National Nursing Informatics
Deep Dive Program

Integrating AACN Essentials, QSEN KSA’s and TIGER Competencies for Nursing Informatics

Part 3

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Faculty Practices, Partnerships and Professional Development

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Objectives: Overview

• Describe why it is important for nursing students to develop successful knowledge, skills and attitudes for information management and patient technology.
• Discuss methods of integrating professional standards for nursing informatics into program curricula aimed at prelicensure nursing students.
• Provide nursing informatics resources and tools that can be easily incorporated into existing prelicensure program curricula.

Objectives: Part 1

Part I: Aligning AACN Essentials for Information Management and Patient Care Technologies with QSEN & TIGER

• Compare and contrast how information management and patient care technology has impacted nursing in the last 35 years.
• Describe how rising complexity in healthcare is driving the need for continuous learning systems enabled by technology.
• Discuss challenges nursing school faculty face in learning and teaching information technology today.
• Identify nursing school accreditation expectations and standards for integration of information management and patient care technology in pre-licensure nursing programs.
Part 2: Supporting Safe Nursing Practice Through Patient Care Technologies and Workflow Design

- Define patient care technologies, information systems and communications devices (AACN BSN Essential – IV, Information Management and Patient Care Technologies).
- Discuss assessment of, minimum requirements for and resources available for computer literacy in prelicensure students (TIGER).
- Identify how, and provide examples of patient care technologies that enable management of information and improve patient care.
- Demonstrate exemplars of strategies and methods used by nursing faculty to teach informatics to prelicensure students.


1. Review AACN Essential, “Demonstrate skills in using: patient care technologies, information systems and communication devices that support safe nursing practice”.
2. Review AACN Essential, “Understand the use of CIS (clinical information systems) to document interventions related to achieving nurse sensitive outcomes.”
3. Discuss strategies for integrating an academic EHR into the pre-licensure curriculum
4. Review TIGER competencies for “Information Management”
5. Discuss AACN Essential “Recognize that redesign of workflow and care processes should precede implementation of care technology to facilitate nursing practice.”

Part 4: April 22, 2015

Identifying Nursing’s Unique Contribution to Patient Outcomes Through Standardized Terminologies

- Information technology as an enabler of evidence based practice and outcomes research (standardized nursing terminologies, descriptive and predictive analytics, population management, dashboards), ethics, information security, and protected health information as they relate to regulatory requirements, confidentiality, and clients’ right to privacy
1. Demonstrate skills in using:
- patient care technologies,
- information systems and
- communication devices that support safe nursing practice.

AACN Information Systems

Operations Support
- Basic computer software applications (spread sheets, email, word processing, databases)

Core Systems
- Admission, discharge, transfer
- Financial systems
- Order entry system
- Ancillary systems (lab, pharmacy, radiology)
- Results reporting systems
- Documentation systems
- Administrative systems (scheduling)

Sample AACN Content
Computer skills that may include basic software, spreadsheet, and healthcare databases.

2. Understand the use of CIS (clinical information systems) to document interventions related to achieving nurse sensitive outcomes.

Nursing Dashboard Examples
QSEN Attitudes

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

Knowledge
- Explain why information and technology skills are essential for safe patient care.

Skills
- Navigate the electronic health record.

Academic EHR’s

- Commercial
- Open Source
- Development Partner
- Health System Partnership
- Home Grown

Strategies for Implementation

1. Planning
2. Product Demonstration and Selection
3. Faculty Development and Training
4. Curriculum Threading and Implementation
5. Evaluation

Planning

- Commitment of faculty to program integration
- Barriers
- Resources (funding, available experts)
- Product steering committee
- IT support

Product Demonstration & Selection

Develop program goals
- Evaluate different models of delivery
  - Fully functional EHR
  - Hospital training
  - Textbook with accompanying disc
- Product evaluation process & criteria
- Product demonstrations
- Faculty feedback

Commercial Vendors

- Jones & Bartlett – Simulated Health Records
- Elsevier - SimChart
- NEEHR (Networked Education EHR)
- Perfect
- Cerner Academic Health Record

Functionality
- Virtual Patients and case histories
- Create a Patient Record
- Create an Appointment
- Check in a Patient
- Record Patient Vital Signs
- Record Patient Medications
- Create a Patient Note
- Start the Patient Order Process
- Explore Patient Orders
- Complete a Patient Order
- Use Doctor Desktop to Manage Your Patient Care Load
- Sign Notes and Orders
- Update Reference Information
- View Patient Events
Commercial Vendors

Advantages
• Turn-key application
• Automatic upgrades
• Ongoing support
• Inventory of case studies
• On-line training for faculty
• Scalable – web based

