We Save Lives: A Nursing Informatics Perspective on Patient Safety and Quality

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Objectives

• Discuss the impact of the CNIO role in use of the EHR by Nursing.
• Explore how Nursing Informatics impacts patient safety and quality
• Explain construct of Unintended Consequences and impact on safety and quality
• Discuss how Texas Health Resources utilized the EHR to better manage detection of Ebola patients by redesigning their Emerging Disease Screening Tool.
Texas Health Mission
To improve the health of the people in the communities we serve

Texas Health Vision
Texas Health Resources, a faith-based organization joining with physicians, will be the health care system of choice

Innovative Technology Solutions
Innovate, transform, and serve
Texas Health Resources

• One of the largest faith-based, nonprofit health care delivery systems in the United States

• Facts and Figures
  • 14 Wholly owned hospitals (25 hospitals total)
  • 18 outpatient facilities and
  • 250 other community access points
    • 3,100 Operational beds
    • 4,100 licensed hospital beds
    • 22,500 staff
    • 7,500 RN’s
    • 5,500 physicians
    • 557,785 annual emergency visits
    • 24,573 annual deliveries
    • More than 1.3 million inpatient & outpatient visits
Texas Health Resources in Dallas-Fort Worth Area
This material contains confidential and copyrighted information of Texas Health Resources.
CNIO Role

• CNIO Role is a relatively new, emerging role within organizations.
• Bridges Nursing and Information Technology together.
• The CNIO is a Nurse Leader with variety of key responsibilities
  – Strategic direction of nursing’s use of technology
  – Operational oversight of clinical application implementations
  – Relationship building between key leaders and departments- i.e.: Nursing, IT, Medicine, Quality, Patient Safety
  – Professional Development of Nursing Informatics

Swindle & Bradley, 2010
CNIO Responsibilities

- EHR Implementation and adoption
- Regulatory requirements compliance
- Infrastructure/Integration
- Managing the Corporate Vision
- Emerging Technologies
- Analytics- “Answering the question.”
- Professional Development of staff in Nursing Informatics
Benefits of the CNIO Role

• The role of the CNIO is both strategic and operational in developing programs to positively impact the adoption and use of the EMR for nursing and other clinical departments.
• Translator of the technology and understanding of risks and benefits
• Understanding of the organization and factors impacting nursing practice within the organization
• Understanding of regulatory requirements especially around HITECH Act and Meaningful Use
• CNO does not have to “worry” about technology impact on nursing
• Professional development of Nursing Informatics

Swindle & Bradley 2010
Key Relationships

- Chief Nursing Officer
- Chief Information Officer
- Chief Medical Informatics Officer

All 3 reporting lines are optimal for CNIO effectiveness.
Why is This Role So Critical Now?

- EHR Use and Adoption
- Increasing Regulatory Requirements
- Focus on Outcomes and Analytics
- Emerging Mobile Technology
- Focus on Patient Safety
My Life as a CNIO
Islands of Communication

Yesterday: Life Was Simple

Today: Islands of Information

Improved Quality, Safety and Efficiency

**HITECH Act of 2009**

- Better Communication and care coordination
- Safer Treatment via e-Prescribing
- Faster Delivery of information and results
- More efficient Coding and billing

EHR and Patient Safety

• Well documented benefits of Electronic Health Record (EHR)
  – Legibility
  – Increased access to patient record
  – CPOE/Order Sets- evidenced based
  – ePrescribing
  – Data Analysis

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

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.
Patient Safety at THR

THR Core Measures ACS Scores
Q1 2007 - Q3 2010

60%
65%
70%
75%
80%
85%
90%
95%
100%

Q1 07 Q2 07 Q3 07 Q4 07 Q1 08 Q2 08 Q3 08 Q4 08 Q1 09 Q2 09 Q3 09 Q4 09 Q1 10 Q2 10 Q3 10

AMI HF PN SGP
THR Approach to Medication Safety

CPOE

IV Pump Integration

CDS

BMV

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Closed Loop Medication Administration

• Reduction in ADE’s as result of:
  – 36% decrease in adverse drug events through universal use of CPOE by physicians, resulting in $1.8 million in cost avoidance.
  – 42% reduction in medication errors through closed-loop medication administration process.
  – The use of smart pumps with “guardrail” software to alert the nurse when dosage parameters are exceeded.
  – Expecting another 30% decrease in medication errors with Smart Pump Integration
Medication Errors 2010-2013

