Nurses: Are You Ready for Your New Role in Health Information Technology?

A 4-Part Educational Series Sponsored by TNA and TONE

Acknowledgement: Contribution by Susan McBride, PhD, RN and Mary Beth Mitchell, MSN, RN, BC-NI and the TNA/TONE HIT Task Force members

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TNA/TONE Health IT Task Force

• Charge: Determine implications of health care informatics for nursing practice and education in Texas
• Include nationally-based Technology Informatics Guiding Education Reform (TIGER) initiative

Vision: To enable nurses and interprofessional colleagues to use informatics and emerging technologies to make healthcare safer, more effective, efficient, patient-centered, timely and equitable by interweaving evidence and technology seamlessly into practice, education and research fostering a learning healthcare system.

TNA = Texas Nurses Association
TONEm = Texas Organization of Nurse Executives
http://www.thetigerinitiative.org/
HIT Taskforce Membership

Composed of TNA and TONE Members from practice and academia

Task Force Members
– David Burnett
– Nancy Crider*
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– Susan McBride
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– Elizabeth Sjoberg
– Mari Tietze*

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Texas Nurses Assoc.
– Clair Jordan
– Joyce Cunningham
– Laura Lerma
Why Does HIT Matter Deep in the Heart of Texas?

CNE for Practicing Nurses
Educational Content Dissemination
Awareness Campaign
Nursing HIT Curriculum Development

Embrace the Technology
Preserve the Art
For 300,000 Texas Nurses

Environmental Forces:
- Health Care Reform/ARRA
- Advanced Practice Nurse Roles
- EHR Incentives
- IOM/RWJF Report *Advancing Health Care*
- Informatics Nurse Standards by ANA

Advisory Committee: Practice, Administration, Education and Vendors/Suppliers
Objectives

Discuss safety advantages of the electronic health record in promoting quality care
    • Legibility
    • Access to patient record
    • CPOE/Order Sets- evidenced based, linked to reference data, alerts.
    • ePrescribing
    • Clinical decision support and data analysis

Define unintended consequences and how they impact nursing documentation in the EHR
    • Anticipate-unanticipated
    • Desirable- undesirable
    • Reasons for occurrence
    • Impact of meaningful use

Explore ways to manage unintended consequences to reduce safety risks to patients
    • Governance
    • Training
    • Workflow optimization
    • Accountability
    • Reporting

Explain state and federal measures to monitor and reduce safety concerns with the EHR
    • Managing product development issues
    • State and national reporting databases
    • Development of safety standards
Safety Advantages

- Well documented benefits of Electronic Health Record (EHR)
  - Legibility
  - Increased access to patient record
  - CPOE/Order Sets- evidenced based, linked to reference data, alerts.
  - ePrescribing
  - Clinical Decision Support
  - Data Analysis

- Decision support delivered electronically within the medical record will provide decision makers with tools for best practice and safety improvements.

JAMIA 2003
Clinical Information Technologies and Inpatient Outcomes

Amarasingham, Plantinga, Diener-West, Gaskin, & Powe, *Archives of Internal Medicine* - January 2009

Study of 167,233 patients older than 50 admitted to 41 hospitals from December 1, 2005 – May 30, 2006 (6 month period)

**Results with use of EMR:**

- 15% decrease in mortality
- 9% decrease odds of death from MI
- 55% decrease in odds of death from coronary artery bypass graft Procedures
- 6% decrease in the odds of complications

**Conclusion:**

- Hospitals with automated notes and records, order entry and clinical decision support had fewer complications, lower mortality rates, and lower costs.

Radice, 2011
Impact of HIT on detection of potential adverse drug events at the ordering stage

**Background:** 49% of serious errors associated with ADEs occur at time of order; estimating that 28-64% of ADEs are preventable

**Study:** ADE alerts and evidence-based CPOE at 9 hospitals were compared with 9 hospitals without these technologies

**Results:** Pharmacists reviewed an increase of ADE alerts at the technology hospitals and effectively captured a significant number of true positive ADE alerts and showed an increase in physician agreement with pharmacist recommendations

**Conclusion:** CPOE and advanced CDS tools significantly increased the number of potential ADE alerts for pharmacist review and the number of true-positive alerts per 1000 admissions

Hospital Information Technology Systems’ Impact on Nurses and Nursing Care

Waneka and Spetz, JONA, December 2010

• **Background:** review of the literature to determine the impact of health information technologies (HITs) on nurses and nursing care

• **Study:** Review of literature produced 564 references, of which 74 were selected for review to determine impact of HIT on nurses and Nursing Care

• **Results:** Findings suggest that
  • HIT improves the quality of nursing documentation;
  • HIT reduces medication administration errors;
  • Nurses are generally satisfied with HIT and have positive attitudes
  • Nurse involvement in all stages of HIT design and implementation, and effective leadership throughout these processes, can improve HIT.

