Nursing Informatics
The Future is Here

One (1) Contact Hour

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Acknowledgments
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Purpose
The purpose of this course is to provide nurses with an overview and basic understanding of how informatics and information technology can be used to improve the delivery of quality patient care.

Learning Objectives
After successful completion of this course, you will be able to:
- Define nursing informatics.
- Discuss implementation of technology in healthcare.
- Discuss ways in which nurses can participate in the implementation of new technology.
- Describe the roles and responsibilities involved in nursing informatics.
- Describe the specialty of nursing informatics and explain educational pathways to certification.

Introduction
Technology has increased rapidly over the past four decades, and has become an integral part of healthcare. Nurses have participated in the purchase, design, and implementation of information technology in healthcare. The knowledge required for the field of nursing informatics has expanded and it is now a recognized specialty in the profession. Nursing informatics is considered both a science and a system, including process and data.

Definition of Nursing Informatics
The term "nursing informatics" was initially seen in literature in the 1980s, including a definition of combining nursing, information, and computer sciences for managing and processing data into knowledge for using in nursing practice (Murphy, 2010). In 1994, The American Nurses Association (ANA) began developing a statement to describe and define the scope of nursing informatics (Baker, 2012). The meaning of nursing informatics has evolved and been refined, with the American Nurses Association (2008) definition stated as "a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice" (p. 65).

Another definition of nursing informatics comes from the American Medical Informatics Association (AMIA), which states "Nursing Informatics science and practice integrates nursing, its information and knowledge and their management, with information and communication technologies to promote the health of people, families and communities worldwide" (2009, para. 1).

Components of Nursing Informatics
It was identified by the Institute of Medicine (IOM) report in 2001 that a transformation in healthcare is needed. Included in this report was a call for the use of health information technology (IT) to enhance the quality, safety, and efficiency of healthcare. This transformation includes improving communication between providers and patients, automating clinical information, reducing errors, and promoting evidence-based practice.

- Nursing informatics (NI) supports the decision-making of patients, nurses, and other providers in all roles and settings. This assistance is achieved through the use of information structures, processes, and technology.
- Informatics nurses are those who have extensive clinical practice, are considered experts in using the nursing process, and have additional experience and education with technology (Healthcare Information and Management Systems Society [HIMSS], 2012).

Test Yourself: Which of the following is NOT considered part of the definition of nursing informatics?
   a) Information science
   b) <mark>Social science</mark>
   c) Computer science
   d) Nursing science

Theory with Nursing Informatics

Theories in nursing include concepts and relationships that assist in providing framework. Theories that assist in defining nursing informatics include systems theory, cognitive theory, and change theory.

- Systems theory: Systems theory looks at interacting parts within boundaries, and can be seen with the use of technology and the body systems of patients.
- Cognitive theory: Cognitive theory can be related to input, output, and processing.
- Change theory: Change theory is applied in looking at the dynamic processes that are incorporated with nursing informatics.

(Baker, 2012)

Meaningful Use

The Patient Protection and Affordable Care Act and the American Recovery and Reinvestment Act of 2009 (ARRA), includes incentive payments from the Centers Medicare and Medicaid Services (CMS) to eligible hospitals and providers for the meaningful use of certified health information technology products. Meaningful use is mandated for providers and hospitals to improve quality, safety, communication, and coordination in healthcare.

There are three components of meaningful use: use of an electronic health record (EHR) in a meaningful manner, use of EHR technology for electronic exchange of information, and use of EHR technology to submit clinical quality measures (CMS, 2010). Stage one of meaningful use for hospitals includes reporting of 14 core objectives and 15 clinical quality measures, and stage two includes 16 core objectives and 6 hospital menu objectives (CMS, 2010 and 2012).