Standardization through also decreased variability among hospitals
Modified Early Warning System
Modified Early Warning System- MEWS

• Evidenced-based predictive tool that indicates patients at risk of cardiac arrest.
• Proactive management of patients before they experience significant clinical events that negatively impact their recovery.
• EHR facilitates clinician’s ability to aggregate patient information to make care decisions sooner.
• MEWS project designed to bring relevant information to the registered nurse with which to make immediate care decisions in critical situations.
• The success of this project has been beyond expectations.
• Cardiac arrest decreased by 38% in the first six months of use.
• Cardiac arrest decreased 65% within 1 year (represents 22 at-risk patients)
• Represents cost avoidance $640,000* per year from increased MEWS surveillance

So how does it work?

*based on the Centers for Medicare and Medicaid Services average of ICU bed cost of $4,850, and an average ICU stay of three days).
<table>
<thead>
<tr>
<th>Bed</th>
<th>Patient Name</th>
<th>SIRS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>NONE</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>NONE</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>NONE</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>NONE</td>
<td>0</td>
</tr>
</tbody>
</table>

**Patient Scoring**

**MEWS EARLY WARNING SCORING TOOL**

<table>
<thead>
<tr>
<th>Score</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>≤ 40</td>
<td>41-50</td>
<td>51-100</td>
<td>101-110</td>
<td>≥ 111 129</td>
<td>≥ 130</td>
<td></td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>≤ 70</td>
<td>71-80</td>
<td>81-100</td>
<td>101-199</td>
<td>≥ 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>≤ 9</td>
<td>10-16</td>
<td>17-20</td>
<td>21-29</td>
<td>≥ 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature (°F)</td>
<td>&lt; 95</td>
<td>95-101</td>
<td>101.2</td>
<td>≥ 101.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNS - Level of Consciousness</td>
<td>Alert</td>
<td>Confusion/ Restlessness</td>
<td>Responds to Pain</td>
<td>Unresponsive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Flowsheet Rows**

- **Pulse**: 99, filed on 09/09/2013 10:21
- **BP**: 106/60 mmHg, filed on 09/09/2013 10:21
- **Resp**: 22, filed on 09/09/2013 10:21
- **Temp**: 99 °F (37.2 °C), filed on 09/09/2013 10:21

**VITAL SIGNS EARLY WARNING TRENDS**
Safety Concerns with the EHR: Unintended Consequences of HIT

- Events that are neither anticipated nor the specific goals of the associated computer project implementation
- Includes both undesirable as well as desirable, positive, and beneficial consequences
- 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.”
- Meaningful User impact of trying to get EHR’s in quickly to get incentives
A Construct for Quality and Safety in the EHR

Several reasons identified for occurrence:

- Workflow
- Culture
- Technology
- Social Interactions

Workflow

• Order Management-
  – Orders not always discontinued, or modified-
  – Difficult to understand med dose, and IV rates.
  – Bad practices in placing order sets
• Blood Administration
• Medication Reconciliation
Culture

- Ignoring Alerts
- Over-reliance on technology
- 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
Technologies

• CPOE
• BMV- Barcode Medication Verification
• Hard to Tell the Patient Story
  – Documentation in multiple places
• Integration- with other systems
  – Device Integration
  – Disparate Systems
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
Ebola Screening Case Study

- Culture
- Workflows
- Technology
- Social Interactions
• Faith based organization
• SSHH
• Special, Sacred, Humbling, Heroic
• “SSHH! Listen. The work that we do is a very special, sacred, humbling and heroic ministry.”

