10TH ANNUAL
QUALITY & SAFETY SYMPOSIUM

Tuesday, May 5, 2015
Duchossois Center for Advanced Medicine
4th Floor Atrium

The symposium is an opportunity to share with colleagues ongoing efforts and initiatives to improve the quality of care delivered at UCM.

- Poster session showcases quality improvement projects
- Gain insights and techniques to improve patient care
- Find out about internal UCM quality resources and tools

Poster Submissions due April 15

For more information, go to:
clinicaleffectiveness.uchicago.edu
Poster Session: Innovations in Effectiveness

1. 3D Printing: A novel approach for customizable ostomy care
2. Abnormal general movements in hospitalized preterm infants
3. BREATHE pilot program
4. CAC-3: Pediatric Asthma Action Plan
5. Clot Busting: Enhancing nursing documentation
6. Curbing COPD Readmissions
7. Ebola Virus Disease: Training plan for healthcare workers
8. Improving PAP device reconciliation
9. Increasing HPV series completion in teens
10. Integrating pharmacy resident consult into continuity clinic
11. International program pharmacy process
12. Lung cancer screening in primary care clinic
13. Optimization of musculoskeletal hip MRI exams
14. Project Walk: Early mobilization
15. Real time risk prediction on the wards
16. Reducing poorly controlled DM
17. Reducing uncontrolled hypertension
18. Staff radiation protection for oropharyngeal motility studies
19. Validation of GoJo Hand Hygiene monitoring system
20. Young surgeons on speaking up
3D Printing: A novel approach for customizable ostomy care

Lead Investigator: Jessica J. Kandel, MD

Background

* An ostomy, or stoma, is a surgically created opening of the intestine to the abdominal wall to eliminate stool (Figure 1A).
  * Stoma output is contained by an ostomy appliance, an adhesive barrier that attaches to the skin around the stoma and has a pouch to collect output.
  * The ostomy appliance should have a predictable and effective wear time without leakage, typically 24 hours in a neonate.
  * The most common complication associated with ostomy management is ostomy appliance failure and leakage of stool onto the skin of the abdominal wall.
  * Leakage causes skin breakdown and discomfort (Figure 1B), which negatively impacts patient quality of life and adds to caregiver frustration.
  * Leakage is addressed with appliance adaptation, including the addition of convexity.
  * Convex ostomy inserts depress the skin around the ostomy, resulting in slight protrusion of the stoma which encourages effluent to drain effectively into the pouch.
  * Convex products are widely available for adult patients but are extremely limited in the neonatal population.
  * There is only one neonatal ostomy product, which cannot be customized.
  * The Department of Pediatric Surgery performs about 20 ostomy surgeries per year with approximately 40% of patients developing complications related to appliance malfunction.

Aims

* Utilize a 3D printer to create a customizable convex ostomy insert, which will improve patient quality of life as well as the caregiver experience, align with University of Chicago Medicine operating goals, and set our department apart from other neonatal care providers.
* Design a study that tests the utility of our custom convex ostomy insert, ensures increased caregiver satisfaction, and decreases ostomy complications.

Methods

* After thorough product and literature review, we determined there are no customizable neonatal ostomy appliances on the market.
* A stereolithography (STL) file of the prototype convex ostomy insert was designed using Blender 2.74 based on the standard shape of most adult convex ostomy appliances (Figures 2A and B).
* The STL file was printed using the Objet 30 Scholar Desktop 3D printer located in the Hack Arts Lab at the University of Chicago using blue ultraviolet curing resin to establish the correct density and pliability of the prototype.
* The STL file was then modified based on patient specifications, including shape, size, and depth of stoma (Figure 2C).
* Given our success in creating the convex ostomy insert using the 3D printer, a study was designed to test the device in a clinical setting.

Figures

Figure 1: Stoma with intact (A) and irritated (B) surrounding skin.

Figure 2: (A, B) Prototype convex ostomy insert. (C) Variability in shape, size, and depth of the convex ostomy insert.

Outcomes

* A customizable convex ostomy insert was successfully designed and 3D printed.

Next Steps: Clinical Outcomes Study

* Submit preliminary project design for Institutional Review Board approval.
  * Study length: 12 months
    * Inclusion criteria: All neonates with a stoma managed by currently available ostomy supplies who experience two consecutive ostomy appliance failures
    * The Pediatric Surgery Ostomy Specialist will be consulted to assess the stoma and the need for a customized convex ostomy insert
    * If patient meets inclusion criteria, informed consent for use of the 3D printed convex ostomy insert will be obtained
    * The shape, size, and depth of the convex ostomy insert will be determined by the Ostomy Specialist and the insert will be printed
  * Outcomes measurement will include surveys before and after use of the 3D printed convex ostomy insert to parents and NICU caregivers.
    * The survey will evaluate skin integrity, frequency of ostomy appliance changes, and overall satisfaction.

Acknowledgements: A special thanks to Dr. Ilija Vukotic for assisting in product design.
Abnormal general movements are common in preterm infants with prolonged hospitalization

Colleen Peyton, PT, DPT\textsuperscript{1}, Meredith Lepley, PT, DPT\textsuperscript{1}, Kelly Smith, PT, DPT\textsuperscript{1}, Lars Adde, PT, PhD\textsuperscript{2,3}, Toril Fjortoft, PT, MSc\textsuperscript{4}, Raghnild Stoen, MD, PhD\textsuperscript{2,3}, Michael Schreiber, MD\textsuperscript{1}, Michael E. Msaal\textsuperscript{1,5}

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Background

The general movement assessment (GMA), and fidgety movements (FM) in particular, in the infant at 10-15 weeks corrected age (CA) has been reported to predict neuromotor outcome with a high degree of certainty. However, no studies have described GMA in preterm infants who are still hospitalized during the FM period. The effects of medical stressors and medications may impact the quality of FM. The therapy department routinely uses the GMA in our NICU with hospitalized children.

Aims

To describe FM in a sample of preterm infants hospitalized at 10-15 weeks CA. This better helps our department understand what FM look like in infants with medical complexity and this has not been reported yet in the literature.

Project Design/Strategy

Prospective cohort of preterm children enrolled in a neuroprotective clinical trial. 11 infants who were born \leq 31 weeks GA, with a BW of <1500gm and who required oxygen at birth were recruited at a university hospital. The infants were assessed with GMA at 10-15 weeks CA by two expert testers. FM were classified as normal (present) or abnormal (absent or sporadic). Figure 1. All children were hospitalized at time of testing. Length of exposure to benzodiazepines, opioid analgesics, phenobarbitol and muscle relaxants was extracted from the medical record.

Outcomes

All 11 infants had abnormal general movements. Gestational age at birth ranged from 24-28 weeks and birthweight ranged from 500-1425g (mean 799g). 1 child had a grade III IVH. All infants were exposed to benzodiazepines and opioid analgesics during hospitalization. 4 infants were exposed to phenobarbitol and 9 infants were exposed to muscle relaxants. At time of filming 2 infants were receiving phenobarbitol and 2 infants were receiving morphine. 7 children were hospitalized for bronchopulmonary dysplasia and feeding problems, 2 children were hospitalized for g-tube placement and one child was hospitalized for short gut syndrome. See Table 1

<table>
<thead>
<tr>
<th>Gestational age at birth in weeks</th>
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Figure 1. GMA: Normal spontaneous movements (the child to the left) show variation, complexity and fluency, and indicate normal development. Abnormal movements are stereotypical and monotonous (the child to the right) and are a marker for cerebral palsy development.

Lessons Learned

Medical complexity and cumulative exposure to medication may have a negative effect on the quality of FM and transient neuromotor status.

Acknowledgements

This effort was supported in part by the American Physical Therapy Association, Section on Pediatrics. Dr. Msall was supported in part by T35MC104477/HRSA Leadership Education in Neurodevelopmental and Related Disorders Training Program and P30 HD09-6275 NIH/NICHD J.P. Kennedy Intellectual and Developmental Disabilities Research Center (IDDRC). We are grateful to the children and families for their cooperation.

Next Steps

Further longitudinal studies are needed to investigate long-term outcomes of preterm infants with prolonged hospitalization. We would like to follow these infants to examine their neuromotor performance, and long term gross, fine, and oral motor control, and adaptive competencies.
The BREATHE Pilot Program: Extending Asthma Care to a Homeless Shelter in Englewood
Brooke Peterson, Eric Whitney, Andrew Davis, MD; Kathy Pischke-Winn, MS, MBA, RN; Melody Young, RN; Evan Fowler, RN

Background

ASTHMA DISPARITIES IN CHICAGO
58% of children in Chicago had a severe asthma attack last year. Blacks in Chicago are 8x more likely to die from asthma than non-Hispanic whites.

BENEFIT OF PREVENTATIVE CARE
Nearly 2.1 million ER visits in 2009 were because of asthma. Every $1 spent on asthma preventative care may save $2.27.

REACHING THE UNDERSERVED
The Maria Shelter Free Clinic is a medical student-run clinic at a 50-bed homeless shelter for women and children in Englewood.

Changes Made

ESTABLISH NEW PARTNERSHIPS ACROSS HEALTHCARE-RELATED INDUSTRIES
- Partnership between nurses, physicians, and medical students facilitated the provision of expert asthma education at a shelter where students have a 5+ year history of relationship-building and service.
- Partnership with Walgreens enabled the receipt of medications and supplies for free or at cost.
- Partnership with the regional office of Get Covered Illinois led Ada S. McKinley Community Services to provide health care navigators at no cost to Maria Shelter residents.

INCREASE ACCESS TO ASTHMA EDUCATION AND MEDICATION IN AN UNDERSERVED COMMUNITY
- A team of one pulmonologist, one nurse educator, two nurses, and two medical students visited the clinic twice in April to provide asthma education to Maria Shelter residents.
- Spacers, reliever inhalers, and controller inhalers will be provided to asthmatic pediatric patients on 4/15/15.
- Health care navigators will hold one-on-one meetings about health insurance with Maria Shelter residents on 4/8/15 and 4/22/15.

Aims

THE GOALS OF BREATHE ARE TO PROVIDE:
1. Prescription asthma medication at no cost to Maria Shelter residents.
2. Education about the management and medication of asthma.
3. Access to health care navigators to increase insurance coverage and continuity of care.

Project Design/Strategy

FEB 2015
- The Maria Shelter Free Clinic received a $6,000 twelve-month grant from UCM to design and implement BREATHE (Building Responsible Englewood Asthma Treatment, Health, and Education).
- A month-long workshop curriculum was designed with the input of nurse educators and physician faculty.

MAR 2015
- Participants were recruited via flyers, announcements, a voicemail line, and an asthma screening protocol implemented as part of regular clinic visits.
- Relationships were established with Walgreens and Ada S. McKinley Community Services.

APR 2015
- The first round of the BREATHE program was executed: two evenings of asthma education, two evenings of one-on-one meetings with health care navigators, and asthma medication distribution (spacers, relievers, and controllers).
- Participants completed a baseline survey based on the Brief Pediatric Asthma Screen. This will be retaken at 3 and 12 months to assess the program's impact on quality of life, health literacy, and emergency department usage.

Outcomes & Lessons Learned

- 4 patients (three children and one adult) attended the first workshop about asthma pathology and physiology, triggers, treatment, and management.
- At the start of the workshop, none of the participants could explain the difference between a controller and a reliever or the correct protocol for taking asthma medications; by the end of the workshop, all participants could do this.
- More results about pilot effectiveness forthcoming at the end of April.

Next Steps

- Strengthen relationships with Maria Shelter director and staff to improve patient recruitment.
- Revise curriculum to be delivered quarterly to adjust for lower-than-expected patient volume.
- Revise asthma screening protocol used in weekly free clinic to include basic asthma education and prescription of asthma medications as needed.

Acknowledgements

- B. Louise Giles, MD - Pediatric Pulmonologist
- Jim Kulikowski - Walgreens Liaison
- Tsera Herbert - Ada S. McKinley Liaison

3 Centers for Disease Control and Prevention. National Center for Health Statistics. National Hospital Ambulatory Medical Care Survey. 2009. Analysis by the American Lung Association Research and Health Education Division using SPSS software.
5 Image credit: Michael Scott Fischer, Maurilio Podrazzi, Anna T. Kang, and Willson Joseph for the Noun Project
Generating Compliance with CAC-3: Pediatric “Asthma Action Plans”

Poster Authors: Ajanta Patel MD MPH, Mridul Khanolkar MS, Samira Qadir MHA, Nanah Park MD
CAC-3 Intervention Team: Matt Pellerite MD, Melody Young RN, Chaundra Phillips, Janet Gervasio RN, Colleen Jensen RN, Nanah Park MD

**Background**
- In 2007, three measures were adopted by The Joint Commission for public reporting of inpatient Children’s Asthma Care (CAC) quality:
  - CAC-1: use of oral steroids for acute asthma exacerbation
  - CAC-2: use of bronchodilators for acute asthma exacerbation
  - CAC-3: used Asthma Home Management Plans of Care (HMPC)¹
- CAC-1 and CAC-2 showed nationally good success rates without interventions, due to practice similarities across children’s care
  - Attention therefore focused on CAC-3
- Asthma Home Management Plans of Care (HMPC), or “Asthma Action Plans,” have been shown to improve self-management and patient education, leading to better outcomes²
  - Incorporate multiple educational and discharge planning tools into one document

**Aims**
1. Increase rate of completion of all 5 mandatory measures of HMPC to be comparable to other Chicago hospitals; goal rate set at 90%.
   - To receive credit for HMPC completion, 5 key areas must be addressed on each form: arrangements for follow-up care, environmental and trigger control, method and timing of rescue actions, use of controllers, and use of relievers.
   - A completion failure occurs if any of these is missing
2. Increase documentation of attempts to complete Asthma Action Plan to 100%
   - Paper Asthma Action Plans were difficult to track; many completed forms were not counted

**Project Design**
- Pediatric Asthma Quality Group (PAQG) founded at Comer Children’s Hospital, University of Chicago
- Multidisciplinary representation from Pulmonary Nursing, Respiratory Therapy, Epic IT, Inpatient Nursing, Pediatric Emergency Medicine, Child Life Services, and General Pediatric (Hospitalist) service
- Outcome measured by chart sampling, data collected by Quality Analytics (QA) and Quality Reporting Evaluation (QREE) on a monthly basis

**References**

**Changes Made**
- **Asthma Action Plan**
  - **Original**
    - Paper with carbon triplicate copies; all manual entry
  - **Modified**
    - Word-type document in Epic, prompts for manual entry
  - **Final**
    - Epic Smartform (left) generates, records, and prints plan (right)

- **HMPC Compliance Rate (Mean, Range)**
  - Increased rate of completion to 92% (mean) since launch of Epic Smartform and resident training sessions
  - Data displays on HospitalCompare.hhs.gov

**Lessons Learned**
- Continuous improvement and focus on the end user created solutions targeted to the actual problems
- Learned value of teamwork, communication, and persistence
- Learned the value of making it easier for clinician to do the right thing

**Next Steps**
- Housestaff meetings, live demonstrations by team members, and Chief Resident announcements promote correct use
- Developed an online module for training residents to complete the Smartform Asthma Action Plan; currently testing for effectiveness
- Epic Solutions to make U of C HMPC Smartform available with Epic packages
- Internal targets heightened to 96%
- PDSA includes earlier identification of key areas and organizing information in chart to assist end user in completion during discharge

**Acknowledgements**
The UCM Pediatric Asthma Quality Committee, Valerie Press MD, Patti Solano RT, B Louise Giles MD, Jasmine Taylor MD, Carmen Harris-Frowner
Clot Busting: Enhancing Nursing Documentation

Background

Stroke can cause severe disability and is a leading cause of death and disability in the United States.
- The only FDA-approved treatment of acute ischemic stroke is tissue plasminogen activator (rt-PA) which dissolves the clot and improves blood flow to the compromised brain area(s).
- According to the National Institute of Neurological Disorders and Stroke rt-PA Study Group, 6.4% of patients treated with rt-PA experienced a hemorrhagic conversion. Thus, it is critical to closely monitor neurologic status (neurologic exam and vital signs) during treatment.
- During Joint Commission Comprehensive Stroke Certification (CSC), we identified opportunities for improvement in our documentation of neurological status for our patients receiving rt-PA.

Aims

Following the Iowa Model of EBP to promote quality patient care, our purpose was to develop a standardized guideline for neurological assessment and documentation for patients following administration of rt-PA. Our goal was to attain a 90% compliance rate for appropriate neurological assessment documentation.

