National Nursing Informatics Deep Dive Program

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

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Faculty Practices, Partnerships and Professional Development

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Disclosure

I have no relevant financial interest to disclose nor am I endorsing any commercial products identified in this presentation.
Workshop Objectives

- Discuss methods of integrating professional standards for nursing informatics into program curricula aimed at prelicensure nursing students.
- Explore various methods used to teach nursing informatics to prelicensure students.
- Provide nursing informatics resources and tools that can be easily incorporated into existing prelicensure program curricula.
Presentation Objectives

• Discuss the “Knowledge Complexity Framework” as it relates to curriculum development for nursing informatics.

• Review the integration of The AACN Essentials for Information Management, The TIGER Competencies for Practicing Nurses and the QSEN knowledge, skills and attitudes for nursing informatics into a nursing informatics curriculum.
National Nursing Informatics Deep Dive Workshop Websites

Workshop Packet


Workshop Webpage

• [z.umn.edu/nnideepdive](http://z.umn.edu/nnideepdive)

2012 Nursing Deep Dive Workshop

• [http://www.aacn.nche.edu/qsen-informatics/workshop](http://www.aacn.nche.edu/qsen-informatics/workshop)
Human Graphic Information System (GIS)

- Multiple layers of demographic, physiologic, anatomic, biologic and environmental data about a particular individual.


https://twitter.com/erictopol/status/449529091536863233
Knowledge Engineering

Data Mash-ups

Knowledge Value

Figure 3: Intermediate HIE

www.onhealthtech.blogspot.com
Knowledge Value Embedded in Technology

iPhone

- Proximity sensor
- Ambient light sensor
- Accelerometer
- Magnetometer
- Gyroscopic sensor
- Camera/Video
- Voice recognition (Siri)
- Phone
- Email/Text
- Intranet
- NLP
Monitoring Systems: Clinical and Business Intelligence Dashboards

Performance Analytics Dashboard

Predictive Systems: Modified Early Warning System (MEWS)

Scoring is based on:

- Respiratory rate
- Heart rate
- Systolic blood pressure
- Conscious level
- Temperature
- Hourly urine output (for previous 2 hours)

Image: http://www.ihi.org/resources/Pages/ImprovementStories/EarlyWarningSystemsScorecardsThatSaveLives.aspx
Expert Systems: Algorithmic Symptom Checkers

- WebMD Mobile
- iTriageHealth
- Medscape Mobile
- Diagnosaurus DDx
- Symptoms TakTools
- iHeadache
- SignsSx Handbook
- Symptom Mate
- Differential Dx i-pocket
- STATworkUP
- eRoentgen Radiology DX
- Symptom Minder

Pocket Symptom Analyzer

https://www.youtube.com/watch?v=CQqBMG578tA

Image: http://www.thinklabs.com/#!thinklink/cbor
## Knowledge Work

<table>
<thead>
<tr>
<th>Data</th>
<th>Continuous pattern recognition of HR, BP, Temp, Resp. (MEWs): <strong>Monitoring Dashboard</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td><strong>Alert! MEWs score is trending upward:</strong> Clinical Decision Support Systems</td>
</tr>
<tr>
<td>Knowledge</td>
<td>A upward trending MEWs score indicates patient is decompensating: <strong>Predictive System</strong></td>
</tr>
<tr>
<td>Meaning</td>
<td>Patient will require immediate intervention (consider executing order sets for sepsis)</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Systems theory: Rule out other contributing factors first: <strong>Expert System</strong></td>
</tr>
<tr>
<td>Wisdom</td>
<td>Reflect on past experiences under similar conditions. What is the best sequence of steps.</td>
</tr>
<tr>
<td>Union</td>
<td>Integrate all components and execute your course of action.</td>
</tr>
</tbody>
</table>

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Knowledge Complexity Framework

- Data
- Information
- Knowledge
- Monitoring Systems
- Decision Support Systems
- Meaning
- Predictive Systems
- Philosophy
- Expert Systems
- Wisdom

