), the next most populous profession is a combination of allied and complementary health care workers (50,401) followed by medicine (46,873).

Nurses are mostly female (92 per cent) and have an average age of 42 years. A large number of nurses work on a part-time or casual basis, and the average nurse works 30 hours per week (Commonwealth of Australia 2004).

Nurses work in major cities, inner and outer regional areas as well as rural, remote and very remote areas. They provide generalist and/or specialist nursing services at beginning, advanced and expert levels. Generalist nursing practice is defined by the Queensland Nursing Council (Queensland Nursing Council 2002) as:

[encompassing] a comprehensive spectrum of activities. It is directed towards a diversity of people with different health needs, it takes place in a wide range of health settings and it is reflective of a broad range of knowledge and skills. Generalist practice may occur at any point on a continuum from beginning to advanced.

Specialist practice is defined in the same document as:

[following and building] on a base of generalist preparation. Specialist practice focuses on a specific area of nursing. It is directed towards a defined population or a defined area of activity and it is reflective of depth of knowledge and relevant skills. Specialist practice may occur at any point on a continuum from beginning to advanced.

Australia has more than 50 national nursing organisations that reflect the many areas of nursing specialisation. Many have developed their own unique set of competencies and provide a credentialing service to their constituents. Nursing is a massive workforce and engaging such a large section of the health care industry is crucial for the HealthConnect project and to the future of any informatics projects undertaken in this country.

5. Nurse informaticians

Nursing informatics in Australia began around 1984. Since then, it has played a significant role in educating nurses and other health professionals in the use of digitised health information. Nurses were prime movers in bringing about a strong health informatics focus throughout the country. It is difficult to say whether nursing informatics is a recognised discipline or a recognised nursing specialty in Australia because this depends on the criteria used to determine such recognition. Indicators that could be used to determine if nursing informatics is a recognised specialty are the identification of nurses working within the domain or in positions that have nursing informatics in the title, or the existence of formal or informal educational programs, or the publication of relevant literature.

NIA has participated with many other national specialist nursing organisations in a national nursing initiative to define designated nursing specialties. The criteria adopted were based on Styles' (Styles 1989) work for the American Nurses Foundation. It is clear that nursing informatics traverses all nursing domains as it integrates nursing science with the computer, information and telecommunication sciences. Therefore, it is somewhat different from all other nursing specialties and considerably broader in scope (Hovenga 1997). Ten criteria for the designation of nursing specialties have been established and these are set out in Appendix 4.

Nurse informaticians' contribution to the creation of an electronic working environment that meets all clinical nursing needs and integrates this with all functions of the health care team, is expected to positively impact on cost-effectiveness, productivity and patient safety while helping to revitalise nursing practice (Ball, Weaver & Abbott 2003).

As nursing informaticians work in disparate areas and normally alone or in small team, they need an overarching effective governance structure. Without such a structure, nursing informatics will develop in a slow and piecemeal manner in this country. Conversely, with such a structure in place, nursing can engage with IT developments, education can be pursued in a systematic and targeted manner, and research can be undertaken to ensure quality care for all patients.

6. The national statement and recommendations

NIA has the endorsement of the national nursing organisations to seek government support for the establishment of an Informatics Management Centre for Nurses (see Appendix 5). The centre will focus on professional nursing issues associated with the development, implementation and management of IT in nursing practice. It will also oversee the development and implementation of the building blocks required for health and clinical information systems including initiatives such as electronic health records and standardised nursing language development. The centre will consist of representatives from all relevant stakeholders. A governance structure will be established and a small management committee put in place to manage the overall organisation of and resource allocation for activities to be undertaken (see section 6.7).

This centre will implement the recommendations and action plan put forward in this paper. It will contribute to and augment informatics initiatives undertaken by the Commonwealth (NeHTA and AHIC) and State governments. Patients and residents will be primary beneficiaries of the development of such a system that supports and meets the needs of nurses providing care. Key performance indicators for this centre are provided in Appendix 5.

NIA recommends that:

1. A business case be developed for an Informatics Management Centre for Nurses.
2. An Informatics Management Centre for Nurses be established.

6.1 CLINICAL INFORMATION SYSTEMS AS DATA SOURCES FOR HEALTHCONNECT

HealthConnect, by design, relies on systems from many different sources that feed data into the clinical repository for storage and access by other health care providers and consumers. There are many critical success factors that influence this process, and perhaps the most significant is the implementation of comprehensive clinical information systems throughout inpatient facilities,

outpatient service clinics and community nursing services at the area health level in each state and territory.

Many questions arise in relation to the reliance of *HealthConnect* on data from feeder systems over which the Federal Department of Health and Ageing has little control. These questions include the motivation for state health departments and area health services to participate in *HealthConnect* ('what's in it for me?'), continuity, source of funding, and how to populate *HealthConnect* with comprehensive health data on a national level. The answers to these questions are complex and have not been fully answered yet. However, *HealthConnect* and the state/territory health departments have a prime opportunity to build an electronic health record system at a national level that will provide the benchmark for global health care.

In principle, most nurses and state health departments would be willing to participate for the greater good of patient care and improved quality of health care delivery. However, in reality, such participation will depend on the resources and funding being provided to complete the projects.

Clinical information systems implemented at a state level should:

- Be comprehensive in scope, and all major components of the clinical record should be available in the electronic format. This must include all clinical orders (medications, diagnostic orders and specialty consults), nursing care orders and documentation and allied health.
- Be user friendly and intuitive.
- Be designed around best practice clinical workflow of the end-user.
- Have a single data entry point for each item (which may then populate multiple components of the chart and therefore eliminate duplicate data entry).
- Have network speed and hardware specifications that facilitate rapid log-in access and workflow.
- Be readily accessible by the end user. This includes both a single log-in process and appropriate hardware devices for user access.
- Ensure data collection for management, quality and statistical reporting is an output of data collected during the routine clinical workflow, rather than an additional task imposed on the end-user.

Until the state-level systems are fully implemented across all health care facilities, the data sources for HealthConnect will be incomplete. This will probably have a significant impact on clinicians' level of confidence in the system because the value-added returns of using HealthConnect will decrease, as the information they require is unavailable or inaccessible.