Project Design/Strategy

- Based on research, the American Heart Association clinical guidelines, and consultation with a CSC and our Regulatory Compliance department, we developed the standardized documentation guideline.
- The project included strategies addressing four process phases required to implement and integrate EBP.
- Strategies included: 1) education on standards utilizing information sessions at staff meetings, use of tip sheets and badge cards 2) standardization of neuro assessment in documentation 3) utilization of the stroke page system for patient identification 4) audit and feedback loops with just-in-time inserviceing

Changes Made

Outcomes & Lessons Learned

Through the implementation of our standardized protocol for neurological assessment and documentation of patients following administration of rt-PA, we were able to improve the quality of neurological assessments, meet Joint Commission requirements, and improve the quality of patient care.

Next Steps

Next steps to prepare for Comprehensive Stroke Center recertification.

Acknowledgements

Thank you to Lliana Slaneva for your support with this project.

Authors: Patience Tieri, BSN,RN, Nancy Scott, DNP, RN, Ashley Wahome, BSN, RN, Cedric McKoy, APN,RN, Catherine Vincent, PhD, RN
Curbing COPD Readmissions: Finding the Target Population While They are Still in Their Beds

Authors: T. Shah MD MPH; S. Qadir MHA; M. Miller BA; E. Kim BS, S. White MD; V. Press MD MPH

Background
- Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AECOPD) is the third leading cause of hospital readmissions
- AECOPD is covered under the Medicare Hospital Readmissions Reduction Program (HRRP) for inpatient admissions to reduce readmissions.\(^1\)
- There is limited evidence on effective interventions that reduce readmission risk in the 30 days post discharge for AECOPD.\(^2\)

Objectives
- We developed a program targeted at patients admitted with AECOPD to reduce all-cause 30-day readmissions.
- We present the development of the intervention and preliminary feasibility and outcomes data based on our iterative approach.

Aims
Program elements were piloted in 2 phases using a Plan-Do-Study-Act quality improvement model.\(^3\)

Study population: all UCM adult inpatients
Data sources: chart review and from UCM analytics core

Phase 1: February to July, 2014
- Develop a screening algorithm that identified AECOPD admissions prior to discharge
- Pilot inhaler teaching using teach-to-goal (TTG) technique by Respiratory Care (RCS)
- Developed a pulmonary consult provider (PCP) model algorithm

Phase 2: August to mid-October, 2014
- Determine the sensitivity and positive predictive value (PPV) for the screening algorithm in real-time
- Pilot an advanced practice nurse (APN)-led COPD consultation that used the PCP algorithm
- Determine compliance with inpatient and outpatient intervention components
- Elucidate the patient- and hospital-level characteristics of patients enrolled in our program

Conclusions
- We demonstrate a novel, highly sensitive screening algorithm that identifies AECOPD admissions under the readmissions penalty prior to discharge.
- We demonstrate feasibility of an inter-disciplinary program to reduce COPD readmissions
- We demonstrate a reduction in 30-day readmissions for AECOPD back to UCM
- These data suggest that a robust, comprehensive program can reduce the overall readmission rate.

References
Ebola Virus Disease: Training Plan for Healthcare Workers

Authors: Rachel Marrs MSN, RN CIC, Kristen Becker MSN, RN, John Bivona, Patricia Gwizdalski BSN, RN CCRN, Katie Mochmal BSN, PCCN, Georgia Orzechowski, MSN, RN CPN, Katherine Pakieser-Reed PhD, RN, Sylvia Garcia-Houchins RN, MBA CIC

**Background**

- Ebola virus causes hemorrhagic fever in humans. Without supportive treatment it is often fatal, as it affects the body's vascular system leading to significant bleeding and organ failure.
- EVD can only be spread through direct contact (through broken skin or mucous membranes) with blood, body fluids, tissues of infected persons including remains and medical equipment contaminated with infected body fluids.
- At the beginning of the current outbreak, mortality was estimated to be around 80%. With additional public health and medical resources, the mortality rate has dropped to 50.5%.

**Aims**

Create a comprehensive training plan which included development of Standard Operating Procedures, Training Documents, and Staffing Models.

**Planning and Preparedness**

July 2014
- Infection Control Team recognized the potential implications of an infected individual presenting to an American hospital.
- Biosafety, Medical Staff and Nursing recruited to develop training program: Staff Must Be Competent in Biosafety Procedures as well as Clinical or Laboratory Procedures
- Materials management recruited to acquire best quality personal protective equipment and supplies.

September 2014
- 3 Levels of personal protective equipment and provider settings identified
- RN and MD volunteers recruited to work in quarantine unit
- Standard Operating Procedures (SOPs) Developed

October 2014
- UCM initiated its Emergency Operations Hospital Incident Command Structure
- Screening at both high and low risk points of entry began.
- Training area similar to quarantine unit built and training initiated

**Acknowledgements**

We would like to acknowledge the multidisciplinary team who came together to provide excellent care to our suspected Ebola patients and ensure the safety of UCM staff. Including but not limited to: Nurses and Physicians, CNPPR, Argonne and Ricketts Biosafety, Infection Control, Patient Safety and Risk Management, Supply Chain, Clinical Laboratories, Facilities and Physical Plant, Environmental Services, Childlife, Food Services, Security, Patient Transportation, Clinical Engineering and Respiratory Care Services.

**Training and Competency of Care Providers**

**Quarantine Providers**
- Round 1: 2 days of training focusing on:
  - How PPE functions, limitations and use
  - Donning/Doffing
  - Basic Standard Operating Procedures
  - Clinical Care
- Round 2: 1 day of training focusing on:
  - Clinical Care of Patient
  - Role of Observer and First Contact PPE
  - Practice Provider and Observer Role
  - Competency Assessment
- Round 3: Half day Training focusing on clinical skills

**First Responders**
- Round 1: 30-45 minutes individual training
  - How PPE functions, limitations and use
  - Donning/Doffing
- Round 2: 30-45 minutes
  - Review of how PPE functions
  - Practice Donning and Doffing with limited support
- Round 3: Unlimited time
  - Don/doff with glow spray applied
  - Can be coached by observer but not trainer

**Outcomes & Lessons Learned**

- Obtaining sufficient PPE to protect healthcare workers can be a challenge – early identification of needs and fast purchasing response is essential to being prepared
- A total of 60 Quarantine Providers and 300 First Responders have been trained and passed competency assessment
- Training of Laboratory staff requires additional time because of lack of familiarity with use of gowns, shoe covers and PAPRs
- October 21 and December 18: Patients with suspected Ebola admitted
- Revision of SOPs needs based on staff input, drills, and actual cases
- Set-up time from call to unit staffed and ready decreased from 5 hours to 3 hours
- On-going staff training is needed to ensure continued competency
- Staff turnover and change in life circumstances will require ongoing recruitment of volunteer staff
- OSHA has rated UCM Program "Top Tier"
Improving PAP Device Reconciliation in the Ambulatory Sleep Setting: A Pilot Quality Initiative

Camelia Musleh, MD; Bilal Safadi, MD; George Getty, MD; Jay S. Balachandran, MD
Sleep Disorders Center, Division of Pulmonary and Critical Care, The University of Chicago

Background
- Positive airway pressure (PAP) is an effective therapy for patients with sleep-disordered breathing and increased PAP adherence has been shown to improve overall outcomes (1).
- Adherence to PAP therapy is sub-optimal, with local data suggesting that ~1/2 of patients fail to meet adherence guidelines within 30 days of therapy initiation (2).
- Enhancing the patient's knowledge, motivation, and self-efficacy to use PAP, and intensive PAP support have been shown to improve adherence (3-4).
- Increasing in-clinic reconciliation and troubleshooting of PAP device failures may facilitate patient education, partnership, and involvement in clinical decision-making and may thereby improve adherence.
- Increasing patient habits of bringing PAP devices to clinic is therefore an important quality improvement target.

Project Aim

Global
We aimed to increase the number of patients who bring their PAP device to their sleep appointments via by using a non-automated, human phone call reminder prior to clinic visit, which specifically requests patients to bring their device to clinic. We hypothesized this would lead to improved PAP device presentation in clinic, compared to the usual automated phone call reminder.

Specific
By implementing non-automated, pre-appointment reminders for one of our continuity clinics, we will have a higher rate of patients who bring their PAP device to clinic compared to other sleep clinics which utilize standard automated call reminders.

Process Analysis

Figure 1. Fishbone diagram of factors contributing to PAP device presentation
Feedback was obtained from relevant stakeholders (patients, DME providers, schedulers, and technicians).

Project Design/Strategy
- Process analysis was performed by interviews with stakeholders (see Figure 1)
- Human pre-appointment reminders were given by the sleep disorder clinic schedulers for Thursday clinics in lieu of automated calls for the other clinics and patients reminded to bring their PAP devices to the clinic appointment.
- We tracked the number of patients who should have brought PAP therapy to clinic over six weeks in different sleep clinics.
- After six weeks, we assessed the percentage of patients who brought their PAP devices to Thursday clinics versus the other sleep clinics who utilized automated phone calls.

Results

Figure 2. Impact of human reminder phone calls on PAP device presentation in clinics.
Overall 67% of patients brought in PAP device to their clinic appointment with human reminder phone calls compared with 47% with automated appointment reminder. Pearson's Chi-square = 1.9957, p = 0.15.

Conclusions/ Lessons Learned
- Human phone reminders did not lead to a significant improvement in PAP presence in sleep clinic compared to automated calls. However, there was a trend towards improvement.
- The lack of significance may be attributed to the small sample size/insufficient duration in this pilot initiative.
- Patients receive mixed instructions on what to bring to clinic from physicians, technicians and medical equipment providers. Streamlining communication may lead to improved PAP presence in clinic.
- Quality improvement projects often require a multidisciplinary approach involving clinicians, clinic coordinators, and patients.
- Opportunities exist within the sleep field for improvement in focused areas which may impact clinical care and patient outcomes.

Acknowledgements
We thank Ms. Adriana Rodriguez, Clinic Scheduler, for assistance with patient calls.

References
Increasing HPV Series Completion in Teens

**Background**

- Human papilloma virus (HPV) is the most common sexually transmitted virus in the United States with 20 million Americans currently infected and about 6 million more infected every year.
- Gardasil is a quadrivalent, recombinant vaccine that protects against two strains of HPV (16 and 18) that cause about 75% of cervical, 70% of vaginal, and 50% of vulvar cancers in women and two more strains (6 and 11) that cause about 90% of genital warts in both men and women.
- A three dose vaccination series is recommended for all girls and boys 11 or 12 years of age and older and consists of doses at 0, 1-2, and 6 months.
- Nationally, 57.3% of females and 34.6% of males receive the first HPV vaccine, but only 37.6% of females and 13.9% of males receive the third and final HPV vaccine.
- As of June 2014, 51% of patients (both male and female) 13-18yo in the Primary Care Group (PCG) received the first dose of the vaccine. However, only about half of those patients received all three vaccinations.

**Aims**

Our overall goal is to increase the percentage of both male and female patients in the Primary Care Group who complete the HPV vaccination series to ≥80%. This is well above the national average of 38% of females and 14% of males in line with the Healthy People 2020 goal of 80%.

We seek to accomplish this by increasing the percentage of patients who both start (from 51% to ≥80%) and complete (from 50% to ≥90%) the HPV Vaccination series.

**Project Design/Strategy**

- Across the country, many patients do not complete the series on account of missed opportunities – they present for other issues but vaccinations are overlooked – or they forget to return at the recommended time.
- Our literature review showed that many tools have been utilized to remind patients of their immunization schedule, from wallet cards to automatic cell phone reminders to fridge magnets.
- We wanted to design an easy-to-use tool which providers in the PCG could utilize to send reminders to the physician and nursing staff at appropriate times.
- The tool leverages the EPIC electronic medical record to send time delayed reminders via the program’s messaging feature when the next vaccination in the series is due.
- HPV immunization data is collected monthly from iCARE and tracked for series completion.

**Changes Made**

We show an increase in the percentage of patients receiving the 3rd dose of HPV from 25% in June 2014 to 32% through March 2015.

Cycle 1 included gaining familiarity with the Illinois Vaccine Registry (I-CARE) and beginning tracking our HPV vaccine administration numbers. Cycle 2 included our first intervention. We started with provider education and assistance in setting up automatic message reminders. Providers were taught to create the reminder for the second and third dose of the vaccine whenever the first dose was ordered. Reminders were routed to the clinic nurse and scheduling staff to contact the patient and family for a nurse visit for the next vaccine in the series.

As a complementary intervention, we helped design a Best Practice Alert (BPA) through EPIC’s health maintenance activity that went live in December 2014 (second arrow). This is a form of clinical decision support that analyzes each adolescent’s immunization profile and alerts the provider that a particular immunization is due based on age, immunization history, and interval since last immunization for vaccination series like HPV.

**Outcomes & Lessons Learned**

- The full scope of our intervention is not yet visible given the 6 month timeline for completion of the HPV series.
- Creating reminders at the time of the initial order generated a substantial and immediately visible increase in completion.
- However, more work needs to be done to ensure timely follow up.

**Next Steps**

We are discussing methods for the reminders to be sent to the teenager and/or parent automatically via MyChart to their mobile device.

Using the Health Maintenance activity, we will generate lists of patients who are overdue for any dose in their HPV series to target our future interventions to help them fully immunized.

**Acknowledgements**

University of Chicago Primary Care Group, our co-medPeds residents and faculty, and our amazing clinic nurses – Aurora, Mirthala and Susanaf.
Integrating a pharmacy resident consult service into the resident continuity clinic

Background

- Pharmacists can improve medication adherence, patient knowledge, avoidance of adverse events and interactions, and patient satisfaction1-6.
- Pharmacists involved in direct patient care can improve outcomes in such conditions as HTN, hyperlipidemia, diabetes, and asthma3-6.
- Our quality-improvement project sought to incorporate pharmacists into the resident Primary Care Group (PCG) clinic at the University of Chicago.

Aims

To improve resident knowledge and confidence in working with pharmacists over a three month period.

Project Design/Strategy

Retrospective sequential chart review of 45 resident continuity clinic patients to evaluate the number of prescriptions and problem list length for patients in our clinic.

Pharmacist embedded in clinic two half days/week from Aug-Oct 2014 provided physician consultation and direct patient counseling.

Each pharmacy resident allocated eight appointments (30 minutes each)

Referrals from PGY2 and 3 for education about medication side effects and devices, medication reconciliation and risk assessment.

- 44% of residents referred patients to the clinical pharmacist
- Total number of referrals: 42
- Residents who used the service were asked to complete a post-intervention survey.

Lessons Learned

- >90% of residents who used the pharmacy consult service reported benefit from the experience
- >80% of residents felt their patients had improved medication literacy and had greater satisfaction with their care.
- Pharmacists incorporated into a resident-run primary care clinic might benefit physicians and patients

Challenges

- Patients unable to stay for pharmacists visits, and reluctant to return for pharmacist-only visits
- Patient confusion with additional care provider
- Limited pharmacist availability to two clinics per week
- No effective method to identify patients prior to clinic appointments

Next Steps

- Patient surveys to assess improved knowledge of medications and overall satisfaction with the service
- Integration into discharge planning for PCG patients admitted to the hospital
- Expansion to intern and attending continuity clinic patients
- Electronic referral form to improve referrals

Acknowledgements

We would like to thank Julie Oyler, MD, Dr. Lisa Vinci, MD, Jiz Thomas PharmD, and the pharmacy residents who contributed to the project.
International Program Pharmacy Process

**Background**
- International Programs provides international patients comprehensive care including care coordination and logistical services, including home delivery of medications after inpatient appointments.
- Previous pharmacy process prior to 1/1/15 included:
  - Utilizing administrative assistant to organize, track and go to DCAM pharmacy to drop off/pick up patient prescriptions.
  - Prescriptions were coming from multiple sources: patients, eScribe, written, interpreters, patient coordinators or not at all (missing medications).
  - Home delivery was completed by outside vendor (not HIPAA compliant). Medication left with front desk/security of building that patient lived or undelivered with no tracking available of medication status.
  - Limited tracking of prescriptions submitted/expected for delivery.

**Aims**
- Implement a new international pharmacy process that follows a known protocol to ensure patient safety. Using interdisciplinary team create a process that follows HIPAA guidelines, provides home delivery, tracking at all stages and escalation if delayed.

**Project Design/Strategy**
- Create a streamlined process with patient coordinators as main contact for prescriptions including centralized start to finish tracking system.
- Escalation process for all prescriptions/refill requests that have not been filled within 24 hours of original request.
- Delivery vendors whom are HIPAA compliant and provide medication transport (including refrigeration).
- Secure after hours location to return medication if patient is not home inside of DCAM.
- Tracking of all prescribed/refilled/completed medications during appointments/inpatient care.
- Evaluation of refill necessity and patient education related to early refills, dosing and appropriate use of medications.