Dr. Jeffrey Canose, COO
Immediate Response

• Initiate CDC guideline
  – Paper-based immediately at all intake points

• Form a multi-disciplinary team to design Emerging Diseases screening tools
  – Nursing Informatics Specialist- Project Lead

• Subject Matter Experts
  – Infection Prevention, ED, Ambulatory, Inpatient clinicians

• EHR Design Team
  – CMIO, Builders from every application, Reporting, CDS
PDSA Approach

Plan

• Reach beyond Ebola for basic Emerging Disease evaluation (include MERS-CoV)
• Evaluate current tools and determine gaps between existing system and CDC recommendations
• Build the EHR screening tools to CDC algorithm
• Deliverables
  – Screening are done on all patients regardless of the point of entry
  – Questions should be required (hard-stopped)
  – All CDC/state guidelines must be addressed
  – Alerts/warnings must be prominent
  – Emphasize face to face communications in addition to EHR alerts and warnings
PDSA Approach

Do

• Project team multiple daily meetings to identify the build potential and design the EHR screens.
• Iterative process between Informatics, Builders, and Clinicians- validation and usability testing
• Supported by EHR vendor to assess, analyze and support
• System coordination (in addition to ITS meetings)
  – HIM paper processes
  – System leadership communications
PDSA Approach

Study

• Evaluation of build
• CDC and State of Texas guidelines changed resulting in significant rebuild before initial release.
• Usability testing
• Multi-disciplinary committee review and acceptance
• Monitoring and reporting
PDSA Approach

Act

• Required for all areas using the EHR, not just ED
• All patients, regardless of the point of entry, including Ambulatory clinics, procedural areas and general admissions, are screened
• Only clinicians assess patients in a confidential space
• Standardized paper-based form, for areas and clinics not using the THR EHR
Previous Screening

• Began asking travel questions in response to SARS and the Avian flu several years ago

• Asked in ED after patient rooming
• Travel screening answers viewable on the “Track Board” in the Triage Report
Lessons Learned

• EHR can create illusion of communication
• Emphasize the importance of direct clinical communication for patient, staff, population health, and safety
• Ensure visibility of high value data in EHR
• Screening tools must be tied to discrete actions
Guiding Principles

• Care and safety of the patient come first, documentation comes second
• Care and safety of other patients and staff is equally as important
• Screening MUST be done on ALL patients to keep the population safe
• If there is a question, initiate precautions
• EHR documentation does NOT replace verbal communication
Screening

- Inpatient Admission section
- Triage & Assessment sections of ED workflow
- Physician Admission, Rounding, Transfer, and Discharge sections
- Radiology Tech sections at beginning and end of exam
Screening

• Expanding questions based on answers
• If the patient has been outside of the U.S. in the last 4 weeks, a selection list opens to document the primary or highest risk country of travel (additional countries can be documented in comments)
Screening

By documenting a high risk country:

- Flags the high risk country on the disease-specific list
- Prompts additional required questions
  - Fever
  - Other symptoms
  - Interventions
- Cancel out to document later if needed
Screening

Travel or Exposure

With
Fever or Symptoms

Without
Fever or Symptoms
Screening: Red

- Traveled or exposed WITH fever or symptoms - Best Practice Advisory

- Interventions documentation from guidance box

- Banners on all patient reports and handoff tools for all care team members
Screening: Orange

- Traveled or exposed without fever or symptoms - BPA

- Interventions documentation from guidance box

- Banners on all patient reports and handoff tools for all care team members
Monitoring

Patient lists and columns

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**Emerging Disease Screen**

- Have you been outside of the United States in the last 4 weeks? **Yes**: 10/30/2014 1346
- Country Traveled: Sierra Leone 10/30/2014 1346
- Travel to Ebola-affected country in the past 21 days: Sierra Leone 10/30/2014 1346
- Travel to the Arabian Peninsula in the past 2 weeks: **No**: 10/30/2014 1346
- Exposure to a person suspected of having or having Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV): **No**: 10/30/2014 1346
- Exposure to a person suspected of having or has Ebola: **No**: 10/30/2014 1346
- Fever (within last 24 hrs) **100.4 °F (38 °C) or greater**: 10/30/2014 1346
- Symptoms: None / patient denies: 10/30/2014 1346
- Interventions: Physician informed, Infection Prevention notified, mask placed on patient, patient put in isolation room, order placed for isolation/implemented isolation precautions: 10/30/2014 1346

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ALERT! EBOLA RISK FACTORS IDENTIFIED

*If you need to correct Emerging Disease Screen, click HERE*
Discharge Instructions

- Safety net
- Emerging disease screen is required before discharge instructions can be printed
Ebola Virus Disease (Ebola)
Algorithm for Evaluation of the Returned Traveler