Data input processes must be rapid and intuitive without placing an additional burden on the user. While it is unlikely that any method of data collection in an electronic clinical information system will be faster than writing a few notes on paper (often incomplete and illegible), the benefits far outweigh the change in workflow process required providing the design and input methods are not overly cumbersome and unreasonably time consuming. User interface design and an understanding of clinician workflow (including nursing and allied health) are of critical importance. If these designs are not compatible with nursing work processes, the system will collect questionable data.

NIA recommends that:

3. A multidisciplinary approach to system design must be adopted that has appropriate representation from all clinical providers including, at a minimum, nursing (inpatient, outpatient and community), medicine, allied health, mental health and aged care).
4. Nursing workflow studies must be undertaken to determine 'best fit' information requirements.
5. A comprehensive standard nursing language must be adopted to underpin electronic communications and nursing work.
6. A comprehensive national education program must be provided for nurses.
7. Increased support and funding must be provided for the implementation of the point of care clinical systems that support nursing practice.

6.2 NURSING DATA AND NURSING LANGUAGE

As health care grows more complex, and the boundaries between the professions and sectors become increasingly blurred, the ability to communicate effectively about patient care is more important than ever. The delivery of good nursing care has always depended on the quality of the information available to nurse. However nurses, long recognised as key collectors, generators and users of

patient/client information (Currell, Wainwright & Urquhart 2002) are unable to communicate across locations and geographical settings.

We also know that if patient care is not consistently and accurately recorded, the possible adverse effects on patient care might be highly significant (Currell et al. 2002). The role of the nurse in providing 24-hour care, coordinating the care given by others and providing continuity of care means the exchange and transfer of information is a significant nursing activity and crucial to patient outcomes. Good quality data is essential to all areas of the health care system and nursing data is especially crucial.

Nurses reject language classification systems that are inadequate or inappropriate but with the implementation of electronic health records, consensus on language classification must be achieved (Conrick & O'Connell 1998). Without some type of organisation or classification, the differences in nursing language can be quite marked and result in inappropriate interpretations of the patient record, and the key process of nursing care being measured in different ways (Conrick 1995).

A major problem for nursing has been a lack of funding to initiate research into an appropriate terminology/ies that represents the spectrum of nursing practice in Australia. If HealthConnect is to succeed as a national summary record and the AHIC vision realised, this problem must be addressed as a matter of urgency.

NIA recommends that:

8. A comprehensive stocktake of nursing data sets and terminologies currently in use should be undertaken.
9. An evaluation should be undertaken of available data sets and terminologies regarding their ability to adequately represent nursing concepts and meet nurses' information needs at all levels in the health industry.
10. Specialist nursing groups must be represented in any development of clinical minimum data sets to ensure their specific information needs are met, and that continued growth of a standardised language for nursing is supported.

6.3 NURSING EVENT SUMMARIES AND REFERRALS

Complex health populations are characterised as requiring care in more than one health sector, having two or more chronic conditions, or when day-to-day management calls for the participation of the individual and the family (Harrison et al. 2002). Nursing works closely with these patients on a daily basis as community and continuity of care providers, and nursing can supply the snapshot of ongoing care.

Discharge planning grew out of the early work on hospital-to-home transition and most facilities now have a discharge planning policy. Historically, nursing professionals have filled this role. Therefore, nursing event summaries and nursing referrals are of critical importance to HealthConnect because nursing holds the key to this project's operational efficiency and effectiveness. However, nursing recognises that it does not work in isolation from the rest of health care providers, and recommends that a clinical discharge summary be produced and that this summary contains data elements that support nursing communication needs.

NIA recommends that:

11. Nursing data elements must be developed for the nursing portion of a clinical referral to support the continuity of patient care.
12. Nurses must participate in the evaluation of the effectiveness of the nursing portion of the referral to support the continuity of patient care.

6.4 EDUCATION/CAPACITY BUILDING

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 skills that must be integrated into the continued development of nursing practice.

A national approach to the development of competencies and integration of these into the curriculum must be undertaken. In addition, national and state

information management and technology initiatives must include health informatics education, training and development strategies to support competency development with current staff. To promote advances in informatics education and research, academic incentives must be provided if governments are to demonstrate their commitment to informatics scholarship.

A beginning standard, the international computer drivers licence (ICDL), could hold the key to community development of computer literacy and competency. Although many schools in Australia are ICDL testing centres and encourage students to undertake this qualification, it is not a requirement of their study. Undergraduates entering higher education institutions need basic computer literacy as a minimum entry standard. NIA recognises the difficulty in this, but sees an active role for governments to ensure that nursing informatics competencies are incorporated in all nursing courses and as the basis for staff development programs. If the nursing workforce continues to be uninformed and uneducated about informatics and its use in health care, best practice will not be attained and patients and patient care will suffer in the long term.

NIA recommends that:

13. A skills audit must be undertaken across the health care workforce to identify the different HI needs of the nursing workforce in each of its subdisciplines. This will enable effective targeting of appropriate education and training.
14. A nationally agreed set of basic nursing informatics competencies that all nurses need to acquire must be developed. These should be incorporated in all undergraduate curricula and be used as the basis for staff development programs. They might be incorporated into a national computer drivers licence for nurses.
15. Nursing informatics must be part of the curricula of any postgraduate nursing programs to continue the embedding of informatics skills as a core competency of nursing at any level.
16. The delivery of nursing informatics education and training must be available through a number of different mechanisms, such as through universities and the TAFE system, professional associations and private sector trainers. It must also be a component of the broader nursing education and training programs.
17. Incentives for offering NI education must be provided to organisations with the capacity to do so.
18. Nursing colleges and/or professional associations must receive funding to assist members in undertaking appropriate and relevant educational activities to advance their core competencies in NI and, ideally, to recognise such activities as a form of continuing professional development.
19. A scholarship program should be developed to enable the study of nursing informatics to occur. This should be available to eligible nurses interested in advancing their NI qualifications.
20. Scholarships should be awarded each year to a general field of applicants and have identified places for indigenous and aged care health workers.
21. A consortium of educational institutions, vendors and so on must be established to manage the necessary infrastructure needed to enable all Australian universities' nursing programs to access and make use of simulated and fully integrated health information systems to support all nurse and NI education.