**Outcomes & Lessons Learned**
- Tighter refill requirements and tracking indicated multiple prescribers of same medication and competing treatment plans.
- Review by Risk Management and Pharmacy Director gained approval for new process flow, without recommendations for change.
- Patient coordinators owning patient medication process for their respective patients allows accountability and electronic AVS provides direction of clinical plan including list of new and refilled medication for each visit.
- Limitation of lost and or misallocation of undeliverable medication.

**Changes Made**
- Implemented new algorithm (below) to allow for checks and balances between all parties.
- Implement pharmacy log on shared drive to monitor requests, refills, deliveries and timing – allowing for accountability and tracking across departments/functions.
- Clinical escalation process to provide quick problem resolution and increase safety.

**Next Steps**
Work to implement auto-refill process to limit patient management of refills

**Authors:** Christina Wagener, APN, Dalia Atassi, MBA, Muhanad, Diab, Maggie Ladas, PharmD.
Lung Cancer Screening in the Primary Care Clinic: A Quality Improvement Study

Background
- Lung cancer is the most common cause of cancer-related deaths in the US
- 94 million former and current smokers in the US are at risk for lung cancer
- The National Lung Screening Trial showed a 20% reduction in lung-cancer mortality with low-dose CT screening compared to CXR screening
- High-risk persons were defined as those 55-80 yo, current smoker OR former smoker within past 15 years with at least 30 pack-year history
- Screening was performed with annual low-dose chest CT, and the number needed to screen to prevent one lung-cancer-related death was 302
- Lung cancer screening is controversial, but since 2014, USPSTF recommends annual screening with low-dose CT scan

Aims
- To improve resident education about lung cancer screening
- To incorporate lung cancer screening into the primary care group (PCG) workflow
- To improve resident PCG clinic adherence to USPSTF lung cancer screening guidelines from 0 to 60% over 1 year

Project Design/Strategy
- Data collected (n=279): age, smoking status (current, former, never), # of pack-years, and lung cancer screening status
- Cost of testing and insurance coverage determined
  - Self-pay $300
  - University of Chicago health plan covers
  - Medicare and most private insurers do not
- EMR adapted to include lung cancer screening prompt (July 2014)
- Referral pathway established with Section of Pulmonology lung cancer screening clinic
- Education campaign targeting house staff focused on application of lung cancer screening guidelines in the primary care clinic (September 2014)

Results

<table>
<thead>
<tr>
<th>Number of Patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referred to Lung Ca Screening Clinic</td>
</tr>
<tr>
<td>Attended Lung Ca Screening Clinic</td>
</tr>
<tr>
<td>Deemed Appropriate for Screening</td>
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<tr>
<td>Elected to Undergo Screening</td>
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<tr>
<td>Screening Covered by Insurance</td>
</tr>
<tr>
<td>Paid Out of Pocket for Screening</td>
</tr>
</tbody>
</table>

Lung Cancer Screening Candidates
Current tobacco use status (Figure 1)
Patients who qualify for lung cancer screening (Figure 2)

Figure 1: Tobacco Status
- n=279
- 33 (12%)
- 131 (47%)
- 49 (18%)
- 46 (17%)

Figure 2: Lung Ca Screening Indicated
- n=279
- 22 (8%)
- 257 (92%)

Limitations
- Screening often not complete as most insurances do not yet cover this test
- Sample size was small and may not represent actual proportion of at-risk patients
- Screening recommendation is new and does not identify limits on screening based on life expectancy or other co-morbid conditions
- Findings on CT scans may lead to unnecessary invasive testing
- More patients will need to be followed to determine if screening is more beneficial than harmful

Next Steps
- Improve completeness of smoking history
- Respond to changing insurance coverage of screening CT scan
- Work to decrease cost of screen by UCHP
- Managing potential harms and costs of positive exams
- Following future research regarding best candidates for screening

Acknowledgements
The authors would like to acknowledge the pulmonary clinic and Dr. Sachin Shah, Dr. Kyle Hogarth, and Kimberly Gottlieb, RN.
Optimization of Musculoskeletal Hip MRI Examinations
Section of Musculoskeletal Imaging, Department of Radiology

Background
- Magnetic resonance imaging (MRI) examinations of the hip represent one of the most common musculoskeletal MRI studies performed at the University of Chicago; however, multiple scan protocols on different scanner systems create non-uniformity of study quality
- A review of baseline data, for which the quality of each hip MRI examination performed over a one-year period was evaluated using 6 parameters, yielded the following results:
  - Appropriateness of resolution: slice thickness (4mm or less), 15% of exams, in-plane (0.8mm x 0.9mm or better), 50% of exams
  - Appropriateness of contrast/signal-to-noise (SNR), 70% of exams
  - Completeness of pulse sequences, 95% of exams
  - Appropriateness of imaging planes, 100% of exams
  - Completeness of anatomic coverage, 100% of exams
  - Minimization of artifacts (excluding patient motion), 95% of exams
- This project was selected because of the inconsistency of hip MRI scan quality, arising predominantly from suboptimal resolution, and to a lesser degree suboptimal image contrast/signal

Aims
The aim of this project was to improve the consistency of quality of hip MRI examinations using a “Plan-Do-Study-Act” cycle consisting of a series of interventions followed by repeat measurements of the 6 scan parameters listed above. Improvement in consistency would allow for more confident interpretations of hip abnormalities, thereby benefiting the patient and referring clinician.

Project Design/Strategy
A “Plan-Do-Study-Act” cycle was designed. Following the aforementioned review of baseline data, protocols were redesigned on 3 MR scanner platforms in the DCAM for both non-enhanced and gadolinium-enhanced hip MRI examinations. MRI technologists were provided with in-service training sessions following implementation of the new protocols; volunteers and subsequently patients were scanned using the new protocols. The examinations were then evaluated by musculoskeletal radiologists using the 6 scan parameters listed above.

1) Review baseline data and determine aim 
2) Redesign protocols 
   1) 4mm maximum slice thickness 
   2) Minimum matrix of 236x234 (18-20cm max FOV) 
   3) Addition of radial imaging sequences

Refine protocols as needed

Changes Made
- Using the Plan-Do-Study-Act strategy, nonenhanced and gadolinium-enhanced hip MRI protocols were re-designed, re-implemented, re-tested, and re-evaluated on 3 different scanner platforms with a goal of 90% consistency for each parameter
- The new protocols were initially tested on volunteers
- Once the protocols were deemed suitable for patient care, they were evaluated in “real time” (i.e., at the time of interpretation) by a musculoskeletal radiologist

Table (above) shows quarterly progress during project

Outcomes & Lessons Learned
- Using the 6 scan parameters, hip MRI exams using the new protocols were evaluated over the course of 1 year
- The consistency of appropriate resolution markedly improved, and there was also improvement in image contrast/sNR and minimization of artifacts. This occurred at the slight expense of incomplete pulse sequences (particularly initially, as the technologists were learning the new protocols) and appropriateness of imaging planes (due to the addition of a novel but difficult-to-prescribe “radial imaging” sequence).
- Based on the evaluation data as well as subjective assessment, the new protocols were deemed a satisfactory improvement compared with the old protocols, and resulted in greater consistency in image quality; the new protocols are now used for all patients undergoing hip MRI

Next Steps
We will continue to evaluate the “new” hip MRI protocols on a patient-by-patient basis, providing feedback to technologists and implementing additional protocol revisions as needed.

Acknowledgements
We would like to thank the MRI technologists for their hard work and professionalism while conducting this study

Authors: Gregory Scott Stacy MD, Donna Arellano RTR(MR), Donny Nieto RTR(MR), Wendy Stirmkorb RTR(MR), David Rupiper MD, Larry Dixon MD, Chris Straus MD, Stephen Thomas MD
Project Walk: An Evidence-based Interdisciplinary Early Mobilization Protocol for Adult Inpatient Medical Surgical Patient. 9 West Pilot

Background

Prolonged immobility has been associated with:
- Decreased functional and cognitive status of patients in acute care settings
- Extended length of stay (LOS)
- Increased risk of developing a Hospital Acquired Condition (HAC): Hospital Acquired Pressure Ulcer (HAPU), a venous thromboembolism (VTE), Hospital acquired Pneumonia (HAP), and Falls. (1,2,3)

Standardized Interdisciplinary Early Mobilization Protocols implementation:
- Increased the number of patient mobilized (Drolet, 1)
- Decreased the incidence of delirium, DVT, LOS, and Falls (1,2)

Aims

Development and implementation of an Evidence-Based Interdisciplinary Early Mobilization Protocol for the Adult Medical-Surgical population incorporates the standardized utilization of the Boston University Activity Measure (AM-PACES), mobility algorithm, patient education tool, and interdisciplinary team communication.

Project Design/Strategy

Outcomes & Lessons Learned

References:

Special thanks to: Debi Albert MS MBA, Nursing and Therapy Directors, Michael Howell, MD, PhD, Cynthia Lafond, PhD, RN, Ann Pohnlma, MSN, RN, Vivek Prachand, MD, Mary Lawler, MD, Gretchen Pacholek MS, RN, the RNs/NSAs/PTs from 9w, the Center for Quality, and Analytics, Center for Nursing Professional Practice & Research, the EPIC team & The Healing Arts Committee.

Next Steps

Plan to roll out early mobilization protocol to all remaining medical surgical units in the hospital in a step-wise manner over the next 8-9 months.

Authors: Anabel Bedoya MS, RN, Maria Robinson MSc., OTR/L, Nancy Scott, DNP, RN, Sarah Dangelo, PT, DPT, Geline, Goy, RN, Amy Krizmanic, MSN, RN, & Sherita Tubbs
Real-Time Risk Prediction on the Wards: A Feasibility Study

**Background**
- Many patients who experience an adverse outcome on the hospital wards exhibit abnormal vital signs hours to days before the event.
- While the majority of hospitals in the US have implemented Rapid Response Teams (RRTs) to provide early intervention, the effectiveness of these teams is hindered by the inability to accurately trigger the RRT.
- In our prior work, we used retrospective data to derive and validate eCART, an algorithm for determining risk of cardiac arrest or ICU transfer.

**Aims**
- To develop a real-time analytics platform and conduct a prospective black-box study to assess the feasibility and accuracy of real-time eCART calculation.

**Project Design/Strategy**
- The study was conducted on adult patients between February 4, 2013 and June 20, 2014 in three units and 83 beds at UCM.
- eCART scores were calculated and updated in real-time whenever a new lab or vital sign value was entered in the EHR for all patients in the participating wards. Clinicians were blinded to the scores, and thus patient care was not affected.
- Scores were categorized, a priori, into risk categories by setting the intermediate and high score thresholds at 50 and 54, which represented the 86% and 95% specificity cut-off determined from our previous study.
- The unit of analysis was a ward segment, which concluded with one of three mutually exclusive outcomes: cardiac arrest, ICU transfer, or no adverse outcome.
- For ward segments that resulted in an adverse event, the proportion of those segments that had at least one intermediate and/or high eCART score was compared to the proportion that had an RRT call.
- The average time from first eCART alert and RRT call to ICU transfer was compared using the Wilcoxon matched-pairs signed-rank test.

**Changes Made**
- Ten segments ended in cardiac arrest and 383 in ICU transfer. The RRT was activated in 241 ward segments.
- The AUC of eCART for predicting cardiac arrest and ICU transfer was 0.88 [95%CI 0.85-0.92] and 0.80 [95%CI 0.77-0.82] respectively.
- Of the 102 patients who met at least the intermediate risk threshold and were seen by the RRT, the high-risk threshold was met 13 hours prior to RRT and the intermediate risk threshold 22 hours prior (p<0.001 for both thresholds.)

**Outcomes & Lessons Learned**
- Real-time eCART calculation predicts deteriorating patients much earlier and with greater accuracy than manual RRT activation by caregivers.
- Real-time eCART calculation and RRT notification has the potential to reduce emergent ICU transfer and cardiac arrest rates on the wards by enabling early intervention.

**Next Steps**
- Real-time eCART calculation has recently begun automatic triggering of the RRT at our hospital, and we are currently studying its effect on outcomes.

**Acknowledgements**
We would like to acknowledge the University of Chicago Clinical Research Data Warehouse for providing us with dates and times for cardiac arrest, ICU transfer, and RRT activation, as well as patient characteristics.

Authors: Michael A Kang, Matthew M Churpek, MD, MPH, PhD. Frank Zadravec, Richa Adhikari, Meredith Borak RN, Nicole Twu, MS, Dana P Edelson, MD, MS, University of Chicago Medicine
Reducing Number of Patients with Poorly-Controlled DM
Authors: Jennifer Seo, MD, Natalia Lipin, MD, Amy Wang, MD, Shreya Sengupta, MD, Rita Rossi-Foulkes, MD

Background
A recent meta-analysis demonstrated that QI strategies reduced HbA1c by a mean difference of 0.37% (95% CI 0.28-0.45; 120 trials). The study found larger effects when baseline concentrations were greater than 8.0% for HbA1c. Interventions utilizing multiple QI strategies had greater positive effect on reducing HbA1c and improving provider adherence than single-faceted interventions.
A resident / faculty practice is an ideal setting to apply QI knowledge acquired in residency training to improve care of the patients in the practice.

Aims
Reduce the number of patient in the Med-Peds Practice with HbA1C% ≥ 8.0 to less than 20% by the end of the 2014-2015 academic year.

Project Design/Strategy
- One resident from each Med-Peds year and one Med-Peds attending work as a team (“Quatro-DM”)
- Process mapping and brainstorming used to determine existing resources in the practice for patients with DM.
- Created registry of patients in Med-Peds (MP) Practice with HbA1C ≥ 8.
- Provide DM management education to MP residents and attendings in the MP Practice.
- Perform a chart audit of patients in the MP Practice with A1C ≥ 8 to determine opportunities to improve management.
- Design an EMR tool to help providers streamline latest DM management recommendations.

References:

Changes Made

<table>
<thead>
<tr>
<th>% of Diabetes with A1c ≥ 8</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
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<td>D</td>
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</tbody>
</table>

- August 2014: Registry of patients in MP Practice with A1C ≥8.0% initiated (A)
- September 2014: DM management presentation given at Med Peds meeting (B)
- December 2014: Chart audit performed (C)
- April 2015: DM management algorithm smart phrase launched in EMR (D)

Chart Audit: Patients with A1C > 8.0 (N=61), Average A1C 10.1 (8.0-15.5)
- Insulin therapy: 43/61, average A1C 9.9 (8.0-13.4)
- No insulin therapy: 18/61, average A1C 10.5 (8.0-15.5)
- Seen by Diabetes Nurse Practitioner in past year: 4/61 (7 more referred: 4 cancelled, 1 no show, 2 no appointment); Seen by Practice Pharmacist in past year: 0 (0 referred)
- Seen by Endocrinology in past year: 7/61 (11 more referred: 3 cancelled, 3 no shows, 4 no appointment, 1 future appointment)
- 22 regimens included sulfonylureas, 1 thiazolidinediones, and only 2 DPP-4i and 2 GLP-1ag

Outcomes & Lessons Learned
- Clinicians need real-time tools, in addition to presentations, to implement recommended DM medication and referral practices.
- Referrals need to have buy-in from the patients and should be on same days as other clinic appointments for coordination.
- NP/Pharmacy interviews revealed automatically generated referrals have high no-show/cancel rates.
- Clinicians did not adhere to AACE algorithm as evidenced by underuse of preferred agents and potential overuse of agents considered 2nd line or “use with caution.” Our EMR-embedded smart phrase may help to guide physician management of DM.

Next Steps
- Revise existing DM smart set for diabetes preventive care to include stepwise approach to DM treatment (incorporate our management algorithm) and alert MDs to use.
- Give chart audit data and recommendations to each MP Practice physician.
- Target subset of patients to implement individualized referrals.
- Enhance robustness of current QI interventions through more coordinated implementation effort.

Acknowledgements: George Weyer, MD, Primary Care Group, UCMC
Reducing Uncontrolled Hypertension in Adults in the Med-Peds Clinic
Healan S, Khan N, Degesys S, Good K, Thomas J, Laffin L, Weyer G.

Background
- The prevalence of hypertension among U.S. adults aged 18 and over was 29.1% in 2011–2012 but only 51.9% of these Americans had controlled blood pressure.
- The risks of uncontrolled hypertension include stroke, heart failure and kidney disease.
- Protocol driven interventions can improve hypertension control with defined populations.
- Hypertension control is a Healthcare Effectiveness Data and Information Set (HEDIS) quality metric and influences performance on STAR measures within Medicare Advantage plans.
- Developing Population Health Management capabilities is part of UCM Strategic Plan.
- The University of Chicago has recently established a Medicare Advantage contract with Cigna-Healthspring.
- UCM Primary Care Physicians have limited knowledge about blood pressure control in their own patient panels and have not previously engaged in hypertension directed quality improvement.