• **Conclusion:** HIT has had positive influences on nurse satisfaction and patient care. Effective nursing leadership can positively influence the effective development, dissemination, and use of HIT. Radice, 2011
What are Unintended Consequences

- Unanticipated and undesirable consequences, of HIT implementation and outcomes.
- May undermine patient safety practices, and cause delays, miscommunication, and even errors or harm to patients.
- Often blamed on the performance of the “newly introduced technology.”

Harrison et al, 2007
Framework for Monitoring and Evaluating EHRs for Safety

1. Ability for practitioners and organizations to report patient safety events or potential hazards related to EHR use;

2. Enhanced EHR certification that includes specific assurances that good software development procedures have been followed along with evidence that previously reported adverse events and hazards have been addressed;

3. Self-assessment, attestation, testing, and reporting by both clinicians and health care organizations that all 8 dimensions of safe EHR use have been addressed;

4. Local, state, and national oversight in the form of an onsite, in-person accreditation of EHRs as implemented and used by clinicians in the health care setting; and

5. A national EHR-related adverse event investigation board that reviews incident reports and has the authority to investigate.

Walker et al 2008
Patient Safety and Health Information Technology

Type: Consensus Study
Topics: Health Services, Coverage, and Access, Health Care Workforce, Quality and Patient Safety, Public Health
Boards: Board on Health Care Services

Activity Description

The IOM will review the available evidence and the experience from the field on how the use of health information technology (HIT) affects the safety of patient care and make recommendations on how public and private actors can maximize the safety of HIT-assisted health care services. The IOM’s final report will be both comprehensive and specific in terms of recommended options and opportunities for public and private interventions that may improve the safety of care that incorporates the use EHRs and other forms of HIT.

For more information

Source: http://www.iom.edu/Activities/Quality/PatientSafetyHIT.aspx
EHR Safety Web Sites: Includes a PSO

4. State/Federal Monitoring

2) Patient Safety Organization (PSO) for EHR Issues/Best Practices


Peer reviewed and “protected”
EHR Safety Web Sites: Content is Public

4. State/Federal Monitoring

Peer reviewed and public resources learned, lessons accessed, and gaps filled.

https://www.healthitxchange.org/Pages/landing.aspx
Health IT and Patient Safety: Building Safer Systems for Better Care

Key findings:
-- Health IT can improve patient safety in some areas such as medication safety; however, there are significant gaps in the literature regarding how health IT impacts patient safety overall
-- Safer implementation and use begins with viewing health IT as part of a larger sociotechnical system
-- All stakeholders need to work together to improve patient safety

Author: Institute of Medicine Committee on Patient Safety and Health IT

Discuss Common Unintended Consequences in EHR Use by Nurses

This is taking way too long . . . I don’t have time for this

That is not what I was expecting

It worked differently in the training session

This looks different than it used to

Why did that happen?
Current State of Health IT

- Literature has shown that health IT may lead to safer care and/or introduce new safety risks

- Magnitude of harm and impact of health IT on patient safety is not well known because:
  - Heterogeneous nature of health IT products
  - Diverse impact on different clinical environments and workflow
  - Legal barriers and vendor contracts
  - Inadequate and limited evidence in the literature

Unintended Consequences of Meaningful Use

- EHR implementation can improve care delivery. Many experts, however, believe that too many systems are being installed too fast into environments too complex to be easily computerized.

- In the frenzy to be eligible for federal EHR meaningful use incentive payments, and avoid reimbursement penalties starting in 2015, institutions may be setting themselves up for disastrous computer-induced medical errors.

- Majority of HIT related patient safety issues, when they occur, are related to preparation, training, and workflow changes.

(Gardner, 2010)
Clinical Information Systems: Overcoming Adverse Consequences

• Based on the research and findings from the Provider Order Entry Team from the Oregon Health & Science University
• Discusses the nine categories of unintended adverse consequences that occurred at many of the leading medical centers during their implementation and maintenance of a state-of-the-art clinical information system.
• Present the best practices they identified to help organizations overcome these obstacles.