Augmented Cognition

Cognitive Load

Complexity
## Knowledge Complexity Curriculum Framework

### Sample Crosswalk Between AACN BSN Essentials/ Knowledge Framework/Semester

<table>
<thead>
<tr>
<th>Key</th>
<th>Classroom Activities</th>
<th>Simulation Activities</th>
<th>Clinical Activities</th>
<th>Syllabus</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>DATA (Instinctual Learning) Sensing</td>
<td>INFORMATION (Single Loop learning). Action without reflection</td>
<td>KNOWLEDGE (Double Loop learning) Self-conscious reflection.</td>
<td>MEANING (Communal learning) Understanding context, relationships &amp; trends.</td>
<td>PHILOSOPHY (Duetero learning) Self-organizing</td>
<td>WISDOM (Generative learning) Value driven</td>
</tr>
</tbody>
</table>

### Fall Freshman Year
- ICL, 1, 5, 6
- ICL, 1, 5, 6
- ICL, 1, 5, 6

### Spring Freshman Year
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, 1, 5, 6

### Fall Sophomore Year
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, 1, 4, 5, 6

### Spring Sophomore Year
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, 1, 2, 4, 5, 6
- ICL, 1, 4, 5, 6

### Fall Junior Year
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, CI 1, 2, 3, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, CI 1, 2, 3, 4, 5, 6
- ICL, 1, 3, 4, 5, 6

### Spring Junior Year
- ICL, PCT, CIS, CD, CDS, SNT, CI, HIPAA 1, 2, 3, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, CI, HIPAA 1, 2, 3, 4, 5, 6
- ICL, 1, 3, 4, 5, 6

### Fall Senior Year
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, WA 1, 3, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, WA 1, 3, 4, 5, 6
- ICL, 1, 3, 4, 5, 6

### Spring Senior Year
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, WA 1, 3, 4, 5, 6
- ICL, PCT, CIS, CD, CDS, SNT, CL, HIPAA, WA 1, 3, 4, 5, 6
- ICL, 1, 3, 4, 5, 6

### Additional Resources

- [http://z.umn.edu/nnideepdive](http://z.umn.edu/nnideepdive)
# Competency Matrix for Nursing Informatics

<table>
<thead>
<tr>
<th></th>
<th>AACN BSN Essentials</th>
<th>TIGER Competencies</th>
<th>QSEN Undergrad. KSA’s</th>
<th>AACN Essentials Masters</th>
<th>QSEN Graduate KSA’s</th>
<th>AACN Essentials DNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalist</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Masters</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Doctor of Nursing Practice</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Standards and Guidelines

AACN Essentials for Information Management and Patient Care Technologies

Quality, Safety & Education for Nurses Knowledge, Skills and Attitudes

Technology Informatics Guiding Education Reform Competencies for Practicing Nurses
AACN Essentials for Baccalaureate Education For Professional Nursing Practice

Information Management and Application of Patient Care Technology

- I. Liberal Education for Baccalaureate Generalist Nursing Practice
- II. Basic Organizational and Systems Leadership for Quality Care and Patient Safety
- III. Scholarship for Evidence Based Practice
- IV. Information Management and Application of Patient Care Technology
- V. Healthcare Policy, Finance, and Regulatory Environments
- VI. Inter-professional Communication and Collaboration for Improving Patient Health Outcomes
- VII. Clinical Prevention and Population Health
- VIII. Professionalism and Professional Values
- IX. Baccalaureate Generalist Nursing Practice
## Course by AACN Essential

### Sample Crosswalk Between AACN BSN Essentials for Information Management and Patient Care Technologies and Curriculum

<table>
<thead>
<tr>
<th>Key</th>
<th>Classroom Activities</th>
<th>1.0 Demonstrate skills in using patient care technologies, information systems, and communication devices that support safe nursing practice.</th>
<th>2.0 Understand the use of CIS (clinical information systems) to document interventions related to achieving nurse sensitive outcomes.</th>
<th>3.0 Advocate for the use of new patient care technologies for safe, quality care</th>
<th>4.0 Use telecommunication technologies to assist in effective communication in a variety of healthcare settings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
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<tr>
<td>6.</td>
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</tr>
</tbody>
</table>