Aim
Reduce the percentage of adults in the Med-Peds Primary Care Clinic with poorly controlled systolic blood pressure to less than that in the general adult population per the NHANES reference standard.

Project Design & Strategy
- Identified and tracked all patients seen within the Med-Peds clinic over the past 24 months utilizing EPIC Workbench reports.
- Developed clinic wide EPIC "Patient List" rosters for using encounter department and the EPIC PCP for provider attribution.
- Display most recent BP as a column in each list.
- Used JNC8 standards to identify patients with uncontrolled systolic blood pressure on a monthly basis.
- Expressed data as percentage of adults ≥18 years of age with uncontrolled systolic BP as compared with NHANES reference data.
- Utilized the IHI Model for Improvement and the PDSA model (Plan, Do, Study, Act) processes to implement interventions and measure outcomes.

Improvement Cycles
1. Measurement development and monitoring period.
2. Targeted PharmD referrals.
3. Implementation of HTN EPIC dotpharse and standardized treatment algorithms.

Limitations
- Unable to incorporate diastolic BP
- Indexed to all adults rather than those with HTN
- Can’t exclude BP measurements taken outside of clinic (ER, during hospitalizations, etc.)
- Small number of patients have chronic poor control and may be good targets for non-face-to-face interventions.
- Limited success in getting patients to see PharmD without direct PCP to PharmD handoff.
- EPIC dotpharse uptake is slow.

Next Steps
- Refine HTN dotpharse and increase utilization of algorithms during visits.
- Improve referral process to PharmD by focusing on same day or co-appointments.
- Develop improved pathway for patients that have consistently poor control.
- Examine collaboration with nephrology regarding ESRD patients.
- Align measure and goals with HEDIS standard as IT capacity improves.

Acknowledgements
Special thanks to Sachin Shah, MD and Yash Attanayake from EPIC IS for their assistance with creating the EPIC dotpharse.
Staff Radiation Protection for Oropharyngeal Motility Studies

Background

- The oropharyngeal motility (OPM) study is a fluoroscopic exam widely used for the diagnosis of Dysphagia. During the exam, a speech pathologist and a radiologist work in tandem to image the swallowing motion of the patient using barium contrast.
- During the procedure, the radiologist typically stands behind lead drapes (red arrow in Fig.1), and is therefore protected from scattered radiation. The speech pathologist, on the other hand, usually stands lateral to the patient in close proximity due to the need to communicate with the patient and handle contrast materials. They consequently receive relatively high unshielded scattered radiation, which originates from the patient body.
- At UCM, many speech pathologists are young women who might be pregnant, which highlights the need for staff radiation dose reduction.
- The radiologists and the speech pathologists, though educated in radiation safety, are not necessarily familiar with the scattered radiation distribution patterns in all fluoroscopy suites, which may vary depending on the type and setup of the individual fluoroscopy system. This makes it difficult for speech pathologists to choose the best location to position themselves.

Aims

In this project, we aimed to quantify the scattered radiation distribution and communicate the findings using easy visual aids, so that operators could be better informed of the high risk areas during the procedure and adjust their positions accordingly.

Project Design/Strategy

- The scattered radiation distribution pattern was measured in two suites equipped with the Siemens Luminos Agile fluoroscopy system. An anthropomorphic phantom was used to simulate the patient. The setup is shown in Fig. 1.
- The study was performed in the upright position with our site’s standard OPM protocol. (For a typical technique of 15 FPS, Mag 1.0, 62 mmCu added filtration, 73 kVp and 23 mA, the resultant entrance skin air kerma rate is 12 mGy/min.)
- The scattered radiation distribution was measured with an Unfors Raysafe Xi survey detector. Measurements were made around the patient at 15° intervals, at a height of 1.0m and at distances of 1.0m, 1.5m and 2.0m from the center of the phantom.
- A bivariate spline interpolation was used to create the 2D distribution from point measurements.

Results & Changes Made

- The measured scattered radiation pattern in one fluoroscopy suite is shown Fig. 2. Two areas of relatively high scattered radiation are identified.
- The first area is adjacent to the patient in the lateral direction, with an exposure rate of approximately 50 mR/hr at 1.0m distance. This is also the area where the speech pathologist tends to stand during the OPM studies for easy access to the patient. Properly deploying the lead drape attached to the image receptor (red arrow in Fig. 1) helps to reduce the size of this area, but cannot completely eliminate it.
- The second area is behind the patient bed at approximately 30° from the x-ray tube, with an exposure rate of approximately 35 mR/hr at 1.0m distance. This is caused by the backscatter from the patient. A bedside lead shield (white arrow in Fig. 1) effectively blocks most backscatter behind the bed. However, since this shield only extends for a limited distance, a gap exists between the shield and the x-ray tube, which gives rise to the second hot spot.
- Based on the above results, warning tapes were laid out on the floor to mark the high exposure areas (Fig. 3), and the radiologists and speech pathologists were informed of the findings.

Outcomes & Lessons Learned

- High exposure regions during OPMs were found to be limited to a few isolated locations and were system-dependent.
- Floor markers help operators easily recognize these areas and avoid them accordingly.
- With increased awareness of the safety zones, the radiologists and speech pathologists have modified their positions during OPMs by increased use of the foot paddle and more frequently positioning themselves several feet away from the patient.

Next Steps

Since the locations of the hot spots depend on the setup of the individual units and the positions of lead drapes and shields, measurements and markers need to be made and prepared for each fluoroscopy suite. Frequent training on radiation safety helps operators maintain heightened awareness and the best practice.

Authors: Xia Jiang, PhD, Abraham Dachman, MD, Ingrid Reiser, PhD, Kevin Little, PhD, Zheng-Feng Lu, PhD, Department of Radiology, University of Chicago Medicine
Validation of the GoJo Smartlink System to Measure Hand Hygiene Compliance

Background

- Hand Hygiene (HH) is the single best way to prevent the spread of Healthcare Associated Infections (HAIs) and provides an ideal opportunity for application of lean principles to healthcare worker (HCW) behavior.
- Direct observation of hand hygiene behavior captures less than 1% of all HH opportunities, making this method highly unreliable.
- To help measure our progress towards the Annual Operating Goal to reach 75% compliance with performing HH upon entering and exiting a patient room, UCM installed an aggregate electronic monitoring system to capture all opportunities for Hand Hygiene related to room entry and exit.

Aims

To reach 90% accuracy of the electronic monitoring system to capture purposeful behavior and 85% accuracy of the electronic monitoring system to capture routine healthcare provider behavior by February 1, 2015.

Project Design/Strategy

- First, each activity counter (placed above each patient room doorway) and dispenser actuation counter (placed in every soap and Purell dispenser) was tested for basic functionality.
- Next, the Infection Control team created a planned path for every unit with the technology installed using blueprints. This planned path was followed in order to systematically activate every activity counter and dispenser actuation counter installed throughout the medical center. This behavior was recorded by hand to ensure documentation of any deviations from the planned path.
- Next, data from the GoJo electronic monitoring system was reviewed to compare actual behavior to what was captured by the system. Any deviations were counted against the system as ‘inaccurate.’
- Inaccuracies were reported to the GoJo system, who worked with infection control to reposition activity counters and ensure functionality of the system.
- This process was repeated on every unit until 90% accuracy was reached.
- Finally, once 90% accuracy with purposeful system activation by the Infection Control team was reached, over 100 hours of observations were conducted by the Hand Hygiene Leadership Team in order to determine accuracy of the system in capturing routine healthcare worker behavior.
- Direct observation of room entries and exits as well as soap or Purell use was recorded by the observer. Data from the GoJo electronic monitoring system was then pulled for the same time period and compared to behavior recorded. This provided a percent accuracy. The team worked closely with GoJo to again reposition activity counters and troubleshoot inaccuracies until 85% accuracy was achieved on every unit.

Outcomes & Lessons Learned

- Purposeful movement in and out of patient rooms is accurately captured by the GoJo system >90% of the time.
- Routine healthcare provider behavior in and out of patient rooms is accurately captured by the system >85% of the time.
- Actuation of hand hygiene soap or alcohol-based hand rub dispensers is captured by the GoJo system nearly 100% of the time.
- A majority of inaccuracy can be explained by the basic functionality of the system to detect directionality of movement: an “entry” or “exit” is labeled based upon the order in which two thermal heat detection zones are activated. Thus, routine behavior may result in activation of these zones in a reverse order—resulting in a true room entry being recorded as a room exit.
- Observation of routine healthcare worker behavior proved the Annual Operating Goal to reach 75% compliance to be a reasonable goal as it allows for a 25% ‘handicap’ that takes into account: Visitor room activity, a non-standardized work flow of environmental services in cleaning patient rooms, and multiple patient room entries by nurses grabbing supplies. These observations highlight a need for improved standard work in order to comply with hospital policy of performing Hand Hygiene every time an employee enters and exits a patient room.

Table 1. Accuracy of GoJo system when purposefully triggered by investigator

<table>
<thead>
<tr>
<th>Unit</th>
<th>Room Entry</th>
<th>Room Exit</th>
<th>Soap Dispenser</th>
<th>ABHR Dispenser</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100%</td>
<td>96.4%</td>
<td>97.3%</td>
<td>96.6%</td>
</tr>
<tr>
<td>B</td>
<td>91.7%</td>
<td>91.7%</td>
<td>100%</td>
<td>96.3%</td>
</tr>
<tr>
<td>C</td>
<td>90.0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>D</td>
<td>92.9%</td>
<td>93.1%</td>
<td>92%</td>
<td>93.1%</td>
</tr>
<tr>
<td>E</td>
<td>92.3%</td>
<td>92.0%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>F</td>
<td>91.7%</td>
<td>91.7%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>G</td>
<td>91.7%</td>
<td>91.7%</td>
<td>92.9%</td>
<td>97.0%</td>
</tr>
<tr>
<td>H</td>
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<td>94.7%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>I</td>
<td>90.8%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>J</td>
<td>92.9%</td>
<td>92.9%</td>
<td>92.5%</td>
<td>96.6%</td>
</tr>
<tr>
<td>K</td>
<td>96.3%</td>
<td>92.3%</td>
<td>92.3%</td>
<td>90.0%</td>
</tr>
<tr>
<td>L</td>
<td>100%</td>
<td>90.0%</td>
<td>97.2%</td>
<td>91.7%</td>
</tr>
<tr>
<td>M</td>
<td>92.0%</td>
<td>90.9%</td>
<td>97.1%</td>
<td>98.1%</td>
</tr>
<tr>
<td>N</td>
<td>90.9%</td>
<td>90.0%</td>
<td>93.3%</td>
<td>100%</td>
</tr>
<tr>
<td>O</td>
<td>90.1%</td>
<td>93.3%</td>
<td>93.3%</td>
<td>95.0%</td>
</tr>
<tr>
<td>P</td>
<td>90.8%</td>
<td>91.2%</td>
<td>94.9%</td>
<td>94.4%</td>
</tr>
</tbody>
</table>

Next Steps

As this system continues to be deployed in the Mitchell hospital and in selected outpatient pilot environments, rigorous validation of the system will be completed for each new location. Additionally, ongoing assessment of accuracy will continue indefinitely as we strive to reach 75% compliance with hospital Hand Hygiene policy.

Working closely with Patient Care Services, Environmental Services, and ancillary staff leaders, the team will continue to work towards developing Standard Work that aligns with the Annual Operating Goal of 75% compliance with HH policy. This will focus on the number of room entries and exits required to perform necessary tasks as well as education of all employees about the importance of protecting our patients from infection and how this fundamental behavior is being measured.

Acknowledgements

We would like to acknowledge the work of numerous employees who have helped identify benefits and concerns of this system. Additionally, we would like to thank the GoJo team for all of their work in helping validate and improve this system.

Authors: Hand Hygiene Leadership Committee, University of Chicago Medicine
Young Surgeons on Speaking Up: When and How Surgical Trainees Raise Concerns About Supervisors' Clinical Decisions

**Background**

- The "Swiss cheese" model of accident causation suggests that latent organizational failures such as poor team communication contribute to adverse events.
- Linked to major flight disasters, the inability of subordinates to effectively voice and escalate concerns about their superiors' plans has been addressed by the aviation industry through crew resource management training programs for over 30 years.
- Since physicians in training take oaths to protect patients but are also responsible for executing supervisors' treatment plans, they may face difficulty in voicing concerns.
- The literature examining the factors influencing surgical trainees' approach to concerns about supervisors' clinical decisions is sparse.

**Aims**

- With the ultimate goal of creating a curriculum to improve the ability of junior trainees to speak up about their concerns, we used a qualitative analysis approach to identify:
  - Types of situations in which surgical trainees may have concerns about supervisors' decisions
  - Factors that contribute to the willingness to raise and escalate these concerns
  - Strategies currently used to escalate these concerns

**Project Design/Strategy**

- Residents in their PGY2 or higher year from 4 surgical specialties were recruited to participate in semi-structured interviews starting with the question, "When you encounter situations where an attending or supervising resident has made clinical decisions that you have strong concerns about, how do you approach them?"
- Qualitative analysis software was used to organize data, code interview transcripts according to developed themes, and identify significant connections.
- A second researcher independently coded 50% of the transcripts and reviewed the remaining transcripts to confirm that themes were appropriate and complete.

18 participating residents from 4 surgical subspecialties:
- General Surgery
- Otolaryngology
- Urology
- Ob-Gyn

**Outcomes**

- Residents reported that situations where they had significant clinical disagreement with supervisors were rare, but multiple examples of pre-, intra-, and post-operative concerns were elicited.
- The sense of individual responsibility for patient outcomes varied between those who tended to emphasize their obligations to the patient ("the patient comes first") versus those who stressed that supervisors held ultimate authority over patient care ("it's their patient"). Several residents acknowledged both sentiments.

- "If I don't initially agree with what they say, I would ask... Why? Why would you do that instead of this?" But I would never argue in a way that they wouldn't want me to.

- Factors influencing the willingness to raise concerns included:
  - Systems factors: i.e., department culture, resident autonomy
  - Supervisor factors: i.e., approachability, familiarity
  - Trainee factors: i.e., knowledge base, personality
  - Clinical factors: i.e., severity of potential harm, strength of evidence to guide clinical decision

- Reported strategies currently used to raise concerns could be categorized in 3 phases:
  - Preparation: i.e., reviewing clinical data, discussing case with other staff
  - Execution: i.e., asking questions, stating concerns directly, appearing respectful
  - Escalation: i.e., speaking with department head
- No resident reported formal instruction in raising and escalating concerns

**Lessons Learned**

- Several factors affect surgical trainees' management of concerns about supervisors' clinical decisions.
- No consistent method is used.
- Based on aviation literature, indirect strategies such as asking questions may be ineffective at preventing sentinel events.

**Next Steps & Changes To Be Made**

- Validate our findings across multiple institutions with a web-based survey
- Design a curriculum drawing on crew resource management to improve trainees' ability to identify and raise concerns with the goal of optimizing patient safety.

**Acknowledgements**

We thank the residents who volunteered to participate in this project by sharing their thoughts and experiences.

Authors: Malini D Sur, MD; Nancy Schindler, MD, MHPE; Puneet Singh, MD; Peter Angelos, MD, PhD; Alexander Langerman, MD
Poster Session: Innovations in Safety

1. Acute decompensated HF pathway to reduce readmissions
2. Bar code medication administration
3. Clinical uncertainty during handoffs for ICU transfer
4. Comfort Care Order Set
5. Countdown to Zero: HAPU
6. Culture directed periop prophylaxis after cystectomy
7. Effectiveness of simulation on adverse contrast reactions
8. Immediate Use Sterilization Reduction
9. Interventions to decrease in hospital spread of flu
10. Lean Principles and Hand Hygiene
11. Managing inpatient sepsis early identification
12. MASD: Moisture Associated Skin Damage
13. Pause for POSS
14. Pediatric sepsis initiative in ER
15. Peds Massive Transfusion Protocol
16. Preventing CAUTI
17. Preventing Patient Harm
18. Safe transport of patients on inhaled Nitric Oxide
19. SICU: pressure ulcers
20. Therapy to reduce bone fractures in infants
A Bundled Multidisciplinary Acute Decompensated Heart Failure Clinical Pathway Reduces Hospital Readmission and Identifies High-Risk Patients


Background

- Acute Decompensated Heart Failure (ADHF) is the most common diagnosis for hospitalized patients over 65 years of age, costing the US health system $35 billion annually.
- UCM discharges ~700 patients with ADHF annually with a 30-day readmission rate of 20%.
- Readmissions represent a failure of clinical care, negatively impact the patient experience, and hurt the medical center’s bottom line.
- Isolated attempts to reduce readmissions have failed because the root causes for ADHF readmissions are very diverse.
- Clinical pathways utilizing bundled intervention packages are an effective mechanism to increase effect size through synergy while controlling costs.

