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Nursing Informatics in New Zealand:

Evolving Towards Extinction?

by

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From pen to pad to laptop,
let me digitally express
How I. T. is evolving
and patience is a test.

Technophobic nightmares
for some
are all too real,
And scanning in your barcode
Is how you book your meal.

Referrals come by e-mail
from which we un-attach,
And you call "Computer Doctor"
For viruses to catch.

Working on the World Wide Web
Is now the latest trick,
As patients check on websites
To find out if they're sick.

So the time to learn is now nurse,
up-date those I. T. skills,
Become computer literate
before your o'er the hill !

Liz Conroy
Feb' 2001

Abstract

This project undertakes a critique and review of a decade (1990–2000) of available New Zealand literature to reveal the current state of Nursing Informatics utilisation in nursing practice. Since the early 1990s, nurses from diploma and baccalaureate nursing programs have been graduating with knowledge and skills in Nursing Informatics. Yet when scrutinising the two main nursing publications for New Zealand, it is surprising to note the scant publication of articles that pertain to this topic area of nursing. Why is this? Having taught Nursing Informatics curricula over ten years, I now have concerns to voice. Is this an area of nursing that is seen as unimportant or irrelevant to the work nurses do in providing patient care? Are computers still the domain of the ward clerk and admissions personnel? Is cyberphobia still alive and well for nurses in practice? These are key considerations in reviewing the literature.

Competencies as product of the 1989 *Guidelines for Teaching Nursing Informatics* will be a key consideration in this discussion, including ways in which the articles may reflect the content or intent of the Nursing Informatics curriculum as prescribed in these guidelines. This commentary enlightens readers as to how Nursing Informatics has evolved in New Zealand nursing practice, situating its growth, or lack of, in the context of concurrent socio-political influences as well as conditions created by national and international nursing trends. It is significant however that due to the scope of this project, comments on specific Nursing Informatics conferences held in New Zealand over the decade can not be addressed in any depth. This is an area that deserves further investigation. Several recommendations are discussed to guide the future direction of Nursing Informatics for nursing education and practice in New Zealand.

Acknowledgments

It is well known that in the completion of any significant work, many others have contributed in their own unique way and it is a privilege for me to name these special people and thank them sincerely. First, to my very patient husband Chris and my three children, Nick, Callum and Katie-Rose who had to disappear on many a weekend to allow me quiet space to think and work. Second, to my very dear friend and colleague, Annette Delugar, who walked this journey the year prior and whose words and letters of encouragement have enabled me to stick with this project to its end, thus allowing me to complete my Masters programme this year; Thank you.

As well, a big thanks to my supervisor Rose McEldowney, whose insight and belief in my ability made me quietly plod on when giving up was such an easy alternative. This is also true of Louise Rummel, my colleague and adviser who has always encouraged me and kept me on track.

To the reference librarians at NZNO and, especially Sue Roylance of Manukau Technical Institute Library who willingly aided me to locate and receive copies of the articles I required, I thank you. Support has also been gratefully received from the New Zealand Nursing Informatics group who have provided me with access to resource material as well as an opportunity to attend the 7th International Nursing Informatics Congress and see first hand exactly where Nursing Informatics is and hopes to be, globally. This includes a special thanks to Jan Hausman (a founder of NINZ and compiler of the Ministry of Education 1989 Guidelines for Teaching Nursing Informatics), who allowed me access to her historical records, as well as inspiring and encouraging me with this worthwhile project.

And finally, as editing neared completion, a huge thanks to my brother-in-law Gerry Conroy, who follows true to his Irish name and has the 'gift of the gab'; when there was a need to express my ideas more clearly, he willingly heard me out and offered useful suggestions.

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Section One: Introduction

In 1989, guidelines for teaching Nursing Informatics were released to all schools of nursing in New Zealand, along with resource kits and lesson plans. This followed a year of intensive research and development by Jan Hausman who had been seconded to the Department of Education for this purpose. As this department was disestablished at the beginning of October 1989, and was replaced by the Ministry of Education, I have used both depending on the time period under discussion. Jan had been teaching the pre-registration programme for nurses at Manukau Polytechnic and had previous experience in the Palmerston North District Nursing Service where she had been involved with an innovative computer program for scheduling and tracking appointments for district nurses, meals-on-wheels, and home-aid requirements.

Previously, following inception of the International Medical Informatics Association Working Group 8 in 1982 where the special interest group for nurses and computing began, international activity was occurring in this area of curriculum development (Scholes, Tallberg, Pluyter-Wenting, 2000). Numerous conferences specific to this nursing interest group followed. One significant conference was held in 1985 at Calgary, Canada and was attended by nurse speakers and observers from New Zealand. Then in 1987, a forum was held in Wellington for interested nurses from practice, administration and education, to consider the use of computers within the nursing service in New Zealand.

Since the early 1990s in New Zealand, graduates of diploma and baccalaureate nursing programs have been concluding their studies with knowledge and skills in Nursing Informatics. However, I consider that in recent years the graduate level of informatics skills is inconsistent. For the past fifteen years I have been an educator at a technical institute teaching nurse education. Nursing Informatics has been of specific interest to me when I have implemented and evaluated various aspects of this area of the curriculum. Additionally, I consider being an active member of the national executive for the special interest group in Nursing Informatics to have contributed to my understanding of how this specialty has developed. I therefore feel qualified to discuss these concerns

that make me feel uneasy about the future of my profession. These concerns have been fuelled by anecdotal evidence which suggests that Nursing Informatics is no longer an integrated thread in the three year curriculum. In some programmes, it sits as an option topic where the "technowhizz" nurse may choose to go, and others may choose to avoid. There is also a growing trend for informatics courses to be offered from Business or Computing schools under a title such as "Computers for Nursing", (c/f. Waikato Polytechnic, Young & Doherty, 1999). Thoughts around this issue are briefly discussed later.

I am also concerned that there may be insufficient role models for students in nursing. There has been anecdotal evidence in the past that teachers of nursing have been reluctant to take up computer technology. Indeed, educators appeared reluctant to embrace even simple communication technology when e-mail was introduced. Nursing lecturers who are proficient and knowledgable in teaching information technology and computer literacy are still few and far between, and there is no New Zealand accreditation body to certify them as Nursing Informatics specialists. Thus, computer experts from business or computing schools are seen by some nursing professionals as best equipped to teach this material to nursing students.

Further anecdotal evidence suggests that some nursing schools expect students to enrol having already attained basic computer skills. Others consider that for students to enter the baccalaureate program, they must seek out these skills themselves, and they are not provided within the three-year programme. But is this sufficient to enable students to grasp the issues behind management of health information, such as assessment of patient acuity; clinical workload planning; and clinical staff resource scheduling? Is it no longer relevant for Nursing Informatics' competencies to be taught as core elements within the three-year undergraduate programme? Is Nursing Informatics in New Zealand evolving towards extinction, or will evidence based practice require nurses to further develop skills in Nursing Informatics?

When I reviewed the two main nursing publications for New Zealand, *Nursing Praxis in New Zealand* and *Kai Tiaki: Nursing New Zealand,* I identified very

few articles that pertain to this topic area of nursing. Why is this? Is this an area of nursing that is seen as unimportant or irrelevant to the work we do as nurses in providing patient care? Are computers still the realm of the ward clerk and admissions personnel? Can cyberphobia still be alive and well for many nurses in practice?

To enlighten the reader about these issues and provide comment to these questions, I have selected articles for discussion that may reflect the consensus of opinion among nurses about Nursing Informatics over the past decade. This in-depth literature review mainly focuses on articles from the two named nursing publications in New Zealand, (although some specialist journals are included), that discuss and describe issues related to information technology and computer utilisation in the health care setting. I have chosen to focus on the main publications as they have mostly represented the profession in New Zealand over this decade. This is specifically true for '*Kai Tiaki*' as Manchester and O'Connor (1999) describe this journal as influential due to its large annual circulation [around 24,000] and its monthly frequency. Significantly, it is "one of the longest surviving nursing journals in the world" (ibid, p.2) having endured since its first publication in 1908, and it is the official journal of the New Zealand Nurses Organisation (NZNO).

Other sources I will critique and discuss include documents used by Jan Hausman in her quest to develop the first guidelines, as well as historic resources from Nursing Informatics teaching material. I have also been fortunate to have access to library material specific to Nursing Informatics New Zealand's own conference collection, and was supported by this organisation to attend the 7th International Nursing Informatics 7th International Nursing Informatics Congress in Auckland this year, receiving their CD-Rom of proceedings. I also refer briefly to articles from other New Zealand journals pertaining to Primary Health Care delivery, as this is one of the areas which appears keen to use information technology in relation to patient management and funding (payment for services) documentation.

To enable a fuller understanding of this topic, I will initially define 'Technology', 'Nursing Informatics' and 'Health Informatics' in Section Two, followed by an outline of the national and international historical development of Nursing Informatics in Section Three.

Section Four identifies themes emerging from the published articles and describes their relevance today in directing Nursing Informatics curricula. The themes are: An impetus for Learning and the Challenge of Change; Legal Responsibilities in Nursing Informatics; Cyberphobia and Applications in Practice; Research, Robotics and Hi-Tech Care (Shaping the Future); and, Millennium readiness and 21st Century Nursing. Notably, in the discussion of 'Shaping the Future', informatics skills will be illustrated as paramount to evidenced based practice – a very important trend in health care. Evidenced based practice not only reinforces best practice for both the medical and nursing professions, but also demonstrates how research may strengthen our professional base by expanding its epistemology.

As nursing is an applied discipline, there is also benefit in understanding the changes that have influenced the health and education sectors. Accordingly, Section Four includes an outline of key relevant reforms such as the health services funder-purchaser split, and the development of a national technology curriculum for Primary and Secondary education.

Section Five relates to future Nursing Informatics: 2000 and beyond, and specifically discusses two very significant documents related to future developments in New Zealand nursing. The first of these is the current Nursing Council Standards for Registration (Appendix One), which outlines expected competencies of graduands with the exception of Nursing Informatics competencies. The second is the Nursing Council's Strategic Review of Nursing, currently being undertaken by independent researchers from KPMG. This review primarily describes nurses' perceptions of the future requirements for preparing nurses and discusses the directions for nurse education, with interesting comment on technological trends that I discuss.

Finally, Section Six answers the questions raised previously and it offers concluding statements and recommendations, including justification for a review of the 1989 *Guidelines for teaching Nursing Informatics* (Hausman, 1989b). A commentary is provided on Nursing Informatics over the last decade as it appears in the selected literature, thus revealing a perceived status of Nursing Informatics in practice. Of significance to myself as a teacher of informatics, I suggest possibilities for further education in Nursing Informatics, but most importantly, recommend a consistent baseline be achieved by all registered nurses as I see this as essential to the development of nursing as a profession.

Section Two: Definitions of Technology, Nursing / Health Informatics

Confusion still remains for some nurses when hearing the term 'Nursing Informatics' as many assume this relates solely to keyboard skills and the technology used to care for a patient. This clouded definition may have been fuelled for some when first confronted with the notion of a technological age, highlighted by books such as Toffler's *The Third Age* (1980). The perceived rapid takeover of technology may have caused despair and confusion for nurses as computerised technologies have increased their visibility and presence in the nurse's workplace, especially in acute, diagnostic and peri-operative settings.

The myth of machine replacing man has created worry and concern for many who dislike change in their work environment, and I believe factors such as these contribute to past misconceptions by some nurses about the relationship between computers and technology. According to Barnard (2000), one may consider a definition of technology as merely relating to objects of machinery or equipment, however I concur with his clarification that this is not entirely so;

> *"**Technology** is also the skills developed to use equipment, etc; the associated knowledge that fosters professional care, and decisions related to, for example, organisational management, politics and technology assessment"* (p.1137).

When scrutinising definitions offered for Nursing Informatics, the truth of the above definition becomes more apparent. Indeed, some 'non-computer' machines used by nurses also gather and record data / information about the health of patients; for example, a print out from an Electrocardiograph (E.C.G.) monitor is 'health information' that will be used to 'manage' a patient's care. Use of the printout is therefore applied Nursing Informatics, even though many nurses might not recognise it as such.

Accordingly, the definition offered by Graves and Corcoran (1989) usefully describes **'Nursing Informatics'** as

> *"A combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of health care"* (1989, p.277).

This is not dissimilar to a description mentioned in the Nursing Informatics New Zealand (NINZ) inaugural conference proceedings in 1991, which describes it as *"the use of computers in relation to any of the functions that are carried out by nurses: eg. patient care, administration, education, research"* (Appleton, Carr, & Hausman, 2000, p.10).

Almost ten years later, the definition of this area of specialist nursing knowledge has seen further clarification by the main authoritative group, the Nursing Informatics: Special Interest Group of International Medical Informatics Association (IMIA-NI). This group's definition of Nursing Informatics is *"the integration of nursing, its information, and information management with information processing and communication technology, to support the health of people world-wide"* (Retrieved 22 June 2000, from Nursing Net Website: http://www.lemmus.demon.co.uk/defin.htm)

However I consider there is a need for a definition that is accurate and clear enough for any nurse to readily understand. This is essential to establishing Nursing Informatics as an integral part of nursing practice.

