

# NURSING INFORMATICS

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## Abstract :

Computers have opened for us a world of information. New and emerging technologies will continue to have an effect on the health care delivery system. Nurses as a major player in health care, will be part of this ever growing era technology. A nurse must know generalized applications such as word processing, as well as specialized applications such as clinical information system. Virtual reality (simulation) and ubiquitous (every where) computing are emerging and being used in education and other areas in health care nursing knowledge workers must be able to understand the evolving specialty, nursing informatics, in order to begin to harness and use the tools available for managing the vast amount of health care data and information. This article mentions in detail about Nursing Informatics and therefore highlights that nursing informatics capabilities be appreciated, promoted, expanded and advanced to facilitate the work of the Nurse, improve patient care, and enhance the Nursing profession.

Keywords: Clinical Information System, Virtual reality, Ubiquitous computing

## Introduction :

*"The Future is here. It's just not evenly distributed..."*

(William Gibson, Novelist and visionary)

Computers have moved from the realm of a "nice to know" luxury item to a "need to know" essential resource for professional practice. Nurses are knowledgeable workers who require accurate and up to date information for their professional work. Trends in computing will affect the work of the professional nurses in areas beyond the development of Clinical Information systems. Computerized patient Records, Research advances, new devices, monitoring equipment, sensors and 'smart body parts' will all change the way that health care is conceptualized, practiced and delivered. Every nurse need to be computer literate. For health care professional's computer literacy requires having an understanding of systems used in clinical practice, education and research settings.

Informatics:

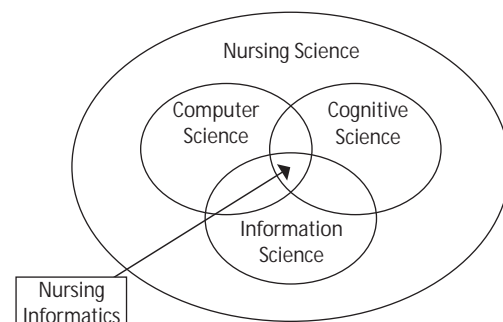
The term was coined as a combination of "information" and "automatic" to describe

the science of automating information interactions.

## Nursing Informatics :

"Nursing Informatics is the specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice." (ANA 2008)

Figure 2 : Nursing Informatics Model ( Turley. 1996)



## EVOLUTION OF NURSING INFORMATICS

- | Nurses have been involved in "informatics" since the 1960s
- | San Jose Hospital (1965): Nurses recorded their observation on a check list which was then converted into punched cards for computer entry
- | 1966 Institute of Living in Hartford: Nurses used

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machine readable pencil "bubble sheets" to document patient status

- | 1970s: Nursing Diagnoses researched and approved by the North American Nursing Diagnosis Association (NANDA).
- | 1974: Nursing research papers presented at an international medical informatics conference (MEDINFO)
  - o Four research papers on NI from the UK and one from US nurses adapting and implementing an information system at the NIH
- | 1979: *The Journal of Nursing Administration* features a monthly column on "automation in nursing"
- | 1980: The term "Nursing Informatics" originated by Scholes and Barber
- | 1985: Nursing Minimum Data Set (NMDS) researched/developed by Werley and Lang.
- | 1990: ANA House of Delegates recognizes the Nursing Minimum Data Set (NMDS).
- | 1992: NI approved as a nursing specialty by American Nurses Association (ANA)
- | 1992: ANA Database Steering Committee formally recognizes four nursing vocabularies:
- | 1995: ANA credentialing exam

According to Thompson (2005), three main shifts catalyzed Nursing Informatics:

- o Moving from centralized data storage to decentralized data access
- o Moving from paper charts to electronic health records
- o Moving from relying on memory to continuously using information resources

GOAL OF NURSING INFORMATICS is to get the....

- RIGHT information to the
- RIGHT people at the
- RIGHT time to do the
- RIGHT job at the
- RIGHT Cost

NURSING INFORMATION SYSTEMS (NIS)<sup>5</sup> - is one of the major clinical systems and allows for assessment of the patient and the documentation of the care and teaching delivered.<sup>5</sup>

TWO APPROACHES OF NIS<sup>5</sup>

1. Menu driven screens- It presents content in pre arranged categories that allow practitioner to select the most applicable items. The categories are designed around the nursing process from admission through to discharge based on the nursing diagnosis.
2. Care Protocols- In this type of documentation, a specific protocol is selected based on the admission diagnosis. The protocol lists the elements of care to be initiated and monitored during each patient day. The documentation is related to the ability of the patient to achieve the established daily protocol goals.