Aims

- Design and implement a Bundled Multidisciplinary ADHF Clinical Pathway (ADHFCP)
- Measure the impact of the ADHFCP on 30-day readmission
- Identify particular groups of patients at high risk for readmission

Project Design/Strategy

- Readmissions are most often due to patient deficiency in one of the 5 areas below. Therefore, our multidisciplinary team brainstormed methods to measure and address each defect.
  1. Cognition - Montreal Cognitive Assessment (MoCA) was administered by Occupational Therapy
  2. Physical Conditioning - 10 Meter Walk Test was administered by Physical Therapy
  3. HF Knowledge - Atlanta Heart Failure Knowledge Test (AHFKT) was administered before and after an intense education program provided by Nursing and Nutrition
  4. Medication Adherence - Intense screening and education by Pharmacy
  5. Social Barriers - Standardized assessment provided by Social Work

- Additionally, the ADHFCP included the following improvements:
  - Improved communication with downstream providers - A standardized discharge summary was completed and transmitted to the next care provider at the time of discharge.
  - Intensified follow up - Patients received a phone call from a cardiologist within 3 days, a Cardiology appointment within 7 days, and a PCP appointment within 14 days.
  - Partnership with the ED - Patients who returned to the ED within 30 days, despite the above interventions, were assessed by a multidisciplinary team, clinically stabilized, and discharged with close follow up if safely possible. Otherwise, they were readmitted if necessary.
  - All patients with a primary diagnosis of ADHF on the General Cardiology Service on 5SW/SE were enrolled beginning on January 13, 2015.
  - The new process meets or exceeds all relevant Joint Commission and American Heart Association Quality Metrics.

Changes Made

- The ADHFCP reduces 30-day readmissions by 66% (6.8% readmission rate for 74 patients receiving the intervention vs. 20% in historical controls)
- The AHFKT score upon admission predicts 30-day return to the ED (14.5±9.3 for returners vs. 21.1±5.1 for non-returners, p=0.01).
- Our multidisciplinary education program improves AHFKT scores 35% vs. 2% in controls.
- MoCA and AHFKT correlate highly (R=0.572, p<0.001) allowing identification of patients where intensified intervention will likely have the most effect.

Outcomes & Lessons Learned

Next Steps

- Expansion to other floors
- Targeting intensified intervention toward high-risk patients (as measured above)

Acknowledgements

- UCM Center for Quality
- Booth School of Management
- Debi Albert and Mike Howell
Implementation of Bar Code Medication Administration

Background

- Studies have reported adverse drug events rates as high as 6.5 events per 100 inpatient days, with approximately one-third occurring during medication administration
- Bar code medication administration (BCMA) has been shown to intercept errors in medication administration by helping to ensure three of the five rights of medication administration (right patient, right drug, right dose)
- Adoption of BCMA helps the institution achieve regulatory requirements including The Joint Commission’s National Patient Safety Goal 01.01.01: Use at least two patient identifiers when providing care, treatment, and services

Aims

As part of the UCM FY2015 Annual Operating Plan, implement bar code medication administration technology and achieve 95% patient and medication scanning compliance.

Project Design/Strategy

- Outcome measures include: Implementation by scheduled go-live date; Scanning compliance rates of greater than 95%
- A BCMA Clinical Champion Committee was created of leaders from various departments (Nursing, Pharmacy, IT, Respiratory, CPOE) to lead training, planning, and implementation
- Subject Matter Experts (SME) group was formed with front-line staff from nursing, respiratory, and pharmacy
- Kaizen event was conducted to establish key workflows from receiving medications in pharmacy and ensuring appropriate barcodes to establishing standard nursing workflow practices
- Human factors engineering literature search was conducted to identify best practices and prevent workarounds
- Gap analysis from the Institute for Safety Medication Practices (ISMP) was completed to identify deficiencies and assess readiness for implementation
- Direct observation study of medication administration was conducted to evaluate workflows and impact of implementation
- The adult ICU was selected as a demonstration unit to test the BCMA process
- Following the demonstration unit success, all units throughout CCD, Mitchell, and Comer implemented BCMA
- Perioperative areas, select clinics in DCAM, Silver Cross infusion clinic, and RN holding also went live after workflow evaluation
- Patient and medication scanning compliance tracked daily and weekly
- SMEs and Clinical Champions met routinely for six months to evaluate and address issues brought forward

Kaizen Event: BCMA Workflow

Outcomes & Lessons Learned

- Implementation of BCMA has helped improve the safety of medication administration by double-checking 3 of the 5 Rights of Medication Administration
- Double check for Right Time implemented with off schedule medication administration alert
- Scanning compliance surpassed our goal of 95%
- Improvement in the patient identification process

Changes Made

Pre-Implementation

- 100% medication inventory scanned prior to go-live to proactively identify and resolve barcode issues, resulted in additional medications requiring repackaging in pharmacy
- Workflows developed for unique medications (multi-dose insulin, bulk compounds, patients with precautions)
- Patient Banding Task Force developed workflows for patient banding and preventing workarounds

Post-Implementation

- Near miss alerts were evaluated on a monthly basis to identify opportunities for informatics or workflow fixes; shared at Nursing-Pharmacy Committee and Medication Safety Committee
- Procedural areas noted challenges with scanner cord length; decision made to purchase wireless scanners for these areas
- Off schedule medication administration alert implemented to prevent wrong time events (addition of double check for fourth right of medication administration); alerts reviewed on a monthly basis to identify opportunities to improve medication administration workflows
- Challenges in workflows for documenting “Bolus from Bag” and “Rate Change” resulted in reassessment of MAR actions requiring medication scan
- Respiratory Therapy compliance rolled into units, additional report created to facilitate specific tracking of RT compliance
- Saline flush workflow created for scanning and documentation on the MAR
- Challenges in scanning multiple syringes for one dose led to workflow changes
- Inpatient bedside sedation process developed to ensure appropriate scanning
- Workarounds for scanning medications and patient bands monitored and addressed

Next Steps

- Continue to monitor near miss alerts and scanning compliance to identify additional workflow and informatics fixes
- Report BCMA scanning compliance at UCMC Safety Huddles to identify and resolve issues real-time
- Implement BCMA in ambulatory areas
- Conduct safety assessment of procedural areas

Acknowledgements

BCMA SMEs, Clinical Champions and Sponsors

Authors: Bar Code Medication Administration Clinical Champion Committee
Clinical Uncertainty, Near-Misses, and Adverse Events Relating to Physician Handoffs During ICU-Ward Transfer: A Qualitative Analysis

P.G. Lyons¹, V.M. Arora², J.M. Farnan²

¹The University of Chicago Internal Medicine Residency, Chicago IL, ²The University of Chicago Medicine Department of Medicine, Section of Hospital Medicine, Chicago IL

Background

Patient vulnerability during care transitions secondary to:
- Discontinuity in care
- Poor communication

ICU to ward handoffs may be different than other handoffs:
- Long/complex ICU courses
- Patient physically moving
- Longer medication lists
- Multi-specialty care

Little data on handoff communication at ICU to ward transfer or standardized process

Aims

- Describe resident handoff behaviors at ICU-ward transfer
- Identify complications related to handoff communication failures

Project Design/Strategy

- Structured private interviews with PGY2/3 residents completing inpatient services
  - General medicine
  - Oncology
  - Cardiology

- Interview script informed by literature and expert review
- Audio-recorded and transcribed
- Qualitative analysis with no a priori hypotheses using critical incident technique:
  - Communication failures
  - Adverse events
  - Near-misses
  - Constant comparative method

Results

Participation

- 68 residents approached
- 29 (43%) interviewed
- 2.9 transfers/week (SD 1.7)

Table 1. Characteristics of ICU-ward handoffs

<table>
<thead>
<tr>
<th>Table 1. Characteristics of ICU-ward handoffs</th>
<th>Residents (n=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received ≥1 face-to-face handoff, n (%)</td>
<td>24 (82%)</td>
</tr>
<tr>
<td>Received ≥1 telephone handoff, n (%)</td>
<td>13 (45%)</td>
</tr>
<tr>
<td>Reported mean handoff length ≤ 10 min, n (%)</td>
<td>26 (90%)</td>
</tr>
<tr>
<td>Reported mean handoff length ≤ 5 min, n (%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Reported ≥ 1 adverse event or near-miss, n (%)</td>
<td>19 (66%)</td>
</tr>
</tbody>
</table>

Table 2. Adverse events and near-misses

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>&lt; fatal event could have been prevented</td>
</tr>
<tr>
<td>Existing Respiratory Failure</td>
<td></td>
</tr>
<tr>
<td>Seizure</td>
<td></td>
</tr>
</tbody>
</table>

- Death or Life-Threatening Adverse Event
  - Potential Life-Threatening Near-Miss

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-Miss with Potential for Significant Harm, Cost, or Delay</td>
<td></td>
</tr>
<tr>
<td>Test Results Not Communicated</td>
<td></td>
</tr>
<tr>
<td>Inconsistent Goals of Care</td>
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</tr>
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</table>

Table 3. Domains of Communication Failure Experienced at ICU-Ward Handoff

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handoff Missing Critical Information</td>
<td></td>
</tr>
<tr>
<td>Handoff Provided Incorrect Information</td>
<td></td>
</tr>
<tr>
<td>Handoff Provided Correct Information</td>
<td></td>
</tr>
</tbody>
</table>

Next Steps

- Developing a standardized process for ICU to ward handoffs
- Creating and validating a handoff template
- Continued housestaff education

Discussion

- Residents report spending little time on ICU-ward handoffs
- Residents frequently encounter adverse events/near-misses related to handoff miscommunication
- Handoff communication failures commonly involved missing information, incorrect information, or an unclear point of transferring responsibility
- Interventions to improve ICU-ward handoffs are needed

References

Evaluation of a Revised Comfort Care Order Set

Authors: Kane Hosmer, PharmD; Randall Knoebel, PharmD; Monica Malec, MD

Background

- Little data is available to evaluate continuous infusion opioids at the end of life.
- A Phase I prospective observational study involving 4301 patients revealed that nearly half of patients reported moderate to severe pain over 50% of the time during the last three days of life.
- There are guidelines for continuous opioid usage. Morphine is historically the most utilized agent. It is recommended to convert prior opioid usage to continuous infusion to be used over 24 hours, administer a loading dose at start of infusion, and monitor vital signs every 30 minutes for 4 hours at initiation of opioid and with dosing changes.
- Overall, there is a lack of data to support safety or efficacy of continuous infusions.

Changes Made

- A comfort care order set was developed based on the pharmacokinetic properties of morphine.
- Rather than increasing the rate of the infusion, the emphasis was on providing a number of boluses to get the patient to a therapeutic goal.
- The order set also provided an opioid conversion table to assist with converting patients who were previously on opioids to a comparable initial infusion rate.
- With the revision, there was also the addition of an order set for patients being treated outside of the intensive care unit to avoid delays in palliation at the end of life.

Aims

The aim was to provide data to support a standardized titration algorithm for continuous opioid infusions in the setting of comfort care to improve efficacy while maintaining similar safety.

Project Design/Strategy

- Retrospective, single-center study evaluating the efficacy and safety of a revised comfort care order set.

Definitions:
- Therapeutic goal: Pain score defined by medication order at initiation of comfort care order set.

Outcomes & Lessons Learned

- The primary endpoint, time to attainment of therapeutic goal, was not met, but this may be due to lack of pre-implementation documentation.
- There was an 11% increase in starting patients on comfort care orders in non-ICU setting.
- Numerically increased the time on continuous opioids.
- The use of a revised comfort care order set was associated with a statistically lower consumption of morphine per hour, lower infusion rates of opioids, higher percentages of opioids from bolus rather than infusion without an increase in uncontrolled pain.

Outcomes & Lessons Learned

- The primary endpoint, time to attainment of therapeutic goal, was not met, but this may be due to lack of pre-implementation documentation.
- There was an 11% increase in starting patients on comfort care orders in non-ICU setting.
- Numerically increased the time on continuous opioids.
- The use of a revised comfort care order set was associated with a statistically lower consumption of morphine per hour, lower infusion rates of opioids, higher percentages of opioids from bolus rather than infusion without an increase in uncontrolled pain.

Table 1. Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pre-June 2014 (N = 24)</th>
<th>Post-June 2014 (N = 27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>33.3 %</td>
<td>37.0 %</td>
</tr>
<tr>
<td>Age in Years [range]</td>
<td>62.5 (23 – 96)</td>
<td>63 (31 – 95)</td>
</tr>
<tr>
<td>ICU Patient (%)</td>
<td>66.7 %</td>
<td>55.6 %</td>
</tr>
<tr>
<td>Baseline CrCl (mL/min)</td>
<td>52</td>
<td>35</td>
</tr>
<tr>
<td>Baseline RR (bpm)</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Baseline Pain Score</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Prior IV Morphine Eq.</td>
<td>7.25</td>
<td>6.67</td>
</tr>
<tr>
<td>IV Morphine Eq. Rate</td>
<td>0.3</td>
<td>0.28</td>
</tr>
<tr>
<td>Morphine gtt utilized</td>
<td>100 %</td>
<td>88.5 %</td>
</tr>
</tbody>
</table>

Table 2. Results

<table>
<thead>
<tr>
<th></th>
<th>Former Order Set (N = 13)</th>
<th>Revised Order Set (N = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioid Used (mg/hr)</td>
<td>12.8</td>
<td>4.9*</td>
</tr>
<tr>
<td>Rate Ordered (mg/hr)</td>
<td>2.3</td>
<td>1*</td>
</tr>
<tr>
<td>% Opioid via Bolus</td>
<td>6.04%</td>
<td>11.25%*</td>
</tr>
<tr>
<td>Boluses/hr on gtt</td>
<td>0.23</td>
<td>0.18</td>
</tr>
<tr>
<td>Time on Infusion (hr)</td>
<td>13.3</td>
<td>19.3</td>
</tr>
<tr>
<td>Time to goal (hr)</td>
<td>1.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Pain scores &gt; 4 per time on gtt</td>
<td>0.09</td>
<td>0.02</td>
</tr>
<tr>
<td>Hypotensive episodes</td>
<td>5</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Next Steps

- Recommend restricting the ordering of continuous opioids in EPIC to an order set in order to increase compliance with order set utilization from 81.5% to 100%.
- Evaluate nursing satisfaction with the new comfort care order set.
- Continue educational efforts to promote the ordering and appropriate use of the comfort care order set.

Acknowledgements

- Palliative care team, nursing educators, pharmacy informatics team, Drs. Randall Knoebel and Monica Malec.
Countdown to Zero: Reducing Hospital Acquired Pressure Ulcers Through Continuous Quality Improvement

Background

In spite of initiatives to reduce the prevalence, Hospital Acquired Pressure Ulcers (HAPU) were consistently well above our target rate. The development of a HAPU can have a significant financial impact to healthcare organizations including loss of payment, increased length of stay and potential litigation. Further, patients with HAPUs have poor outcomes, including septic shock resulting in approximately 60,000 patient deaths each year.

Aims

Reducing HAPU aligns with the elimination of harm events as called out by the Annual Operating Plan. Our aim was to reduce HAPU rates to below 1.59% by the end of FY15.

Project Design/Strategy

- In 2013, a Project Plan-Do-Study-Act (PDSA) Worksheet was used to formulate a step by step approach to implement a series of small changes over time to improve performance.
- Monthly Prevalence Surveys were conducted to determine our HAPU prevalence and evaluate improvement initiatives.
- Input was obtained from nursing leadership, Skin Care/Senior Skin Care Team RNs, Quality RNs and direct observation by an experienced Certified Wound Care Nurse (CWCN).
- A comprehensive literature review was conducted encompassing HAPU prevention in acute care as well as HAPU prevention by patient population/clinical service. This information, as well as an analysis of current practice and outcomes, was used to create to create the quality improvement plan.
- Because of the need to create rapid change, the Quality Improvement Project was implemented throughout the institution.
- In addition to measuring the prevalence of HAPUs across the institution, analysis of each HAPU occurrence was used to identify success as well as areas in need of continued improvement (e.g., anatomical location of occurrence, unit/service line where HAPU occurred).
- A project theme “Start Your Engines: Count Down to Zero HAPU!” was used to engage and motivate staff. This theme has been incorporated into communications, summary reports and in-services (or “pit stops”).