### FALL SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>1,2,4,5,6</th>
<th>1,2,4,5,6</th>
<th>1,5</th>
<th>1,5</th>
<th>1,5</th>
<th>1,5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 3703 Assessment and Basic Nursing (lab I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NURS 3801PCC Adults/Older Adults I or NURS 3802 Nursing Care of Families I (1/2 Class in each)</td>
<td>1,5</td>
<td>1,5</td>
<td>1,5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NURS 3806 Professional Nursing</td>
<td>1,5</td>
<td>1,5</td>
<td>1,5</td>
<td>1,5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NURS 5010 Foundations of Interprofessional Communication/Collaboration</td>
<td>1,2,4,5,6</td>
<td>1,2,4,5,6</td>
<td>1,5</td>
<td>1,2,4,5,6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[http://z.umn.edu/nnideepdive](http://z.umn.edu/nnideepdive)
# BSN Program

<table>
<thead>
<tr>
<th>Fall Junior Year</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 4301PCC Adults/Older Adults II</td>
<td>4</td>
</tr>
<tr>
<td>Practicum I: NURS 4303 PCC Adults in Acute Care I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 3115 Informatics (online)</td>
<td>3</td>
</tr>
<tr>
<td>Total:</td>
<td>10 cr</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>NURS 4312 Nursing Care of Families II</td>
<td>4</td>
</tr>
<tr>
<td>Practicum I: NURS 4305 Community-based Family Care-lifespan I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 4321 Public Health Nursing</td>
<td>2</td>
</tr>
<tr>
<td>Total:</td>
<td>9 cr</td>
</tr>
<tr>
<td>NURS 4106 Nurse as Collaborator (online, all students)</td>
<td>1</td>
</tr>
<tr>
<td>NURS 4104 Ethical Sensitivity and Reasoning in Health Care (all students)</td>
<td>2</td>
</tr>
<tr>
<td>NURS 3710 Stats for Clinical Research (or other approved statistics course)</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>15-16</td>
</tr>
<tr>
<td>Week/Dates 2014</td>
<td>Topics</td>
</tr>
<tr>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td>1 9/2-9/7</td>
<td>Introductions and Course overview</td>
</tr>
<tr>
<td>2 9/8-9/14</td>
<td>Introduction to Health Informatics and Information Technology</td>
</tr>
<tr>
<td>3 9/15-9/21</td>
<td>Current trends/issues in health informatics and information technology</td>
</tr>
<tr>
<td>4 9/22-9/28</td>
<td>Research/ Evidence-based Practice</td>
</tr>
<tr>
<td>5 9/29-10/5</td>
<td>Technology and Data Standards</td>
</tr>
<tr>
<td>6 10/6-10/12</td>
<td>Software Applications and Technological Trends</td>
</tr>
<tr>
<td>7 10/13-10/19</td>
<td>Evaluating technology functionality: Workflow/business processes/system requirements.</td>
</tr>
<tr>
<td>8 10/20-10/26</td>
<td>Selecting, implementing and evaluating technology for healthcare information systems: System Development Lifecycle</td>
</tr>
<tr>
<td>9 10/27-11/2</td>
<td>Public Health Information Systems</td>
</tr>
<tr>
<td>10 11/3-11/9</td>
<td>Geographic Information Systems part 1</td>
</tr>
<tr>
<td>11 11/10-11/16</td>
<td>Geographic Information Systems part 2</td>
</tr>
<tr>
<td>13 11/24-11/30</td>
<td>Human Factors Engineering / Clinical Involvement</td>
</tr>
<tr>
<td>14 12/1-12/7</td>
<td>Peer review of final assignment</td>
</tr>
<tr>
<td>15 12/8-12/10</td>
<td>Ethical and Political Issues</td>
</tr>
</tbody>
</table>
1. Demonstrate skills in using:
   - *patient care technologies,*
   - *communication devices* that support safe nursing practice,
   - *information systems*
AACN Patient Care Technologies

Patient Care Technologies

• Computers, printers
• IV smart pumps,
• Bar coded medication management systems,
• Pulse oximeters,
• Automated blood pressure and pulse
• Monitoring equipment (ECG, arterial blood pressure, respirations)
• Automated temperature
• Defibrillators
AACN Communication Devices