Accordingly, I have chosen to adapt an earlier definition as offered by Hannah (in Hausman, 1990a, p.13) as I consider the following perspective offers the greatest clarity and relevance. **'Nursing Informatics'** is

> *"The use of information* [and communication] *technologies in relation to any of the functions that are within the purview of nursing and are carried out by nurses in the performance of their duties. Therefore, any use of information* [and communication] *technologies by nurses in relation to care of patients, administration of health care facilities, research in nursing, or the educational preparation of individuals to practice the discipline is considered nursing informatics".*

It is also significant and timely to consider a definition of Health Informatics as this broader term appears to be where Nursing Informatics will flourish in New Zealand. I mention this because NINZ is currently merging with the New Zealand Health Informatics Foundation (NZHIF) to strengthen its presence in the New Zealand health care context. For as Ann Browett, the NINZ Chairperson suggests *"in having a united organisation for Health informatics within New Zealand, we can help each other grow and participate in the health care information technology age in New Zealand"* (Personal communication, 2000). Also, at the recent 7th International Nursing Informatics, Hannah (2000) reminds us that Nursing Informatics sits within the field of 'Health Informatics', and this gives the profession a direction for growth, both individually and as part of the multidisciplinary nature of health care. I am also becoming increasingly aware from colleague's comments nationwide, of the various post-graduate courses offered entitled 'Health Informatics' to which more and more nurses subscribe.

Graham (in Hovenga, Kidd & Cesnik, 1996, p.1) defines **'Health Informatics'** as

> *"An evolving 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, decision making and assuring the highest quality of health care in all basic and applied area of the biomedical sciences".*

If nothing else, nurses need to remember that 'informatics' is about managing and communicating information to care for patients; a key nursing function since Florence Nightingale's day. According to Hannah (2000, p.13), Nightingale *"was a strong proponent of the use of information to influence decision making related to health care".* Using computer hardware to assist with this task is *"only a means to an end".*

The evolving nature of Nursing Informatics is illustrated above by the fact that various definitions of Nursing Informatics have changed and lengthened over time. Also as indicated, Nursing Informatics is being considered more and more under the broader term 'Health Informatics'. This is likened to the analogy of ape to man as proposed by Darwin's Theory of Evolution, yet as New Zealanders will appreciate, we must not let this specialty become like one of our native birds, the Kakapo, which is under threat of extinction as predators kill them off. Encouraging nurses to foster and nurture informatics skills will be increasingly important in the future, as health becomes more and more dependent on technology. But before advancing to the future, I invite the reader to consider where Nursing Informatics was first conceived and how its growth began in New Zealand and overseas. These details are laid out in the following section and provide interesting background for this study.

Section Three: The Historical Development of Nursing Informatics

As seen in the previous section, there are differing interpretations when defining the term 'Nursing Informatics'. As time has progressed it is noted that this definition be considered as part of the broader term 'Health Informatics'. Yet when reading the historical development of this specialty, the links back to international medical informatics are clearly seen. It is therefore not hard to understand why this broader term is now used in describing educational programmes on offer to nurses and other health professionals alike. Informatics developed internationally and eventually found its feet in the New Zealand nursing scene through conferences and special interest groups, and this exciting chapter in our national history is detailed below. The section concludes with a brief outline of Nursing Informatics competencies compiled by Jan Hausman that were part of the 1989 Ministry[1] of Education guidelines.

International development of Nursing Informatics

Computers in nursing were embryonic thoughts as far back as the 1950s when visionary individuals such as Blumberg "foresaw the possibilities of automating selected nursing activities and records" (in Hannah, 2000, p.22). Due to a general lack of knowledge and interest by manufacturers, hospital administrators and nursing management, nothing ever came of this idea. However, by 1963 an American Nurse Maryann Bitzer had written, implemented, and evaluated a 'simulation exercise' program to be used in obstetric nursing (ibid). Utilisation of computers for nursing research was also emerging in other areas of American research when a notable increase in computer tabulation of research results was reported during the 1960s (Hannah, ibid).

What followed was further program development "to demonstrate and improve patient care" including the eventual automation of nursing documentation

[1] On October 1st, 1989 the Ministry of Education replaced the Department of Education due to an amendment of the Education Act. Initially Jan Hausman was seconded by the Department of Education, which later appears in this text as the Ministry of Education. Hence use of the two differing terms throughout this text due to the chronology of the discussions offered.

during the 1970s and 1980s (Hannah, 2000, p.23). Eventually, computers left the sole realm of hospital financial management (as was the case in New Zealand prior to 1986, according to Appleton et al., 2000) and became evident in nursing situations such as rostering schedules, and direct data inputting of patient's vital signs. Reflecting on this period of history, Hannah (ibid, p.23) believes "we weren't really doing things differently". However, she indicates that this groundwork led Nursing Informatics away from a focus on equipment and software, and by the 1990s the main issues were in consideration of the data and information, particularly with nursing data and data standards.

Similarly in the United Kingdom, nurses' curiosity in computer use for practice began to spread "as a result of the development of attractive computer systems in the commercial world and the changing environment in health care" (Scholes et al., 2000, p.10). This interest was assisted by international conferences, such as the 1980 International Medical Association of informatics (IMIA) conference in Tokyo, where the key nurse presenter Kathryn Hannah, spoke of computer use within nursing. By 1982, IMIA had developed 'Working Group 8' (WG8), a special interest group specific to computer use for nurses. This group of international nurses, later known as the Special Interest Group Nursing Informatics (SIGNI) began spreading the word by hosting numerous conferences, continuing the links made earlier between North America, Europe, and Eastern Asia.

In 1985, the first conference organised by WG8 was held in Canada and New Zealand nurses attended. New Zealand nurses also attended the *3rd International Symposium in Nursing Use of Computers and Information Science* that was held in Dublin in 1988. It was this Irish conference that held significance for the early development of our own national branch of SIGNI, Nursing Informatics in New Zealand (NINZ).

Maureen Scholes' opening address at the 1985 Canadian conference, describes how nurses form the largest part of the health care workforce, thus collecting much of the information required in health care. She stated that nurses were "used to equipment and have no fear of computers" (Scholes et

al., 2000, p.33) and therefore the challenge of the 20th century was for nurses to pick up the gauntlet and start utilising computers. At that time, this may not have been the view of many New Zealand nurses until the global effect of improved computer use in the commercial world snowballed into health care, creating the growing interest by nurses in communities, hospitals, research, and management. The prime area I wish to focus on however is the initial spark that set nursing education on its course to develop the national guidelines.

Scholes et al. suggest that this international interest by nurses in computer utilisation is due to circumstances in health care such as: longevity; 'hi-tech' nursing units; increased budget constraints; shortened acute care with early follow-up home care; costing of nursing services; and finally, "an increasing need for timely and fast communications between hospital and community health care facilities" (ibid, p.11). Therefore as the understanding of how computers will change the future of nursing in providing health care grew, ripple effects were occurring across the globe. Of relevance to this study, the following discussion details notable aspects of New Zealand's national history from the early development of Nursing Informatics up to the publishing of the 1989 Ministry of Education document *Guidelines for Teaching Nursing Informatics.*

National development of Nursing Informatics

By the mid 1980s, the prevalence of computer technology in the everyday life of New Zealanders was becoming more evident. Video technology was available in most parts of New Zealand and banking systems such as Electronic Funds Transfer at Point Of Sale (EFTPOS) were beginning to emerge in retail stores nationwide. Computer courses in Programming and Word Processing were becoming more available in educational facilities, and nursing lecturers like myself could see the implications for our profession. I realised that computer knowledge and skills were the way of the future and promptly enrolled in classes offering various levels of word processing.

This ground swell of interest in computers was also felt by key nurse leaders such as Janice Wenn, who at that time was Chief Nurse of Taranaki Hospital

Board, and Bill McCallum, Head of Department, Nursing, at Taranaki Polytechnic. They arranged support from the Department of Education for one tutor from each of the fifteen nursing schools to attend a two day meeting to investigate the impact of computer use in nursing, focusing specifically on the implications for nurse education. The drawcard was having speaker Kathryn Hannah, who was at that time "considered a nursing informatics 'guru', [and] a nurse working in a university preparing nurses for practice and in the use of computers in health care", (Appleton et al., 2000, p.13). Notably, by 1987, she had taken over the Chair of the WG8 and later went on to publish prominent texts for and about Nursing Informatics.

This workshop was followed soon after by a forum held in May 1987, to debate the impact of computerised documentation of nursing care on nursing practice. As the Department of Health was reviewing a system for implementation in New Zealand hospitals, known as the Milwaukee Patient Care Plan system, they were keen for nursing service input. Consequently, this forum was presented in conjunction with the Department of Nursing Studies, Victoria University of Wellington, and the New Zealand Nurses' Association, (the professional body at that time) as it was anticipated this type of patient care system would allow for "service costing and performance management" (Jacobs, 1987, p.7).

However, this wishful vision for a nationally implemented patient planning system was not to be, and it had no relationship to the Milwaukee system which had been designed and developed by American nurses for use in their practice. Preceding this, the Department of Health had attempted to supply a number of centralised applications to primarily support administrative needs, but by the mid 1980s it was felt computerisation within the large hospitals was "consuming large investment, and delivering relatively little of value to the end users" (Melhuish, 1993, p.36). Melhuish identifies development in "building systems to support nation-wide planning" to be lacking because a national Health Information Strategy and set of standards was not in place (ibid, p.35).

During the 1980s, it became apparent that issues about interface and interoperability (c.f. as defined by Simpson, 1998) would also be a major

problem. The government may have envisaged a nationalised health infrastructure, but it could not support implementation of a national patient care system because of these issues. These unresolved problems about how New Zealand's health computer systems 'speak' to one another continued as one of the key issues preventing national unification of health information technology in the years that followed. Added to this, independent health providers began developing or buying in their own systems, many of which were unique in the hardware and applications purchased. Melhuish describes this conflict as "local autonomy versus national cohesion", and relates it to the government struggle at that time to relinquish centralised funding and thus control (ibid, p.38).

By 1991, Simon Upton (the incoming Minister of Health) proposed reforms known as 'The Green and White Paper', that would change the focus of health service provision to a business and customer orientation in the hopes of greater efficiency (Upton, 1991). And following in 1993, the New Zealand Health Information Service was formed as part of the Ministry of Health and was began to implement specific Health Information Strategies (Anand, 1998). One strategy of note provided for security and authentication communications standards for communication with the New Zealand Health Information Services' National Health Index and Medical Warning System. Prior to this, the intercommunication and sharing of health information about a client from one provider to the next, was hindered and was not achieved until the gradual implementation of clinical coding systems. Two codes specific to New Zealands use were the READ codes (Read Clinical Classification (RCC)), used for coding diagnoses and procedures in general practice, and similarly in public hospitals, the ICD-10-AM system (which stands for the 'International Statistical Classification of Diseases and Related Health Problems – Tenth Revision – Australian Modification'). (See hyperlinks in references).

Based on using a single unique identifier per patient as allocated by the National Health Index (NHI), it was hoped this would not only provide a population register for health programme targets, but also link the health services provided for individuals. The complexity of a nationwide uniform system is still apparent today as health moves to an integration of information

between primary and secondary service providers. Added to issues of classifications for health is the current nursing language debate in which globally a majority of nursing groups are attempting to establish a recognised and agreed upon classification system of nursing definitions or data dictionaries (c/f. The ICN Project, Coenen, 2000, p.883).

Returning attention back to the forum of 1987, key persons attending were from the Department of Education as well as nurse leaders and clinicians from all over New Zealand. It was anticipated that the key outcomes would be to clarify options in relation to future nursing directions, and "set the stage for nurses to provide input to ensure that non-nursing computer professionals are developing systems that best meet the needs of the nurse clinician" (Jacobs, 1987, p.8). The outcome of this forum was based on final workshop discussions reported by the 150-plus attendees, with 'readiness' being the major theme. Specific to education for computer use was a desire for "detailed training" and "a change in attitudes" (Litchfield & Bickley (Eds.), 1987, p.49). Further recommendations addressed professional, administrative and service issues, and two worthy of future attention reinforce the need for ethically based practice concerning computer programming and computer usage. Notably, within nursing curricula assurance is given "that the use of computers is incorporated within a framework which emphasises the "caring", inter-personal aspects of nursing" (ibid, p.51).

According to Appleton et al. (2000), 1988 saw further interest develop in justifying why nurses needed to have more knowledge of Nursing Informatics, after seven nurses returned from the 3rd International Symposium in Nursing use of Computers and Information Science as mentioned above. Ideas from this conference were shared at the meeting for Heads of Schools (Nursing) in Wellington, where it was decided "a cost effective approach would be for one person to develop a nursing informatics curriculum which could be implemented on a national basis" (ibid, p.15). This led to the secondment of Jan Hausman by the Department of Education in 1989, resulting in the publication of the 1989 Ministry of Education manual for use in nursing curricula nationwide, titled *Guidelines for Teaching Nursing Informatics*. It is this document that specifically

set out the competencies that resulted from a national survey of nursing schools throughout New Zealand, and it is the currency of these competencies that I wish to challenge for 2000 and beyond, (refer Section Five).