Changes Made

The Continuous Quality Improvement Project to reduce HAPUs was implemented in January 2014 as a bundle. A 70% decrease in the HAPU rate occurred in the first 6 months after initiation demonstrating the effectiveness of the PDSA approach. Key deliverables of this project include:

- Education of nursing staff (1,159 RN/NSA) occurred prior to and during bundle implementation including annual competencies. Targeted reinforcement with 5 minute “pit stops” occurred periodically.
- Creation of posters to create awareness and reinforce education of nursing staff.
- During the Prevalence Survey, the expert validates all potential HAPUs and Moisture Associated Skin Damage (MASD) – initiated January 2014.
- Annual 8 hour training of Skin Care Team RNs and creation of Senior Skin Care Team RNs to influence change at the unit level.
- Creation of a monthly Prevalence Summary Report to analyze and communicate progress/issues.

Outcomes & Lessons Learned

- Moisture, a major risk factor for HAPU development, was identified as a factor in September - November 2014 increased HAPUs.
- The decrease of HAPU rates remains significant. In comparing mean FY HAPU rates, a 55% decrease was noted from FY13 to FY14. FY15 has demonstrated a 50% decrease from FY14. Continuous Quality Improvement using the PDSA format is an effective way to improve outcomes.

Acknowledgements

Thank you to the dedicated members of our Senior Skin Care Team and Skin Care Team, UCM nursing staff, Nursing Leadership, Cyndi LaFond and Megan Mooman.

Authors: Susan Solmos MSN, RN, CWCN, Judy Doby MSN, RN, Mary Maroney MSN, RN, FNP-BC and Katherine Pakieser-Reed, PhD, RN
Culture-Directed Peri-Operative Prophylaxis Regimen Reduces Infections After Radical Cystectomy

Background

- Radical cystectomy with urinary diversion is associated with significant post-operative infectious complications
- There is limited data in the literature to guide optimal antimicrobial selection for peri-operative prophylaxis in patients undergoing radical cystectomy
- Recommendations in national guidelines (e.g. 2nd or 3rd generation cephalosporin) are extrapolated from other intra-abdominal procedures

Aims

- Formulate optimal peri-operative prophylaxis recommendation for patients undergoing radical cystectomy based on institutional cultures and susceptibilities
- Reduce infectious complications after radical cystectomy

Changes Made

- Pre-review radical cystectomy peri-operative prophylaxis
  - Cefoxitin (< 60kg: 1g, ≥ 60kg: 2g)
  - Severe beta-lactam allergy: ciprofloxacin (400mg)
- Post multi-disciplinary review, culture-directed prophylaxis regimen recommended
  - Ampicillin/sulbactam (3g) + gentamicin (4mg/kg) + fluconazole (400mg)
  - Severe beta-lactam allergy: vancomycin (15mg/kg) + gentamicin (4mg/kg) + metronidazole (500mg) + fluconazole (400mg)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Overall Infection Rate*</td>
<td>107/258 (41%)</td>
<td>39/128 (30%)</td>
<td>0.036</td>
</tr>
<tr>
<td>C. difficile Rate**</td>
<td>17/258 (7%)</td>
<td>5/128 (4%)</td>
<td>0.170</td>
</tr>
</tbody>
</table>

*Based on all positive cultures collected 30 days after surgery
**30 days after surgery

Figure 2. Change in Number of Clinically Significant Isolates

Outcomes & Lessons Learned

- Multi-disciplinary effort and culture-directed peri-operative prophylaxis reduce post-operative infections in patients undergoing radical cystectomy

Next Steps

- Conduct safety analysis pre vs post-review, i.e. incidence of post-operative acute renal failure

Authors: Zhe Han, PharmD; Joseph Pariser, MD; Blake Anderson, MD, Shane Pearce, MD; Gary Steinberg, MD; Norm Smith, MD; Emily Landon, MD; Natasha Pettit, PharmD; Jennifer Pisano, MD

Acknowledgements: Benjamin Briemmaier, PharmD; Rachel Marrs, MSN, RN CIC
Effectiveness of High-Fidelity Simulation on Radiology Trainees in the Diagnosis and Management of Adverse Contrast Reactions

Anup Alexander MD, Rishi Ramakrishna MD, Carina Yang MD

Background

- Cochran et al. (2009) reports a 0.7% incidence of adverse contrast media reactions for nonionic iodinated contrast.
- Although fairly uncommon, contrast reactions are potentially life-threatening events that require prompt recognition and management by radiologists.
- In the setting of a moderate to severe reaction, it is essential that the radiologist be capable of assisting in the diagnosis and management of a contrast reaction until the arrival of a code team.
- Most radiologists have little to no experience in managing serious contrast media reactions - an important and necessary expertise.
- In years past, two didactic lectures were provided to radiology residents highlighting key points such as diagnosis, determination of the severity, and management of a contrast reaction.
- However, Tubbs et al. (2009) suggests didactic lectures alone may not provide adequate training. Additionally, neither the effectiveness of the lectures nor the ability of residents to appropriately act when faced with a contrast reaction has been evaluated.

Purpose

- To equip all participants with the appropriate skills to recognize and manage contrast reactions effectively.
- To emphasize teamwork and crisis management, as well as identify potential barriers to efficiently manage a contrast reaction.

Materials/Methods

- U of C Simulation Center is a high-tech simulation center where emergency codes are routinely run on high-fidelity mannequins.
- A variety of contrast reaction scenarios with differing severity were developed based on the American College of Radiology’s Manual on Contrast Media (v9), focusing on recognizing the type of contrast reaction and providing the appropriate immediate management that is indicated.
- 34 radiology trainees (PGY2-6), 4 radiology technologists, and 4 radiology nurses participated in all 7 scenarios: panic attack, hypertensive crisis, laryngeal edema, cardiovascular shock, bronchospasm, urticaria, and contrast extravasation.
- Following each scenario, participants are debriefed immediately, in a nonjudgmental manner, to help identify areas in need of improvement.
- A pre- and post-simulation subjective survey and objective assessment are administered. The subjective survey evaluates comfort levels while the objective assessment evaluates medical knowledge.

Results

- When prompted "what I learned today will help improve patient outcomes," participants reported an average of 4.6 (1=strongly disagree, 5=strongly agree).
- Subjective evaluations for average comfort level (1=not comfortable, 5=very comfortable) of managing contrast reactions increased from 3.2 to 4.6 (p<0.001) following the simulations and average scores on the objective assessment increased from 74% to 85% (p<0.001).
- Results by PGY levels are displayed in chart format (left).
- Each participant was given a "Quick Card" – a pocket-sized reference card highlighting the management of various contrast reactions based on severity.
- "Quick Card" was posted in the radiology resident on-call room.

Next Steps

- We hope that the contrast media reaction simulations can be expanded to include not only radiology trainees, technologists and nurses, but all hospital staff who work with intravenous contrast agents.
- Specialists such as interventional cardiologists and gastroenterologists, as well as vascular surgeons, among others, would benefit from this valuable curriculum.
- After providing initial training, this course can be used for maintenance of skills and team-based dynamics; the CT technologist manager is submitting the course for approval as a continuing education program.
- Additional contrast media reactions scenarios are being drafted including pediatric cases.
- Prospective analysis on management of future contrast reactions in the radiology department may be performed.

Acknowledgements

We would like to acknowledge the University of Chicago Simulation Center Staff, especially the hard work of Marcie Lambrix MA.
A Multifaceted Approach to Immediate Use Sterilization Reduction

Authors: Rachel Marrs MSN, RN CIC, Jon Brickman MS, CRCT, Andrey Ibragimov BSN, CNOR, Chatoma Scott, Alanna Diamond, MPH

Background

- Immediate Use Sterilization (IUS): Sterilization of unwrapped medical instruments with abbreviated steam exposure for immediate use.
- IUS is recognized by AAMI, AORN, APIC CDC HICPAC IAHC5MM and TJIC as an important quality indicator. IUS should not be used for convenience or to avoid instrument purchase.
- Personnel involved in reprocessing and IUS must have appropriate training, education and competency.
- Improper technique can result in contaminated instruments in surgery resulting in serious consequences including Surgical Site Infections (SSI).

Aims

Reduce Immediate Use Sterilization in the OR to <5% in CDOR, Comer and DCAM Operating Rooms (OR).

Project Design/Strategy

- Many cases utilize the same trays, thus Central Sterile Processing (CSP), OR staff and management must carefully coordinate efforts to supply packaged sterile instruments in time for each surgical cases.
- The IUS rate is calculated monthly by dividing the total number of IUS cycles by the total number of cases per location.
- The IUS rates are sent to Operating Room (OR), Central Sterile Processing (CSP) and Infection Control leadership monthly and reviewed for trends.

Outcomes & Lessons Learned

- Incomplete IUS documentation.
- Increased trust and accountability among staff from CSP and OR staff lead to being able to reduce the number of operational IUS sterilizers 8 to 4.
- All 3 OR’s have been below goal of 5% since July 2014.

Methods

- Education and Feedback:
  - Annual Competencies for nurses and surgical technicians on IUS.
  - IUS rate publicized throughout the OR.
- Purchasing: The IUS documentation indicated regular immediate use sterilization of some instruments.
  - Additional trays and instruments were ordered.
  - Alternative sterilization methods have been identified for some items.
- Imprest Instrument Tracking Software: Instrument tracking system implemented.
  - Reduced the number of missing instruments in trays.
  - Monitors real-time location of instruments and sets throughout the work cycle.
- Instrument Tray Lists and Preference Cards Updated and reviewed annually.
  - Updated Preference cards to identify critical items before start of case.

Next Steps

- Implement “peel pack” instrument carts in the central cores for point of care access.
- Tray lists reviewed and unnecessary instruments removed from trays.

Acknowledgements

Special Thanks to all Central Sterile Processing and Operating Room Staff.
Interventions to Decrease in Hospital Spread of Influenza

Authors: Sean Carriño, MPH, Sylvia Garcia-Houchins, RN, MBA, CIC, Cynthia Perez, M(ASCP), CIC, Aurea Enriquez, M(ASCP), CIC, Rachel Marrs, MSN, CIC, and Emily Landon, MD, Bartlett, Allison, MD, Ridgway, Jessica MD

Background
- In the US, seasonal influenza can begin as early as October and can continue through May.
- At UCM, the 2014-2015 influenza season began mid-November and was H3N2 virus.
- Early CDC reports indicated that the circulating H3N2 flu viruses this season were different from the vaccine virus and reduced vaccine effectiveness was anticipated.
- This information, as well as a dramatic increase in cases the first week of December 2014, and a suspected healthcare associated influenza case prompted the need for increased interventions.

Aim
Implement interventions to decrease risk of in hospital transmission to patients, visitors and staff.

Interventions

Visitor Restrictions
- All children under age 12 restricted from inpatient buildings: Mitchell, CCD and Comer
- Anyone with fever/respiratory symptoms prohibited from visiting inpatients
- Aggressive screening/ masking of outpatients with fever, cough, sore throat, runny nose, nasal congestion

Employee Work Restrictions and Screening
- Employees with fever restricted from working until no fever without use of antipyretics for 24 hours.
- Employees with cough directed to mask and go to the closest influenza testing location.
  • If results were negative: Employee allowed to work with a surgical mask in place until symptoms resolved
  • If results were positive: Employee required to go home until 7 days after onset of symptoms or resolution, whichever was longest.

Exposure Work up
- All employees and patients who were within 6 feet of Influenza positive individuals for >10 minutes were offered oseltamivir (Tamiflu) prophylaxis regardless of vaccination status

Contact and Droplet associated with RVBP orders
- Infection Control Practitioners verified that Contact and Droplet precautions were instituted for all patients with respiratory virus testing orders

Outcomes

Overall
- Among 4,669 Respiratory Virus Bacterial Panels sent from November 15, 2014 to March 28, 2015, UCM saw 736 respiratory panels positive for Influenza. The previous two seasons saw 308 (2013 to 2014) and 338 (2012 to 2013) cases for the entire season (November to May).

Visitor Restrictions (12/11/14 to present)
- Infection Control, public safety, and Hospital Operations Administrators, collaborated daily to review patient information and assess whether individual exceptions to the visitor rule could be allowed

Employee Work Restrictions and Screening (12/13/2014 to 02/26/2015)
- 103/414 (24.9%) of Respiratory Virus Bacterial Panels sent between December 12, 2014 and February 26, 2015 were positive for influenza.
- The previous season, 34 of 449 (7.6%) tested positive for influenza.

Exposure Work up (On-going throughout year)
- Approximately 119 exposure work-ups have been conducted between December 04, 2014 to April 07, 2015 with --- course of Tamiflu administered through Occupational Medicine.

Contact and Droplet associated with RVBP orders
- 4,790 total Respiratory Panel orders have been reviewed
- Over 5.5% of all Respiratory Panels ordered required infection control intervention

Current State
- As of 04/01/2015, concern for influenza remains elevated but at lower levels than seen earlier in the season. Influenza B activity has increased during the past several weeks, accounting for nearly all of the positive influenza results. Infection Control continues to be alert for influenza and to look for signs of a potential resurgence.

Acknowledgements
We would like to acknowledge the efforts of our colleagues in Occupational Medicine, Respiratory Therapy, Hospital Operations Administrators Microbiology Laboratory, Public Safety
Applying Lean Principles to Identify Barriers to Hand Hygiene

**Background**

- Hand Hygiene (HH) is the single best way to prevent the spread of Healthcare Associated Infections (HAIs) and provides an ideal opportunity for application of lean principles to healthcare worker (HCW) behavior.
- Despite overwhelming evidence and knowledge around the importance of HH, Hand Hygiene compliance of healthcare workers in hospitals across the country hovers between 18% - 45%.
- Our institution identified similar trends of compliance with HH performance hovering around 30% upon entering and exiting a patient room on two pilot inpatient units after implementation of an aggregate Electronic Compliance Monitoring (ECM) system (GoJo Smartlink).

**Aims**

An institutional goal, incorporated into the hospital Annual Operating Plan, was established to reach or exceed 75% hand hygiene compliance upon entering and exiting a patient room or area.

**Project Design/Strategy**

- A multidisciplinary Hand Hygiene Leadership Committee was established providing representation from various clinical, administrative, operational, and quality improvement disciplines.
- UCM is testing ECM to measure hand hygiene, with the hopes that better data will help us to improve actual hand hygiene performance.
- Two pilot units were selected to testing an aggregate ECM system in the adult inpatient setting. The team is applying Lean Principles to attempt to improve hand hygiene on those units.
- Voice of the Customer interviews were conducted on the pilot units to identify current views around HH behavior, reported compliance of HH for that unit, and the ECM system (see right for summary of themes.)
- This data was then extracted and analyzed using an Affinity approach. A team of leaders and front line staff from the pilot unit used the affinitied data to assist with the identification of potential failure modes and root causes of poor hand hygiene compliance.
- The team brainstormed potential solutions to those opportunities and then evaluated those opportunities based on impact to goal and ease of implementation. This allowed the team to prioritize and create an improvement roadmap.

**Changes Made**

- A Hand Hygiene Toolkit was created as a resource for management and staff including education on the importance of HH, institutional policies and expectations, barriers to measuring HH, and suggested approaches for implementation of HH improvement efforts into daily practices.
- Institutional policy for Hand Hygiene was simplified and disseminated throughout the institution via intranet and email from Senior Leadership.
- To better incorporate Hand Hygiene into daily practices and to integrate with institution-wide Lean approaches, a HH measure was added to the unit’s KPIs (Key Performance Indicators) on their MCI (Managing for Daily Improvement) board. The board was also moved from the nursing workroom to a unit hallway to allow for multidisciplinary engagement in HH efforts.
- Multidisciplinary huddles were created and expectations around attendance set by hospital leadership to ensure engagement of all disciplines around HH through huddles held at the MCI board. Hand Hygiene is also a recurring topic at weekly multidisciplinary rounds.
- A roadmap for designing improvement of hand hygiene compliance was created, setting monthly Just Do It events with representation from clinical, administrative, facility planning, environmental services, and ancillary support staff dedicated to implementation of agreed upon solutions. Events to date have focused on design of workflow to ensure successful hand hygiene compliance, including:
  - Room set up for new patients
  - Environmental services workflows & ensuring that pumps are full
  - Placement of soap and sanitizer pumps
  - Documentation and use of workstations on wheels
- Future events will address:
  - Transporting patients (specifically when PT/OT exit & enter room with the patient)
  - Supply storage and the need to leave a patient room to get supplies
  - Empty patient rooms
  - Interdisciplinary champions and methods for individualized feedback

**Outcomes & Lessons Learned**

- Multidisciplinary engagement has been successful as measured by participation of each discipline in the Just Do It events. We will also track attendance of each discipline at unit-based shift huddles.
- The first pilot unit has shown small improvement over the first few months and
- Hand Hygiene performance continues to be monitored with anticipated improvement as improvement initiatives are rolled out.