Meaningful Use Hospital Menu Objectives Stage 1
- Drug-formulary checks
- Record advanced directives for patients 65 years or older
- Incorporate clinical lab test results as structured data
- Generate lists of patients by specific conditions
- Use certified EHR technology to identify patient-specific education resources and provide to patient, if appropriate
- Medication reconciliation
- Summary of care record for each transition of care/referrals
- Capability to submit electronic data to immunization registries/systems*
- Capability to provide electronic submission of reportable lab results to public health agencies*
- Capability to provide electronic syndromic surveillance data to public health agencies*
* At least 1 public health objective must be selected

Meaningful Use Core Objectives Stage 1

- Computerized provider order entry (CPOE)
- Drug-drug and drug-allergy interaction checks
- Record demographics
- Implement one clinical decision support rule
- Maintain up-to-date problem list of current and active diagnoses
- Maintain active medication list
- Maintain active medication allergy list
- Record and chart changes in vital signs
- Record smoking status for patients 13 years or older
- Report hospital clinical quality measures to CMS or States
- Provide patients with an electronic copy of their health information, upon request
- Provide patients with an electronic copy of their discharge instructions at time of discharge, upon request
- Capability to exchange key clinical information among providers of care and patient-authorized entities electronically
- Protect electronic health information

(CMS, 2010)

Components of meaningful use through the EHR include computerized physician order entry, patient demographics, vital signs, medication reconciliation, drug interactions, allergies, smoking status, clinical decision support, interdisciplinary communications, advance directives, confidentiality, transitions of care, patient education, and ability of patients to obtain a copy of their EHR (CMS, 2010 and 2012). As the criteria of meaningful use evolve, it is essential that nurses be involved as key stakeholders in the planning, design, implementation, evaluation, and optimization of health IT (HIMSS, 2011).

Nurses' Involvement in New Technology

The environments in healthcare have encompassed more than just a physical location. There is an increase in the use of technology such as mobile computers and wireless solutions, and automated exchanges between providers and patients. Adapting to these new environments requires a paradigm shift for how care is communicated and delivered, which requires knowledge of the evolution of new technologies. Nurses are at the center of this advancement as the professionals with the greatest amount of direct patient care.

Healthcare environments now incorporate virtual office visits, online appointment scheduling and payment, mobile laboratories, and electronic medication prescribing. Nurses are also essential in helping patients set up their own personal health records (PHRs), or explaining to patients how to use a patient portal. The use of telehealth exchanges is increasing, particularly with underserved rural populations. New technologies offer access and opportunities to provide quality care to patients in remote settings. The challenge for these technologies with healthcare is ensuring that the automated solutions completely interact with one another, as well as with the healthcare professionals using those (HIMSS, 2011).

Test Yourself: Meaningful use incorporates an electronic health record (EHR) for use in a meaningful manner and which two other purposes?
    a) **Upholding core measures and submission of clinical quality measures**
    b) **Submission of clinical quality measures and protection of patient privacy**
    c) **Protection of patient privacy and electronic exchange of information**
    d) **Electronic exchange of information and submission of clinical quality measures**

Categories of Competencies

Categories of competencies involved in nursing informatics include basic computer skills, information literacy, and information management. Nursing informatics assists nurses to communicate with all other clinical disciplines, coordinate patient care, and manage the information related to patient care and the nursing process (HIMSS, 2012).

Competencies of Nursing Informatics

The Technology Informatics Guiding Education Reform (TIGER) Initiative was created in 2004 to collaborate with nursing stakeholders to create a vision, action, and strategies to improve nursing education, practice, and patient care delivery through the use of health information technology. TIGER formed an Informatics Competency Collaborative, which define the competencies recommended for the NI discipline (TIGER, 2010).

Competency: Basic Computer Skills

Specific competencies for basic computer skills identified by TIGER include:

- Information and communication technology concepts
- Computer use and managing files
- Word processing
- Spreadsheets
- Database use
- Presentation
- Communication and web browsing

Competency: Information Literacy

TIGER identified specific competencies for information literacy:

- Establish the character and extent of the information needed
- Efficiently and effectively access needed information
- Appraise information and the sources critically, and integrates appropriate information into his/her knowledge base and value system
- Use information effectively, as an individual or team member, to achieve a specific purpose
- Evaluate outcomes of information use

Competency: Information Management

The competencies recognized for the category of information management include:

- Verbalize the importance of health information systems with clinical practice.
- Have knowledge of types and clinical and administrative uses of health information systems.
- Ensure confidentiality of protected patient health information.
- Assure access control in the use of health information systems.
- Ensure the security of health information systems.
- Have user skills, including navigation, decision support, and output reports.
- Understand the principles of health information system use by healthcare professionals and consumers are based.

