Using Simulation to Improve CLABSI Prevention in Pediatrics

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Objectives

- Discuss pediatric CLABSI prevalence and the impact on patients and families.
- Identify benefits of simulation in pediatric blood stream infection education.

Duke Children's Hospital

- Hospital-within-a-hospital
- 190 inpatient beds
- 28 subspecialties

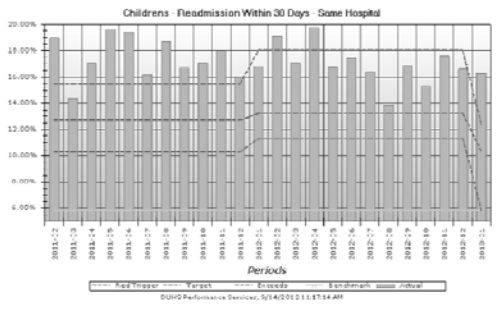
http://www.dukechildrens.org/about_us/overview/#facts

Our Story

Discovering the Problem

- Duke Children's Performance Improvement Oversight Committee (PIOC)
- Readmission rates
- Most common cause for readmission

Readmissions



Questions, Questions, Questions

- What are we teaching our families when they are discharged from the hospital?
- How do we evaluate the education we've provided?
- What is the scope of our problem?

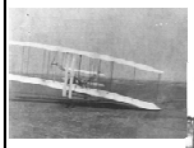
Simulation

What is Simulation?

- "The technique of imitating the behavior of some situation or process (whether economic, military, mechanical, etc.) by means of a suitably analogous situation or apparatus, especially for the purpose of study or personnel training."

http://dictionary.oed.com

Aviation and Simulation Training



The Wright Flyer
Dec 17th, 1903

French Simulator
circa 1907

Improving Safety and Outcomes in High Risk Industries

Ressler EK et al. Military Mission Rehearsal in:Tekian et al eds. *Innovative Simulations for Assessing Professional Competence*. 1999;157-174

Simulation and Anesthesia Training

- **Complex "realistic" simulations in OR-like setting**
- **Simulation training has been shown to:**
  - **improve acquisition and retention of knowledge**
  - **decrease unplanned errors**
  - **improve correction of problems**

Chopra V et al. *Br J Anaesth* 1994;73:287-292
DeAnda A et al. *Anesth Analg* 1991;72:308-315

Simulation in Nursing

PRE-LICENSURE

- Initial skill acquisition
- Patient assessment
- Safety training
- Enhances teaching

STAFF DEVELOPMENT

- Further development of critical thinking
- Familiarization with core competencies
- Skills revalidation
- Team training
- Mock codes
- Architecture
- RCAs

Literature Tells Us…

- Agreement regarding use of simulation
  - Academic settings
  - Practice settings
- Simulation plus debriefing builds confidence and performance

What Can We Simulate?

- Technical skills
  - Psychomotor
- Non-technical skills
  - Decision-making
  - Cognitive rehearsal
  - Teamwork
  - Situational awareness
  - Communication

Types Of Simulation

- Low Fidelity
  - Role Play
  - Mannequins
- High Fidelity
  - HPS

Part-Task Trainers

Laerdal – 1960's - present

Simulation: Past

Potential applications of simulation

- Routine basic training of individuals and teams
- Practice of complex clinical situations
- Rehearsal of serious and/or rare events

Potential applications cont.

- Rehearsal of planned, novel or infrequent interventions
- Design and testing of new clinical equipment
- Performance assessment of staff at all levels

Advantages/Benefits

- Safe learning environment
- Student-focused – may be individualized
- Patient safety not compromised
- Immediate structured feedback
- Flexible teaching methodology

Disadvantages

- High capital cost
- Staff development intensive
- Mechanical, environmental and psychological limitations
  - Suspension of disbelief
  - Hyper-vigilance
- Evidence in practice?

Simulation: Present

- Neonatal Resuscitation
- Using Simulation to treat Oncologic Emergencies
- Critical Thinking
- ACLS – Mega Code Teach/Testing
- Critical Care Core Classes
- Preceptor Development classes
- Unit-Based Initiatives

High Fidelity Simulators

Implications For Practice

- **Recommendations from the IOM report:**
  - **Use simulators to ensure that clinical training is safe for patients**
  - **Develop simulators for use in skills assessment**
  - **Use simulation technology to improve individual and team performance through interdisciplinary team training**
  - **Use simulation for problem solving and recovery from problems — "crisis management"**

***To Err is Human: Building a Safer Health System*, Institute of Medicine, Committee on Quality, National Academy Press, 1999**

Another Potential Application

- Patient Education!