Communication Devices

• Smart phones,
• Hands free mobile communication devices (Vocera),
• Tablets (iPads)
• Email
• Telehealth (telehealth assessments, virtual visits, virtual ICU’s).
Communication Devices: The Intranet of Things (GlowCaps)

http://www.youtube.com/watch?v=LVlT4sX6uVs

http://www.youtube.com/watch?v=R-ypgw03sy0
AACN Information Systems

Operations Support
• Basic computer hardware and software
• Software (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.
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
• Seek education about how information is managed in care settings before providing care.
Technology Informatics Guiding Education Reform (TIGER)
Informatics Competencies for Every Practicing Nurse:

TIGER Competencies

European Computer
Driving License

Basic Computer Competencies

1.1 Hardware
1.2 Software
1.3 Networks
1.4 Information/communication tech.
2.1 Operating systems
2.2 File Mgt
2.3 Utilities
2.4 Print Mgt
3.1 Using the Application
7.1 The Intranet
7.2 Using the browser
7.3 Using the Web
7.4 Web outputs
**Myth Buster:**
Percent of new/novice nurses 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%

Miller et al. (2014)
2. Understand the use of CIS (clinical information systems) to document interventions related to achieving nurse sensitive outcomes.

AACN Clinical Information Systems

Clinical Information Systems

Electronic health records in:

- Acute care
- Ambulatory care
- Skilled nursing care
- Home, public and community health systems

Applications to manage care.

- Provider order entry
- Clinical documentation (assessment, care planning, other)
- Results reporting
- Bar coded medication administration (BCMA)
- Electronic medication administration record (eMar)
- Ancillary systems (pharmacy, lab, radiology)

AACN Sample Content

Electronic health records/physician order entry.
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
• Document and plan patient care in an electronic health record.
• Navigate the electronic health record.

Quality and Safety Education for Nurses
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
Academic EHR’s

• Commercial
• Open Source
• Development Partner
• Health System Partnership
• Home Grown
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
Open Source EHR’s: OpenEMR

- Demographics
- Scheduling
- Vital Signs
- Order Entry
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 used 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

https://www.cchs.net/onlinelearning/cometportal/intro3.aspx?entityId=11
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.
What New Nurses Know

Miller et al. (2014)

Time it took nurses to become comfortable using an EHR
3. Advocate for the use of new patient care technologies for safe, quality care
The Future is Here!

Clinical/Translational Bioinformatics
- Big data/ Prediction
- Geonomics/Personalized Health

Clinical Informatics
- EHR - Clinical decision support

Consumer Informatics
- Telehealth
  - Mobile Health
  - Smart Phone
  - Wearable Technology

Patient Engagement
- Health Literacy
- Social Media
- Personal health records

Public Health Informatics

Heads Up Display (HUD)
Google Glasses

http://www.youtube.com/watch?v=AYRDVMZ3TbY
http://vimeo.com/98459160
The Quantified Self

• Bio-stamp Tattoos
• Computer chip powered pills
• Nanoparticle pills
4. Use telecommunication technologies to assist in effective communication in a variety of healthcare settings.

AACN Sample Content

- Technology for virtual care delivery and monitoring.
- Interstate practice regulations (e.g., licensure, telehealth).
- Information literacy
AACN Essentials

Telehealth

• Patient monitoring technologies (virtual assessments, ICU’s)
• Home sensing devices (weight scale, BP monitor, bed chair, glucose meter, implant monitors, baby monitors, spirometer, medication monitoring, pedometer)

eICU
Telehealth: The Quantified Self

Wearable Computing

- Activity monitors
- Diet and weight
- Sleep and mood
- Vital signs
- Insulin and blood sugar
- Medication compliance

http://www.ted.com/talks/gary_wolf_the_quantified_self?language=en
QSEN Attitudes

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

Knowledge

• Contrast benefits and limitations of different communication technologies and their impact on safety and quality

Skills

• Employ communication technologies to coordinate care for patients.
Technology Informatics Guiding Education Reform (TIGER)
Informatics Competencies for Every Practicing Nurse:

TIGER Competencies

European Computer Driving License

Communication Technologies

Basic Computer Competencies

Electronic Communication
• 7.6 Using e-mail
• 7.7 e-mail management

Information Mgt Competencies
• 9.0 Facilitating Communications

http://www.ted.com/talks/dave_debronkart_meet_e_patient_dave
5. Apply *safeguards and decision making* support tools embedded in patient care technologies and information systems to support a safe practice environment for both patients and healthcare workers.
Safeguards and Decision Making Support

- **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 infraction)
- **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
QSEN Attitudes
Value technologies that support clinical decision-making, error prevention, and care coordination

Knowledge
• Describe examples of how technology and information management are related to the quality and safety of patient care

Skills
• Respond appropriately to clinical decision-making supports and alerts.
• Apply technology and information management tools to support safe processes of care.
TIGER Competencies

Decision Support
7.1 Standard Assessments
7.2 Patient Context-Driven assessments
7.3 Identification of Potential Problems and Trends
7.4 Patient and Family Preferences
7.5 Standard Care Plans, Guidelines, and Protocols
7.6 Context-Sensitive Care Plans, Guidelines, and Protocols
7.7 Consistent Healthcare
7.8 Patient Groups or Populations
7.9 Research Protocols Relative to Individual Patient Care
7.10 Self-Care
7.11 Medication and Immunization Ordering
7.12 Drug Interaction Checking
7.13 Patient Specific Dosing and Warnings
7.14 Medication Recommendations
7.15 Medication and Immunization Administration
7.16 Non-Medication Ordering
7.17 Support for Result Interpretation
7.18 Referral Process
7.19 Referral Recommendations
7.20 Safe Blood Administration
7.21 Accurate Specimen Collection
6. Recognize the role of information technology in improving patient care outcomes and creating a safe care environment.
Information Technology and Improving Patient Outcomes

Benefits of Big Data

- Population management
- Cost benefit/Effectiveness
- Best practices & EBG’s
- Health analytics
  - Descriptive
  - Predictive
- Clinical research
- Comparative analysis
  - Nurse sensitive quality outcomes
  - Dashboards
Prevention: Heart Failure Events

Sensor Cluster
- Beat to beat variability
- Fluid status
- Sleep quality
- Apneic spells
- Vital signs
- Lab tests (via smart phone app)
- Med. adherence (via digitized pills)

https://www.youtube.com/watch?v=…

7. Use **standardized terminology** in a care environment that reflects nursing’s unique contribution to patient outcomes.
Benefit of Standardized Language

• Collect & analyze uniform information about nursing’s contribution to patient care
• Build nursing data in data warehouses
• Improve nursing care through outcome evaluation
• Build evidence for expert practice
• Assist administrators in planning more effectively for staff and equipment services
• Provide information for the formulation of organizational and public policy concerning health

Standardized Terminologies

• Multidisciplinary terminologies (SNOMED-CT, LOINC)

• Nursing terminologies (CCC, ICNP, NANDA, NIC, NOC, OS, PNDS)

AACN Content Sample:
Information management for patient safety.

http://z.umn.edu/nnideepdive
A Call To Action

• Despite efforts, a lack of standardization and integration within key technologies such as electronic health records (EHR) and administrative systems persists and prevents information exchange, quality measurement, research, and the expansion of data-based, knowledge driven solutions for the delivery of health care.

• No more evident is this than in Nursing where after decades of implementing EHR’s nurses still cannot consistently use electronically collected data to conduct research or report quality and patient safety outcomes.