Disadvantages
• Cost
• Student fees for ongoing support
• Limited customization

Open Source

• Open EMR
• Practice Fusion
• VistA
• Other

OpenEMR

Demographics
Scheduling
Vital Signs
Order Entry
Open Source

**Advantages**
- Software application is free
- Semi-customizable
- On-line training
- On-going support and maintenance
- Scalable

**Disadvantages**
- No inventory of case studies
- All exercises and assignments must be developed by faculty
- Requires a super user to develop and customize screens

Six Partnership Models

- Cleveland Clinic Student Nurse Portal
- Oregon Health and Sciences University “Sim-EHR”
- Maricopa, AZ Community College Health Assessment Nursing Documentation System
- Ball State University and Cardinal Health System
- University of Kansas Center for Health Informatics and Cerner Corporation
- School of Nursing Clemson, Virgina “Teach EHR”

http://www.thetigerinitiative.org/docs/partnershiptoteachnurseshowtouseelectronichealthrecords.pdf

Heath System Partnership

- Formal program where nursing students are oriented to the a hospitals EHR prior to beginning their clinical rotations.
- Integrated as part of an ongoing hospital training program for new clinical nurses
Student Nursing Portal

Welcome to Cleveland Clinic’s online curriculum for nursing students. The curriculum is designed to complement nursing programs offered through colleges and universities. The purpose of the first three courses in the curriculum is to share Cleveland Clinic’s knowledge of the Electronic Medical Record (EMR), the use of the EMR to transform the practice of nursing, and help prepare nursing students for rotation at any hospital that uses electronic medical records by:

- Introducing the nursing students to basic information technology supporting the EMR
- Educating nursing students on how the EMR is used to manage patient care
- Promoting understanding of the use of the EMR across the continuum of care
- Explaining the value of the EMR as a tool for communication, patient education, and decision support

In addition, the Student Nurse Portal provides access to basic EPIC tutorials to students participating in clinical rotations at a Cleveland Clinic. These tutorials include:

- An introduction to the components of the EPIC documentation system and the entry of vital sign and intake and output values
- The documentation of patient assessments, needs, and care through data entry and nursing progress notes
- Documentation of medication administration


Health System EHR Training Program

**Advantages**
- Low Cost
- Real system training
- No development, maintenance or support resources required

**Disadvantages**
- Loss of control for program curriculum
- Inconsistent across different health systems
- Customized to individual hospital
- Short duration training

Partnership Models

<table>
<thead>
<tr>
<th>Community College</th>
<th>Health System</th>
<th>Business</th>
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OHSU and Epic partner to accelerate electronic health record research, learning

- Oregon Health and Sciences University
  - Sim-EHR
  - Epic training environment
  - Workflow identical to OHSU EHR Platform
  - Built one virtual patient with multiple co-morbidities.
  - Novice to advanced levels
  - Two week course prior to clinicals

Definition of objectives [ACMG competencies]

- Identify and correct errors in the EHR
  - Inaccurate information is removed/corrected, and an addendum is added to notes with errors.
- Correctly reconcile a medication list
  - Medication list correctly reflects current doses and medicines. Old medicines/doses/duplicates are discontinued.

General objectives

Specific objectives

Assessment measures

- All active medical problems are listed.
- Family, social, obstetrical, past medical, and surgical history are listed in the appropriate sections of the EHR.
- Documented allergies are entered in the allergies section.

Homegrown EHR’s

School of Nursing, Clemson University
- “TeachEHR”
- Fully functional academic EHR
- Computer science students developed application

Development Partner

Become a development partner with a commercial vendor:
- Nightingale Notes
- iCare
- VitalSims

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4035239/
Partnership/Vendor Models

- Customizable and can be integrated into the program curriculum.
- Consistent EHR application across multiple classes.
- Development expertise and resources are needed
- Ongoing maintenance and support must be internal
- Difficult to scale up to multiple sites.

Faculty Development and Training

- Assess faculty training needs
- Determine champions, experts & super users.
- Develop training methods for use of applications
- Implement and evaluate effectiveness of faculty training

Curriculum Threading and Implementation

Review Accreditation Standards:

- AACN, NLN, QSEN, TIGER, ANA
- Determine matriculation and integration of standards over program
- Create a crosswalk between standards and location in curriculum
Knowledge Complexity Framework

- **Digital data** can be created, reproduced and stored at a fraction of the cost of paper data. Digital data can be configured to be displayed in specific fields in EHR's or LED’s to turn raw data into information (vital signs, medications, flow rates).