A brief outline of competencies included in the guidelines provides background to the general focus of this discussion. Broadly, the guidelines describe how the competencies specific to Nursing Informatics could be achieved, detailing skills, knowledge and attitudes that relate to content in three areas: computer literacy, computer applications; and, philosophical considerations. For a fuller description of each area refer to Appendix Two: 'Competencies for all nurses' (an excerpt from the 1989 guidelines document).

Having considered events that heralded the development of Nursing Informatics in New Zealand, it is apparent how dedicated the nursing profession and past governments have been to ensure this nursing innovation was researched and implemented into undergraduate curricula. In the following section however, articles published throughout the 1990s tell another story as the welfare state, so long a part of New Zealand's health service delivery, was diluted (Boston, Dalziel and St John, 1999). Under the pressures of the 'New Right' philosophies, health provision became a market driven commodity and care was now to be monitored and measured in monetary terms.

Additionally, dramatic changes in nursing pre-registration education programmes demanded a shift in thinking with the most significant change being the need for practice to be underpinned by theory and research. Some would say this happened during the late 1970s and 1980s when the comprehensive programmes began. As the decade is described through the articles discussed, the reader will see the increasing importance of informatics skills in nursing research, especially as awareness of evidenced based practice grows and nurses come to appreciate how this will develop the profession while ensuring quality health care is provided.

Section Four: Themes emerging from the published articles

In this section I discuss issues raised in the main nursing publications since the release of the Ministry of Education's 1989 *Guidelines for Teaching Nursing Informatics*. As I considered each of the articles, I noted what was occurring with the biannual conferences held by the national special interest group, NINZ. Each of these had theme titles and when reflecting on the related articles mostly found in both *Kai Tiaki* and *Praxis*, I have chosen to discuss these using themes that in some respects parallel those used for the NINZ conferences (Appleton et al., 2000). Subsection themes are titled as follows: An Impetus for Learning and the Challenge of Change; Legal Responsibilities; Cyberphobia and Applications in Practice; Research, Robotics and 'Hi-Tech' care (Shaping the Future); Millennium readiness and 21st Century Nursing.

Where applicable I will relate the concurrent socio-political activities occurring in education and health that I consider to have influenced Nursing Informatics developments at that time. For example, according to Appleton et al. (2000, p.15) educational politics of the late 1980s "encouraged and enabled the sharing of ideas and developments at a national level" as central funding was still in place. This helped to facilitate the nationwide development of the Nursing Informatics curriculum that was funded through the Department of Education (as it was known at that time. See footnote[2]). It is interesting to note the common threads that were occurring in general education (primary through to tertiary) in relation to computer usage in schools. In 1986, Russell Marshall (the Minister of Education at that time) urged development of policy and research into computer technology. Following on from this in 1989, was the release of the Sallis Report on *Information Technology in Schools,* which is discussed below.

[2] On October 1st, 1989 the Ministry of Education replaced the Department of Education due to an amendment of the Education Act. See note on page 10.

An impetus for Learning and the Challenge of Change

The nursing profession needed to be made aware of the elements of this new innovation related to informatics, and how it was perceived to impact on most areas of practice. Therefore, the national journal with the highest readership would have seemed the best vehicle to serve this end. It was no surprise then that this innovation was laid out in an early publication soon after Jan Hausman's completed secondment to the then Department of Education. In the February 1990 issue of the *New Zealand Nursing Journal,* (which had its name changed finally to *Kai Tiaki: Nursing New Zealand* in April 1995), Jan describes what 'Nursing Informatics' is. This includes findings of a national survey of New Zealands 15 undergraduate nursing schools that identifies the anticipated use and competencies required by nurses when using computers in their practice. As previously stated, this was the research which gave rise to the 1989 document *Guidelines for Teaching Nursing Informatics* (Hausman, 1989b), and the outline of this document was revealed to readers the following month. Aptly titled *New Age Nursing* (Hausman, 1990a), this may have alerted nurses at that time to the future in a rapidly developing technological world. However, I do not believe anyone new to computer technology could at that stage have predicted the huge impact and lifestyle changes computerisation has now had in all areas of our lives.

In reading further, there may have been one nurse with this 'futurama' view. In Merian Litchfield's (1990a) debate on the impact of a computerised client management system, she appears to have a grasp of some of the potential issues computerisation may have for nurses. Being one of two sequential articles, this contains a similar message to the discussion document of the 1987 forum previously discussed, again challenging nurses to consider the philosophical issues surrounding computers and their relevance to practice. As before, she expresses one of nursing's fears relating to replacing our humanistic approach with one of managerialism as the current health service answered to administrative demands, and was "becoming increasingly impersonal in its struggle to contain escalating costs" (1990a, p.11). Her other fears include a concern that as the nursing process provided an effective framework for computerised client management, being systematic and

purposeful, this would lend itself more readily to standardisation, hence opposing the intent of the individualised holistic approach.

An extended debate and discussion continued in the following month's journal, explaining the concern that caring would give way to a technical approach to care. Litchfield (1990b) is very clear in her view that the standardised descriptors used for planning client care would further impersonalise the client-nurse relationship as "clients are squeezed or moulded into the diagnostic labels that are provided" (p.12), despite the advantage that standardisation facilitates measurement of the quality of care. She had previously stated "the expression of the 'art' of nursing [was] beyond computerised documentation" and shares her further concern as to how some nurses may use the computer in either a 'detached' or 'engaged' manner (Litchfield, 1990a, p.12). These are terms associated with Benner's model (in Litchfield, ibid) of the 'expert' nurse versus the 'competent' nurse. Litchfield explains how the expert nurse would use the computer as a tool to conveniently deal with data for a range of purposes, whereas the competent nurse would rely on the computer to guide or instruct their actions.

Philosophical debate about how nurses apply models, such as Carper's *Ways of Knowing* (1978) and Benner's *Novice to Expert* (1984) mentioned above, was not to the fore during this time except among registered nurses who had undertaken higher education studies (such as the advanced diploma programmes offered by Massey and Victoria Universities in the 1980s. NB: Auckland Technical Institute, as well as Waikato, Wellington, and Christchurch Polytechnics all ran advanced Diplomas where nursing theorists were initially introduced into these curricula). It was in following years that pre-registration education moved away from diploma to baccalaureate programmes, thus requiring the evidence of theoretical underpinnings as mentioned by Litchfield. Other issues raised by Litchfield challenge the profession to consider if computer use would enhance practice or create barriers to "nursing's evolution as a caring profession" (1990b, p.14). This was based on discussion that the resulting computer efficiency would mean nurses having more time to spend

with patients, yet a study in the United States by Brichead (in Litchfield,1990b, p.13) shows the opposite to occur; nurses spend more time with the computers.

As mentioned earlier, by 1990 the generic introduction of computing and information technology skills to students at all levels of New Zealand education was occurring concurrent to the implementation of the Nursing Informatics content at tertiary level and related to developments outlined in the 1989 Sallis Report (Ministry of Education, 1993 a & b). As Craig (1990, p.13) reveals in her discussion of this report, the most notable recommendation was "that all students through access to appropriate information technologies at all levels of education, will leave school with the necessary skills to take their place in an information society". Students from Year 1 to Year 13 of schooling were expected to use computers for problem solving and to develop critical thinking skills; "they will be using computers to collect and organise information and telecommunication resources to retrieve and deliver information", Craig (ibid, p.13). Nursing curricula of the last decade clearly document how important this approach to learning now is, supporting my view that these skills need to be reinforced and developed within nursing programmes today.

With the introduction of any new concept into a profession, initial discussion within published journals tends to centre around the impact this innovation will have on practice, especially in the sphere of education. Pre-empting the 1993 NINZ conference theme *The Challenge of Change*, nursing tutor Peggy Patterson strongly put her case in *Praxis* (November 1992), justifying the importance of nurses up-skilling in Information Technology or Computer Literacy. Patterson (1992) was already looking towards 2000 by suggesting that the change to degree education bought with it further responsibility to be a profession, reflecting women's new found role in society. Taking a significantly feminist stance, she reminds readers of where nurses as women have come from and how exclusion from things related to information technology could see women return to their previously held traditional power status. She warns that in neglecting anything mechanically oriented [ie; computer technology], women perpetuate the myth that they are inherently inept and unmechanical when it came to using technology. This translated to the general reluctance by many in

the profession who are found to be uncomfortable with using computers in their practice; notably from nurse education where few effective role models continue to be found (Fitzpatrick, in Patterson, 1992; Saranto & Tallberg, 1998; Travis & Flatley Brennan, 1998).

The need to address educational issues was also the focus of the first conference for NINZ in 1991 titled *Nursing Informatics in New Zealand: An Impetus for Learning*. According to Appleton et al. (2000, p.72), the challenge for nurses in all clinical areas when introducing computers was outlined by visiting overseas speakers with at least one example shared using computerised information management in an Australian District Nursing setting. With this came a reminder of how change affects practice and how nurses must further prepare for the inevitable as information technology was by now being advocated at government level. This was reflected in Helen Clark's opening speech at the second national NINZ conference in 1993, where she stated the importance of "recognising the need to develop open consultative information systems which are supported by technology that allowed the gathering of timely, accurate and valid statistics" (in Appleton et al., 2000, p.75). By now the health reforms aimed at improving efficiency through the purchaser-provider (or funder) split were just beginning, and information about the provision of health services needed to be gathered, mainly for administrative purposes to monitor costs (Gauld, 1999). Yet emphasis was placed on improving the health of New Zealanders using the information gathered to measure performance through financial indicators. Ashton (1999) however suggests this was often impossible to measure as each patient's situation varied despite having similar diagnoses.

One area affected by the requirement for funding 'evidence' was in Primary Health. It was not surprising that an article then appeared in the *New Zealand Practice Nurse* (Churchman, 1993) outlining how computerisation of patient records would benefit the management of a practice, and explaining the new role required by practice nurses. As this was a specific change in a specific area of practice, this message of change was targeted at nurses in general practice through selective publication in this journal. I consider this to be the reason behind absence of any similar articles in either of the two main nursing

publications as documentation to justify funding had little relevance for nurses in the secondary health care sector at that time. Health data was primarily being collected and utilised using a Management Information Systems (MIS) approach rather than a Patient Care Systems (PCS) approach. Thus, recording of nursing care within the secondary sector served only to cater for acuity and rostering needs.

As illustrated above, debate surrounded the introduction of computers in nursing, especially the concern from an educationalist's perspective that the humanistic focus would be lost in this new 'technical' age. However, others saw computerisation as advancing the profession, and suggested nurse's take on board the new learning required. With the move to professionalism, nurses had to ensure evidence of accountability. Therefore, practice needed to reflect the acknowledgment of an ethico-legal base, as illustrated in the following discussion. How the law affected nurses using digital information was a primary focus of articles published at that time, as awareness of these issues by nurses was becoming a priority.

Legal Responsibilities for Nursing Informatics

The first article specific to Nursing Informatics was in *Praxis* (Hausman, 1989a). Hausman alerts nurses who use patient information management systems of the need for caution if contemplating sharing a computer access code prior to entering data. Historical reasons for use of a communal code includes "nurses can't remember an ID number – they record it on the base of the keyboard", (1989a, p.33). Confidentiality and privacy of data about a person's health were also spelt out, including strong reminders not only of nurses' obligations under the Hospitals Act 1957, but also that the legal requirement to verify authorship of computerised nursing records had yet to be challenged in a court of law.

Further articles specific to Nursing Informatics and legal issues appeared to be absent from the two national nursing journals until 1994, when a very important piece was published highlighting the legal aspects of dealing with information about people's health. In an article titled "Private Practice", Westbrooke and Bell outlined issues of privacy when handling patient information. They

concurred with other researchers who had identified nurses as "the most frequent users and processors of patient care information", and justifiably warned of the need for protection of patient information as the use of computerised information systems escalated (Curran & Curran; Mackie; Romano; in Westbrooke & Bell, 1994, p.23).

Privacy of information was topical at this time due to the previous release of the 1993 Privacy Act, and this article clearly spelt out the changes required in practice in light of the temporary Health Information Privacy Code 1993, that was soon to be ratified as the 1994 Code. Restating Hausman's security message, they remind nurses of the professional obligation that confidentiality demands, relating this specifically to an individual's right to how much personal information they disclose, and their right to its protection from unauthorised disclosure. With the introduction of Nursing Informatics, the access and handling of patient information was about to change as Hausman (1989a) had already made nurses aware of document 'vulnerability' associated with using electronic patient records. Westbrooke and Bell were equally direct, suggesting actions such as changing computer passwords at frequent, irregular intervals and "positioning computer screens so they cannot be seen by unauthorised people" (1994, p.22). Thus the importance of this new legislation and how it would affect the future practice of New Zealand nurses, was revealed.