Standardized Nursing Terminology<sup>1</sup>:

Without a standardized nursing terminology, it would remain difficult to quantify nursing and the nursing component of electronic health record systems would remain at best rudimentary. ANA has recognized 13 standardized nursing languages

DATA ELEMENT SETS	SETTINGS	CONTENT
1.NMDS-Nursing Minimum Data Set	All Nursing	Clinical Data Elements
2.NMMDS-Nursing Management Minimum Data Set	All settings	Nursing Administrative data elements
3.CCC-Clinical Care classification	All nursing care	Diagnoses, Interventions and out come
4.ICNP-International classification of Nursing Practice	All nursing care	Diagnoses, Interventions and out come
5.NANDA	All nursing	Diagnosis
6.NIC-Nursing Intervention Classification	All nursing	Interventions
7.NOC-Nursing Outcome Classification	All nursing	Outcomes
8.OMAHA system	Home care, Public Health and Community	Diagnosis ,Interventions, Outcomes
9. PCDS-Patient Care Data Set	Acute Care	Diagnosis, Interventions, Outcomes

DATA ELEMENT SETS	SETTINGS	CONTENT
10.PNDS-Perioperative Nursing Data Set	Perioperative	Diagnosis ,Interventions, Outcomes
11.ABC-Alternative Billing Codes	Nursing And Other	Interventions
12.LOINC-Logical Observation Identifiers Names and Codes	Nursing And Other	Out come and Assesments
13.SNOMED CT-Systematic Nomenclature of Medicine Clinical Terms	Nursing And Other	Diagnosis ,Interventions, Outcomes

All the 13 languages were designed to record and track the clinical care process for an entire episode of care for patients in acute, home or ambulatory care settings. The use of standardized nursing languages has many advantages for the direct care/bedside nurse. These include: better communication among nurses and other health care providers, increased visibility of nursing interventions, improved patient care, enhanced data collection to evaluate nursing care outcomes, greater adherence to standards of care, and facilitated assessment of nursing competency

#### General Application Soft Ware For Nurse Leaders<sup>4</sup>

1. Communication software – provides link for access between computer
2. Database management system- for storing and retrieving data
3. Word processing software- to produce documents such as memos, letters, signs, books and resumes
4. Spreadsheets- to develop budgets, maintain staff record, calculate, track and create graphs on statistics relating to staff and patient data
5. Personal Information Manager Applications – contains address book, calendar, email, a journal, notes and tasks.

#### Advantages in Utilizing Nis<sup>5</sup>

1. Increased observation due to forced recall
2. Increased Accuracy and reliability of observations
3. legibility with less time required to read and interpret accurately
4. Decrease time in writing notes
5. Available for statistical analysis. Elements already coded can be selected.
6. Teaching tool to guide observations.can develop elements to help staff with what they need to look for
7. Errors and omissions are decreased or eliminated with protocol followed

#### Disadvantages in Utilizing Nis<sup>5</sup>

1. Charting may be longer due to need for review of content prior to selection
2. Wording may not be common to users language. Standard Dictionaries are not readily available
3. Pre established content and need to make sure protocols are individualized for patients with comorbidities

#### Types of Nursing Hit (health Informationtechnology) Applications

- Automation of documentation
  - Nurse rounding tools
- Bar-coded Rx management
- Nurse staffing systems
- Tele Nursing

#### Application of Nursing Informatics

##### Nursing Practice

- accesses, enters and retrieves data related to client care via available hospital or nursing information systems
- uses computer applications to plan Computer-generated nursing care plans ,Order entry, results reporting, documentation and clinical path ways, work lists, including discharge planning
- uses computer applications to enter client data (demographic, vital signs, physiological data)
- uses information management systems for client education
- uses technology based client monitoring systems
- operates peripheral devices (bedside and hand held)
- automatic billing while nursing documentation
- uses e-mail systems to communicate
- Uses presentation applications to create slides, displays, overheads (PowerPoint, Corel Presentation, etc.)
- participates in the design and develop design and

development of new applications for nursing practice

- participates in developing new methods for data and information organization
- upholds ethical standards related to data security, confidentiality and clients' right to privacy

#### Nursing Administration :

- Workload measurement systems that collect statistics for internal and external reporting requirements
- Indenting and stocking
- Online computer policy, protocols and procedure manuals that guide organizational practices
- Staff scheduling systems that either automate schedules or allow for self-scheduling through rules-based protocols
- Internal email and/or systems for improved communication
- Cost analysis of specific patient populations
- participates in design of data collection tools for practice decision making and record keeping
- participates in quality management initiatives related to patient and nursing data in practice
- participates in patient instructional program development
- Trending & forecasting
- Safety and quality
- Make judgments based on data trends and pattern
- ? participates in ergonomic design of work stations, bed side access stations and portable apparatus equipment
- uses decision support systems, expert systems and other aids for clinical decision making and care planning

#### Nursing Education

- Presentation software
- Computer labs or resource centers
- Computer assisted Instruction
- teleconferencing
- Simulation labs with lifelike mannequins that mimic real patient scenarios and respond to nurses' interventions

and actions

- Online registration, scheduling, attendance tracking, test administration and grade management of courses through learning management systems
- Remote access to libraries or online publications
- Web based Education

#### Nursing Research

##### a. Problem identification and literature review

- Search databases for current research
- Availability of full text journal articles
- Research design
- Search the literature for instruments
- Design and test instruments

##### b. Data collection and analysis

- Create forms for data collection
- Calculate descriptive and analytic statistics
- Display output in tables, charts, lists, and other easily read formats

##### c. Research dissemination

- Word processing programs used to author the final reports
- Send the reports to various readerships
- Frequently used to present research at meetings