**Acknowledgements**

We would like to acknowledge the project teams from 8 South and 8 West including Denise Berry, Martina Buttlar, Aurora Enriquez, Cheryll Estbrook, William Fowler, Naliesa Hawkins, Catherine Houda, Liz Marlin, Sherwin Morgan, Mark Myren, Michael O'Connor, William Pharr, Abigail Poyer, Megan Stulberg, Anthony Stull, Elaine Tsakiropoulos, David Velasco.

**Next Steps**

The developed Road Map will be followed and executed over the upcoming year, with Just Do It events guiding the design and implementation of individual interventions. The Plan-Do-Study-Act approach will be used to assess individual improvement initiatives and to monitor the overall effect on Hand Hygiene performance throughout this year-long journey. As the pilot units learn from their tests of change, those learnings will be integrated into the Hand Hygiene Toolkit.

**Authors:** Hand Hygiene Leadership Committee, University of Chicago Medicine
Managing Inpatient Sepsis: A Process for Early Identification and Treatment Outside Intensive Care Areas

Background
- UCM joined the multi-center collaborative through the Surviving Sepsis Campaign to improve mortality from sepsis. The project rolled out in the Emergency departments first and is now making its way to the general inpatient floors.
- Patients with sepsis, severe sepsis or septic shock on the inpatient floors have a higher rate of mortality than their counterparts identified in the Emergency Departments, likely due to delays in recognition and treatment.
- FY13 UHC risk adjusted mortality rate for sepsis was 1.48

Aims
- Create a process to screen all inpatients for signs and symptoms of Sepsis and provide necessary interventions for all patients with positive screens.
- Goal: decrease observed sepsis mortality on the pilot unit-Mitchell 5NW, by 18% from 22 to 18 deaths by April 1, 2015

Project Design/Strategy
- Representatives from Nursing, Center for Quality, Pharmacy, Rescue Care and Medicine met weekly to:
  - Design a screening process (Figure 1)
  - Choose outcomes metrics
  - Review process measures
  - Troubleshoot
- Starting April 1, 2014 all patients on Mitchell 5NW General Medicine floor were screened every shift for signs and symptoms of sepsis.
- Rapid Response team activation criteria included:
  - Positive screen and a lactate level ≥ 2
  - SBP <90mmHg
  - MAP<65

Changes Made
- A paper tool was created to screen each patient for signs and symptoms of SIRS within 2 hours of start of shift or arrival to unit (Figure 2).
- The Rapid Response Team assisted the Primary RN with 3 and 6 hour bundle requirements (Figure 3).
- Fluid bolus packs were created and placed in the supply rooms to expedite delivery of fluids.

Outcomes & Lessons Learned

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>p-value</th>
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<tr>
<td>Number of Screens, n</td>
<td>11325</td>
<td>11821</td>
<td>0.45</td>
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<tr>
<td>Positive Screens, %</td>
<td>4.4%</td>
<td>4.2%</td>
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<tr>
<td>Severe sepsis/shock, n</td>
<td>51</td>
<td>55</td>
<td></td>
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<tr>
<td>RRT Activations within 3 hours, %</td>
<td>0%</td>
<td>10.9%</td>
<td>0.03</td>
</tr>
<tr>
<td>ICU Transfers within 6 hours, %</td>
<td>0%</td>
<td>7.3%</td>
<td>0.12</td>
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<tr>
<td>Number of Total ICU Days, mean</td>
<td>4.23</td>
<td>3.35</td>
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<tr>
<td>Mortality, %</td>
<td>9.8%</td>
<td>9.1%</td>
<td>1.00</td>
</tr>
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</table>

Table. 1-year outcomes pre- and post-intervention.

FY14 Mortality index for sepsis is currently 1.24 – a 50% reduction in excess deaths and a 13.5% reduction overall

Next Steps
- Automatic identification of patients who meet SIRS criteria
- Implementation of a Nurse driven protocol for lactate levels to begin soon
- Development of a Fluid Resuscitation Protocol

Acknowledgements
Mitchell 5NW Nursing Staff, Eve Edstrom, Amy Krizmanic, Nicole Twu, Blair Wendlandt, Trevor Yuen, Ruth Shimandle, Dr. Poushali Bhattacharjee, Tom Best, Mary Ann Francisco, Ruth Barnes, Ilana Stanneva

Authors: Meredith Borak, Rita Lanier, William Marsack, Jessica Kolek, Dr. Dana Edelson
Moisture Associated Skin Damage (MASD): A Quality Improvement Initiative

**Background**
- MASD caused by urine and stool is known as Incontinence Associated Dermatitis (IAD)
- MASD caused by perspiration is known as Intertriginous Dermatitis (ITD)
- The prevalence of IAD/ITD in acute care is unknown
- Moisture on the skin and IAD in particular is a major risk factor for Hospital Acquired Pressure Ulcers (HAPU)
- IAD determined to be a major contributing factor to the institution’s high rate of HAPUs
- Diapers and blue chux, which increase the risk of MASD, were the only products available for incontinence management
- In FY15, MASD became an institutional Nursing Quality Measure with a target of 3.56%

**Aims**
To quantify the prevalence of MASD and reduce HA-MASD rates to below 3.56%.

**Project Design/Strategy**
- An analysis of current knowledge, practices and formulary identified gaps in each key area
- In October 2013, MASD data collection began during HAPU Prevalence Survey to quantify MASD
- A Quality Improvement project was initiated to address each of these gaps including improving nursing knowledge and changing nursing practice
- Skin Care Team/Senior Skin Care Team RNs received training on MASD to become unit resources

**Changes Made**
- Incontinence pads were added to the formulary in January 2015, following data collection demonstrating an issue with MASD and a successful trial of disposable incontinence pads
- Guidelines for Use were implemented which delineate blue chux and incontinence pad use
- Diaper use in bed (adult or above age of potty-training) is avoided

**Outcomes & Lessons Learned**
- Skin Care Team/Senior Skin Care Team increased reliability in differentiation of MASD versus HAPU
- Our prevalence data consistently demonstrates a high rate of MASD
- In the first month following implementation of the incontinence pad, IAD rates dropped
- Mean HA-MASD rate is 3.36% for FY15 is below target
- Nursing staff aware of MASD including prevention, identification, and treatment
- HAPU rates below benchmark

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**Next Steps**
- Data collection and analysis will continue to track outcomes
- A formulary gap still exists for the evidence-based prevention and treatment of ITD
- Request evaluation through MedSurg VAT for a FDA approved product to prevent and treat ITD

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**Acknowledgements**
Judy Doty, Mary Maroney, Nursing Leadership and Katherine Pakieser-Reed, Purchasing

Authors: Senior Skin Care Team members, Skin Care Team members, Susan Solmos MSN, RN CWCN
Pause for POSS: Assessing and Managing Unintentional Sedation in Patients Receiving Opioids

Background

- The primary intervention for managing pain in hospitalized patients is opioid administration.
- Potential side effects of opioid administration include unintentional sedation and respiratory depression.
- Nearly one third of opioid-related adverse-events are related to improper monitoring.
- At UCM, sedation scales varied across practice areas and lacked evidence. Nurses lacked knowledge regarding which sedation scale to use in specific clinical situations, and the frequency to perform sedation assessments.
- Improvement in patient monitoring for unintentional sedation from opioids was needed.

Outcomes & Lessons Learned

<table>
<thead>
<tr>
<th>POSS Score</th>
<th>Description of POSS Scores</th>
<th>Percent of all POSS Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Awake &amp; Alert</td>
<td>83.30%</td>
</tr>
<tr>
<td>2</td>
<td>Slightly drowsy, easily aroused</td>
<td>5.80%</td>
</tr>
<tr>
<td>3</td>
<td>Frequently drowsy, arousable, drifts off to sleep during conversation</td>
<td>0.70%</td>
</tr>
<tr>
<td>4</td>
<td>Somnolent, minimal or no response to verbal or physical stimulation</td>
<td>0.30%</td>
</tr>
<tr>
<td>5</td>
<td>Sleep, easy to arouse</td>
<td>9.90%</td>
</tr>
</tbody>
</table>

- Higher percent of POSS documented on adult surgical units.
- Lower percent of Naloxone administration to reverse unintentional sedation after POSS was implemented.
- Higher percent of Naloxone administration when opioids given via multiple methods/routes.
- Higher percent of Naloxone administration in adult medical units (including oncology).
- POSS documented 40% of time when Naloxone behavior is being measured.

Aims

The aim was to implement evidence-based processes to assess patients for unintentional sedation after opioid administration.

Project Design/Strategy

- Used Iowa Model for Evidence Based Practice.
- Reviewed literature: sedation scales, patient populations and settings.
- Revised policies: pain assessment, patient controlled analgesia, epidural analgesia and continuous opioid administration to assess intentional and unintentional sedation.
- Incorporated Pasero Opioid-Induced Sedation Scale (POSS) into 17 nursing flow sheets.
- Educated 1240 RNs (March 2014-June 2015) via computer based training, unit in-services.
- Emailed tip sheet to RNs.
- Implemented POSS March 17, 2014.

Next Steps

- Emphasize sedation assessment with ALL opioid administration regardless of methods/route.
- Simultaneous reassessment of pain and POSS after opioid administration.
- Consider changes in order sets: Indications for Naloxone.
- Encourage event reporting, especially with Naloxone drips.

Acknowledgements

References available upon request. Contact: maryann.francisco@uchospitals.edu

Authors: Mary Ann Francisco, MSN, APN, AGCNS-BC, CCRN; Monica Gonzalez, MSN, APN, PCNS-BC, CCRN; Cynthia LaFond, PhD, RN, CCRN-K
Center for Nursing Professional Practice and Research
Pediatric Sepsis Initiative in the Emergency Room

Background

Overwhelming infection manifested as septic shock is one of the leading causes of pediatric mortality. Despite the existence of literature describing improved outcomes from goal directed therapy, there continues to be less than desired quality of care delivered to this patient population resulting in suboptimal outcomes. The need to improve outcomes in the diagnosis and treatment of children with septic shock is of paramount importance to pediatric care providers and to the children and families the subspecialty serves. Thus, in conjunction with the Pediatric Septic Shock Collaborative we will implement evidence-based, nationally recommended practices for pediatric sepsis care in the Comer ED from triage assessment to initial patient management to disposition.

Aims

- To decrease mortality from pediatric septic shock
- To evaluate the difference in time to antibiotics and time to first IV fluid bolus after the introduction of intervention bundle for pediatric sepsis in the Comer ED

Project Design/Strategy

- Education on the signs of sepsis for all MDs and nurses that work in the Comer ED
- Introduction of intervention bundle of best practices for pediatric patients suspected to have sepsis in the Comer ED
  - Development of Sepsis Screening Triage Tool
  - Best Practice Alert for Sepsis
  - Sepsis Clinical Pathway
  - ED Sepsis Order Set – Initial hour
  - Sepsis Flow Sheet and Checklist
- Integration of Sepsis Screening Triage Tool into EPIC
- Best Practice Alert in EPIC
- Feedback through Sepsis Alert Summary

Changes Made

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention (n=41)</th>
<th>Post-Intervention (n=92)</th>
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<tbody>
<tr>
<td>Mortality</td>
<td>4.9%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Antibiotics &lt; 80 min</td>
<td>51.2%</td>
<td>75%</td>
</tr>
<tr>
<td>Bolus Start &lt; 20 min</td>
<td>7.3%</td>
<td>57.6%</td>
</tr>
<tr>
<td>Bolus Complete &lt; 20 min</td>
<td>n/a</td>
<td>27.2%</td>
</tr>
</tbody>
</table>

Outcomes & Lessons Learned

- Education on pediatric sepsis and the implementation of an intervention bundle of best practices has increased awareness of suspected sepsis in the Comer ED overall
  - The results show increased compliance with goal directed therapies
  - The intervention bundle has made a significant difference in mortality rate, the administration time of antibiotics and the time to first IV fluid bolus
  - The compliance with completing the first IV fluid bolus in < 20 min on the clinical sepsis pathway has only been 27.2%

Next Steps

- Education directed towards appropriate IV fluid bolus delivery in a timely manner in ED
- Expansion of Sepsis Initiative to the Pediatric Floors and Pediatric ICU in Comer
- Resident Education completed
- Integration of the early identification of sepsis tool into EPIC for inpatient environment completed Jan 2015
- Education for the Floor and PICU nurses May 2015
- Role out Inpatient Sepsis Screening July 2015

Acknowledgements

Authors: Emily C Dawson MD, Jessica Kolek BS, Pediatric Sepsis Work Group
**Pediatric Massive Transfusion Protocol**

**Background**

- Massive transfusion (MT) refers to transfusion of large volume of blood products in a short time.
  - In adults, MT is transfusion of ≥10 units of red blood cells (RBCs) within 24 hours, transfusion of > 4 units of RBCs within 1 hour with anticipated continued need, or replacement of 50% the total blood volume (TBV) in 3 hours.\(^1\)\(^2\)
  - In pediatrics, MT is transfusion of >50% TBV in 3 hours, transfusion >100% TBV in 24 hours, or transfusion support to replace ongoing blood loss of >10% TBV per minute.\(^2\)
  - Management of the massively bleeding patient has focused on early transfusion of products in a balanced ratio as part of MT protocols (MTP). MTPs can be driven by laboratory test results, predetermined ratio based transfusion packages, or a real-time transfusion service physician with preset ratios being favored. MTPs have been associated with improved outcomes in adults.\(^1\) Limited data exists on the management of MT in pediatrics without evidence of mortality benefit but with evidence of feasibility and reduced morbidity.\(^2\)
  - Accruing meaningful data from a randomized controlled trial of pediatric MTPs would necessitate several years; the need for a pediatric MTP is more immediate.

**Aims**

- We designed and are implementing a pediatric MTP for The University of Chicago Medicine.
- We anticipate that the pediatric MTP will improve our resuscitation outcomes in hemorrhagic shock.

**Project Design/Strategy**

- Literature review and consultation with experts and centers currently using pediatric MTPs. No existing pediatric MTPs have been validated by prospective study or historical controls.
  - 1:1 unit approach for RBC:FFP with appropriate weight-adjusted aliquots of platelet pheresis packs. However, consensus regarding this ratio is not widespread.
  - Multidisciplinary discussion between pediatric critical care, pediatric surgery, anesthesiology, and transfusion medicine to determine weight categories appropriate for trauma patients and believed to be distinct from the categories published for all other indications.
  - Subsequent calculation of weight-based MTP packs that would provide ≈1-2 blood volumes per pack.
  - Development of pediatric MTP.

- Outcome measures will include assessment of logistic benefits and morbidity.
- Change in number of MTP activations.
- Improved communication between transfusion medicine, laboratory, and direct care providers measured by direct survey of bedside nurses, pediatric surgeons, pediatric emergency physicians, pediatric intensivists, laboratory and transfusion medicine staff.
- Improved utilization of blood products and improved ability of Blood Bank to anticipate needs and provide blood products rapidly.
- Decreased complications of excessive volume resuscitation in the setting of hypovolemic hemorrhagic shock and coagulopathy such as anasarca, pulmonary edema, and abdominal compartment syndrome.

**Outcomes & Lessons Learned**

- Pediatric MTP guidelines have not been established. We hope to contribute knowledge to this field.
- We anticipate improved communication between bedside providers and the blood bank, reduction in delays and errors in ordering and administering blood products, and improved patient outcomes.

**References**


**Next Steps**

- Pediatric MTP is currently under institutional policy review.
- Large, prospective multicenter studies to determine the optimal strategy and efficacy of pediatric MTP are needed.

**Acknowledgements**

We would like to thank the Center for Quality and the Quality of Blood Use Committee for their support and input.

**Authors:** Neethi Pinto, MD, Angela Treml, MD, Ariana Dye, MT, MPH, Jessica Kandel, MD, Juliane Bubeck Wardenburg, MD, PhD, and Michael F. O'Connor, MD
Preventing Catheter-Associated Urinary Tract Infections (CAUTI)

Judy Doty, MSN, RN; Sylvia Garcia-Houchins, MBA, RN, CIC; Rachel Marrs, MSN, RN, CIC; Katherine Pakieser-Reed, PhD, RN; Jessica Ridgway, MD

Background

- Risk of a urinary tract infection (UTI) increases 5% to 10% per day of bladder catheterization.
- Acquisition of an UTI associated with an urinary catheter has been linked to a 3-fold greater risk of mortality in hospitalized patients.
- Estimated 13,000 attributable deaths annually.
- UTI is the most common type of healthcare-associated infection

Aims

To decrease CAUTI by 30%, from 2.59 to 1.91 per 1000 urinary catheter days, by the end of FY14.