6.5 CONTINUITY OF CARE

Nurses focus on patients' responses to illness, injury, treatment and care within the context of their family, social structure and location. In addition, their services are guided by patient risk assessments that form the basis of preventive nursing interventions. These assessments and interventions include the broader health context of psychosocial, environmental and family/carer considerations and are crucial to the ongoing health of our community. Nursing, as the only profession working across this continuum of care, must have the support and resources to effectively and efficiently engage in this crucial area.

Nurses are found in a diversity of practice areas and geographical settings and serve an increasingly transient community. Increasingly, they are struggling with this, particularly in rural and remote Australia where they are often isolated from other practitioners. IT has the potential to support these isolated clinicians and to largely negate the tyranny of distance.

IT can support all clinicians by enabling much greater interaction and improvement in communication. If nurses are not able to engage because of incompatible work processes, a lack of a common language, education or interoperability of systems, a large section of our community will remain isolated and nursing's communication inconsistent. This, in turn, will affect nursing services, patient care and patient and nursing satisfaction with the health care system. Services will also remain unequitable: the rate of readmissions will continue to climb and the retention of nurses will continue to be problematic.

NIA recommends that:

22. All information flow analyses must include nurses' information needs to enable them to provide continuity of care for all case types whose care is managed by multiple providers.
23. Clinical systems in use at the local level must be interoperable so they can be used as feeder systems to HealthConnect.

6.6 UNIQUE IDENTIFIERS

The future of Health*Connect* will depend on providers being able to access quality data, when and where it is required; without this the system will be compromised. Therefore, unique identification of all relevant nurses will be one of the key components in facilitating a nationally integrated health record.

A unique identifier also has ramifications for privacy and liability when data is shared across boundaries. Appropriate security technologies must be in place to protect data from unauthorised access, along with appropriate user access policies and procedures. Data integrity is critical and safeguards must be implemented to ensure data capture is accurate and efficient, and effectively maintained over time. There are a number of other issues for a unique identifier such as:

- Standards for the characteristics for a unique ID, how it is assigned and how a registry is both developed and maintained.
- A method used to assign the number or biometric data.
- Implementation costs need to be investigated.
- Continuity issues may arise as processes and standards change.
- Historical records will need to be changed or mapped to the new ID.
- Privacy and confidentiality issues must be addressed.

The implementation of national unique provider identification also poses a number of challenges that will require significant effort and cooperation to successfully overcome. Experiences in other countries have shown that implementing national unique provider identification for nurses is achievable; however, the nursing profession needs to be engaged early in the process and as a crucial stakeholder.

NIA recommends that:

24. A cost-effective structure for ID development and initiation must be developed.
25. Nursing stakeholders or their representatives must be invited to participate in the development and maintenance of the ID system.
26. Value should be added to the unique ID program to ensure participation and to gain stakeholders' support, acceptance and universal adoption. For example, the ID program could be linked to HRM systems.

6.7 INCENTIVES FOR UPTAKE OF IT

A fundamental shift has occurred in nursing and the registered nurse workforce over the last two decades. As occupational opportunities expand and working conditions for nurses become more difficult, the number of young people entering nursing has declined. There are 290,000 registered practitioners in Australia; however, there is a severe shortage in those willing to commit to the current health care system (Karmel & Jianke 2002). This trend is not confined to Australia and many health care systems are feeling the pressures of a global nursing shortage.

In Australia, projections show that by 2010 there will be a registered nurses shortage of 40,000, and the ageing of the nursing workforce will have a continuing effect, at least until 2020. Student numbers need to increase by 120 per cent to ensure a stable workforce (Karmel & Jianke 2002), a seemingly impossible target. It is into this already stressed workforce that information technology is being introduced.

The acknowledgement of nursing's place in health care and incentives for the uptake of information technology are vital for the introduction and ongoing use of technology by nurses. Without this, IT will continue to be a low priority and the data collected will be of questionable quality. At the very least systems will be compromised or fail due to the lack of nursing involvement and gaps in nursing data.

NIA recommends that:

27. A governance structure for nursing informatics in Australia must be established to enable buy-in from all areas of nursing.
28. Adequate funding must be provided to support the ongoing development and governance of nursing informatics nationally.
29. A research plan for nursing informatics must be developed.
30. The nursing profession must be represented in the governance of information management and technology initiatives that impact on the nursing profession.
31. The benefits of clinical information systems and HealthConnect should be measured and communicated to senior nursing leaders to support the continued change management and the implementation of systems that support nursing.
32. Research should be undertaken into the value and benefit of an information framework for the ongoing development of nursing knowledge.
33. Funding must be provided to demonstrate the value of nursing informatics in supporting nursing and nursing care and improving nursing outcomes.
34. Change management for all health informatics and associated IM&T initiatives should be supported.

6.8 CHANGE MANAGEMENT

Change involves some catalyst. It is an inevitable part of our life and work and it occurs whether we want it to or not (Conrick 2003b). As new technology is developed and implemented, personnel and organisations have to adjust, and sometimes the adjustment is major. In nursing and health informatics, there will be two distinct types of change. The first is common to all people when faced with a new situation and they undergo something akin to a grieving process as they leave the old reality behind. This is well explained in the literature (Bridges 1991; Conrick 1996).

The second type is change related to the nursing service delivery system itself. Nurse leaders and managers will hold key positions for the successful implementation of change in health care organisations. Nurses will also be crucial to the success of change management strategies, as any significant transformation

creates 'people issues' within the institution. Leaders will be asked to step up, jobs will be changed, and new skills and capabilities will need to be developed as employees may be uncertain and resistant to the changes brought about by the introduction of information technology.

Change must be well planned and all layers of the nursing workforce must be involved. Change efforts must include plans for identifying leaders who will be champions. At the same time, the responsibility for design and implementation of technology should be given downwards, so change 'cascades' through the organisation and creates ownership (Jones, Aguirre, & Calderone 2004). This requires more than mere buy-in or passive agreement that the change is acceptable. It demands ownership by leaders willing to accept responsibility for making change happen in all of the areas they influence or control.

Ownership is often best created by involving people early, and encouraging them to identify problems and craft solutions. Extensive communication is essential and must reinforce core messages through regular, timely advice that is inspirational and practicable. Communications should be targeted to provide nurses with the right information at the right time, and to solicit their input and feedback.