Responsibilities within Nursing Informatics

Nurse informatics have different roles and responsibilities in healthcare, each bringing value to the provision of patient care. Identified responsibilities of nursing informatics (HIMSS, 2012) include:

- Analyze both clinical and financial data
- Endorse and facilitate resource and reference access

- Deliver nursing content to standardized languages
- Improve continuity of care
- Enhance relationships between providers and patients
- Support cost savings and goals for productivity
- Sustain nursing work processes using technology
- Redesign clinical workflow
- Assist with change management
- Encourage provision of high quality, evidence-based care
- Facilitate true interdisciplinary care

Test Yourself: Categories of competencies with nursing informatics include basic computer skills, information management, and which of the following?
   a) **Workflow redesign**
   b) **Health literacy**
   c) **Information literacy**
   d) **Leadership skills**

Roles within Nursing Informatics
Roles for nurse informatics have grown over the years. A few examples include:
- Leadership, including management and administration
- Analysis
- Integrity and compliance management
- Consultation
- Patient care coordination
- Data integration
- Educational and professional development
- Policy development and advocacy
- Research and evaluation
- Systems integration
- Clinical application support
- Process and workflow design
- Clinical transformation
- Information technology security
- Clinical champion
- User training

History of Nursing Informatics
Historically, nurses who worked in nursing informatics were considered "pioneers" who frequently got into the informatics practice because they were good practitioners, were involved in IT projects as project team members or educators, or were just curious and technically competent. The role, responsibilities, and titles of these nurses were varied, and they often got into nursing informatics unintentionally (Murphy, 2010).

The Nursing Informatics Specialty
In 1992, the American Nurses Association (ANA) recognized nursing informatics as a specialty, which includes demonstrating a distinguished practice base, identifying educational programs, and support from nationally recognized organizations. With the increased recognition and educational programs focused on nursing informatics, the American Nurses Credentialing Center (ANCC) created a certification in nursing informatics in 1995 (Murphy, 2010).

According to the ANA (2010), the criteria for recognition of a nursing specialty includes an area of practice that:

- Defines itself as nursing
- Is clearly defined
- Has a well derived knowledge base particular to the practice of the nursing specialty
- Is concerned with phenomena of the discipline of nursing
- Subscribes to the overall purposes and functions of nursing

The Nursing Informatics Specialty (cont)

According to the ANA (2010), the criteria for recognition of a nursing specialty includes an area of practice that:

- Can identify a need and demand for itself
- Adheres to the overall licensure, certification, and education requirements of the profession
- Defines competencies for the area of specialty nursing practice
- Has existing mechanisms for supporting, reviewing, and disseminating research to support its knowledge base and evidence-based practice
- Has defined educational criteria for specialty preparation or graduate degree
- Has continuing education programs or other mechanisms for nurses in the specialty to maintain competence
- Is practiced nationally or internationally
- Includes a substantial number of registered nurses who devote most of their professional time to the specialty
- Is organized and represented by a national or international specialty association or branch of a parent organization

(ANA, 2010, p. 12-13).

Educational Pathways

Many educational programs now offer a major of nursing informatics, such as master's level degrees. Some institutions offer a certificate in nursing informatics, which can be obtained with a minimum of a bachelor's degree. Informatics can be included in programs with one or more courses, or have components of informatics integrated into the curriculum. Technology requirements are also increasing, such as online learning, simulation, the use of hand-held mobile devices and applications.