Hausman's (1989a) warning was not discussed again for nearly a decade until Adam Lewis (2000) briefly revisited use of the electronic patient record and the 'protection from amendment' issues that Newby had raised in the same issue of *Kai Tiaki*. Lewis retold of an incident where a general practitioner had anonymously amended an entry in the patient's electronic record, previously authored by the practice nurse and without her knowledge. I would have to agree with his conclusion that relatively unsophisticated patient information systems appear to have been purchased in New Zealand's past ....just another reason I believe, why nurses must know and understand the legal issues behind electronic documentation.

However, fear of legal misadventure was not the only thing holding nurses back from embracing computers in practice. Cyberphobia (defined as "subjective feelings of fear or apprehension experienced by persons when using computers" (Maurer & Simonson, 1984)) was very real for some nurses, as illustrated in a study undertaken by Michelle Honey outlined later in these subsections. Although reporting of specific practice settings using computers as tools to assist nurses occurred at the inaugural NINZ conference in 1991, only those who shared this interest knew about it. I suggest nurses throughout New Zealand had a limited awareness that computers had begun their inception into nursing practice. This is illustrated by the absence of significant publications found in the two main nursing journals. These issues are described in the following discussion that presents articles about computer use by nurses and initially, in which clinical settings this occurred.

Cyberphobia and Applications in Practice

By 1993, students were graduating from the first diploma programmes that had implemented Nursing Informatics in their curriculum; as well, registered nurses who had completed certificates in Nursing Informatics (such as Level One, Two & Three certificates offered at Manukau Polytechnic). Thus began the emergence of New Zealand nurses in practice with knowledge and skills specific to Nursing Informatics. Articles reflecting areas of practice that were utilising these skills, began to appear initially from the community setting. As stated, computerisation was mostly affecting practice nurses who chose to address their audience through their specialist journals, leading to a continued absence of articles appearing in the main nursing publications that I am critiquing.

To start with, nurses shared their doubts as to the benefits of computerisation of documents (such as laboratory results and cervical smear recalls), focussing on the concern that nurses may become impersonal as they looked at the screen and not the patient (Docherty, 1994). However, positive statements eventually outweighed this view. This discussion also noted the increasing commercial interest by one particular community laboratory network, who tempted general practices to utilise their services by offering "personal

computers to link general practices to its database" (ibid, p.31). This reflected the 1993 health reforms, which saw the erosion of the public health system and the beginnings of privatisation and commercialism (Gauld, 1999). Within the Primary health sector, each community practice moved to create electronic records of their patients, assisting the importing of data into patient files such as laboratory reports. More significantly, this facilitated the provision of costing information to the government funding authority to justify reimbursement back to general practice providers (ibid).

Computerisation of records may have been perceived to be 'just what the doctor ordered' when it came to increased efficiency in general practice, but this was not the case for one health centre in the Waikato (McLean, 1995). The nurses bravely took on the task of implementing an automated system to perform a cervical screening audit only to find that the computer program used did not suit their needs, thus making the task very time consuming and providing further reason to reject innovations of this kind.

The issue of cyberphobia (c/f. 'technophobia', Catlow, p.15) and the reluctance by nurses to accept computers in practice was also on the mind of nurse Helen Catlow, who further challenges the profession with her discussion in *Kai Tiaki* (April, 1999). Introducing her article with the question "Are computers (an) anathema in the practice of nursing? Or will they add to developing nursing as a profession?" (p.14), she clearly describes the benefits computerisation would bring for nurses when using their information management skills to provide patient benefits. She bases this discussion around the first-hand knowledge gained from being an 'application analyst' for Capital Coast Health's implementation of their new computerised patient management system.

Escourt (1995, p.99) however, in discussing her role as the coordinator for computerised immunisation audits for the Central Regional Health Authority, identifies herself as "only a semi computer-literate person". Yet she still manages to humorously offer positive suggestions to those practice nurses experiencing cyberphobia as computerisation invades their workspace. As implied in these previous articles, it appears none of the 1994-95 nurses

undertook any formalised education in informatics prior to the new systems being thrust upon them, and presumably had to learn through 'on the job training' from the system provider. This reinforces the difficulty with accepting innovations in practice, and how reluctant (or resistent) nurses appear to be at this time in history to value education that may have been beneficial to their future. Part of this mindset however may have been reinforced by a traditional view by nurses that nursing is more about caring for people than machines.

Little clinical evidence was available at that time to indicate clearly how informatics skills could be applied in practice, with the exception of one unique study undertaken by Michelle Honey in 1995. This research specifically describes the utilisation of computers by practice nurses throughout New Zealand as this was one area where the purchasing of computers had reportedly peaked by 1992. Her study also established the attitudes of nurses to computer use and is still the only investigation of this nature in New Zealand to date. The findings indicate a "slightly positive attitude to computers by practice nurses of five to ten years" but were considered to be statistically insignificant due to a small sample size (Honey, 1997, p. 95). However, it tends to support my view about the lack of formalised training and preparation to use computers. Half of Honey's respondents indicate that they received a maximum of training, usually from the vendor or computer company.

This further illustrates the absence of education in informatics being undertaken by registered nurses in the mid 1990s. It may be related to the availability and access to certification courses for this group, but I suggest there are other issues about continuing education that would also be factors, such as support for funding and 'time off' to attend. Additionally, it would seem that 'mainstream' nurses showed a reluctance to adopt the newer trends in technology as the main nursing publications did little to verify that computers were being utilised in New Zealand nursing practice. The later part of the 1990s looked brighter however, as it seems informatics and technology were more and more evidenced in practice. How this was demonstrated is discussed below, with special attention given to a positive use of informatics skills required for evidence based practice.

Research, Robotics and Hi Tech Care (Shaping the Future)

By 1996, 'hi-tech' care and the sophistication of computerised technologies were reflected in the 3rd NINZ conference title of I*nformatics: Shaping the Future* (Appleton et al., 2000). The main themes of this conference illustrate the progress Nursing Informatics is having nationally as demonstrated in practice in the following ways: Plunket was piloting the use of Personal Digital Assistants (PDAs) for patient assessment; Critical Care Pathways were mapping out essential care elements that could be forecast and tracked digitally; a major Auckland hospital had designed and implemented its own computerised nursing dependencies; and, for doctors in the Waikato, the latest Telemedicine technology was being utilised for remote Dermatology consults. However, there still appeared reluctance by NINZ enthusiasts to share this message in a national publication.

As if trapped in a time warp, nursing articles tended to focus only on mechanical technology, such as that used by nurses in an intensive care context or for community care of chronically ill children who were technology dependent; eg. Parenteral Nutrition (Campbell, 1998; Skiba, 1995). This was also the case for two gastroscopy nurses who felt this area of practice had traditionally been focused on machinery and the medical model (Geekie & Grieve, 1997). Yet in support of Litchfield's earlier warning to keep the art of nursing overt and not buried in the empirical approach, these nurses describe ways to promote the humanistic and caring approach in this 'hi-tech' area, replacing "the hardness of technology " with tenderness to patients (ibid, p.13).

I note that this issue of caring and technology is not mentioned in further journals under discussion, until publication of articles by Nicol (1999) and Newby (2000); the latter coinciding with the start of the 7th International Nursing Informatics Congress in Auckland. Newby's informative discussion outlines why nursing must accept the technological age, citing a demand by consumers for more control over their health decisions as they access health information from on-line resources. Other reasons include increasing patient acuity in the community setting, and developments with genetic manipulation that force new legal and value systems.

This further illustrates how broad the concept of technology has become as Newby and Nicol both use this term to incorporate mechanical, communication and information technologies. As this all encompassing definition appears to have been used to mean the same in the 7th International Nursing Informatics Congress entitled: *One Step Beyond: The evolution of technology and nursing*, it would seem the profession now needs to ensure members understand the previously described, expanded definition and meaning of the concept: *Technology.*

Robotics was the next progression in 'hi-tech' nursing, and Vincent (1997) debates the implications of this for New Zealand nursing's future. Describing usage overseas by such things as "guide [dog] robots" and "doctor-less" hospitals, she raises ethical issues that may become apparent once "robot caregivers" are purchased to deliver 24-hour continuous care. Nicol (1999) also notes the use of robotics to "decrease the amount of physical work that nurses do" (p.26), and although contemptible for some in the profession, he felt this was an innovation that must be considered in light of future educational needs.

But robotics alone will not seal the future for informatics in nursing as I concur with writers who identify research as the key area for utilisation to occur. This had previously been evidenced in 1995 with the immunisation audit (Escourt) and the cervical screening audit (McLean) as described in the preceding discussion of the community setting. This also includes the outline of Honey's (1997) study in which she identifies positive attitudes towards computers by practice nurses, but as mentioned earlier this has been the only study of attitudes performed in New Zealand to date. Lakeman (2000) has however studied this approach further in attempting to identify attitudes to the use of the Internet, revealed by mental health nurses when they described their experiences of testing this technology. Yet again though, this is not published in either of the two journals at the focus of this discussion, but in the specialist publication, *Australian and New Zealand Journal of Mental Health Nursing.*

The relationship of research and informatics is further revealed by McArthur and Dickinson who acknowledge "in part it is the increasing role of Information Technology that supports the development of an explicit evidence-based approach to health care decision making" (1999, p.35-6). Their article describes how evidence-based decision-making contributes to cost effective health care and better practice; the push for this is attributed to establishment of the New Zealand Guidelines Group (NZGG) as part of the National Health Committee of 1996. This can be related to the political climate of that time which faced a shrinking pool of health resources for an increasingly aging population, that was anticipated to place further strain on the 'health purse' (Ashton, 1999).

A key feature of this concept (Evidence Based Practice) is the utilisation of information technology for decision support, where it is necessary for nurses to apply informatics skills in order to search databases (On-line and CD-Rom based) for evidence of best practice. Sackett, Richardson, Rosenberg & Haynes, (1997, p.2) describe how this concept has derived from Evidence-based Medicine which "uses current best evidence in making decisions about the care of an individual patient ...integrating individual clinical expertise with the best available external clinical evidence from systematic research". According to information viewable at the website for The Joanna Briggs Institute for Evidenced Based Nursing and Midwifery (2000; hyperlink available in references) "Sackett and his colleagues recognised that the way to encourage [medical] practitioners to base their practice on evidence was to assemble the evidence for them". This is based in the knowledge that few health professionals have both the time and the skills necessary to critically appraise the evidence on which to base their practice. However, health professionals can readily base their practice on evidence by accessing systematic reviews of research undertaken that are now available on CD-Rom or the Internet.

The key strategy used was to form research review groups from all over the world, known as the 'Cochrane Collaborative' which makes results of these reviews available from the Cochrane Library. It is a regularly updated electronic library, designed to provide the evidence required for health care decision-

making. The strategies that they utilise, however, are readily applicable to nursing, as the benefit for everyday practice is improved access to external evidence such as practice reminders, guidelines and micro-management tools. These include "clinical pathways with hypertexted links to evidence summaries" (McArthur & Dickinson, 1999, ibid).

Access to this information will be hindered if nurses have limited knowledge and skills of computer and information literacy. This is a key factor to be considered in educating nurses to use the clinical enquiry approach (described above) that is fast becoming an essential tool that informs practice and provides some means of quality assurance. It also benefits the profession by ensuring nurses are not at risk of "being left as service workers from the industrial age" (Newby, 2000, p.20). Other initiatives to ready nurses for the future were topical as 1999 came to a close, these being reflected in articles that are discussed below.

Millennium readiness and 21st Century Nursing

By 1999, the whole world was anticipating the changes the next millennium would bring. It is not surprising to find this theme in many articles at this time. Manchester (1999) specifically addresses the issue of the Y2K bug and how this might affect nurses on duty on the day of the assumed "Apocalypse", but this threat was portrayed in terms of equipment failure related to life-support rather than any perceived difficulty to access patients' electronic records. Apart from identifying changes within clinical settings, changes were also predicted for nursing education. At the 4th NINZ conference held in 1998, preparation for the new millennium had been the theme and changes such as web technology were but one suggestion for future nursing education. Catherine Rennolds (1998) reminded the audience of the rapid increase in print-digital shift, as well as the potential for 'telemeducation' through videoconferencing for patients and students alike. Keynote speaker Dave Warner, also featured the 'webification' of medicine through 'Interventional Informatics' (1998). This painted a future that involved using specialists via remote on-line communication and how multimedia information would support health care at every level.

Nicol's (1999) discussion of nursing and technology also features education with specific points of note pertaining to informatics. His view is that "Health care is increasingly driven by information, and consequently, patient care will demand effective management of information" (ibid, p.16). This message to the profession and almost identical to my own, was expressed the following month in *Kai Tiaki,* entitled *Are you prepared to leave the 20th Century?* This reminds nurses of the skills required to provide improved patient care and challenging them about their informatics readiness (Conroy, 1999). Nicol goes further however, suggesting that co-operative development occur between the disciplines of nursing and information systems to create and deliver "tailored programmes to equip nurses with these essential skills" (ibid). He names use of the information superhighway as one example of the need to come equipped for the multiple changes occurring in health care; other areas of nursing practice where informatics has become more visible were more specifically mentioned in my article that followed (Conroy, 1999).