Patient and Family Education

The Role of the Nurse

- Florence Nightingale (Nigthingale, 1860)
- Virginia Henderson (Henderson & Nite, 1960)
- National League for Nursing Education (1918)
- American Nurses Association (1975)

Challenges

- External
  - Changes in health care delivery
  - Adequacy of resources
- Internal
  - Nurse's values and beliefs
  - Patient's and caregiver's values and beliefs
  - Educational level
  - Teaching and learning styles

Teaching the Family

- Patient education in pediatrics
- Special considerations
  - Environment
  - Workload
  - Resources
  - Learning Process

Theories of Learning

- Condition – Behavioristic
  - B.F. Skinner
- Apperception
  - J.F. Herbart, E.B. Titchener
- Interpersonal – Social Learning
  - A. Bandura

Future Implications

- Incorporate patient and family education into the mission and strategic priorities
- Create an environment that rewards patient and family education efforts and outcomes
- Create a structure that supports patient and family education
- Incorporate patient, family and staff education into policies and procedures

Implications for Nursing Practice

- Motivate staff nurses and experts to teach
- Promote recognition and documentation of patient and family learning outcomes
- Streamline teaching protocols
- Promote a team approach

Need for Innovation

- Present challenges to patient and family education
  - ?

Caregiver Education Using Simulation

Background

- Inequities accidentally created
- Caregiver anxiety and fear

Significance

- Printed education material (PEM)
- Simulation as a valid teaching-learning strategy
- Readiness for discharge

The Team

- Vascular Access Team Coordinator
- Staff Educators
- Hospitalists
- Pediatric Intensivists
- Pediatric BMT Attending
- Clinical Nurse Educators
- Nurse Managers
- Clinical Operations Director
- Clinical Nurses
- Clinical Practice Council
- Infection Control Nurse

Setting the Expectations

- Review of our current practice
- Standardizing practice
- Setting the policy

Change Management

- Getting the clinical staff involved
- Unit-based champions
- Collaborative meetings

Education

- Collaboration with Clinical Nurse Educator
  - Lesson plan
  - Measures of success
- 2 Mini-Expert Training Sessions

Role of the CVAD Mini-Expert

- Change management
- Expert knowledge
- Just-In-Time training for staff nurses
- Provide the staff with updates to policy and practice

Role of the Infusion nurse

- Content expert for best practices
- Leadership for identifying complications and trends
- Setting the research agenda to improve the specialty body of knowledge

Measuring Success

- Balanced Score Card
- Infection Control Surveillance
- Routine unit-based audits
- Routine organizational-level audits

Future Implications

- Engage multi-disciplinary team members
- Expand to other areas of Children's
- Embed education into core curriculum
- Research!

Central Venous Access Device (CVAD) Discharge Teaching Randomized Control Trial

Design

- Randomized controlled trial, compared to case-matched controls using prior CVAD content

Arms

Arm 1: current caregivers of children who received CVAD teaching based on old content and unit-based delivery methods.

Arm 2: caregivers of children who will receive CVAD teaching based on the new CVAD protocol. Delivery of content is unit-based.

Arm 3: caregivers of children who will receive CVAD teaching based on the new CVAD protocol. Delivery of content is structured using PEM and a task-simulator.

Research Question 1

- What is the difference in BSI rates between individuals who have received the content from the previous Central Venous Line Management Protocol for Pediatrics and the individuals randomized to Arm 2 and Arm 3?

Research Question 2

- What is the difference in re-admission rates between individuals who have received the content from the previous Central Venous Line Management Protocol for Pediatrics and the individuals randomized to Arm 2 and Arm 3?

Research Question 3

- How do Readiness for Discharge and Post-Discharge Coping Difficulty scores differ between individuals in Arm 2 and Arm 3?

Instruments

- Weiss Readiness for Discharge Parent Form (RHDS)
- Weiss Post-Discharge Coping Difficulty Scale – Parent Form
- Pre- and Post-Test Knowledge Assessment

Subject Selection

INCLUSION

- Parents or caregiver(s) of a patient on any pediatric service
- ≥ 18 years old
- CVAD must be a PICC/implanted port/tunneled catheter
- Consent given related to treatment plan
- English-speaking
- Able to complete education prior to discharge

EXCLUSION

- Vascath/perm-a-cath, PIV
- Patients under the care of a governmental agency
- Patients whose time of departure does not allow completion of either intervention

Next Steps

- Form the Research Team
- Institutional Review Board
- Recruit Participants
- Collect Data
- Analyze Data

Our Vision

- To provide our patients, their families and their loved ones with excellent discharge preparation
  - Evidence-Based
  - Safe
  - Sustainable

It Takes A Team…

- Britt Meyer, RN, MSN, CRNI, VA-BC
- Kathleen Little, BS, RN
- Julia Aucoin, DNS, RN-BC, CNE
- Duke Vascular Access Team
- Duke Clinical Practice Council
- Clinical Education and Professional Development
- Duke Children's Nursing

Thank You!