Curriculum Components

Components of informatics curriculum, as described by the National League of Nursing (NLN, 2008) include:

- Content about available informatics tools (documentation systems, electronic health records, bar code medication systems)
- Content about informatics issues (privacy, security, confidentiality in the digital age, technological impact on workflow, patient care, outcomes)
- Content about how tools in informatics can facilitate nurses' work
- Content about clinical decision support and tools to promote patient safety
- Promote using hand-held devices (such as a personal device assistant, or PDA) to find reference materials such as medical terminology, drug information, interpretation of laboratory results
- Encourage use of PDAs for documentation of clinical rotations/practicum
- Support using PDAs to locate evidence to support nursing practice
- Use clinical information systems in clinical simulation
- Incorporate assignments to find appropriate patient educational materials electronically
- Include assignments to search the web for particular topics and find current evidence

- Utilize assignments to evaluate websites, especially consumer health sites
- Incorporate assignments to prepare presentations using software such as PowerPoint
- Include assignments to develop the use of spreadsheets or databases for information management
- Incorporate software use for creation of nursing care plans
- Provide web-based discussions

Certification

A certification in nursing informatics is available through the American Nurses Credentialing Center (ANCC). To sit for the certification exam, nurses must meet the following criteria (ANCC, 2012, p.1):

- Hold a current, active RN license within a state or territory of the United States or the professional, legally recognized equivalent in another country
- Hold a bachelor's or higher degree in nursing or a bachelor's degree in a relevant field
- Have practiced the equivalent of 2 years full-time as a registered nurse
- Have completed 30 hours of continuing education in informatics within the last 3 years
- Meet one of the following practice hour requirements:
  - Have practiced a minimum of 2,000 hours in informatics nursing within the last 3 years
  - Have practiced a minimum of 1,000 hours in informatics nursing in the last 3 years and completed a minimum of 12 semester hours of academic credit in informatics courses that are part of a graduate-level informatics nursing program.
  - Have completed a graduate program in nursing informatics containing a minimum of 200 hours of faculty-supervised practicum in informatics

Test Yourself: Components of nursing informatics can be incorporated into curriculum by which of the following examples?
   a) **Use of clinical simulation**
   b) **Providing assignments with web-based searches for evidence**
   c) **Encouraging students to use PDAs**
   d) **All of the above**

Opportunities in Nursing Informatics

The opportunities in nursing informatics include all specialties in acute care, home health, ambulatory care, long-term care, outpatient settings, telehealth, software development, and redesign of work flows. The HIMSS made recommendations for nursing informatics based on the IOM report. These suggestions include involvement in leadership, education, and practice for nursing.

- **Leadership**: With leadership, HIMSS proposes partnership with nurse executives to lead technological changes that promote health and healthcare delivery, support the development of informatics departments, and foster the development of the Chief Nursing Informatics Officer role.
- **Education**: For education, suggestions include transformation of nursing education to include informatics competencies and behaviors at all levels of academic preparation, and promotion of continuing education of all levels of nursing, particularly in the areas of health IT and EHRs.
- **Practice**: Recommendations for nursing informatics with practice include incorporating informatics competencies into practice standards, and facilitating the collection and analysis of healthcare workforce data by collecting from existing heath IT systems (HIMSS, 2011).

(HIMSS, 2011).

Applying Nursing Informatics

- **Practice**: knowledge of nursing information systems can be used with nursing practice such as patient documentation, monitoring devices, developing and implementing care plans and pathways, retrieval of previous records and imaging, use of telehealth, and access to current practice standards.
- **Administration**: information systems are used with communication, staff scheduling systems, cost and budget analysis, and monitoring of trends with quality and satisfaction data.
- **Education**: informatics and technology has applications in education, including simulation, electronic learning, teleconferencing, and software availability for educational presentations and programs.
- **Research**: internet capabilities and electronic databases provide rich access to obtaining, compiling, and conducting research (Baker, 2012).

Conclusion

The profession of nursing is viewed as both an art and science. Evolution of nursing includes evidence-based practice and rapid incorporation of advances in technology. Nursing informatics is a field that has widespread uses in healthcare, including specialty practice. Numerous roles have developed based on the growing education and applications of the nursing informatics knowledge base. Educational curriculum and certification are options for nurses to pursue in this exciting field.

Resources

- American Nurses Credentialing Center (ANCC): www.nursecredentialing.org

- Centers for Medicare and Medicaid Services (CMS), Meaningful Use: http://www.cms.gov/RegulationsandGuidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html

- Healthcare Information and Management Systems Society (HIMSS): www.himss.org

- Technology Informatics Guiding Education Reform (TIGER): www.tigersummit.com

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