For those nurses still pondering their 'technophobicia' and how they would navigate the World Wide Web, help was at hand when Liz Lewis offered her 'how to surf the net' guide (L. Lewis, 2000). This not only relays useful user information for beginners, it also suggests interesting web sites to try. In the same edition of *Kai Tiaki,* there is also a timely reminder of the legal implications for nurses when patients seek information from the Internet (A. Lewis, 2000). As part of recent informatics content to address 'information literacy' for students at my teaching institute, I included exercises in evaluation of web sites as students are constantly reminded to question the validity of any 'information-knowledge' they (or their patients) may see displayed.

Conclusion

In this section I have sifted and critiqued a decade of relevant articles to reveal the evidence that appears to exist about nurses' perceptions of Nursing Informatics within practice. I have found that the articles examined reflect the competencies set out in the 1989 teaching guidelines (see Appendix Two) and I have developed my main themes from the key underlying concepts. However, I have also demonstrated the infrequency of published articles in the two main

nursing publications. I feel this shows that in some way nurses believe informatics to be unimportant. In making this point, I must state that the profession has coped well in a climate of rapid health reforms over the last decade, together with educational changes, including degree based registration. For nurses in practice, one could liken this experience to being on a merry-go-round, as indeed government policy appears to have come full circle. I suggest that for many nurses it has been as much as they could do to maintain their grip. Nurses may fear that if they attempt to take on board new skills such as informatics, they are in danger of losing focus and letting at least one hand go.

However, my view is that the major part of informatics is the application of existing skills to new tools. With adequate education in the theory and practice of informatics, nurses will find the necessary changes easier to make. This will also promote the development of nursing as a profession, through increased accountability and adoption of new disciplines such as evidence based practice.

Section Five: Nursing Informatics Future (2000 and Beyond)

Before looking to the future, there is value in reflecting briefly on the past. Therefore, consideration is given to the document that has been responsible for Nursing Informatics outcomes, illustrated by graduates who demonstrate informatics competencies as suggested below by Hausman. The document that historically guided Nursing Informatics education has been the 1989 *Guidelines for Teaching Nursing Informatics*, and I suggest it is helpful to consider the purpose of these guidelines and how they serve the profession. This is provided in the following discussion, prior to background information that outlines the New Zealand Nursing Council's history in nurse education. The two documents I will specifically focus on are the Standards for the Registration of Comprehensive Nurses (2000) (see Appendix One), which describe competencies for nursing practice identified by the New Zealand Nursing Council, and secondly the Nursing Council Strategic Review of Nursing and Nurse Education conducted by KPMG (Retrieved 26 May 2000, from the Nursing Council of New Zealand website: http://www.nursingcouncil.org.nz).

Past Competencies as stated in the Guidelines document

Taking on board the conception of Nursing Informatics that led to secondment of Jan Hausman by the Department of Education in 1989, her previously stated purpose was to "develop a nursing informatics curriculum which could be implemented on a national basis" (Appleton et al., 2000, p.15). According to her statement on the back cover of the 1989 Guidelines document, Hausman believes she was providing nurse education with a 'manual' of suggested "flexible teaching and learning strategies", for integration into any existing nursing curricula. If the 'strategies' as outlined in the teaching plans were followed, nurses might achieve the recommended competencies specific to the knowledge, skills and attitudes required in informatics.

This would serve the profession by providing nurses with knowledge about informatics and information technology, to ensure that as future end users, they would be competent to plan and implement this innovation for improved practice. However, it must be acknowledged that these guidelines are now ten

years old and reflect the trends of society at that time. The nursing context has changed as technology, education and health have evolved, and future nursing curricula need to mirror this.

The 1989 guidelines compiled by Hausman made clear suggestions of how each student could achieve the stated competencies and some educationalists may now consider these to be almost too explicit and content bound. It would therefore seem impractical by some to tie a curriculum to specifically explicit guidelines, especially when students are expected to assimilate informatics skills from other areas of their lives, and are not expected to require education to further these skills. However, the Nursing Council (2000) sets out standards to be achieved by graduates seeking registration, and one would expect to see stated competencies for demonstrating attainment of informatics skills. However, the following discussion identifies gaps in these as a closer examination of the current competencies for registration is described.

Current Nursing Council Competencies

Before the introduction of standards and competencies for nurse registration in the mid 1990s, Nursing Council had specifically prescribed "the amount and nature of theory content and clinical experience" to nursing schools (Nursing Council, 2000, p.2). Prior to this, "updated curricula and supplementary instruction" (ibid) were developed and provided by the preceding nursing boards of 1925 and 1945, when education was delivered as hospital based programmes. However, with the passing of The Nurses Act in 1971, Nursing Council was created with interesting changes imminent. Significantly between 1973 and 1986, education of nurses was transferred from the hospital nursing schools to the 15 nursing schools throughout New Zealand. By 1984, standards had been developed for registration of nurses and midwives, to reflect the Nursing Council policies and legislated requirements. Currently, registration is awarded to students who achieve these standards as measured by successful completion of the State Examination.

In 1994, the Nursing Council was taking note of international trends that indicated the need for development of "a general set of competencies /

standards for registration / enrolment" (ibid) and it included this as one of 10 strategic issues identified at that time. A pilot of these occurred and by 1996 there was an expectation that each nurse or midwife would "demonstrate these competencies before entry to the register" (ibid, p.3). This situation continues in preparation for the eventual removal of the State Examination. This is soon to be replaced by measurement of achievement of competencies required to be a registered comprehensive nurse (or midwife).

As this is another important change in the way New Zealand nurses are assessed to become registered, the profession would be wise to consider the current stated competencies to ensure they reflect trends and developments in the health sector of New Zealand's society. It would seem this process has begun as the Nursing Council is currently holding a strategic review of the future of nursing and nursing education, which I have outlined in a discussion in the next subsection.

After reading through the most recent 'Standards for Registration of Comprehensive Nurses' document (Nursing Council, 2000, Appendix One), I am surprised to find a notable absence of competencies that specifically relates to informatics knowledge and skills. After recent discussions I have had with the Council as to whether they require informatics competencies to be essential elements of any undergraduate programme for registration, they state there is no specific policy to require these to be present (c/f. Requirements for inclusion of mental health nursing or obstetrics content). They refer to the 1999 and 2000 versions of the 'Standards' (ibid) that appear as broad requirements and do not specify content for nursing curricula in New Zealand.

Specific guidelines and suggested content for this specialty area did exist in the past, when the 1989 *Guidelines for Teaching Nursing Informatics* were complied and distributed to each of the 15 nursing schools nationwide. In addition, the Nursing Council website clearly identifies the educational roles of provision for "guidelines for education [and] setting and monitoring standards for registration and enrolment" (ibid, p.2). I suggest however that a review of the competencies, mentioned by Hausman on the back cover of the 1989

guidelines, reveals that they are outdated in terms of reflecting current trends in informatics curricula as described in Graveley, Lust and Fullerton (1999); McNeil and Odem (2000); and, Travis and Flatley Brennan (1998). Although these writers identify computer literacy as a key requirement for nursing and health care workers of the 21st century, McNeil and Odem report that this is no longer the case in the United States.

Other overseas trends in technology include the use of 'Nanotechnology' for diagnostic testing via handheld biosensors (Heller, Oros & Durney-Crowley, 2000) and locally, the direction for health and education shows an increased use of telecommunications and technologies to deliver care and learning at a distance. Examples of these include Telehealth and Telemedicine which have been initiated because of the decentralisation of health care, (in New Zealand, as well as overseas), and the increasing delivery of Internet–based courses in a variety of disciplines is well documented (Watson, 1999). As mentioned in the previous section (p. 26), a New Zealand example of Telemedicine is a remote dermatology consultant service offered by Waikato Health Care, (Oakley, 1998).

Additionally in education, many New Zealand nurses have previously subscribed to distance education courses from Massey University, an early pioneer of this education style. While not new, it is advances in technology that have furthered this approach by delivery modes such as e-mail, videoconferencing, and the 'synchronous chat rooms'; some of these methods being used for Otago University's Post Graduate Diploma in Health Informatics.

Following inspection of the current stated competencies (as listed in Standard 10, Nursing Council, 2000, p.11), I can only consider that informatics knowledge and skills are implied within these broad categories. This is not the case for other skills; for instance, research skills are specifically named as part of a 'management of nursing care' competency to be achieved for nurse registration (10.4). Each applicant for registration needs to demonstrate the listed competencies, thus the 'communication' competency (10.1) requires that "[the applicant] relates in a professional manner and communicates effectively

to support the client through the health care experience". It may be that nurses and educationalists who were involved in the 1995 competency development workshops had taken note of evidence put by Ball and Douglas, Procter, and Grobe (in Saranto & Tallberg, 1998, p.79) that supports an integrated approach to Nursing Informatics content. Perhaps this has resulted in Nursing Council not naming this area to be measured as a competency. Yet a "balanced integration of relevant theory and practice" is one of the educational requirements stated in the Nursing Council's 'statement of values' (Nursing Council, 2000, p.3), so it may seem that integration of Nursing Informatics was intentional.

As an educationalist, I appreciate the nuances of how a curriculum may be interpreted by those teaching it. I suggest that because the competencies are open to interpretation, each nursing school has been free (to a certain degree) to decide what content it offers students related to technology and informatics in pre-registration programmes. This may have contributed to some nursing schools no longer following the 1989 guidelines for teaching Nursing Informatics as has been reported anecdotally). However the current Nursing Council review of strategic issues coordinated by KPMG (2000) clearly highlights technological developments in relation to current educational trends. This review is very important to the future of New Zealand's nursing profession as many nurses' views are shared. This occurred as a result of an open invitation to all nurses who cared to contribute. I set out below further details of how I see this review relating to informatics education.

Nursing Council Strategic Review of Nursing and Nurse Education (KPMG)

The recent independent review by KPMG (available on the Nursing Council website – http//www.nursingcouncil.org.nz) collates comments from four discussion papers which has been undertaken by Nursing Council over one year. The critique I offer focuses on 'Discussion Paper Two: Educational Trends' (available from the Nursing Council website) as part of this series of four discussion papers. Other include: 'Discussion Paper One: Health trends; and 'Discussion Paper Three: Defining the nurse of the future' (released in mid 2000); and 'Discussion Paper Four: Preparation for the nurse for the future' (released 27 October 2000). I suggest that readers view feedback from this

final discussion paper, as I believe it further supports my position stated throughout this critique. The feedback from initial ideas stated in the earlier discussions was designed to shape subsequent discussion papers and thereby the final report (KPMG, 2000).

The key purpose of this review is "to provide detailed recommendations to the [Nursing] Council on the preparation of nurses to meet health sector requirements in the year 2010...specifically ... the skills, competencies and knowledge required for registration" (Nursing Council, 2000, p.1). It is also intended to provide recommendations on standards and quality of pre-registration programmes "that Council should set" (ibid). Notably in Discussion Paper Two, where the focus is on trends and influences on nurse education, the first section addresses technological trends. In this case it is important to consider two things: First, technology includes both computer literacy, and skills in information management and decision support using technology solutions. Second, this entire review has gathered comments from nurses practising in a variety of New Zealand health care settings, and the views it offers are therefore not restricted to academics, who are at times perceived as offering nursing solutions for the ideal theoretical world.

When considering the six trends outlined in 'Discussion Paper Two', I believe it is significant that the first trend is titled 'Technological Developments'. The question posed here asks, "How does technology impact on processes of education?". One answer indicates that practicum is changing and students may choose more financially rewarding technical health professional positions ahead of nursing (p.6). Two statements that participants rated as having very large significance for nursing education need identifying here. These are that "all students will need to be computer literate and have access to computers", and, that "consumers will continue to want both technical solutions and enhanced personal success, and educators have to teach both" (ibid). I suggest these statements provide evidence to support the reinstitution of competencies as core material / content in pre-registration programmes.

Further statements to support my position include "nurses need to be taught to be outstanding communicators to consumers" (NZNC, 2000, p. 7). This surely implies that nurses need to be competent users of communication technologies. This competency is not stated in the 1989 Guidelines, but is implied within the Nursing Council registration standards (2000).

Within Discussion Paper Two, Trend Four discusses service delivery changes. Again, of significance to my stated position, this identifies computerisation and standardisation to be "the hallmarks of future education service delivery" (NZNC,2000, p.9). This highlights an issue raised earlier – that employers will need to be trainers and will therefore require effective professional development teaching and use of information technologies. Within the United Kingdom there has recently been a push to ensure staff and students at tertiary level demonstrate their level of skill and technological competence by applying for a computer 'Drivers Licence'. This move to upskill staff to a consistent level of basic information technology has also been implemented recently at my own technical institute. Although not enforced as a staff requirement at this stage, this reinforces the expectation of the employer to ensure staff skills reflect the trends in society. In my view this must also be the expectation within the health sector.

Finally, Trend Five discusses "Policy Developments". The main focus here is that registered nurses' "will be expected to be technologically capable"(ibid). I consider this to be an essential competency for all future registered nurses in New Zealand, and I suggest that the profession and future curriculum planners cannot ignore this.