**Fever** (subjective or ≥100.4°F or 38.0°C) or compatible Ebola symptoms* in a patient who has resided in or traveled to a country with wide-spread Ebola transmission** in the 21 days before illness onset

* Available: weakness, muscle pain, vomiting, diarrhea, abdominal pain, or headache
** Available: weakness, muscle pain, vomiting, diarrhea, abdominal pain, or headache

**Report** asymptomatic patients with high- or low-risk exposures (see below) in the past 21 days to the health department

**YES**

1. Isolate patient to single room with a private bathroom and with the door to halfway closed
2. Implement standard, contact, and droplet precautions
3. Notify the hospital Infection Control Program and other appropriate staff

**HIGH-RISK EXPOSURE**
Percutaneous (e.g., needlesticks) or mucous membrane contact with blood or body fluids from an Ebola patient

**OR** Direct skin contact with or exposure to blood or body fluids of an Ebola patient

**OR** Processing blood or body fluids from an Ebola patient without appropriate personal protective equipment (PPE) or biosafety precautions

**LOW-RISK EXPOSURE**
Household members of an Ebola patient and others who had brief direct contact (e.g., shaking hands) with an Ebola patient without appropriate PPE

**OR** Healthcare personnel in facilities with confirmed or probable Ebola patients who have been in the care area for a prolonged period of time while not wearing recommended PPE

**NO KNOWN EXPOSURE**
Residence in or travel to a country with wide-spread Ebola transmission* without high- or low-risk exposure

**Review Case with Health Department Including:**
- Severity of illness
- Laboratory findings (e.g., platelet counts)
- Alternative diagnoses

**Ebola suspected**

**TESTING IS NOT INDICATED**

The health department will arrange specimen transport and testing at a Public Health Laboratory and CDC

The health department, in consultation with CDC, will provide guidance to the hospital on all aspects of patient care and management

**CDC**
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Website: http://www.cdc.gov/vhf/ebola/travelers/index.html

**ISOLATE PATIENT IN SEPARATE ROOM (WITH BATHROOM OR COVERED COMMODE)**

1. Medical providers to wear double gloves, impermeable gowns, face mask and face shield. Consider placing surgical mask on the patient

2. In the presence of significant body fluids (diarrhea, vomiting, bleeding) OR Aerosol generating procedures (e.g., intubation) Add respiratory protection (N95 or greater), shoe covers, and PPE to cover all exposed skin

3. Notify Hospital Infection Control and start written log of exposed personnel

4. Further evaluation and management with dedicated equipment.

**Hospital and Emergency Triage Assessment for Ebola**
(last updated October 23, 2014)

**Ask Patient in Triage Area**
In the last 21 days:
1. Have you been in the countries of Guinea, Liberia, or Sierra Leone?
2. OR meet any of the criteria in the Risk Assessment below?

**Risk Assessment**

1. Direct contact with blood, vomit, feces, urine, saliva, sweat, breast milk or semen of a person with or suspected to have Ebola
2. Household member or others who had brief direct contact of a person with or suspected to have Ebola
3. Attended funeral or had direct contact with a dead body in Guinea, Liberia, or Sierra Leone
4. Health care worker in the patient care area or processing laboratory samples for an Ebola patient in the United States or elsewhere
5. On any public health monitoring list for Ebola or asked to self-monitor for fever or symptoms of Ebola

**NO to BOTH**

**YES to EITHER**

1. Unlikely Ebola
2. Continue routine assessment
3. Provide Ebola information and who to call if fever or symptoms develop
4. Provide patient name and contact to Local Health Department

**Immediately Call**
Local Health Department
OR Department of State Health Services

Information and Referral at (512) 776-7111 or 1-888-963-7111

Prepared by the Texas Task Force on Infectious Disease Disease Response and the Texas Department of State Health Services
Summary

• Enhanced screening tool that incorporates the CDC and State of Texas guidelines.
• Addresses other emerging diseases – not just Ebola.
• Multidisciplinary iterative approach, following our Quality PDSA process, that can be monitored in an ongoing manner.
If you want to go fast, go alone.
If you want to go far, go with others.
A Community of Support

In tribute to your dedication and perseverance...we stand with you.

HCA North Texas

Thank you for taking care of people with Ebola! Y'all rock.

#presbyproud?