- Information can be transformed into knowledge through **clinical decision support** alerts/reminders for values outside of normal range (vital signs, lab values, IV flow rates, medication dosage), trend lines and historical data.

- The creation of meaning from knowledge can be enabled through **expert systems** by predicting outcomes and recommending appropriate nursing interventions.

- Assess and evaluate the impact of actions on systems with **electronic dashboards and benchmarks**.

- Use knowledge, meaning and philosophy to reflect upon past experiences and recognize patterns through **data visualization tools** that aid in monitoring outcomes for entire populations of patients with specific disease conditions.

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**Knowledge Complexity Framework**

![Diagram showing the relationship between data, information, knowledge, meaning, philosophy, and wisdom.](https://sjhobbs.wikispaces.com/Robotics,+AI+and+Expert+Systems)

**Learning Progression**

- **Information Systems**: Admission, discharge, transfer, order entry systems, ancillary systems (lab, pharmacy, radiology), results reporting systems, documentation systems, administrative systems (scheduling).

- **Decision Support**: Medication dosing, order facilitators, point of care alerts, point of care reminders, information displays.

- **Expert Systems**: Predictive, OK, Readmit, Sepsis, Other.
Matriculation of EHR by Method

Case Study
1. Textbook with discs of EHR
2. Academic EHR – data entry in class
3. Academic EHR – basic data entry in a simulated environment
4. Academic EHR – advanced applications (CDS, clinical practice guidelines)
5. Orientation to clinical practicum and hospital EHR

Clinical Practicum
1. Clinical practicum with data entry in AEHR - homework
2. Clinical practicum – supervised data entry in an actual setting

Knowledge Complexity Curriculum Framework

Knowledge Complexity Curriculum Framework

Course by AACN Essential

Course by AACN Essential

http://z.umn.edu/nnideepdive
Technology Informatics Guiding Education Reform (TIGER)
Informatics Competencies for Every Practicing Nurse:

TIGER Competencies
European Computer
Driving License

Information Management
1.0  Demographic
2.0  Consents
3.0  Medication Mgt
4.0  Planning care
5.0  Order results
6.0  Care documentation
7.0  Decision Support
8.0  Notifications
9.0  Communications

TIGER Competencies by Setting For Information Systems

<table>
<thead>
<tr>
<th>TIGER</th>
<th>COMPETENCY AREA</th>
<th>Acute Care</th>
<th>Ambulatory</th>
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<td>Care documentation</td>
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Myth of the Digital Native
Miller et al. (2014)
Ranking of % of new/newer nurse reporting they are highly or very highly skilled by skill area (28 skills)

1. Email 93%
2. Internet use and search 92%
3. Word processing 80%
4. Lab results look up 77%
10. Treatment documentation 68%
16. Patient education 62%
17. Care plan development and update 59%
21. Order entry 45%
Myth of The Digital Native

Assessment of Electronic Health Record Usability with Undergraduate Nursing Students (Jones and Donelle, 2011).

• Third and Fourth Year BSN students
• Self-reported as proficient
• Provided a fictional case study
• Completed six patient assessment tasks with increasing complexity
• Documented in EHR

Results

• 23% did not review Pt. history.
• 62% partially reviewed the Pt. history.
• Students were not proficient in clinical documentation in EHR.
• 77% of students failed to maintain security and confidentiality of private health information by not closing EHR tabs.

Common Themes

Most Vulnerable

• The novice practitioner - A combination of novice in electronic record use, nursing documentation and patient assessment skills.

Most Helpful

• Repetition and practice - Participants indicated that repetition and practice using the electronic record would enhance their comfort with and ability to utilize the system. Templates were especially helpful to novices as they provided a set of guided rules for assessments and documentation.

Problem Based Learning with Virtual Case Studies

Case Study

• Enhance critical thinking
• Provide pt. assessment, problem identification, treatment and evaluation
• Link between structured data and information has on patient care
• Demonstrate information infrastructure for evidence based clinical practice
• Provide dissemination and evaluation of knowledge and research

TIPS

• Develop case studies as a team
• Provide enough information for students to chart effectively
• Consider how CDS alerts, reminders, etc. could be used to drive decision making
• Link CPG link to order sets and other executable knowledge

TIGER: 1.0 – 1.9
Demographic/Patient Information
• Identify and Maintain a Patient Record
• Manage Patient Demographics
• Capture Data and Documentation from External Clinical Sources
• Capture Patient-Originated Data
• Capture Patient Health Data Derived from Administrative and Interact with Financial Data and documentation
• Produce a Summary Record of Care
• Present Ad Hoc Views of the Health Record
• Manage Patient History