Discussion – Blending the Art and Science of Nursing

In support of blending the art and science of nursing, I refer to Benner and Wrubel's (1989, p.13) definition of 'presencing': "To be with someone in a way that acknowledges or participates in the person's experience ...making the person feel understood and supported". I acknowledge that in relating to any patient, creating a sense of connectedness, empathy and presence are paramount and I share the concern that in some way technology detracts from

this experience for the patient. However, I suggest that expert nurses who truly understand 'presencing' as described by Benner and Wrubel (ibid), will interact with tact and appropriateness when using bedside technology. This is especially the case if they have engaged in courses that increase their competency to deal effectively with technology while caring for their patient. Technology (such as a hand held palm-top) may in this instance become an extension of the nurse as they go about their duties and be no more detracting from the relationship than had they taken pen and paper from their pocket. The challenge now for nurse education is to ensure that students of nursing receive this exposure to technologies and have the opportunity to experiment and develop competency in a safe and supported environment, prior to the real life drama of a patient's bedside.

Yet I have found very few articles on Nursing Informatics presented in what I consider to be the main professional publications, until last year. It would seem that informatics has not been visible in the day-to-day practices of the New Zealand nurse. This has implications for the education of both students and registered nurses. If there exists little evidence to demonstrate the relevance of informatics to practice, why should students and nurses' bother taking on courses to understand issues about informatics utilisation in health care? The profession has yet to appreciate how this innovation has advanced in dynamic ways in health care, leaving behind long held beliefs. For example, from my past experience, a ward computer has generally been situated on a central desk, near or beside the ward clerk, and has predominantly served an administrative function.

Other contributing factors that may have hindered nurses from pursuing education in informatics (other than those in a baccalaureate programme), have been access to courses to develop these skills, and more significantly, the traditional view that nursing is solely a humanistic act. This embodied tradition refutes the very idea of man and machine being in someway symbiotic in trying to achieve humanistic ends and is supported by Litchfield and others. Litchfield (1987, p.33) forewarned of the challenge nurses would face when they try to "accommodate the technology without hampering the evolution of the

humanistic aspects of the profession". This can be added to previously expressed fears about computer utilisation by other authors who are equally concerned that "the art in nursing will be neglected" (ibid, p.34). The other strongly held fear was that nursing care may well become prescriptive and lack the uniqueness required for each patient, with the suggestion that standardised care plans are one of the main advantages of computers as a tool for nurses.

Additionally, Litchfield (1987) cautions that although anyone with a little knowledge of health may construct standardised plans, (using a list of terms or statements from a preset menu) it may not necessarily be a registered nurse that establishes this programme. At the time of publication, this reinforced the internationally published view that nurses must not give away their ownership of the development of information technologies specific to nursing care. Litchfield limits this view further, stating that computer use for formulation of care plans would not be as appropriate at that time as employing "computers for organising and retrieving measurement data for use in planning" (1987, p.37). As computerised nursing care plans are still absent in many New Zealand health care facilities, one may be led to believe that this is exactly what has since occurred.

Recently however, evidence is emerging of nursing care being placed within electronic records of patients in New Zealand (Catlow, 1999). Had the Milwaukee nursing care system been implemented nationwide in the late 1980s, this may not have been the case (Jacobs, 1987). Instead, nurses may have become very proficient at entering data about their clients care; updating the patient database would have occurred throughout the duty as currently occurs in acute settings when care is implemented, evaluated and changed. When reflecting on articles such as Litchfield (1990b), it would seem the nursing profession is at a hiatus in terms of accepting Nursing Informatics as relevant to its practice. She suggested at that time how "convenient and reassuring" (p.12) a list of nursing terminology would be when used in a client management system to electronically document such things as data about a patient's health and the event resulting in them needing care.

Yet our profession appears reluctant to agree on definitions of nursing, although projects such as the Plunket Data Dictionary (c/f. POND: Plunket Operational National Database, Honey, 2000) give hope that this will not always be the case. Using a consultative approach, the Royal New Zealand Plunket Society developed Version One of their Data Dictionary in 1997 which "incorporates a number of existing definitions in use by the NZHIS" to facilitate standardisation of descriptive terms specific to the area of child and maternal health (ibid, p.523). Each of their clients is registered using the Internet as a virtual private network within the POND system; an innovation that allows for sharing of documented data nationally throughout Plunket's organisation and illustrates a way around the interoperability issues mentioned in Section Three above.

I envision a future where inevitably the nurse's traditional pen and notebook will be replaced by a pocket palm-top. After gathering data from the patient, a quick entry into the palm-top screen would immediately update records for all users, allowing immediacy of access for the multi-disciplinary team involved in that patient's care. This future is not distant, as the Plunket Society began point-of- care implementation of hand-held computers in October 1999, specifically for the collection of field data (Honey, 2000). Further, one nursing school in Auckland is currently participating in a pilot scheme offered co-jointly with a university in North Carolina, USA, using palm-top technology for documentation of patient data (Wilson, 2000). These students will experience and appreciate first-hand the power of information technology literally at the nurse's fingertips while on duty. To facilitate the safe use of this technology with patients, these nursing students must possess more than basic keyboard skills. They must appreciate issues such as: the use and abuse of patient health data; who has the right to access that information; and, why they may not share their login code with another nurse. I do not believe these knowledge and skills are something that are assimilated solely through completing a three year degree programme in nursing; they are specific to the realm of Nursing Informatics and as such, may exist as core content within any New Zealand nursing curricula. It is timely then that a review of the guidelines on teaching Nursing Informatics competencies occurs.

This section has highlighted the apparent absence in the current Nursing Council undergraduate review documents of any competencies that specifically relate to informatics skills. The reader has also been shown the results of a current review of nurse education being undertaken by KPMG on behalf of Nursing Council. This review is a collation of responses from nurses all over New Zealand and from numerous practice settings. It is a significant document about strategies for the future of nursing in our country. The issue I hope to have made clear however is which nurses themselves identify technology as important. This is evidenced by comments related to the need for nurses to be prepared to cope with this specialty area, along with recent advances in research where it is essential that care provision is evidence based. The following section details several recommendations that have resulted from this in-depth review and critique, with a focus on offering ways to demonstrate how Nursing Informatics may be visible and valued in Nursing curricula.

Section Six: Discussion, Recommendations and Conclusions

Is Nursing Informatics in New Zealand fated to gradually fade into extinction? It would appear after considering a decade of articles from the profession's two main publications, that this specialty is undervalued. Current use of informatics is hampered by its apparent 'invisibility' in practice. Therefore, I will briefly summarise the many factors that may have contributed to this.

As early as 1992, Procter (in Saranto & Talberg, 1998, p.85) describes the obstacles that she believes limit utilisation of information technology in England. These include "the belief that computers would never reach the wards" (ibid), coupled with fear and lack of computer knowledge, expense, and system ineffectiveness. Until recently (Catlow, 1999) there has been an absence of programs in New Zealand specifically for planning nursing care. Consequently, involvement for nurses on a daily basis has been further hindered. However, as developments continue with the Computerised Patient Records (CPR) or Electronic Medical Records, visibility of informatics in nursing will rise. It is hoped that within the digital document (CPR) there will be a place for nurses to record care planning and management details for patients. Nursing Classification systems, such as the International Council of Nurses (c/f. The ICN Project, Coenen, 2000, p.883) will be one example of a nursing language used to record the 'nursing events' that relate to the care that is given.

This is not the case for New Zealand Practice Nurses as application of informatics skills was called on in the early 1990s. However, these skills were predominantly serving an administrative function (Churchman, 1993), as central funding decisions demanded evidence to assist in forecasting the health needs of the nation. This was provided through timely informative statistical data, and accurate monitoring of health outcomes, that had merit as far as they went. However with the political climate driving decentralisation of health services and pushing for a competitive market in health provision, commercial interests (such as those identified by Doherty, 1994) have been served rather than the development of a unified national approach in keeping with the Health Information Strategy (Melhuish, 1993).

The resulting blurring of how Nursing Informatics was defined may have further confused nurses when considering the shape of likely future practice. This may have affected their understanding of the need to be educated to manage information in the 'futurama' ahead.

As previously discussed, it would seem the term 'informatics' is broadening to be more inclusive of technologies such as Interventional informatics (Warner, 1998), Robotics (Vincent, 1997) and Telecommunications such as TeleHealth and Telenursing (Sibbald, 1998). At a national level, the special interest group for Nursing Informatics, NINZ, has as recently as October this year (2000) merged with the Health informatics Foundation to form a new national multidisciplinary body to be known as Health informatics New Zealand Inc (HINZ). I believe courses in New Zealand will be inclined to use this broader title of Health informatics, and would support this move.

In the education setting, the creation of the 1989 *Guidelines for Teaching Nursing Informatics* (Hausman, 1989b) has set the profession off to an effective beginning in what may have otherwise remained an undergraduate curriculum, and now strongly reflects a solid grounding in informatics knowledge, skills and attitudes. This is similar to the 1987 framework and content set out for informatics curricula in the United States (McNeil & Odem, 2000). With changes to our national curricula for undergraduate nurses from diploma to degree, I believe other agendas have been promoted, and inevitably the teaching of content has relied on the skill and confidence of the lecturer. It is the lack of sufficiently trained educators with the right disposition that has led the Nursing Informatics curricula (at undergraduate level) in most nursing schools, to appear diluted or reconstituted in another form (Saranto & Tallberg, 1998; Sibbald, 1998; Travis & Flately Brennan, 1998; Young & Doherty, 1999). This is supported by Watson's (1999, p.178) findings that there exists "a variance in the nursing informatics content of undergraduate curricula", consequently creating graduates who are not adequately prepared to manage information using technology, (as is the case in the United States; Gassert, 1998). Another factor has been the lack of organisational support for access to resources that ensure delivery reflects current trends in computer–aided learning; for example, CD-Rom, multimedia hardware, and World Wide Web access. But I

gather this is gradually changing in New Zealand institutions where funding is available (Travis & Flately Brennan, 1998).

It is an assumption on the part of some nursing educators that school leavers have basic skills of computer and information literacy, as set out in the NZQA 2000 documents referred to previously (c/f. Section 3). This appears to be supported by the implementation of the Technology Curriculum for secondary schools (Ministry of Education, 1993a), as indeed has been proposed in the Sallis Report. In addition, it must be acknowledged that technology has already infiltrated many aspects of daily life.

However my experience, coupled with my enquires of secondary school teachers, has indicated that for students entering into degree education, there is in fact no guarantee of a consistent level of computer and information literacy. This may be due to the fact that the Technology Curriculum for secondary schools is optional rather than compulsory. I have also found that absence of these skills is more likely in mature students or students from cultures that have traditionally not relied on educational technologies. A similar situation exists in continuing education in Canada where Sibbald (1998) identifies that employers assume incorrectly that "new nurses know about it [informatics]", thereby justifying why continuing education courses for this competency are not required.

In spite of an inconsistent level of informatics skills being taught nationwide, hope exists if the profession is to continue its recent drive to educate nurses in skills for evidence based practice. Although predominantly a research specialty, MacArthur and Dickinson (1999) concur with my belief that this relies on nurses applying skills and knowledge of informatics effectively. This is the context that Nursing Council also believes informatics competencies fit, as they do not single out competencies specific to informatics in their document 'Standards for Registration of Comprehensive Nurses', February 2000.

Further to issues raised by Sibbald (1998), Canada is currently experiencing a dearth of Nursing Informatics courses and she/he cites the need for "baccalaureate and continuing education courses, and qualified teachers" (p.30). Past challenges to this occurring have been based on Canada's lack of national standards or

competencies (Abbott, in Sibbald, ibid), although recently they have managed to ensure informatics has been successfully integrated into some curricula. As education for Nursing Informatics in New Zealand has been based on the 1989 guidelines and competencies, I believe it is now timely to review their place in nursing education today and for the future. The challenge now for educators, as put by McNeil and Odem (2000, p.37), is to "design nursing curricula that keep at least one step ahead of informatics practice".

I include the following quote from Virginia Saba, who has been a prominent authority in Nursing Informatics over the past decade. In addition to authoring one of the few early texts for Nursing Informatics, she has held the position of chairperson for the Special Interest Group of Nursing Informatics and IMIA representative. She was also involved in the development of the Omaha System used to describe nursing care.

> ***"By the year 2000, those health practitioners who are illiterate in information systems and computer technology will be likened to the reading illiterate at the turn of the twentieth century" (Saba, 1996, p.5).***

The discussion above offers a summary of reasons why Nursing Informatics may appear invisible to the New Zealand nurse and therefore not valued in education and practice. Based on this I make a number of recommendations. These are supported by two articles that specify how this situation has been recently addressed in the United States: Gassert (1998) describes the five goals of the National Informatics Agenda recommended by the National Advisory Council on Nurse Education and Practice, to enhance nurses' preparation to use and develop information technology. These five goals are to: "include core informatics content in nursing curricula; prepare nurses with specialised skills in informatics; enhance nursing practice and education through informatics projects; prepare nursing faculty in informatics; and, increase collaborative efforts in nursing informatics", (ibid, p. 263). These goals are also feature in McNeil and Odem (2000, p.24) when they describe a proposed undergraduate curriculum for Nursing Informatics.

