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# Nursing Informatics and Implementation of a NICU Portal

Sabrina E. Wong, RN (EC), BNSc, MSc *

*Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada*

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ABSTRACT

Neonatology and informatics are relatively new subspecialties to the health field; however both have made rapid developments over a considerably short period of time. Significant improvements have been made to the care of neonates resulting in a rapid rate of survival of sick and premature neonates. Along with improvements in care there has been the development of technology and with it the field of informatics. This paper offers a review of the development of nursing informatics and its application in changing practice in a tertiary neonatal intensive care unit (NICU).



Health informatics is a discipline that combines health care with the fields of information and computer science. It focuses on the integration of hardware and software technology into the delivery of health care.[1-3] The tools of health informatics are more than just computers and technologies, but also encompass clinical guidelines, medical terminologies and information systems.[4-6] Health informatics is a broad term that encompasses areas of medical, nursing, public health, pharmacy, dentistry, veterinary, and research, among many others.[2,5] Specifically it deals with the resources, devices, and methods required to acquire, store, retrieve, and use medical information all the while focusing on the client and client safety rather than the caregiver.[5,7]

Nursing informatics has been clearly identified as a distinct discipline within nursing.[8,9] It is identified as a practice where data are generated, managed, and processed to provide useful information while also developing knowledge that supports nurses in multiple practice domains, including administration, clinical practice, education, and research.[9] It is a key component of effective communication and decision making of all nurses and helps to build new knowledge to support evidence-based practice.[10] Hebert (2000) states nurses "should have both the skills and knowledge for them to be able to use information and communication technologies to enter, retrieve, interpret and manipulate data, organize data into information to affect nursing practice and combine information to contribute to knowledge development in nursing".[11]

The importance of health informatics has been highlighted in the United States in recent years starting in 2004 with President Bush stressing the need for electronic health records (EMRs) as a method of improving health outcomes.[6]

From there, President Obama signed by American Recovery and Reinvestment Act (ARRA) in 2009, which allocated money to assist in the development of EMRs.[6] As part of the ARRA, The Health Information Technology and Economic and Clinical Health Act (HITECH Act) was developed and outlined a timeline for the meaningful use of information technology.[6,12] Meaningful use of information technology means that health data need to be captured electronically and the information delivered in a way that will improve health outcomes while decreasing health care costs, thus leading to supporting and training medical staff.[6,13]

Around the same time in 2004, the Technology Informatics Guiding Education Reform (TIGER) initiative was formed to develop a strategy and actions to improve nursing education and education specifically in using information technology to improve care.[6,7] This initiative created a set of competencies that provide the minimum standard of informatics competencies that all nurses should be held to as information technology is used to improve the quality and safety of patient care.[7] Concurrently, other countries have been creating similar standards. In Canada, increasing attention to the need for patient safety lead to an initiative which resulted in the development of the Canada Health Infoway (CHI), a non-for-profit, federally funded organization. The CHI facilitates and invests in the development of electronic health records (EHRs) to enable clients and care givers to have more efficient health communication and thus improvements in their requirements of care.[14]

With these developments, the American Nurses Association created its Nursing Informatics Scope and Standards in 2008, which defines nursing informatics as "the integration of nursing science, computer and information science, and cognitive science to manage communication and expand the data, information, knowledge, and wisdom of nursing practice".[7] This definition indicated that information and communication technology and health informatics is an important part of all areas of nursing practice. As such, the TIGER Initiative has indicated that informatics is imperative to improve nursing practice and client outcomes in all domains of nursing practice whether it is clinical, practice, education, research, or administration while highlighting the electronic aspect of nursing.[7] This strategy identified what information a nurse needs and accesses

* Address correspondence to Sabrina E. Wong, RN(EC), BNSc, MSc, 2075 Bayview Avenue, Toronto, Ontario, Canada.
*E-mail address:* Sabrina.wong@sunnybrook.ca.

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available data, information and knowledge they need to make the appropriate clinical decision.[6,7] In essence, this e-nursing strategy hit upon every competency of nursing informatics.

As technology has improved, so too has the understanding of the implication of nursing informatics on clinical practice. With the signing of the ARRA and the creation of the HITECH Act, EMRs have taken the forefront of all informatics discussions. They provide a hands-on method of streamlining clinical and laboratory data to assist in clinical decision-making, documentation, and communication.[15] Clinical data can now be assessed on a second by second basis in order to more clearly identify clinical trends, resulting in more accurate data retrieval. With more accurate time stamps on clinical data and interventions, a more accurate picture of a patient's current clinical status is presented, allowing staff to provide optimal care. With such accurate documentation, bedside charting has become more efficient and more accurate, especially in critical situations such as a Code Pink in the NICU.[15] Thus, removing the variability of documentation that is inevitable due to interpretations or assumptions by those documenting.