TIGER: 2.0 - 2.3
Consents and Authorizations
• Manage Patient and Family Preferences
• Manage Patient Advance Directives
• Manage Consents and Authorizations

Examples: Demographics
• Access EHR with login/password
• Look up assigned patients
• Review demographics and potential social determinants of health
• Have the students check the patients arm band with demographic information in the EHR
• Review and verify advanced directives and consents
• Correct errors and update
TIGER: 6.0 - 6.4

Care Documentation

- Manage Patient Clinical Measurements
- Manage Clinical Documents and Notes
- Manage Documentation of Clinician Response to Decision Support Prompts
- Generate and Record Patient-Specific Instructions

Examples: Assessment & Care Documentation

1. Orient study to EHR
2. Passively observe completion of an assessment template
3. Break into groups and collectively complete assessment in class
4. Complete assessment individually
5. Complete simulated assessment and document in lab
6. Chart in practicum

Tips: Have students act as a scribe:


TIGER 4.0 - 4.6

Planning Care

- Interact with Guidelines and Protocols for Planning Care
- Manage Patient-Specific Care and Treatment Plans
- Interact with Clinical Workflow Tasking
- Interact with Clinical Task Assignment and Routing
- Interact with Clinical Task Linking
- Interact with Clinical Task Tracking
Bill T., a 69-year-old man, was referred to the local visiting nurse association following a four-day hospitalization for an aortic valve replacement. He had a history of hypertension. Because Bill lived alone, he was discharged to his daughter’s home until he became stronger and his sternal incision was stable. His discharge instructions included not to lift more than ten pounds, take his temperature daily, and call his physician if his temperature was higher than 100°F. His medications were enalapril (Vasotec) 20 mg daily, warfarin (Coumadin) 5 mg daily, docusate (Surfak) 240 mg daily, and tramadol hcl 37.5 mg/acetaminophen 325 mg (Ultracet) 1-2 tablets every 4-6 hours.

http://www.omahasystem.org/casestudies.html

Develop Care Plan

Selecting problems

- Click on the charting icon
- A pop up will appear and all 42 problems will be listed in order of the domains.  
  1. Click the appropriate Problems 
  2. Click save
  3. Problems will appear as tabs on the next screen
  4. Click on the edit icon to add symptoms and ratings
Problem Ratings

• To expand problem specific rating examples click on the blue icon next to the concept.
• Then select rating value in the drop down
• Repeat for each concept rating
• Rating will appear on problem page

TIGER: 5.0 - 5.6
Orders and Results Management

Manage
• Non-Medication Patient Care Orders
• Orders for Diagnostic Tests Orders for Blood Products and Other Biologics
• Referrals
• Order Sets
• Manage Results

TIGER 3.0 - 3.7:
Medication Management

Manage:
• Allergy, Intolerance and Adverse Reaction Lists
• Medication Lists
• Problem Lists
• Immunization Lists
• Medication Administration
• Immunization Administration
• Medication Orders as appropriate for scope of practice
TIGER: 7.0 - 7.11
Decision Support
Manage Health Information to:
• Provide Decision Support for Standard Assessments
• Provide Decision Support for Patient Context-Driven assessments
• Provide Decision Support for Identification of Potential Problems and Trends
• Provide Decision Support for Patient and Family Preferences
• Interact with decision Support for Standard Care Plans, Guidelines, and Protocols
• Interact with decision Support for Context-Sensitive Care Plans, Guidelines, and Protocols
• Provide Decision Support Consistent Healthcare Management of Patient Groups or Populations
• Provide Decision Support for Research Protocols Relative to Individual Patient Care
• Provide Decision Support for Self-Care
• Interact with decision support for Medication and Immunization Ordering as appropriate for her scope of practice

TIGER 7.12-7.21
Decision Support
Interact with Decision Support for:
• Drug Interaction Checking
• Patient Specific Dosing and Warnings
• Medication Recommendations
• Medication and Immunization Administration
• Non-Medication Ordering
• Result Interpretation
• Support for Referral Process
• Referral Recommendations
• Safe Blood Administration
• Accurate Specimen Collection

CDS: Bar-coded Medication Management
• Medication dosing support (medication pick lists, dosing calculators)
• Order facilitators (order sets for specific conditions based on evidence based guidelines: pneumonia, adult prosthetic hip replacement, myocardial infarction)
• Point of care alerts (drug to drug interactions, duplicate therapy, drug allergies, contraindications to specific conditions)
• Point of care reminders (immunizations, cancer screenings, fall prevention, pain management)
• Information displays (dashboards of relevant data)

AACN Sample Content
• Use of technology and information systems for clinical decision-making.
• Technology and information systems safeguards

http://z.umn.edu/nnideepdive
**TIGER 8.0 - 8.8**

Notifications

- Interact with decision support that presents alerts for preventive services and wellness.
- Interact with decision support for notifications and reminders for preventive services and wellness.
- Manage health information to provide decision support for epidemiological investigations of clinical health within a population.
- Manage health information to provide decision support for notification and response regarding population health issues.
- Manage health information to provide decision support for monitoring response.
- Notifications regarding a specific patient's health.
- Access healthcare guidance.