Recommendations.... Where to from here?

As an educator of nurses with a specific interest in teaching informatics, I initially focus on nurse education. The remaining recommendations are grouped into the areas most likely to be affected by each recommendation stated, such as research, or our national professional body NZNO.

In an increasingly 'hi-tech' world, it is imperative that nurses are able to use information and communication technology; of increasing significance today nurses must maintain their accountability to the health care consumer as demonstrated through evidence based practice.

The Nursing Council of New Zealand is responsible under the Health and Disability Commissioner's Act 1994 to meet the code of rights for consumers, which includes the right to competent professional care. That can only be assured when the very latest evidence for valid and reliable knowledge underpins nursing practice. Therefore without use of effective informatics skills, nurses can not access databases such as the Cochrane Library. Currently the Nursing Council does not specify the content for baccalaureate programmes but does specify broad standards for competencies required for registration. I suggest this situation change and recommend that in future the Nursing Council set specific standards for Nursing Informatics education and practice. As Nursing Council is the government agent who oversees the Nurses Act 1977 and the Nurses Regulations 1986, it would seem the group most able to provide the necessary infrastructure to support Nursing Informatics.

It may be beneficial for New Zealand to take note of overseas developments in informatics education, supported by government and professional bodies. In the United States, a national agenda for informatics in nursing education has recently been created, supported by Federal government initiatives and national nursing organisations. Their informatics focus has also changed, moving away from computer literacy "to a new model of information processing, cognitive science and computer science" (McNeil & Odem, 2000, p.32). This move could be followed in New Zealand. Yet whatever informatics curricula are developed, two aspects worth inclusion at undergraduate level are the integration of informatics throughout the programme, and establishing an acceptable baseline of informatics competency.

Research supports continued integration of informatics occurring throughout any undergraduate nurse programme. If this eventuates, there would be no need for setting informatics content apart as an option paper at undergraduate level, as has been the case in New Zealand nursing schools. Therefore the profession may consider what already exists overseas to ensure integration of informatics is occurring within curricula.

Returning to the idea of a baseline identified above, I recommend a consistent baseline be achieved by all registered nurses. This is supported by McNeil & Odem (ibid) who suggest a minimum level of informatics competency, specifying a delineation of skills from 'core' to 'expert' that would facilitate undergraduate and post graduate education. Students who lack 'core' informatics skills could be offered support by the educational institute to ensure access in the form of 24-hour access to on-site technicians and facilities. Given integration in undergraduate programmes, and students graduating with a minimum level of informatics competency, progression to offer further education at the expert level would seem appropriate. This can best be achieved if strong role models from education and practice exist, such as those certified as informatics specialists.

It would therefore be beneficial if a postgraduate certificate in 'Informatics' were established for those nurses who wish to pursue this specialty area in future, facilitating the move from proficient to expert level. As certification of these specialists does not currently occur in New Zealand, there may be benefits in following the New Zealand Nurses Organisation's proposal described by Warr (1999) in his recent examination of trends in workforce planning. This indicates that NZNO as the professional body, should have some hand in setting standards for registration of nurses (c/f. the current Nursing Council function). The organisation's hopes are to follow the lead of the American Nurses Association (ANA) who see part of their function as establishing nurses' competency for practice by being responsible for credentialing and certification. One such accreditation in the United States includes certification of informatics specialists.

If the profession values these skills (as suggested by many nurses in the Nursing Council of New Zealand's Strategic Review (2000)), it may be opportune to demonstrate this, perhaps collaborating with the newly formed HINZ group to offer

opinion on what the specialist level for informatics will be. This is the case with the Nightingale Project of 1997 (Mantas & Murray, 2000) that developed after much specialist debate and input from both educationalists and informatics experts. According to Catlow (1999), this is vital to furthering new computer and information technology developments. It is the initiative of a group of nurses known as the European Commission, and has actively developed a planned approach to curriculum development following research into the application of information technology to health care. The primary objective of the project is to ensure that education and training of health care professionals in informatics occurs at both undergraduate and postgraduate levels. Of interest for future New Zealand informatics development at postgraduate level, this includes a curriculum that would 'stand alone'. There needs to be further debate on whether this is taught by Computer or Business schools, instead of Nursing schools. But existing examples in New Zealand, such as that found in Waikato Polytechnic's nurse undergraduate programme, may well offer insights into workable models that can be adapted for future use nationally.

If specialist education and certification is not addressed, I believe that current nurse 'informatitians' will gradually move from traditional health care into more lucrative employment, or at least to a work environment that satisfies the utilisation of their informatics knowledge and skills. Establishing an education programme at an advanced level could be facilitated with help from the special interest group NZHIF, with professional support from NZNO and the Nursing Council. However, consideration of programmes that currently exist at this level in New Zealand is needed, such as the interdisciplinary Diploma of Health Informatics from Otago University and Wellington Medical School.

None the less, I imagine future duplication of courses like this will be discouraged at government level, as resources are as yet underdeveloped. The point here is that there are already teaching staff with an interest in informatics, and extension of their informatics knowledge and skills would greatly benefit future development in informatics education. But support for this to occur is required, as currently there are few locally provided courses specific to this need. The essential factor of support for teaching staff to update skills has been identified by Travis and Flatley Brennan (1998) and may lead to educationalists needing to seek professional

development from overseas. As the financial investment is high, it would be helpful if support was offered for interested educators to pursue professional development of this nature.

On display at the recent 7th International Nursing Informatics Congress in Auckland were outlines of at least one Masters programme on offer in the United States (Williams, 2000) and details of a Finnish Masters programme in Health Science where one paper in Health Informatics is compulsory (Saranto, 2000). Some of these courses can be taken as a distance student using web technology, with some requirement for block school attendance.

More close to hand though, Evelyn Hovenga of the Faculty of Informatics and Communication, Central Queensland University has been responsible for developing the Bachelor of Nursing Informatics for registered nurses via distance education as from Feb 2001: http://infocom.cqu.edu.au . They also offer a Master of Health Administration and Information Systems by distance education. (Until November 1999, Evelyn chaired the Education Working Group of IMIA-NI). Monash University in Melbourne also offers a Graduate Certificate in Health Informatics. This is an on-line course: http://monash.edu.au/informatics. A listing of internationally offered informatics courses are currently held on the AMIA Nursing Informatics Working Group website: http://welcome.to/imia-ni-education.

Finally, I recommend that there be a formal research study into where Nursing / Health Informatics exists in New Zealand practice. This would guide educationalists and the professional organisations on how best to organise a qualification that is specific to informatics, giving recognition to those who demonstrate a higher level of competence and expertise in this specialised field. Pilot schemes such as one currently being run by Unitec's School of Nursing (Wilson, 2000) will help to identify competencies that could be written into new guidelines (if appropriate), and could reinforce the application of Nursing Informatics in practice. If future competencies for Nursing Informatics are to be written within teaching guidelines similar to those compiled by Hausman (1989b),for the Ministry of Education, I concur with McArthur and Dickinson (1999, p.36) who suggest that they be "regularly reviewed and updated in response to relevant scientific advances". Although speaking about

clinical guidelines, I relate these to educational guidelines and thus suggest a review of those written in 1989 be undertaken.

As more informatics projects are implemented nationwide and informatics tools (such as the hand–held palm-top device for entering patient assessment data) become more commonplace, there will be value in reviewing recent research in this area that reflects emerging technologies (McNeil & Odem, ibid). One national study nearing completion aims to identify "what student nurses [in New Zealand & Australia] need to learn about information technology so they can apply it to their clinical practice as newly registered nurses" (Watson, 1998, p.178). This will be valuable for deciding undergraduate and some post-graduate informatics competencies. As mentioned earlier, documents such as the current Nursing Council Strategic Review (2000) will also be invaluable in identifying educational trends in technology that will have implications for nurses as they continue to develop professionally.

Conclusion

This study presents one view of the state of Nursing Informatics in New Zealand and sets out evidence to justify a major review of Nursing Informatics education. This in-depth literature review has focused on articles from what are considered to be the two main publications for nurses in New Zealand: *Kai Tiaki* and *Praxis*. The main criteria for choice of each article was material that in some way related to Nursing Informatics, in the hope that this would portray the story of Nursing Informatics over this last decade. Unfortunately, little of the story has been told in these journals. For keen readers, I suggest a fuller inspection of the past national conference proceedings pertaining to Nursing and Health Informatics. Where applicable, I have included references to these proceedings and to articles from other New Zealand publications as I believe their contribution has allowed this 'picture' to be further defined.

However, I hold the view that the 1989 *Guidelines for Teaching Nursing Informatics* is now obsolete, and conclude that the literature and discussions I have offered, support this.

If nothing else, nurses must accept that their future practice reflects the changing socio-political climate that increasingly demands best practice and quality care based on evidence. This can best be achieved through nurses receiving informatics education so that they can understand these issues, and develop contemporary informatics skills to contribute to this purpose. Changes such as growth in telecommunications and the Internet are making the idea of a global neighbourhood more and more the norm, as web-technology takes information to and from our homes and workplaces. Future curricula content must address these changes if a similar guidelines document is to be used for future teaching of Nursing Informatics; if not as guidelines, then clearly stated as competencies within the Nursing Council standards for registration or evident within accreditation for informatics specialists as I propose. For without addressing any of the issues I have raised, I fear extinction of Nursing Informatics in New Zealand may occur sooner rather later.

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COMPETENCIES FOR ALL NURSES

From the 3 major headings of Computer Literacy, Applications and Philosophical Considerations and their content, competencies for *all* nurses in the areas of knowledge, skills and attitudes have been identified and objectives developed.

KNOWLEDGE

1 Identify similarities and differences between micro, minis and mainframe computers.
2 Describe the information processing cycle in relation to computerised information processing and storage.
3 Explain the principles of a database and the use of keywords for search purposes.
4 Discuss the current and future potential uses of computers within health care in New Zealand and overseas.
5 Differentiate between management information systems and patient care systems.
6 Debate the effects of computers on nurses, clients and client care.
7 Describe methods of maintaining confidentiality of client records.

SKILLS

8 Use a computer with confidence to accurately input, save, retrieve and print data.
9 Explain the purpose and use at least one type of applications software of word processing, spreadsheet and database application.
10 Demonstrate personal ergonomic safety when using a computer.
11 Use a computer to assist with nursing decision-making.

ATTITUDES

12 Discuss cyberphobia as a health problem.
13 Demonstrate an enquiring approach to information technology and a positive attitude towards the use of computers as a tool to enhance nursing practice.

Appendix I

Standards for Registration of Comprehensive Nurses

Amended 11 February 2000

Introduction

The Nursing Council of New Zealand (Nursing Council) governs the practice of nurses and midwives by setting and monitoring standards of registration and enrolment which ensures safe and competent care for the public of New Zealand. As the statutory authority the Nursing Council is committed to enhancing professional excellence in nursing and midwifery.[1]

The Nurses Act 1977 sets out conditions for the registration or enrolment of nurses, including the registration of midwives. The Act restricts the right to practise as a nurse or a midwife to those whose names are entered on to the register or roll maintained by the Nursing Council. Registration and enrolment are for life unless the Nursing Council has due cause to remove the name of a nurse or midwife.[2]

The names of those people who have successfully completed an approved course, passed the State examination in comprehensive nursing or midwifery, are deemed to be 'fit and proper' to practise as a nurse or midwife and who are 'of good character and reputation' are entered on to the register of comprehensive nurses or midwives maintained by the Nursing Council.[3]

Background

New Zealand led the world as the first country to achieve legislation for nurses with the passing of the Nurses Registration Act in 1901. The registration of midwives followed with the Midwives Act 1904. This early legislation required the completion of a nursing or midwifery course of a specified length and with instruction, a pass in the State examination and payment of a registration fee. These criteria still apply, albeit that the curricula, nature of the learning experiences and expected outcomes have expanded from the very minimal beginnings.

Subsequent legislation established the Nurses and Midwives Registration Board in 1925 followed by the Nurses and Midwives Board in 1945. These Boards developed and updated curricula and supplementary instructions for the various hospital based programmes. The Nursing Council constituted under the Nurses Act 1971 continued to prescribe the amount and nature of theoretical content and clinical experience. On site visits to schools of nursing and midwifery were included as part of the approval process.

Commencing in 1973 nursing and midwifery education transferred from hospitals to 15 polytechnics by 1986. From 1984 the Nursing Council developed standards for registration of nurses and midwives. Reviewed periodically, these structure, process and outcome standards incorporate the legislated requirements and Nursing Council policy, and form the framework for the audit tools.

In 1994 the Nursing Council identified 10 critical strategic issues (CSIs) in its *Strategic Plan 1 April 1994 - 31 March 1997.* One of these issues, concerned the 'opportunity/need to develop a general set of competencies/standards for registration/enrolment'.[4]

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1 The Nurses Act 1977 sets out the functions of the Nursing Council including provisions for registration and enrolment of nurses and midwives.