A successful change program picks up speed and intensity as it cascades down. This makes it critically important that leaders understand and account for culture and behaviours at each level of the organisation. The culture of nursing must be understood and issues addressed explicitly if change is to be effective. If change is not managed effectively, the nursing workforce will be greatly affected and more practitioners will find employment outside the health care system.

NIA recommends that:

35. An audit of the nursing work must be undertaken to determine nursing workflows.
36. Nurse leaders and managers who will act as change agents and champions within organisations/departments must be identified.
37. Nursing leaders and managers must be educated about nursing informatics and the broader issues of health informatics.
38. Timely, constant, practical communication about the changes brought by technologies must be undertaken through the relevant nursing organisations.
39. Adequate funding must be set aside for change management activities.

6.9 GOVERNANCE

The nursing profession must decide on a process through which a group with delegated decision-making authority will direct their collective efforts in this new climate. NI governance, involving representative stakeholders and decision-makers, will be accountable to all stakeholders for the process and the output. Good governance is about achieving desired results in the right way. Since the 'right way' is largely shaped by the cultural norms and values of the stakeholders (Plumptre & Graham 1999), the decision-making body needs to engage with the multiple nursing groups.

NIA believes that a body that represents nursing must drive the development and maintenance of the building blocks in nursing informatics. This representative group must consist of nursing's major stakeholders; however, NIA also realises that it should involve representation from other clinical groups and consumers. The governance group should guide the development and management of all aspects related to their knowledge domain (such as archetypes and data standards). It must also create an atmosphere in which nurses feel ownership and are comfortable to explore informatics. Without this type of structure nursing's approach to informatics will continue to be fragmented, duplication of effort will continue, and the workforce capacity in informatics will remain very low. Systems will fail because of either apathy or ignorance, and the projected improvement in clinical care and health outcomes will not eventuate.

NIA recommends that:

40. A governance structure should be established for nursing informatics in Australia.
41. The ongoing development and governance of the group must be supported.
42. This group should develop a research plan for nursing informatics.
43. Nursing representation must be included in the governance of information management and technology initiatives (for example, Health*Connect*) that impact the nursing profession.

6.10 CONTINUOUS CLINICAL PRACTICE IMPROVEMENT CYCLE

Underpinning the real value of the adoption and use of clinical systems, electronic health records (EHR), intelligent decision support and care planning is the ability to share clinical nursing information between systems. Such information needs to be computer 'processable' by the receiving system so it is understood at the level of formally defined nursing domain concepts. This requires four prerequisites: a standardised EHR reference model, service interface model, domain specific concept models and terminologies. The latter two require the development and adoption of nursing domain-specific archetypes (constraint models), templates and terminologies.

This infrastructure is required to enable nurses to evaluate, compare and improve nursing service delivery relative to patient outcomes. The clinical practice improvement methodology was designed to develop data-driven, analytically-based protocols to achieve desirable outcomes at the lowest essential cost over the continuum of care (Horn 2001).

This methodology requires nurses to collect data on outcomes, treatments and care activities as well as patient signs and symptoms based on nursing assessments. Ideally, this is achieved as a secondary function of routine documentation of care via clinical information systems. Use of standardised data enables these types of studies to compare different practices in any number of organisations for specific patient cohorts, and leads to the development of evidence-based clinical guidelines. These, in turn, can be incorporated in decision support systems and positively influence future care.

The cycle is completed when the results of improved practices are again evaluated. However, this cyclic model of improvement will only be achieved if all of the building blocks are in place. It is essential that nursing is involved at all phases of systems design, that practice is underpinned by a common language, and that a systematic education plan is undertaken to enable nurses to base their practice on evidence that was not previously available in a paper based system. This will improve clinical care and health outcomes.

NIA recommends that:

44. Clinical and nursing systems must be designed that enable the use of data mining software and the adoption of the continuous practice improvement methodology.
45. Clinical nursing systems must include, or have access to, sufficient demographic data to enable data aggregation across systems for specific patient cohorts. This will enable the undertaking of 'virtual' randomised clinical trials to evaluate and assess homogeneous patients and their outcomes relative to treatment and care options provided.
46. The National Health Data Dictionary must include sufficient and relevant nursing data elements to ensure nurses' contribution to the delivery of health care services can be evaluated and appropriately recognised.

6.11 NURSING KNOWLEDGE REPOSITORY

It has been demonstrated that nursing knowledge is specific to nursing although there is an overlap with other clinicians (see Figure 1). However, with the development of openEHR, the need for a nursing knowledge repository is essential.

It is well accepted that a distributed national EHR system needs to be underpinned by an appropriate, standardised architecture that defines how patient information is structured, stored and managed so it can be securely shared and safely used by healthcare providers. HealthConnect has been conducting a project to assess whether the *openEHR* architecture is suitable to underpin a national EHR system.

Fundamental to *openEHR* is the use of 'archetypes' or electronically generated documents that provide a relatively simple means for clinicians to specify the structure, content and context of clinical information without becoming involved in how programmers might represent the information within an EHR system. The *openEHR* architecture and archetypes, when implemented with appropriate software, are used to manage clinical information and knowledge in an EHR system. Beyond the current focus on GPs, hospitals, health services, clinical specialties and other health professionals need to be involved in *openEHR*

developments. Nursing should be responsible for the nursing knowledge contained in archetypes and are prepared to undertake this work.

NIA recommends that:

47. Nursing must develop nursing archetypes underpinned by evidence based nursing practice.
48. Organisational structures, working guidelines and methodologies must be established for the governance, naming, development, registration and distribution of nursing archetypes.

6.12 NURSING INFORMATION REPOSITORY

Information and knowledge are the currency of the information technology revolution. Nursing information consists of resources to enable nurses to broaden their informatics knowledge and to support nursing education.

NIA acknowledges that a large proportion of the population search the Internet for resources. A cursory surf of the World Wide Web reveals the broad range of health informatics information that is available. This is difficult for a beginning informatician or interested consumer to sift. The aim of the NIA repository is to produce and develop a well-differentiated and targeted high quality site that is open to all people with an interest in HI and particularly NI.

The site will facilitate the exchange of knowledge through peer-to-peer exchange, collective intelligence, networking, debate, sharing, learning and discussion in support of individuals and their organisation. The repository will:

- Support nursing education.
- Promote the understanding and sharing of information, tools and experiences.
- Develop network of nurses interested in information technology and a 'virtual community' of nurses working in various areas.
- Inform and consult with health informatics personnel (regardless of membership of a professional body).
- Develop a series of case studies in order to share learning and promote best practice in informatics.
- Enable skills development.
- Support the finding and use of sources of evidence relating to informatics.