**TIGER 9.0 - 9.5**

Communication

Facilitate

- Inter-provider communication.
- Provider-pharmacy communication.
- Communications between provider and patient and/or the patient representative.
- Patient, family and care giver education.
- Communication with medical devices.

**Health Coaching: Personal Health Records**

Patient Portals

- Personal health records.
- Patient engagement software.
- Patient pathways.
- Discharge, medication teaching, patient education and pain management.

mHealth & Care Coordination for Chronic Disease Mgt

*Implantable Continuous Glucose Monitoring*

• Provide education and monitoring

http://www.medtronicdiabetes.com/treatment-and-products/continuous-glucose-monitoring

Health Coaching Tools: Patient Engagement and The Quantified Self

*Wearable Computing*

• Activity monitors
• Smart Scales
• Diet & weight loss monitors
• Sleep and mood
• HealthIt.gov

http://www.healthit.gov/patients-families/stay-well#devices
http://www.ted.com/talks/gary_wolff_the_quantified_self?language=en

Real Time Analytics: The New Paradigm

*Descriptive*

Real Time Dashboards

Predictive

MEWS System

Modified Early Warning Score

http://www.infosystems.com
http://www.ihi.org/resources/Pages/ImprovementStories/EarlyWarningSystemsScorecardsThatSaveLives.aspx
http://www.youtube.com/watch?v=Vgczw5d_gv4
Care Coordination Software: Diabetes

- Monitor A1c, fasting lipids, blood pressure, microalbumin and identify high risk patients
- Establish and compare national benchmarks and variations in care
- Monitor and report on key indicators for diabetes complications
- Predict high risk acute care admissions

AACN Essentials For Information Management and Application For Patient Care Technology

Recognize that redesign of workflow and care processes should precede implementation of care technology to facilitate nursing practice.

AACN Essentials For Information Management and Application For Patient Care Technology

Participate in evaluation of information systems in practice settings through policy and procedure development.
QSEN Attitudes

Value nurses’ involvement in design, selection, implementation, and evaluation of information technologies to support patient care.

Knowledge

• Recognize the time, effort, and skill required for computers, databases and other technologies to become reliable and effective tools for patient care.

Case Study

WORKFLOW FOR A PRIMARY CARE CLINIC WITH A PAPER MEDICAL RECORD

Each student should write a narrative summary (no longer than 4 pages, 12 point font, double spaced excluding references and title page) that describes how information technology could address each of the workflow problems listed.

Key Workflow Problems

• Patients frequently complain about having to fill out and update the registration forms and health history in the waiting room when they first arrive at the clinic for their appointment.
• Paper charts occasionally become lost and staff spend a substantial amount of time searching for them.

Requirements Analysis

• Determine organizational goals & meaningful use
• Gap analysis, key stakeholder buy-in
• Champions and Steering committee
• Functional requirements document & selection criteria
• Vendor demonstrations
• Selection

http://www.healthit.gov/providers-professionals/frequently-asked-questions/3914657
Design

• Implementation Team
• Implementation timeline
• Training timeline
• Change management strategy
• Current workflow analysis
• New workflow analysis
• Prototype testing


Implementation

• Conduct the EHR build
• Initiate training
• Gradual vs big bang implementation
• Ongoing training resources and superusers
• Follow up on feedback

Testing and Evaluation

• Performance metrics
  • Medical errors
  • Number of users
  • Productivity
  • Clinical outcomes
  • Cost outcomes
• Patient and provider satisfaction

http://healthit.ahrq.gov/health-it-tools-and-resources/workflow-statement-health-it-tools/
Teaching Resources: Streaming Video

- https://www.youtube.com/watch?v=y85HTG4UpU
- https://www.youtube.com/watch?v=TiQ8e11dkU
- https://www.youtube.com/watch?v=zoxpuzH4B0
- https://www.youtube.com/watch?v=zoxpuzH4B0

- The difference between an EMR and EHR
- The benefits of an EMR
- What is Clinical Decision Support
- Clinic Toolbox (clinical decision support examples)

Questions?
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