2 Nurses Act 1977 and subsequent amendments.

3 Sections 17, 19, 20, 21 & 22, Nurses Act 1977 and subsequent amendments. Nurses Regulations 1966.

4 *Nursing Council of New Zealand Strategic Plan 1 April 1994-31 March 1997.*

Standards and competencies for registration that can be validly and reliably assessed have been developed and piloted in 1996. Each nurse or midwife applicant will need to demonstrate these competencies before entry to the register.

Another issue was the 'need to develop quality assurance and accreditation processes to approve people for registration/enrolment'. The aim is to provide an alternative system to the state examination which ensures that each applicant for entry to the register meets the Nursing Council standards and requirements. Council approved assessment processes include audits against Nursing Council Standards for Registration.

Statement of Values

The Nursing Council of New Zealand holds the following beliefs:

- That the Council exists in the public interest and is accountable to the public for maintaining standards of registration/enrolment of nurses and midwives.
- That the Nursing Council has both a statutory legislative role and also a facilitating, guiding role for the profession.
- That the Treaty of Waitangi is a founding document for this nation and the Council reflects the principles of the Treaty of Waitangi within policies and procedures.
- That the principles of justice, fairness and respect of persons is upheld by the Council.
- That the Council incorporates good employer practices into its policies and procedures.
- That nursing/midwifery education requires a balanced integration of relevant theory and practice.
- That effective practice of nurses and midwives and the protection of the public depends on the competence of practitioners.
- That all nurses and midwives are accountable for their practice.[5]

Statement of Corporate Intent

The responsibilities of the Nursing Council lie in the area of policy, planning and review in order to meet its statutory obligations.

The principal functions of the Nursing Council are set out in section 11 of the Nurses Act 1977.

"The Council shall have the following functions:

(a) to make recommendations to the Minister with respect to the nursing

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5 Ibid.

programmes to be undertaken by candidates for examination under this Act in relation to the minimum standards required for registration and enrolment under this Act;

(b) to approve, subject to the concurrence of the Minister, hospitals and other institutions at which the whole or any portion of any prescribed nursing programme may be undertaken for the purposes of this Act:

(c) to conduct examinations under this Act;

(d) to appoint examiners and make all necessary arrangements for the purpose of the examinations;

(e) to issue certificates of having passed examinations to persons entitled to them;

(f) to advise on and exercise a general supervision of any examination conducted under this Act pursuant to any regulations requiring or enabling the examination to be conducted otherwise than by the Council;

(g) to receive applications for registration and enrolment under this Act, and to authorise registration and enrolment in proper cases;

(h) to exercise disciplinary powers in accordance with the provisions of the Act;

(i) generally, within the scope of its authority, to do whatever may in its opinion be necessary for the effective administration of this Act;

(j) to perform such other functions as may be conferred on it by any other enactment."

The Council's corporate role is to act responsively to national and international social trends and changes to influence the practice of nurses and midwives in the public interest.[6]

Nursing Council Standards

This document details the requirements for approval of courses in the form of structure, process and outcome standards. Applicants for registration as comprehensive nurses or midwives must complete the course as specified and meet the outcome standards incorporating the legislated requirements and expected competencies for safe nursing practice. The audit tools for approving the development and implementation of the curriculum are based on the standards.

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6 Ibid.

Standards for Registration of Comprehensive Nurses

1 The nursing course complies with legislated requirements and Nursing Council guidelines.

2 Student selection complies with legislated requirements and Nursing Council policy.

3 The nursing course has a structured curriculum.

4 The scope and content of the curriculum includes theory and related practice experiences to enable students to achieve the expected outcomes of the course.

5 The curriculum is implemented by teachers who are qualified for their role.

6 The facilities and resources are available to support the achievement of the expected outcomes of the course.

7 The environment is conducive to the teaching-learning process.

8 Student performance is assessed relative to the attainment of expected learning outcomes and nursing practice.

9 The applicant for registration complies with legislated requirements and Nursing Council policy and guidelines.

10 The applicant for registration demonstrates the competencies for safe nursing practice.

STANDARD ONE

The nursing course complies with legislated requirements and Nursing Council Guidelines.

Criteria

1.1 The educational institution offering the course is specified in the schedules of the Nurses Regulations 1986 and Amendments.

1.2 The nursing course meets the requirements specified in the Nurses Act 1977, Nurses Regulations 1986 and Nursing Council policy.

1.3 The governing body of the institution offering the course sends to the Nursing Council such information as the Council requires.

STANDARD TWO

Student selection complies with legislated requirements and Nursing Council policy.

Criteria

2.1 Students selected meet the requirements specified in the Nurses Act 1977 and the Nurses Regulations 1986 in terms of educational, registration or age qualifications.

2.2 Selection criteria and processes require applicants to demonstrate the ability to achieve academically in a Bachelor's degree programme

2.3 Credit and recognition for prior learning must be in line with Nursing Council policy.

2.4 The student satisfies the requirements of Section 19a of the Nurses Act 1977 ("The person is of good character and reputation, and is a fit and proper person to be registered or enrolled in accordance with his application...")

STANDARD THREE

The nursing course has a structured curriculum.

Criteria

3.1 The curriculum is written and reviewed in consultation with the nurse teachers, nurses in practice, the tangata whenua, employers and other representatives of the community and attempts to meet the needs of these groups.

3.2 The curriculum has an identifiable nursing focus consistent with the statement of beliefs or underlying assumptions, both of which are integrated throughout the curriculum

3.3 The curriculum identifies expected outcomes and demonstrates how these

will be met.

3.4 The curriculum outlines the means by which students will achieve the competencies for registration.

3.5 The curriculum outlines the relationship of theory, practice, research and the process of evaluation.

3.6 The curriculum allows for learning opportunities which encourage students to integrate concepts.

3.7 The curriculum incorporates the principles of cultural safety throughout the length of the course.

STANDARD FOUR

The scope and content of the curriculum includes theory and related practice experiences to enable students to achieve the expected outcomes of the course.

Criteria

4.1 The context is specific to New Zealand and includes:

- the Treaty of Waitangi;
- cultural safety;
- nursing theory and practice;
- biological and physical sciences;
- social sciences;
- health systems;
- history and politics of nursing;
- communication skills;
- pharmacology;
- pathophysiology;
- *health science and health promotion;*
- ethics and law;
- research;
- organisation and supervisory skills.

- Clinical content includes:
  Community health nursing, maternal and infant health nursing, child and family health, medical nursing, surgical nursing, mental health nursing, disability, rehabilitation and continuing care.

  Clear learning outcomes relate to placements.

  Maternal and infant health nursing (previously obstetric nursing)
  Registered Comprehensive Nurses must have an understanding of their scope of practice with regard to maternal and infant health. This includes understanding of the legal framework for practice, maternity services available to women and appropriate referral options. In particular, nurses must have knowledge of reproductive/sexual health, normal fetal development and physiology of pregnancy, health promotion, the family experience of pregnancy, birth and the postnatal period, infant feeding,

normal newborn development and contraception. All students should have some follow-up experience with a family experiencing childbirth. This may take the form of discussion with women and families after birth to explore issues related to new families and post-partum care. Management of maternity care and deviations from normal are not included in this interpretation.

4.2 *Full Three Year Course*

4.2.1 The context provides for a minimum of 1500 hours of theory and 1500 hours of practice, or recognition of prior learning in accordance with Section Three of the Nursing Department/Schools Handbook (January 1999).

4.2.2 No less than 50% of the theory hours are nursing related.

4.2.3 practice experiences have well formulated learning outcomes which relate to the competencies for entry to the register of comprehensive nurses.

4.2.4 no more than 10% of the minimum practice hours shall be in a laboratory/simulation setting. These are settings in which students learn clinical skills using models, actors, interactive role playing, interactive media.

4.3 *Individual Programmes*

4.3.1 The theory and practice hours must be sufficient to enable the student to meet the competencies for comprehensive nursing registration.

4.3.2 For single registration nurses practice constitutes at least 60% of the course and is no less than 600 hours. Theory constitutes no less than 400 hours and at least 50% of the theory hours relate to nursing.

4.3.3 For enrolled nurses practice constitutes at least 50% of the total course and is no less than 1000 hours. Theory constitutes no less than 1000 hours and at least 50% of the theory hours relate to nursing.

STANDARD FIVE

The curriculum is implemented by teachers who are qualified for their role.

Criteria

5.1 Teaching staff possess qualifications and experience relevant to the area in which they are teaching and advance of the qualification being offered in the course.

5.2 Nurse teachers hold registration under the Nurses Act 1977 and a current annual practising certificate.

5.3 Nurse teachers have had at least the equivalent of three years full time post registration clinical nursing practice including recent relevant experience in the area they will be teaching.

5.4 Nurse teachers have completed a course in adult teaching and learning within two years of appointment.

5.5 Nurse teachers have completed a Nursing Council approved cultural safety

course within one year of appointment.

5.6 Teachers maintain and update knowledge and skills relevant to the area in which they are teaching.

5.7 The teacher responsible for coordinating the comprehensive nursing course must be a registered nurse with a current annual practising certificate and, in addition to criterion 5.1-5.6, hold a minimum of a post-graduate degree with a nursing or educational focus, or related area.

5.8 The academic upgrading should be completed by the year 2000.

5.9 The Nursing Department or School maintains a plan for staff development and support.

STANDARD SIX

The facilities and resources are available to support the achievement of the expected outcomes of the course.

Criteria

6.1 Teaching and learning resources are adequate to achieve course outcomes and purposes:

- subscription to current nursing journals, up-to-date textbooks in nursing and related sciences;
- nursing practice suite for simulation learning;
- audiovisual equipment sufficient for number of students;
- technical and practice support; and
- access to computers.

6.2 A variety of practice experiences are available in all dimensions of health care within the community including hospital settings.

6.3 A contract exists between practitioners or health and disability support services and the school seeking placement, with written evidence that the students will have access to appropriate practice experiences.

6.4 Teachers are available to give support to students as and when required, in the practice setting.

STANDARD SEVEN

The environment is conductive to the teaching learning process.

Criteria

7.1 The variety of learning styles is acknowledged by providing opportunities to meet individual learning needs.

7.2 Provision is made for students to participate in planning their learning experiences.

7.2 Provision is made for students to participate in planning their learning experiences.

7.3 Students are encouraged to direct their own learning in order to meet course requirements.

7.4 There is a regular discussion of progress between teacher and student.

7.5 Opportunities are provided for the sharing of knowledge and experience within all learning situations.

7.6 Student feedback is regularly sought and acted upon.

STANDARD EIGHT

Student performance is assessed relative to the attainment of expected learning outcomes and nursing practice.

Criteria

8.1 The assessment process is valid and reliable.

8.2 Formative assessment is used to provide feedback to students.

8.3 Summative assessment is used for progression and exit decisions.

8.4 The assessment process determines that the minimum standard of nursing competence for registration has been achieved by applicants.

8.5 The assessment is undertaken by nurse teachers who are skilled in assessment.

8.6 Criteria used for assessment are made available to students who receive individual feedback and the opportunity for self assessment.

8.7 Decisions about student progress are evidence-based and documented.

8.8 Appeal mechanisms are made explicit to students.

STANDARD NINE

The applicant for registration complies with legislated requirements and Nursing Council policy and guidelines.

Criteria

The applicant:

9.1 has achieved the expected outcomes of the course.

9.2 has completed the requirements of the approved curriculum.

9.3 is currently competent and safe to practise as a comprehensive nurse in any New Zealand setting.

9.4 is fit and proper to be registered as a comprehensive nurse.

9.5 is of good character and reputation.

9.6 achieves a pass in the State examination for comprehensive nurses.

STANDARD TEN

The applicant for registration demonstrates the competencies for safe nursing practice.

.Criteria

10.1 Communication

Relates in a professional manner and communicates effectively to support the client through the health care experience.

10.2 Cultural Safety

Practises nursing in a manner which the client determines as being culturally safe.

10.3 Professional Judgement

Makes professional judgements that will enhance nursing practice.

10.4 Management of Nursing Care

Manages nursing care in a manner that is responsive to the client's needs, and which is supported by nursing knowledge, research and reflective practice.

10.5 Management of the Environment

Promotes an environment which maximises client safety, independence, quality of life, and health.

10.6 Legal Responsibility

Practises nursing in accord with relevant legislation and upholds client rights derived from that legislation.

10.7 Ethical Accountability

Practises nursing in accord with values and moral principles which promote client interest and acknowledge the client's individuality, abilities, culture and choice.

10.8 Health Education

Assists clients and groups to achieve satisfying and productive patterns of living through health education.

10.9 Interprofessional Health Care

Promotes a nursing perspective within the interprofessional activities of the health team.

10.10 Quality Improvement

Contributes to ongoing quality improvement in nursing practice and service delivery.

10.11 Professional Development

Undertakes responsibility for own professional nursing development and contributes to the development and recognition of professional nursing practice.

Refer to Nursing Council of New Zealand *Competencies for Entry to the Register of Comprehensive Nurses* (January 1999) for detail of the performance criteria for these competencies.