Source: Jones and Bartlett Series in Biomedical Informatics.
http://www.jblearning.com/catalog/9780763757649/
We have learned a great deal since then . . .

- EHR systems, touted to improve efficiency and quality of health care delivery, may also be a source of patient errors (Langreth, 2009).

- In at least one case, **faulty data transfer** of one EHR system was suggested to be a contributing factor to the deaths of pediatric patients transferred into the hospital and the associated EHR system in question (Hans et al., 2005).
Safety Issues associated with EHR Implementation

- A national sample of sixty-two hospitals voluntarily used a simulation tool designed to assess how well safety decision support worked when applied to medication orders in computerized order entry.
  - The simulation detected 53 percent of the medication orders that would have resulted in fatalities and 10–82 percent of the test orders that would have caused serious adverse drug events.
  - Under-detection of errors in a computerized order entry system may negatively impact patient safety because the false sense of security, common in use of computerized systems.

Leapfrog Group Jan. 2010 Recommendation: As part of the definition of meaningful use, there must be a testing and monitoring component for all technology adoption in hospitals.

Safety (continued)

- EHR-induced medical errors can occur for reasons such as:
  1. Interfaces that do not transfer complete data from one system to another, or from medical devices to the EHR.
  2. Lack of coordination among different systems (e.g., emergency department systems that hold different sets of orders from the same patient).
  3. Not enough data on a single screen (e.g., space for only five medications at a time when the common patient may be on 15).
  4. Inconsistent nomenclature between systems (e.g., calling drugs or diagnoses by different names in different systems).

- Wrong patient errors is the most common and most worrisome.
  - One organization solved this by putting the patient’s picture in the record and allowing the computers in the patient rooms to only show the records associated with the patients registered to that room (Gardner, 2010).
Click-to-Information Ratio

- “The problem with EMR data is that there is so much of it.”
- "You really have to know where to look and know where to find things. In healthcare, we have literally seconds sometimes to assess the situation and make a decision for patients."
- Extensive click-to-information ratio, can be associated with patient morbidity, poor outcomes and even death.
- Three years later . . . “SmartRoom as the app for the EMR."
  - Identifies healthcare workers, who wear small ultrasound tags, as they walk into a patient's room, displays the person's identity and role on a wall-mounted monitor visible to patients
  - automatically pulls relevant, real-time patient information from the EMR and other clinical systems, including pharmacy and lab services.

Tamra Minnier, MSN, RN, FACHE
Chief Quality Officer
University of Pittsburgh Medical Center

http://www.healthleadersmedia.com/content/MAG-257392/Patient-Rooms-Get-Smart
Safe Click-to-Information Ratio

Little in the way of guidelines

Critical information – may be 2-3 and/or voice activated

Routine information – may be 7-8
CUSTOMIZATION:
NURSING MANAGEMENT OF UNINTENDED CONSEQUENCES IN EHR USE FOR YOUR HEALTH CARE ORGANIZATION
3. Ways to Manage UC

AMIA Health Policy Conference 2009

Bloomrosen et al 2009
A Construct for Unintended Consequences

Several reasons identified for occurrence:

- Workflows
- Culture
- Social interactions
- Technologies

Harrison et al, 2007
Workflow

• Order Management-
  – Orders not always discontinued, or modified-
  – Difficult to understand med dose, and IV rates.

• Blood Administration

• Medication Reconciliation

• Blood Glucose Management
Culture
• Ignoring Alerts
• Over-reliance on technology
  – PYXIX
• Verbal orders/Telephone orders
  – Increased volume
  – Error prone
  – Alerts for physicians do not fire for nursing?
  – Order modes- correct co-signatures
• Patient Hand-Offs/Communication
• Lack of standardization within Nursing
  – Variability in hospital size and complexity
  – Variability of services- i.e.: Wound Care
Technologies

• CPOE
• BMV- Barcode Medication Verification
• Integration- with other systems
  – Device Integration
  – Disparate Systems
• Downtime Management
• Other technologies
  – Communication devices
  – Fetal monitors
  – Smart IV Pumps
Social Interactions

- Lack of face-to-face communication
  - Physicians to nurses
  - Pharmacists to nurses
- Perceived decreased socialization
  - Access and location of computers
- Documenting at Nurses Stations
Other Safety Issues