QSEN Attitudes

Value technologies that support clinical decision-making, error prevention, and care coordination

Knowledge

• Identify essential information that must be available in a common database to support patient care

Skills

• Use information management tools to monitor outcomes of care processes
Technology Informatics Guiding Education Reform (TIGER) Informatics Competencies for Every Practicing Nurse:

TIGER Competencies

European Computer Driving License

Standardized Nursing Terminology

Information Literacy

2.9 Understand how to use classification systems and their rationale.
8. Evaluate data from all relevant sources, including technology, to inform the delivery of care.
Relevant Sources, Including Technology

AACN Sample Content

• Retrieval from information systems, including access, evaluation of data, and application of relevant data to patient care.
  • Info-button
• On-line literature searches
• Technological resources for evidence based practice
Real Time Analytics: The New Paradigm

Descriptive
Real Time Dashboards

Predictive
MEWS System
(Modified Early Warning System)

http://www.ihi.org/resources/Pages/ImprovementStories/EarlyWarningSystemsScorecardsThatSaveLives.aspx
http://www.youtube.com/watch?v=Vgczw5d_gv4
QSEN Attitudes
Value technologies that support clinical decision-making, error prevention, and care coordination

Knowledge
• Identify essential information that must be available in a common database to support patient care

Skills
• Use high quality electronic sources of healthcare information.
Technology Informatics Guiding Education Reform (TIGER)
Informatics Competencies for Every Practicing Nurse:

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Information Literacy Competencies

1. Knowledge
2. Access
3. Evaluate Information
4. Application of information
5. Evaluate Outcomes
9. Apply patient-care technologies as appropriate to address the needs of a diverse patient population.

Institute for Family Health
Early adopter of the patient portal, introducing the Epic MyChart, MyHealth in 2007 and the Spanish-language version, MiRecord, MiSalud, in 2011.
Diverse Patient Populations

The Institute implemented a robust patient portal that patients can use to:

• Send and receive secure messages
• Access and review clinical summaries
• Access and review their health information (medications, health history, allergies, current medication, lab and other test results)
• Download their medical record
• Create a “wallet card” that lists their medications
• Access MedlinePlus patient education resources, schedule appointments
• Request medication refills

Specific programs to address health care needs in these communities:

• including education and support for people with HIV,
• a comprehensive diabetes program,
• school-based clinics,
• and clinics for the homeless.

http://www.institute2000.org/
Patient Engagement

Engaged patients

- Seek information about their health and health care
- Make informed and shared decisions with their health care team
- Take steps to manage their health and health care
- Act as partners with their health care team

eHealth literacy

- Defined as the ability to seek, find, understand and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a problem.

## Consumer Health Literacy

<table>
<thead>
<tr>
<th>Type of Literacy</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral literacy</td>
<td>Speaking and listening</td>
</tr>
<tr>
<td>Print/visual literacy</td>
<td>Writing and reading, understanding graphical and visual information</td>
</tr>
<tr>
<td>Information literacy</td>
<td>Obtaining and applying relevant information</td>
</tr>
<tr>
<td>Numeracy</td>
<td>The ability to calculate or reason with numbers</td>
</tr>
<tr>
<td>Computer literacy</td>
<td>Operating a computer or information device</td>
</tr>
</tbody>
</table>
# Evaluating Health Literacy

1. Select a site on HealthIT.gov
2. Evaluate the site using HON

<table>
<thead>
<tr>
<th>Personal Monitoring Devices</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>iBGStarWeb Site Disclaimers</td>
<td>Blood glucose monitor that connects with iOS devices and integrates with management software.</td>
</tr>
<tr>
<td>TelcareWeb Site Disclaimers</td>
<td>Blood glucose monitor that uses cellular technology to automatically upload data to compatible web sites and apps.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apps and Online Tools</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose BuddyWeb Site Disclaimers</td>
<td>Online and smart phone connected diabetes management tools.</td>
</tr>
<tr>
<td>dbeesWeb Site Disclaimers</td>
<td>Online and smart phone connected diabetes management tools.</td>
</tr>
<tr>
<td>Txt4HealthWeb Site Disclaimers</td>
<td>Text based tools for diabetes management and health tips sponsored by American Diabetes Association, currently limited to pilot areas.</td>
</tr>
<tr>
<td>BantAppWeb Site Disclaimers</td>
<td>Smart phone based add for glucose and diet management. Integrates with HealthVault.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Sites</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Diabetes AssociationWeb Site Disclaimers</td>
<td>Diabetes information from the American Diabetes Association.</td>
</tr>
</tbody>
</table>
10. Recognize that redesign of workflow and care processes should precede implementation of care technology to facilitate nursing practice.
Workflow Diagram