While informatics has demonstrated so many improvements in documentation, it has also made significant contributions to nursing education. In order for a nurse to provide optimal care, the data that are collected must be processed and transformed into knowledge.[6] Thus, nurses must have resources, such as unit protocols and policies, drug information, and clinical guidelines at their fingertips to be able to provide the most up-to-date evidence based care.

However, the integration of nursing informatics into nursing practice is reliant on the access nurses have in the workplace to the information and the technology, the competence and skills the nurses have with information and technology to be able to support their knowledge and decision making in their practice, and lastly, their participation in the selection and implementation of information and technology tools.[4,7,16] However, competencies of informatics should not be confused with the ability to use technology and computers. No longer is the focus solely on whether a nurse has an ability to use a computer or electronic medical record, rather, the focus has been expanded to include how a nurse uses these skills to include the knowledge into practice.[16,17] As part of the identification of priority issues, the Canadian Nurses Association (CNA) e-nursing strategy group identified key results that were expected with the strategy was implemented and suggest that an shared portal and developing competencies in nursing informatics as ways to address these results.[4]

Informatics has many positive implications to nursing practice. It has provided a widely disseminated method of formalized education as well as informal knowledge sharing. As the worldwide web has expanded globally, so too has the ability to share information between far reaching parts of the world. No longer are small towns and countries denied the new evidence based research as a result of their locations and lack of teaching hospitals. Now, those teaching hospitals are able to utilize the Internet and fast growing technologies to share their knowledge in real time allowing for a globalization of education programs. In fact, the new generation of nurses is technology savvy and seeks out technology as their first line of information.

## Portal and Change Management

Change is never easy in a health care environment, especially with regards to information technology; therefore careful thought and planning must be used before making significant changes. One method employed as a method of ensuring successful change is the use of change management. Change management is a process that is used to assist in the creation and implementation of health information technology systems and is characterized by 5 steps: assessment, feedback, strategy development, implementation, and reassessment.[6]

### *Step 1. Assessment*

In assessment, the understanding and belief of stakeholders regarding the proposed changes are explored.[18] In 2009, a tertiary care NICU in a large Canadian city moved into a pod style NICU with all single patient rooms. As part of the move, it became quickly apparent that the culture of information sharing that was found in the old open bay NICU was struggling to continue. Past methods of storing all information on one common computer, storing policies in hard copy in a central binder, or referencing senior staff members were no longer efficient methods of sharing information. While there were no arguments that those methods worked in the old open bay NICU, safety issues were identified based on the distance staff would have to travel to reference the necessary resources. Thus, a different method of information sharing was needed.

In the assessment of resources available it became clear that technology would be the answer. This new state-of-the art NICU had a computer at each patient bedside, however there was no external internet access available to front line staff due to the linkages between the computers, patient monitors, and hands-free communication devices. Thus, the idea of a NICU portal was created. The NICU portal would be a shared and secure Intranet website that would house resources and information that were required by the multi-disciplinary team. The intent was for the information to be assembled in an easy to navigate interface that is easy to use by all stakeholders.

### *Step 2. Feedback*

In the feedback stage, feedback is sought out from all stakeholders. Positive and negative effects of the potential changes as well as methods to address each should all be considered at this stage.[18] Nurses were the primary source of feedback as they are often the first contact the multi-disciplinary team has with the neonate, as such, they need to be able to integrate and communicate information and clinical data to the team to help support decisions that will impact the health neonate.[9] As the nurses were learning to cope with the amount of space in the new NICU unit, the idea of access to all necessary information at each bedside computer was appealing. The idea of using information technology to share information brought about both excitement and concerns. Moving towards an environment that required less paper was extremely appealing as it would make updating and circulating documents and sharing of information easier, while at the same time decreasing the environmental impact of printing large volumes of paper.

There were concerns regarding the amount of computer knowledge and computer savvy that would be needed in order to access the necessary information. However, concerns dissipated when assurances were made that accessing the basic data would be no different than opening up an internet browser and clinking on the necessary links. To target these concerns, portal champions were identified and the ability to upload and change documents was limited to a select core group of staff, with the intent to open up availability and portal capabilities as staff became more comfortable with the technology.

### *Step 3. Strategy Development*

Strategy development is the critical stage in planning for implementation and proper strategy development can assist in the acceptance of the proposed change. Information technology decisions need to reflect identified workflow and needs of frontline clinical staff.[19] Importance needs to be placed on the end user rather than on focusing on the technology itself as technology can both facilitate change and stop it in its tracks.[19] Well-organized, high quality information has been highly correlated with acceptance of technology