- Support the sharing of best practices leading to more informed decisions in health and nursing informatics.
- Improve productivity, effectiveness and efficiency of nurses, other clinicians and consumers.
- Increase satisfaction in the clinical area and therefore retention of nurses.

NIA recommends that:

49. An information repository should be established and maintained on an ongoing basis.

6.13 CONSUMER SUPPORT

It is widely acknowledged that knowledge is power; that it reduces fear and increases the chances of survival in some chronic illnesses. The literature reveals that it is essential for education to be provided at the right time and in a form that enables individual patients to learn. Many people access health information through personal computers in their homes; others access these systems in more public locations such as libraries, clinics, hospitals and physicians' waiting rooms. Today's consumers are demanding increasingly more detailed but targeted health information, and they are becoming more active in making decisions about their health and lifestyle (Conrick, Rothwell & Clarke 2004).

Information systems provide health information to consumers in a wide range of settings and support the consumer's ability to obtain health-related information in a variety of ways. These include:

- Using systems that provide information (one-way communication).
- Using information that is tailored to a user's unique situation.
- Communicating and interacting either with health care providers or other users (two-way communication).

The State and the Commonwealth governments support projects to disseminate health information to their constituents. Consumers are able to reduce unnecessary health services and lower health care costs by timely access to health information. Timely, evidence-based and current information also enables health care providers to more effectively treat their patients. However, there are significant issues to be addressed such as:

- Access.
- System development cost.
- Privacy and security.
- Information quality.
- Problems gaining access to appropriate health information, especially in self-care situations.
- Lack of consumer education.
- The lack of a nationwide infrastructure to link consumers to providers.

Nurses are part of people's lives when they are most vulnerable, and are strong advocates on all issues that affect their patients. Ten years of Morgan polling reveals nurses as most trusted of all professionals (Morgan 2004) and, for this reason, nurses are in a unique and strong position to encourage and support consumers in using information technology, promote acceptability and demonstrate its usefulness. Nurses' understanding of the health care environment and service delivery processes positions them well to assess achievements in these areas.

NIA recommends that:

50. Nurses must extend their pivotal role in patient education to consumer informatics. This will enable consumers to:
- Develop a greater understanding of the value of health informatics activities and the impact on their health status.
 - Assist with consumer buy-in.
 - Ensure optimal use of IT to support health care.

7. Conclusion

The nursing profession is an amalgamation of diverse practitioners working in a myriad of settings. However, nursing readily acknowledges that within the health care system there are some commonalities between the health disciplines regardless of the setting. IT will significantly redefine these boundaries as it supports health care workers by providing access to quality, timely data and information. IT opens up new possibilities for the dissemination and use of information, which enable government initiatives such as *HealthConnect* to demonstrate improved performance and outcomes across the health sector.

Nurses are key participants and the largest stakeholder group in health care; therefore, nursing will be most impacted by the introduction of technology. The explosion of IT uses and the Commonwealth's vision for the future of health care have added urgency to testing and development of the building blocks of nursing informatics. Nursing is integral to improving clinical care and health outcomes, and nurses are key stakeholders in the success of information systems implementations. There is evidence, published and anecdotal, that the lack of adequate training and support leads to either a lack of use of the system and waste of human and financial resources or, worse, a major adverse health event (Murphy 2004).¹ Therefore, nursing requires appropriate and targeted informatics education and ongoing support following the introduction of systems in the workplace.

It is essential that a structure to unite, guide and support nursing informatics in Australia be provided. The most expedient way to do this is by supporting and funding the development of a business case for an Informatics Management Centre for Nurses with a mandate to oversee the development of NI nationally. However, to develop NI in Australia, it will also be necessary to address all of the issues presented in this paper. Nursing is prepared to drive these initiatives, but adequate funding and support from government is essential.

¹ Also taken from anecdotal information provided in consultations with the Aged Care Division and the Office of Aboriginal and Torres Strait Islander Health in the Department of Health and Ageing.

Appendixes

APPENDIX 1: THE NATIONAL VISION FOR NURSING INFORMATICS

This paper is founded on a vision for nursing informatics in Australia that will see all nurses in Australia using information technologies to:

- Improve nursing care.
- Better manage information.
- Improve workplace practices.
- Base clinical decisions on readily available quality nursing and other clinical data.
- Achieve efficiency gains that result in more effective allocation of nursing resources.
- Better anticipate and manage risk.
- Deliver evidence-based, quality, cost-effective care and improved outcomes.
- Undertake nursing research through links to data available in nursing information systems and health information systems.
- Describe nursing practice to improve communication among nurses, and between nurses and others.
- Enable comparison of nursing data across clinical populations, settings, geographic areas and time.
- Demonstrate or project trends in the provision of nursing treatments and care, and the allocation of resources to patients according to their needs, based on a common nursing clinical judgement.
- Support consumer advocacy and recognise the role of citizens in their care.
- Recognise the major information-handling roles of the non-medical health care professions.

This will allow the benefits of information technology to be experienced across the nursing profession and in the care given to our patients.

APPENDIX 2: SUMMIT PARTICIPANTS

The following NIA members participated in the summit and the review process for this document:

Dr Moya Conrick (Chair)	Chair NIA, Griffith University and the RCNA
Dr Evelyn Hovenga	Central Queensland University
Ms Joan Edgecumbe	Health Informatics Society of Australia
Mr Tom Morgan	Health Informatics Society of Australia
Ms Mandy Palumbo	Department Health SA, Lyell McEwin Health Service
Ms Robyn Cook	NSW Health, South Western Sydney Area Health Service
Mr Marcus Wise	Tasmania Department of Health & Human Services
Ms Narelle Dep	Derby Aboriginal Health Service WA
Ms Toni Laracuenta	Nurse Informatician/Consultant
Ms Helen Lehmy	Derby Aboriginal Health Service WA
Ms Tricia Leeder	NSW Health, Westmead Hospital
Ms Pam Heterick	St John of God WA

Apologies: Victoria Gilmore (ANF)

APPENDIX 3: RESOURCES

Resources include:

- The Joanna Briggs Institute that brings together a range of practice-oriented research activities to improve the effectiveness of nursing practice and health care outcomes.
<<http://www.joannabriggs.edu.au/about/aims.php>>
- The Australian Resource Centre for Health Care Innovations (ARCHI) whose mission is to support and increase the implementation of effective and quality innovations in clinical care in the Australian health care sector.
<<http://www.archi.net.au/content/index.phtml/itemId/45034>>
- The Australian Council for Safety and Quality in Health Care that leads national efforts to improve the safety and quality of health care provision in Australia.
<<http://www.safetyandquality.org/>>
- Many national nursing organisations, each of which provides information about specific credentialling content and processes. They also have consistent, equitable and defensible assessment procedures for credentialling purposes that reflect their specific body of knowledge as expressed in terms of competencies.
<<http://www.anf.org.au/nno/>>
<http://www.anf.org.au/nno/pdf/NNO_Glossary_of_Terms.pdf>
- Current undergraduate and graduate programs in HI, and existing university HI centres.
- NI components that are provided as part of many health professional undergraduate courses.
- The Nursing Informatics Special Interest Group of the International Medical Informatics Association (IMIA/NI-SIG), Nursing Informatics Competency Recognition Certificate approved at the general assembly meeting during NI'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, & Bickford 2004)
- Existing course program accreditation guidelines such as those available through the Australian College of Health Informatics (ACHI). ACHI assumes responsibility for the adoption and dissemination of HI education standards that provide guidelines for future accreditation of HI educational

programs. Such standards are based on an internationally recognised body of knowledge that defines the HI discipline.

- Existing professional associations such as the NIA, a special interest group of the Health Informatics Society of Australia, HL7 Australia, the Royal College of Nursing Australia and other national nursing organisations that provide continuing professional development programs.
- The International Computer Driver's License initiative available in Australia through the Australian Computer Society.
- Government agencies concerned with nursing workforce planning.

APPENDIX 4: TEN CRITERIA FOR THE DESIGNATION OF SPECIALTIES

1. The specialty defines itself as nursing and subscribes to the overall purpose, functions and ethical standards of nursing.
2. The specialty is a defined area of nursing practice that requires application of specially focused knowledge and skills.
3. There is both a need and a demand for the specialty area
4. The focus of a specialty is a defined population or a defined area of activity, which provides a major support service within the discipline, and practice of nursing.
5. The specialty is based on a core body of knowledge, which is being continually expanded and refined by research. Mechanisms exist for supporting, reviewing and disseminating research.
6. The specialty subscribes to, or has established, practice standards commensurate with those of the nursing profession.
7. The specialty adheres to Australian requirements for nurse registration.
8. Specialty expertise is gained through various combinations of formal education programs, experience in the practice area and continuing education. Educational program preparation and administration must include appropriate nursing representation.
9. The specialty has or is developing a credentialling process consistent with the Australian nurse specialist credentialling framework. Sufficient human and financial resources are available to support this process.
10. Practitioners are organised and representative within a specialty organisation.

(Hovenga 1997, based on Styles 1989)

APPENDIX 5: INFORMATICS MANAGEMENT CENTRE FOR NURSING

This document was prepared in conjunction with representatives of the national nursing organisations

Background

Nurses are a major stakeholder group within the health industry and they represent the largest component of the health professional workforce. Nursing work is information intensive and nurses need to process information to guide their practice, report observations and document their patient care. Nurses use data, information and previous knowledge, plus knowledge from colleagues or the literature as a basis for problem solving and for decision-making. Nurses are able to directly influence the quality of most health services provided and their outcomes.

Nurses spend at least 20 per cent of their time processing written information and up to a further 30 per cent engaging in verbal communication between themselves, patients and co-workers (Hovenga & Hindmarsh 1996). Appropriate and timely information at the point of care is known to improve nurses' decisions about the care to be delivered; thus, reducing risk and improving the quality and outcomes of the care. Consequently, any initiative that aims to automate health information processing is expected to have a major impact upon nursing work practices, and the quality and safety of the care provided.

Nurses must consider the impact electronic health records have on their everyday work, and what preparation is required to make a successful transition to these records. Health records serve not only as archival records but may be viewed as diaries of diagnostic discoveries, observations made and care provided. A by-product of the rigorous collection and recording of health status and nursing activity data into an electronic health record at the point of care would be the capacity to perform post hoc analyses of this data to determine the effectiveness and efficiency of nursing activity in real-world settings. The following questions need to be urgently addressed:

- How are nursing concepts best communicated?
- Do nurses consistently label specific concepts in the same way?
- Have we adopted a structured nursing language that is suitable for inclusion into clinical information systems?

- Are such systems able to identify nursing's contribution to health care and to patient outcomes?
- Do we know what information and features nurses, as information system users, require?

Key performance indicators

Possible key performance indicators are listed in the table below.

Key performance indicators	Comment
Improved patient outcomes as a result of more effective communication between nurses and other health care providers	Nursing is generally a 24-hour per day service but many others involved in patient care are confined to traditional business hours and this can compromise team communication.
Reformed nursing time management	More nursing time will be used for the provision of care rather than documenting or locating documents.
Reduced error rates	All information will be accessible to the nurse providing the care, thereby removing error related to missing data. Data would be entered once and therefore transcription errors would be eliminated. Appropriate warnings can also be built into the system to identify the potential for an error.
Higher quality documentation	Nurses and others will be able to use the documentation more effectively because of its higher quality and its accessibility.
Expanded access to evidence	Systems can be developed so nurses are able to quickly access sources of evidence to assist with providing quality care. The evidence could be locally sorted (for example, policies, procedures) or it could be retrievable from wider sources (for example, journal databases or professional collaborative networks).
Improved patient outcomes as a result of nurse-led interventions	Documentation can be easily used to evaluate nursing care and the outcomes of nursing care. Information about the use of nurse-led interventions can be retrieved and outcomes evaluated.

Mission statement

To improve the health, comfort and quality of life of the Australian population through the systematic introduction of more efficient and effective nursing information management.

Vision

To ensure:

1. The majority of nurses are able to use information and telecommunication technologies for relevant clinical, research and administrative purposes.
2. The technological and information infrastructure enables the adoption of nationally consistent linkages and uniform standards throughout the health sector.
3. Patient outcomes are improved with better management of information.