VTE Risk Assessment and Prophylaxis (Post Admission) Nursing Driven

**Risk Assessment**
- Complete VTE Risk Assessment
  - Protocol allows Nurse to enter Prophylaxis Orders?
    - Yes: ENTERS prophylaxis Order per protocol
      - Written Order
      - Enters written order electronically or scans written order
      - No or Yes
    - Written/Verbal
      - Order for Prophylaxis
      - Written/Verbal or CPOE?
      - CPOE
        - CSPS Dose Checker and Adviser
          - Makes changes if required
            - Re-confirms dose, route, frequency, renal function
            - Yes
            - No
  - Informed of Risk

**Ordering**
- Written Order

**Verification/Dispensing**
- Checks for 5 rights prior to administration
  - Abnormal ab results called to floor
  - Inform Physician of abnormal lab results

**Administration**
- Make changes to therapy
  - Yes
  - Change to therapy?
    - Yes
    - Informed of abnormal results
  - No

**Follow-up**
- Continue to monitor

11. Participate in evaluation of information systems in practice settings through policy and procedure development.
Alignment with Underpinnings of Informatics

<table>
<thead>
<tr>
<th>Look to the Past</th>
<th>Look to the Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathering</td>
<td>Doing</td>
</tr>
<tr>
<td>Know-Nothing</td>
<td>Know-Best</td>
</tr>
<tr>
<td>Know-What</td>
<td></td>
</tr>
<tr>
<td>Know-How</td>
<td></td>
</tr>
<tr>
<td>Know-Why</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data (numbers, symbols, facts)</th>
<th>Information (data processed and organized to describe who, what, where and when)</th>
<th>Knowledge (collected information, instructs how)</th>
<th>Experience (knowledge gained through doing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory (a framework for explaining behavior)</td>
<td>Understanding (assign meaning, explain why, apply to analysis)</td>
<td>Wisdom (judgment, evaluated understanding, long-term, proper, good, right)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extrinsic</th>
<th>Intrinsic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyzing</td>
<td>Deciding</td>
</tr>
<tr>
<td>Control and Efficiency</td>
<td>Value and Effectiveness</td>
</tr>
<tr>
<td>Doing things right</td>
<td>Doing the right things</td>
</tr>
</tbody>
</table>

Marissa Wilson, Nursing Informatics Deep Dive Workshop, November 19, 2014
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

http://z.umn.edu/nnideepdive
12. Uphold ethical standards related to data security, regulatory requirements, confidentiality, and clients’ right to privacy.

AACN Sample
Ethical and legal issues related to the use of information technology, including copyright, privacy, and confidentiality issues
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Basic Computer Competencies

1.10 Security
1.11 Law
QSEN Attitudes

• Protect confidentiality of protected health information in electronic health records
III. Scholarship for Evidence Based Practice

The baccalaureate program prepares the graduate to evaluate the credibility of sources of information, including but not limited to databases and Internet resources.

- locating and evaluating sources of evidence
- electronic database search strategies (e.g., CINAHL, PubMed, the Cochrane Database of Systematic Reviews)

IV. Information Management and Application of Patient Care Technology

- Baccalaureate graduates must have competence in the use of information technology systems, including decision support systems, to gather evidence to guide practice.

- “Improvement of cost effectiveness and safety depend on evidence based practice, outcomes research, interprofessional care coordination, and electronic health records, all of which involve information management and technology (McNeil et al., 2006).”
Future Work Skills 2020

1. Sense-making
2. Social intelligence
3. Novel & adaptive thinking
4. Cross-cultural competency
5. Computational thinking

• Definition: ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning

Future Work Skills 2020

6 New-media literacy
• **Definition:** ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication

7 Transdisciplinarity
• **Definition:** literacy in and ability to understand concepts across multiple disciplines

8 Design mindset
• **Definition:** ability to represent and develop tasks and work processes for desired outcomes
Future Work Skills 2020

9 Cognitive load management

- Definition: ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques

10 Virtual collaboration

- Definition: ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team.
Questions?