- Timely administration of medications - i.e.: SCIP antibiotics - difficult to track non-timed meds
- IV’s not completed, lines not dc’d
- Can’t tell patient story - miss important information
- Documentation in various places - hard to find.
NURSING’S NEXT STEPS ADDRESSING UNINTENDED CONSEQUENCES: WHAT YOU CAN DO
How Can We Improve……

• Governance
• Standardization
• Collaboration
• Training and retraining
• Workflow optimization
• Operational reports
• Front-line manager accountability
• Improved communication between providers
• Super Users, experts, commitment to support
• Ensure good build, strong workflows
Network and Inquire

Support each other

• Join the international listserv - ANIA-CARING:  [http://www.ania-caring.org/](http://www.ania-caring.org/)

• Post questions to colleagues, e.g., the Texas Health Informatics Nursing Network (THINN)

• Contact, stay involved with TNA/TONE HIT Task Force

• Join the TIGER Initiative, it’s free:  [http://www.thetigerinitiative.org/](http://www.thetigerinitiative.org/)

Apply Evidence-based Inquiry

• Search databases/Internet for research articles

• Read the Computers Informatics Nursing journal, Online Journal Nursing Informatics

Different Views of How IT Works

Interfaced.

Integrated.

2012 Innovative NI Activity

Source: Jim Turley, PhD, RN, University of Texas Houston School of Biomedical Informatics, Gulf Coast Regional Extension Center
### Why Nursing Informatics

<table>
<thead>
<tr>
<th>Informaticist</th>
<th>Nurse Informaticist</th>
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<tbody>
<tr>
<td>• Medical – computer science and medical science for optimization of a medical electronic system, e.g., SNOMED</td>
<td>• Insure the nursing care delivery terms are adequately represented; click to information ratio mgt.</td>
</tr>
<tr>
<td>• Health – artificial intelligence applied to patient care</td>
<td>• Insure accurate representation of nursing content; alert fatigue mgt.</td>
</tr>
<tr>
<td>• EHR certified specialist – six month training toward EHR implementation</td>
<td>• Management of nursing modules and workflow</td>
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SNOMED = Systematized Nomenclature of Medicine -- Clinical Terms

### EHR Safety Institute: Safety Flaw Tracker

<table>
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<tr>
<th>Safety Flaw</th>
<th>Criticality</th>
<th>Estimated Likelihood</th>
<th>Event Type</th>
<th>Effect</th>
<th>Discovery Method</th>
<th>Event Date</th>
<th>Discovery Date</th>
<th>Resolution Date</th>
<th>Detail</th>
<th>Cause</th>
<th>Full Resolution?</th>
<th>Resolution Detail</th>
<th>Vetting</th>
<th>Development Needed</th>
<th>Responsible Agent</th>
<th>Timeline</th>
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**Critical** = high threat of serious patient harm  
**Important** = moderate threat of patient harm  
**Low** = low threat of patient harm  

**Estimate Likelihood**  
> 10%  
1-10%  
0.1-1%  
0.01-0.1%  
<0.01%

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3. Ways to Manage UC

http://www.ehrsafety.com/resources/resources.html
Proposed EHR Safety Steps

• Care-process transformation:
  – redesign of health care processes to achieve significant performance improvements in clinical outcomes, service levels, and costs
  – Continuous improvement: ongoing systematic efforts to improve processes and outcomes
  – Use of EHRs as tools for process improvement

• Patient safety:
  – consistent, organization-wide efforts to improve care quality and patient outcomes
  – Prevent and manage EHR related events
  – Policy and process changes

Walker et al 2008
Proposed EHR Safety Steps (cont.)

- Human-factors engineering:
  - fitting technologies to organizational, department, and individual needs
- Software safety: the application of systems engineering methods to reducing the risks associated with software design and use
- Communicate safety flaws and incidents
- Project management: the application of explicit management practices to a project to maximize benefits and minimize costs, including risks

Walker et al 2008
Recommendations of HIT Task Force

- Creation of educational content and dissemination
- Campaign to Raise Awareness
- HIT CNE for practicing nurses
- Nursing HIT curriculum development
- Constituent involvement [incl. TIGER]
- Benchmarking Reports Towards Progress
- Formation of Advisory Structure

[red=support of patient safety and quality in EHR use]
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