Aims

The Informatics Management Centre for Nursing aims to improve nursing information management and minimise costs while improving patient outcomes. It will guide the development, implementation and maintenance of health information systems so that any adverse impact on nursing is minimised. It will pursue the following goals and objectives, within the context of the Commonwealth and State governments' research and development agenda, and the nursing profession's information needs, to optimally support their role in any health setting.

Goals

The goals of the centre are to:

- Contribute to improvements in the efficiency, effectiveness and ability of existing or proposed health information systems to support nursing practice in any health setting.
- Provide a nursing focus for multidisciplinary research and development activities concerning health information systems, standards development and recommendations.
- Foster cooperative relationships between the nursing profession as represented by the national nursing organisations, the federal and state health authorities, regional, district and area health services, the private health care sector, individual health care institutions, the software industry, and other health professional and standards organisations.
- Assist information system vendors to develop systems that accurately reflect nursing's vital contributions to patient outcomes.
- Provide an environment in which interdisciplinary resources can be organised and deployed to undertake major research projects of national significance.

- Share expertise by responding to requests for advice and consultation on health and clinical information systems from a nursing perspective.
- Provide a learning environment for nurses wishing to specialise in information management.
- Inform registered nurses and other system users about nursing data set standards and their information needs, thus making them more informed purchasers.
- Collaborate with international colleagues and professional organisations such as IMIA NI working groups, the ICNP project, Center for Nursing Classification in Iowa, the American Nurses Association and others where appropriate.

Objectives

Develop or recommend the nursing specific building blocks needed for the implementation of information technology in health care. The following list contains some of those building blocks:

- Nursing specifications for EHRs.
- Nursing terminologies.
- Clinical messaging and communication.
- Consensus on admission health status and nursing-sensitive outcome measures to facilitate the automation of practice evaluation, and to provide a foundation for the development of clinical decision support systems enabling patients to be provided with the best possible nursing care.
- Nursing information frameworks that will provide appropriate data for nursing research and evaluation.
- An agreed implementation plan to test and evaluate nursing data, classification and coding arrangements to support nursing service delivery and nursing workforce management systems.
- A nursing minimum data set for national activity reporting.
- Targeted evaluation, research and development projects to solve any specific nursing-related issue associated with the development or implementation of any health information system.
- A central interactive web-based portal to enable effective communication with all relevant stakeholders and decision-makers regarding the results of research and analysis undertaken.
- The adoption of nursing information standards.

- Training and education in nursing informatics and associated research activities.
- A national strategic approach for involvement in relevant international research and development.

Minimum infrastructure needs

- Office space and furniture for at least two people.
- Two computers (hardware and software) with Internet access.
- Space and use of a web server to support a web-based portal to act as a clearinghouse that is able to support remote communication via the Internet and is linked to any number of databases.
- Access to printing, phone, fax and photocopying facilities.
- Personnel and financial management support.
- Support for one face-to-face advisory committee meeting per annum.

Estimated cost

Funding should be sufficient to employ a business/web manager and a senior researcher. It should cover all supporting costs and provide scholarships for honours and doctoral research students. Additional funds are to be sought from a variety of possible sources on an as-required basis to fund specific national projects as agreed by the stakeholders concerned.

A sum of \$850,000 per annum and additional funds may be sought for specific projects. NeHTA and the Commonwealth Department of Health and Aged Care may commission these projects. Other organisations may have nursing information projects that the centre can tender for; for example, aged care and health providers, Standards Australia, International Council of Nurses, and so on.

Evaluation

The Nursing Institute will evaluate the activities undertaken and whether they meet the centre's objectives. An external review process will be included with opportunities for feedback from the Australian Nursing Federation, Royal College of Nursing Australia and the other members of the national nursing organisations.

It is expected that the outcomes will include:

- Nursing specifications for electronic health records.
- The adoption of nursing data standards.

- Consensus on admission health status and nursing-sensitive outcome measures to facilitate the automation of practice evaluation, and to provide a foundation for the development of clinical decision support systems that would enable patients to be provided with the best possible nursing care.
- A nursing information framework that will provide appropriate data for nursing research and evaluation.
- Evaluation of terms included in the electronic catalogue for health care products.
- Collaborative arrangements with international nursing colleagues; for example, International Council of Nurses, Royal College of Nursing and the American Nurses Association.
- An agreed implementation plan to test and evaluate nursing archetypes (for example, data, classification and coding arrangements) to support nursing service delivery and nursing workforce management systems.
- Consensus regarding a nursing minimum data set for national activity reporting.
- Identification of the organisational and nursing work practice implications arising from the implementation of health information systems in any health care setting, and evaluation of the methods being used to minimise adverse or negative consequences.
- Targeted evaluation, research and development projects to solve any specific nursing-related issue associated with the development or implementation of any health information system.
- Effective research with all relevant stakeholders and decision-makers regarding the results of research and analysis undertaken by means of a central interactive web-based portal.
- Training and education in nursing informatics and associated research activities.
- A national strategic approach for involvement in relevant international research and development.
- Public promotion of issues on a website, in health, nursing and informatics journals, and at professional conferences in Australia and internationally.
- An evaluation of informatics content in undergraduate nursing curricula across the nation.

The Nursing Institute will provide a point for nursing informatics collaboration, education and advice. It will be the hub for collaborative research for health

professionals and consumers. It will be the primary centre for nursing informatics in Australia, and will unite nursing informaticians and practitioners for the enhancement of nursing care and improved outcomes for patients.

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APPENDIX 6: LIST OF RECOMMENDATIONS

NIA recommends that:

1. A business case be developed for an Informatics Management Centre for Nurses.
2. An Informatics Management Centre for Nurses be established.
3. A multidisciplinary approach to system design must be adopted that has appropriate representation from all clinical providers including, at a minimum, nursing (inpatient, outpatient and community), medicine, allied health, mental health and aged care).
4. Nursing workflow studies must be undertaken to determine 'best fit' information requirements.
5. A comprehensive standard nursing language must be adopted to underpin electronic communications and nursing work.
6. A comprehensive national education program must be provided for nurses.
7. Increased support and funding must be provided for the implementation of the point of care clinical systems that support nursing practice.
8. A comprehensive stocktake of nursing data sets and terminologies currently in use should be undertaken.
9. An evaluation should be undertaken of available data sets and terminologies regarding their ability to adequately represent nursing concepts and meet nurses' information needs at all levels in the health industry.
10. Specialist nursing groups must be represented in any development of clinical minimum data sets to ensure their specific information needs are met, and that continued growth of a standardised language for nursing is supported.
11. Nursing data elements must be developed for the nursing portion of a clinical referral to support the continuity of patient care.
12. Nurses must participate in the evaluation of the effectiveness of the nursing portion of the referral to support the continuity of patient care.
13. A skills audit must be undertaken across the health care workforce to identify the different HI needs of the nursing workforce in each of its subdisciplines. This will enable effective targeting of appropriate education and training.