##### d. Grants

- Locate
- Download and submit funding applications

#### Nurse Informatics Role<sup>1</sup>

- User liaison- involved in installation of a CIS and interfaces with system vendors, the users and management of health care institution
- Project manager- planning and implementing informatics project
- Educator- develops and implements educational materials and educational sessions about system to employees

- Product developer-participate in design, production and marketing of new informatics solutions
- Decision support/outcomes manager- use tools to maintain data integrity and reliability
- Systems analyst- serves as link between nursing and information services
- Consultant- provide expert advice, opinions and recommendations based on her area of experience
- Advocate/policy developer- develop the infrastructure of health policy
- Entrepreneur- analyzes nursing information needs and develops market solutions
- Researcher- conduct research to create new informatics knowledge
- Chief information officer-provides leadership and management at the executive level for both the organization and the vendors
- Web developer-Web development responsibilities
- Programmer-ability to code identified specifications for system development, enhancement or issue resolution
- Net work administrator-ensures networks continuously runs smoothly

#### Benefits of Information Technology in Healthcare<sup>10</sup>

Safety - Computer technologies can place safety barriers within high risk processes to improve patient safety

Efficiency -

- Achieved through the use of computers and computer technology as a data management tool
- Moving away from paper records – improves access to the data you need without flipping through a bulky patient record
- Easier retrieval of data associated with a particular process
- Data sharing is improved between disciplines

Quality Improvement

- Allows for auditing to assure a consistent standard of care

- Measurement of performance against standards of practice to identify systems issues and opportunities for improvement

Decision Support

- Cues and information built into the system to assist in making care decisions

Data Management

- Workload statistics
- Performance monitoring
- Performance improvement projects
- Identification of problem areas
- Before and after data
- Regulatory compliance

Issues Related to Computers In Nursing<sup>7</sup>

1. Legal/Ethical Issues

- privacy/confidentiality
- access to data for research and other purposes
- informed consent
- License issues with telenursing
- Copy right of materials on the Web

2. Ergonomics

Most common injuries- muscle and eye strain

Guidelines and Strategies to Minimize Risk<sup>4</sup>

1. Never give out your computer password
2. Always log off when you leave a computer terminal
3. Follow procedures for correcting mistakes before computer entries are permanent
4. Don't leave patient information displayed on a screen, keep track of printed information and dispose of it properly
5. Follow institutions confidentiality policies and procedure

Informatics Attitudes<sup>10</sup>

- Appreciate the necessity for all health professionals to seek lifelong, continuous learning of information

technology skills

- Value technologies that support clinical decision-making, error prevention, and care coordination
- Protect confidentiality of protected health information in electronic health records

Value nurse's involvement in the design, selection and implementation of information systems

Building A New Future<sup>12</sup>

Healthcare organizations can do much to support the evolving role of nursing informatics.

- Develop nurses' potential to fulfill emerging informatics management roles by focusing on leadership skills such as communications, strategic and systems thinking, clinical, financial and business operations, and technical skills.
- Build a culture that supports nursing informatics through programs organized around reward and recognition, professional development, mentoring, performance planning and assessment, and career path development.
- Conduct research and explore new models focusing on the roles, responsibilities, competencies of chief medical information officers (CMIOs), chief nursing informatics officers (CNIOs) and CNOs, as well as the function and scope of relationships with other members of the C-suite: CIOs, CEOs, CMOs, CFOs and CTOs. Explore new models that also create a strong tie between informatics and professional practice and interdisciplinary practice.
- Develop and champion leaders with the ability to develop, deploy, re-engineer and integrate clinical information systems; function as members of strategic management teams; and collaborate on goals and implementation of clinical information systems.

As the healthcare landscape continues to shift, nurses are key leaders to navigate the need for coordinated care and enable better data infrastructure. The role of the nurse

leader in informatics will most certainly be integral to the industry's future.

Strategic Directions for Nursing Informatics Future<sup>10</sup>

- Include informatics in nursing education
- Prepare nurses with specialized informatics skills
- Enhance nursing practice and education through informatics projects
- Increase nursing faculty preparation in informatics
- Encourage collaboration

Emerging Technologies to Improve Nursing Practice

1. Wireless communication
2. Real time location system
3. Delivery robots
4. Work flow management systems
5. Wireless patient monitoring
6. eMAR with Bar coding
7. Clinical documentation
8. Interactive Patient system

Conclusion :

DREAM, DARE, AIM to be an INNOVATOR. The nursing profession has a strong commitment to the specialty of nursing informatics. The demand for professional nurses with informatics backgrounds will likely continue to rise .The demand for Clinical IT leadership has provided new roles and opportunities for nurses in all areas of healthcare. Many of the reasons why nurses are being sought for IT leadership positions are based on fundamental skills unique to their profession including being knowledge experts in the clinical care process, global systems view, ability to manage large projects or staff, and understanding the need to access patient information. This is the time to move forward, if you are a nurse seeking advancement in healthcare information technology. Now is the time to craft a successful career path in nursing informatics. Keep abreast of "latest greatest" technology trends.

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