14. A nationally agreed set of basic nursing informatics competencies that all nurses need to acquire must be developed. These should be incorporated in all undergraduate curricula and be used as the basis for staff development programs. They might be incorporated into a national computer drivers licence for nurses.
15. Nursing informatics must be part of the curricula of any postgraduate nursing programs to continue the embedding of informatics skills as a core competency of nursing at any level.
16. The delivery of nursing informatics education and training must be available through a number of different mechanisms, such as through universities and the TAFE system, professional associations and private sector trainers. It must also be a component of the broader nursing education and training programs.
17. Incentives for offering NI education must be provided to organisations with the capacity to do so.
18. Nursing colleges and/or professional associations must receive funding to assist members in undertaking appropriate and relevant educational activities to advance their core competencies in NI and, ideally, to recognise such activities as a form of continuing professional development.
19. A scholarship program should be developed to enable the study of nursing informatics to occur. This should be available to eligible nurses interested in advancing their NI qualifications.
20. Scholarships should be awarded each year to a general field of applicants and have identified places for indigenous and aged care health workers.
21. A consortium of educational institutions, vendors and so on must be established to manage the necessary infrastructure needed to enable all Australian universities' nursing programs to access and make use of simulated and fully integrated health information systems to support all nurse and NI education.
22. All information flow analyses must include nurses' information needs to enable them to provide continuity of care for all case types whose care is managed by multiple providers.
23. Clinical systems in use at the local level must be interoperable so they can be used as feeder systems to HealthConnect.

24. A cost-effective structure for ID development and initiation must be developed.
25. Nursing stakeholders or their representatives must be invited to participate in the development and maintenance of the ID system.
26. Value should be added to the unique ID program to ensure participation and to gain stakeholders' support, acceptance and universal adoption. For example, the ID program could be linked to HRM systems.
27. A governance structure for nursing informatics in Australia must be established to enable buy-in from all areas of nursing.
28. Adequate funding must be provided to support the ongoing development and governance of nursing informatics nationally.
29. A research plan for nursing informatics must be developed.
30. The nursing profession must be represented in the governance of information management and technology initiatives that impact on the nursing profession.
31. The benefits of clinical information systems and HealthConnect should be measured and communicated to senior nursing leaders to support the continued change management and the implementation of systems that support nursing.
32. Research should be undertaken into the value and benefit of an information framework for the ongoing development of nursing knowledge.
33. Funding must be provided to demonstrate the value of nursing informatics in supporting nursing and nursing care and improving nursing outcomes.
34. Change management for all health informatics and associated IM&T initiatives should be supported.
35. An audit of the nursing work must be undertaken to determine nursing workflows.
36. Nurse leaders and managers who will act as change agents and champions within organisations/departments must be identified.
37. Nursing leaders and managers must be educated about nursing informatics and the broader issues of health informatics.
38. Timely, constant, practical communication about the changes brought by technologies must be undertaken through the relevant nursing organisations.

39. Adequate funding must be set aside for change management activities.
40. A governance structure should be established for nursing informatics in Australia.
41. The ongoing development and governance of the group must be supported.
42. This group should develop a research plan for nursing informatics.
43. Nursing representation must be included in the governance of information management and technology initiatives (for example, *HealthConnect*) that impact the nursing profession.
44. Clinical and nursing systems must be designed that enable the use of data mining software and the adoption of the continuous practice improvement methodology.
45. Clinical nursing systems must include, or have access to, sufficient demographic data to enable data aggregation across systems for specific patient cohorts. This will enable the undertaking of 'virtual' randomised clinical trials to evaluate and assess homogeneous patients and their outcomes relative to treatment and care options provided.
46. The National Health Data Dictionary must include sufficient and relevant nursing data elements to ensure nurses' contribution to the delivery of health care services can be evaluated and appropriately recognised.
47. Nursing must develop nursing archetypes underpinned by evidence based nursing practice.
48. Organisational structures, working guidelines and methodologies must be established for the governance, naming, development, registration and distribution of nursing archetypes.
49. An information repository should be established and maintained on an ongoing basis.
50. Nurses must extend their pivotal role in patient education to consumer informatics. This will enable consumers to:
 - Develop a greater understanding of the value of health informatics activities and the impact on their health status.
 - Assist with consumer buy-in.
 - Ensure optimal use of IT to support health care.

List of shortened forms and definitions

AHIC	Australian Health Information Council
DoHA	Department of Health and Ageing
EHR	Electronic health record
HI	Health informatics. An evolving socio-technical and scientific discipline that deals with the collection, storage, retrieval, communication and optimal use of health-related data, information and knowledge. The discipline utilises the methods and technologies of the information sciences for the purposes of problem solving and decision-making; thus, assuring quality health care in all basic and applied areas of biomedical sciences for the community it serves (HISA 1998)
HISA	Health Informatics Society of Australia
ICT	Information and communication technologies
NeHTA	National Electronic Health Transition Authority
NI	Nursing informatics. Nursing informatics is a specialty that integrates nursing science, computer science and information science to manage and communicate data, information and knowledge in nursing practice. Nursing supports patients, nurses and other providers in their decision-making in all roles and settings. This support is accomplished through the use of information structures, information processes and information technology (Staggers & Thompson 2002)
NIA	Nursing Informatics Australia. The national nursing special interest group of HISA
IM&T	Information management and technology

NI makes HI a more comprehensive, inclusive discipline by:

- Bringing specific values and beliefs to informatics.
- Focusing attention on specific phenomena.
- Providing a unique language and word context.
- Bringing a specific practice base that produces a unique knowledge.

(National Advisory Council on Nurse Education and Practice 1997)

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