Project Design/Strategy

- Small workgroup convened in FY 12.
- The CAUTI Prevention Taskforce was formed in FY13; four subgroups were created:
  - Supply Management; Clinical Practice/Education and Training; Specimen Collection and Contamination; Documentation, Analysis and Communication

CAUTI SWOT

Strengths

- Electronic process in place
- Indications within order
- Made – CLARI
- Increase volume of patients
- Equipment/products
- Quality resource exchange
- Awareness/understanding of importance
- CAUTI promotes group
- Administrative focus on quality initiatives
- CAUTI surveillance tool

Weaknesses

- Culture of care: Leaving urinary catheters in for convenience
- Ownership of urinary catheter infections/negotiation
- Lack of clear consistent communication
- Lack of communication in regards to plan of care
- Lack of education: Urinary catheter care and specimen collection
- Treatment of contaminated cultures
- Urinary catheter alternatives. Lack of knowing/quality supply/standard
- Lack of policy and processes

Opportunities

- Apply CLARI strategies learned to CAUTI
- Identify high risk patients: Abnormal lab results
- Assist with product adoption
- Become leaders in quality, information sharing
- Develop evidence and protocols
- Continue physician support
- Patient encouragement and approval
- Patient education
- Alternatives for products
- Research high risk population
- Prevention/renovation
- Minimize mortality

Threats

- Non-compliance with regulatory requirements and policies
- Inability to communicate across disciplines
- Competing priorities
- Consistency and accountability
- Patient inability
- Risk, increase cost, government oversight
- Changes: CMS guidelines
- Public reporting: Comparison with other hospitals
- Private payers and contracts
- Lack of internal buy-in/external support needed

Outcomes & Lessons Learned

- It takes a committed multi-disciplinary approach to effectively address this issue
- It takes time to assess, implement, evaluate and sustain improvements
- Although our CAUTI rates have improved, utilization of indwelling urinary catheters continues at a steady rate

Next Steps

- Continue to investigate steady rate of indwelling catheter utilization and move to reduce the rate
- Assess for long-term utilization and effectiveness of the Standard Pathway
- Assess impact of disposable incontinence pad use

References


Acknowledgements

CBS/EPIC team: Center for Nursing Professional Practice and Research; Infection Control; Laboratory Services; Staff Nurses and Quality Resource Nurses; Medical Providers
Patient Safety: Using a Multidisciplinary Approach to Reduce/Prevent Patient Harm

**Background**

- The University of Chicago Medicine reports performance on Agency for Healthcare Research and Quality Patient Safety Indicators (AHRQ PSIs) and CMS Hospital Acquired Condition (HAC) metrics.
- PSIs and HAC cases are both identified by discharge ICD-9 procedure and diagnosis coding and assigned DRG.
- CMS HACs identify cases with conditions that are high cost, high volume and could reasonably be prevented through application of evidence-based guidelines.
- As of October 2008, hospitals will not receive additional payment for cases with HACs that were not present on admission.
- AHRQ PSIs are a set of indicators providing information on complications, adverse events, and patient safety following surgeries or procedures. In addition to providing information about delivery of safe care, performance on 8 PSIs are included in a composite PSI-90 which has implications on hospital payment through the Inpatient Prospective Payment System (IPPS) Value Based Purchasing and HAC reduction programs.
- Improvement in performance on PSIs and HACs has been identified as an institutional priority.

**Aims**

To identify HAC and PSI cases, form task force teams to review these cases and utilize evidence-based guidelines for prevention. As a result, raising awareness across the institution by using a multidisciplinary approach to reduce HACs and improving patient safety.

**Project Design/Strategy**

- The Department of Risk Management/Patient Safety formed and leads Task Forces for nine of the PSI/HAC metrics.
- Each Task Force is multidisciplinary with representatives from Risk/Patient Safety, physician subject matter experts, Health Information Management, Center for Quality, Pharmacy and Nursing leadership.
- Task Force members review patient charts and in collaboration with Health Information Management and physician subject matter experts, determine if each case qualifies as a HAC/PSI, according to AHRQ specifications.
- The Center for Quality provides Clarity reports to measure performance on a monthly basis to organization stakeholders on a Clinical Effectiveness scorecard.
- Task Force members meet regularly to analyze cases, review clarity reports and brainstorm areas for improvement.
- Task Force members have reached out to other institutions, in some instances, to gain knowledge of specific interpretation and prevention strategies.

**Outcomes**

<table>
<thead>
<tr>
<th>What are we measuring?</th>
<th>How are we measuring?</th>
<th>Desired Direction</th>
<th>Baseline and Rolling 12 Months</th>
<th>Our Performance Results Through</th>
<th>Current Month</th>
<th>FY15 Target</th>
<th>Current Status (FY15)</th>
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<tr>
<td>PSI 69</td>
<td>Score</td>
<td>-30</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
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<td>Death rate among surgical patients with serious treatable conditions</td>
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<td>50 Jan 57 Feb (2003) 53</td>
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<tr>
<td>PSI 69</td>
<td>Perioperative hemorhage or hematoma</td>
<td>↓</td>
<td>46 Jan 3 Feb (42)</td>
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<tr>
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<tr>
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<td>Postoperative respiratory failure</td>
<td>↓</td>
<td>40 Jan 4 (16.7) 46</td>
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<td>↓</td>
<td>11 Jan 1 (1.6) 9</td>
<td>11</td>
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</tr>
</tbody>
</table>

**Lessons Learned**

- Multidisciplinary analysis of flagged patient safety indicators is essential in identifying true complication events.
- Continued monitoring of PSI's is necessary to achieve and sustain reductions in patient harm events.
- Each Task Force will continue to meet regularly and review PSI/HAC flagged events and implement best practices for prevention.
- Provide continued feedback and lessons learned to the healthcare providers and staff.

**Next Steps**

- Each Task Force will continue to meet regularly and review PSI/HAC flagged events and implement best practices for prevention.
- Provide continued feedback and lessons learned to the healthcare providers and staff.

**Acknowledgements**

Taskforce members: PSI #3 Pressure Ulcer, PSI #8 Death rate Among surgical patients with serious treatable conditions, PSI #9 Post-op Hemorrhage/Hematoma, PSI #10 Post-op Physiologic and metabolic Derangement, PSI #11 Post-op Respiratory Failure, PSI #13 Post-op Sepsis, & PSI #15 Accidental Puncture or Laceration.

Authors: Phyllis Turner RN MSN, Sandra Robinson, RN BSN Tara Lynch, RN MSN/MBA, Maria Isabel Macias, RN BSN, Colleen Jensen, RN MSHA/MPH & Curin Herman RN MBA
Safe Transport of the Patient on Inhaled Nitric Oxide

Authors: Sherwin Morgan, RRT, Steve Mosakowski, RRT, Gokhan Olgun, MD
Avery Tung, MD, Philip Verhoeof, MD, University of Chicago Medicine (UCMC)

Background

- Transport of the critically ill neonate, pediatric and adult patient’s on inhaled pulmonary vasodilator nitric oxide (NO) is associated with a certain degree of risk.
- Whether these transports are considered internal or external from one facility to another, the risks need to be minimized through careful preparation prior to the transport, continuous monitoring throughout the transport, and the use of proper equipment and personnel.
- Once NO has been started, delivery should not be interrupted.
- Studies evaluating resuscitation bag performance in conjunction with the INOmax DS® (Ikara, Clinton, NJ) (DS) monitoring – alarm system (MAS) during transport conditions are limited.

Aims

The purpose of this study is to validate DS - MAS response during simulation transport for quality and safety when administering the inhaled pulmonary vasodilator NO.

Project Design/Strategy

- An adult, pediatric and neonatal Mercury® (MB), Clearwater, Florida) disposable manual resuscitation bag with PEEP valve was connected to a test NO gas cylinder containing 800 parts per million (ppm), that was attached to a test lung (TL) to simulate transport. In addition, oxygen tubing was connected to an oxygen cylinder.
- Two methods for NO delivery tested: injector module (IM) and internal blender (IB).
- Two methods for monitoring NO, nitrogen dioxide (NO₂) and FiO₂ were evaluated on the MB, at the gas sample tee (GST) or pressure manometer port (PMP).
- Alarm responses for NO, NO₂, and FiO₂ were evaluated by disconnecting gas lines or turning off gas flow to assess alarm responses for setting violations.

The following schematic reflects the experimental method: each arm tested for 5 minutes:
- T1, IB and connect gas monitoring sample line (GMSL) via GST on gas inlet on MB (Figure 1)
- T2, IM and connect GMSL via GST on gas inlet on MB.
- T3, IB and connect GMSL to pressure monitor port (PMP) on MB. (Figure 2)
- T4, IM and connect gas GMSL to PMP on MB.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>NO</th>
<th>NO₂</th>
<th>FiO₂</th>
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<tr>
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<td>.99</td>
</tr>
<tr>
<td>T2</td>
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<td>0.3</td>
<td>.99</td>
</tr>
<tr>
<td>T3</td>
<td>20</td>
<td>0.3</td>
<td>.99</td>
</tr>
<tr>
<td>T4</td>
<td>20</td>
<td>0.3</td>
<td>.99</td>
</tr>
</tbody>
</table>

We conclude that NO delivery in a simulation transport system is comparable to that achieved with commercial ventilators connected to the INOmax DS System and that patients can be safely transported intra-hospital and externally. NO monitoring during transport improves patient safety.

Changes Made and Lessons Learned

- We have utilized this system to transport more than 100 patients on NO safely, both internal and external. All patient’s require continuous monitoring during such transports; even though this system has been demonstrated to be effective, care must be taken to maintain that NO and oxygen gas flow delivery is not interrupted.
- Appropriate equipment, training and personnel are critical for successful transport of patients on NO. (Staffing include respiratory therapist RN with DS training).
- Alarm situations were readily detected by the DS onboard MAS during simulations and during actual patient transport and alerted transport team of potential problems before patient decompensation occurred and underscores the MAS importance.
- The GMSL connected to the GST on the MB appears to be the best method for detection of alarm situations during transport. All transports performed with MAS at UCMC.

Next Steps

Acknowledgements

We would like to acknowledge the Respiratory Care Staff and nursing staff at Comer Children’s Hospital, Adult Respiratory Care Staff and nursing staff at the Center for Care and Discovery CCD, The University of Chicago Aeronautical Medical Transport Service (UCAM) team of flight nurses and physicians for team collaboration for the successful transport of these critically ill patients.
Do patients in a tertiary surgical intensive care unit, when turning wedges and turning signs are implemented, have a decreased rate of sacrococcygeal pressure ulcers?

**Background**
- A reduction in the incidence of hospital acquired pressure ulcers (HAPUs) remains a high priority in today’s health care.
- According to a University Health Systems Consortium 18-month audit of surgical intensive care unit patients, 19% developed HAPUs.
- A review of six months of skin prevalence data indicates the need for a more focused approach toward reducing the incidence of sacrococcygeal pressure ulcers in the surgical intensive care unit (SICU).
- In response to this problem, an action plan to prevent and combat sacrococcygeal pressure ulcers was developed.

**Aims**
To reduce the number of patients acquiring sacrococcygeal pressure ulcers in the SICU.

**Project Design/Strategy**
A 6-month pilot of turning wedges took place from April 1 to October 1, 2014.
1. Turning wedges were purchased (one per patient bed and bariatric).
2. A reminder sign was developed to be placed on the door of patients with a Braden Score of 18 or less, or a mobility subscale of 3 or less (see Figure 1).
3. Staff were trained on the use of the reminder sign and the turning wedges.
4. In addition to our monthly mandatory skin prevalence, an additional day at the end of the month was dedicated to skin prevalence in the SICU.
5. SICU staff nurses were informed of bi-monthly prevalence results via e-mail and a dedicated skin care board in the staff conference room.
6. Standard prevention measures that were in place prior to and during the project included:
   - Sacral silicone foam dressing applied to all patients on arrival to unit
   - All 12 SICU beds with reactive air mattress
   - FDA medical device used to divert stool if patient met criteria

**Acknowledgements**
Susan Solmos, Peggy Zemansky, Cynthia Lafond, Katherine Pakieser-Reed and the 9 North nursing staff

**Outcomes & Lessons Learned**
- During the 6-month pilot the sacrococcygeal pressure ulcer rate dropped to 13%.
- During the course of the project, an increase in the number of medical device-related pressure ulcers (MDRPUs) was identified which resulted in implementing a shift to shift skin assessment. Correct assessment and reporting of MDRPUs could have contributed to this increase.
- Need to continue to collect data bi-monthly and keep staff informed of results.
- Need to continue to provide staff education and support in order to sustain change as evidenced by an increase in sacrococcygeal pressure ulcer rate post pilot.
- Nurses preferred to use pillows instead of wedge and two patients stated wedge was uncomfortable and requested pillow be used for turning. This needs to be further evaluated.

**Limitations**
- Only had three months of pre-data.
- Unable to determine if the wedges worked due to lost wedges and staff not adhering to pilot protocol.
- Turning signs not placed on patient door.

**References**

Author: Marianne Banas MSN, RN, CCTN
Therapy Interventions to Reduce Fractures in High Risk Infants with Fragile Bones

Background

- Premature infants are among the highest risk for hospital-acquired fracture.
- Fragile bones can be an associated morbidity related to prematurity, secondary to metabolic bone disease, also referred to as osteopenia of prematurity or neonatal rickets. Fragile bones are at high risk for fractures.
- The published incidence of fractures in premature neonates is between 1.2% and 10.5% with an increased incidence among those with lower birth weights.
- The majority of fractures in LBW infants are found incidentally and often occur in multiple sites during hospitalization with ribs being the most common site.
- Routine caregiving such as positioning, diaper changes, dressing and burping as well as medically related events including blood pressure assessment and IV insertions are occasions where a fracture can occur.
- Education in handling the infant with fragile bones should commence with parents and caregivers when an elevation in the serum alkaline phosphatase (Alk Phos) level is seen beyond the first six weeks of life.

Aims

The aim was to identify NICU infants at high risk for fragile bones and to establish education protocols in an effort to reduce fractures sustained in daily handling in this patient population. This may reduce incidence of fracture and promote safety as a standard of care within the medical center.

Project Design/Strategy

- The team is establishing an educational protocol for safe and effective handling of neonates at risk for fractures.
- The project is being measured through two separate methods:
  1. Data collection from point of care delivery (including all incidence reports, documentation of fractures and imaging)
  2. Weekly surveys conducted by therapy staff at bedside with family and caregivers to assess educational efficacy and carryover
- A multidisciplinary team providing representation from various clinical areas including: physical therapy, occupational therapy, neonatal and endocrine physicians, pharmacist and dietitian.
- Corner NICU.
- A clinical tracking mechanism initiated by the NICU team, alerting NICU therapy staff of patients at risk for fractures based on lab values, co-morbidities, diagnoses, imaging, inactivity and nutritional history. Therapists will provide education and demonstration to family and staff regarding preventative measures for safe handling of patients in the at risk population.
- Brainstorm and lit review were utilized to help establish the clinical tracking mechanism and appropriateness for intervention.

Therapy Consultation

Assessment → Education → Follow-up

Outcomes & Lessons Learned

- Literature review indicated most fractures are found incidentally, infants may not demonstrate pain at time of occurrence.
- Routine handling performed by families and caregivers may easily cause fractures in the high risk infant.
- Identifying high risk criteria and providing education to families and staff can prevent fractures during routine handling.
- The risk of fractures may continue after discharge, therefore preventative education to families is imperative.

Next Steps

- Implement in-services to:
  - Therapy Services team
  - Nursing staff
  - NNPs
  - Fellows
  - Child Life Specialists
  - Respiratory Therapists
- Conduct bi-monthly discussions with Therapy services to collect and report results to Developmental Care Committee.
- Monitor survey reports of educational progress for expanded Quality Improvement projects.

Acknowledgements

We would like to acknowledge the NICU clinical care team including Dr. Jaydeep Singh MD MPH, Dr. Dorit Koren MD, Taylor Peters RD LDN CNCS, Deb Rauthel PharmD BCPS

Authors: Patricia Byrne-Bowens, PT, PCS, Alexandra Shandiz, OTR/L
Poster Session: Innovations in Efficiency and Timeliness

1. All Hands On Deck: Advanced Airway Equipment
2. Blood culture pathogen automated alerts
3. Care Companion Reduction Task Force
4. Changing the culture of transfusions via order design
5. CT Imaging: In the Fast Lane
6. Dollars and Sense: Determining the cost of new technology
7. Image quality and radiation dose for PA and lateral CXRs
8. Improving accessibility to outpatient PT using overbooking
9. Improving quality of handoffs in the PICU
10. Improving patient workflow in CT & MRI

11. Indication-based Antimicrobial Derestriction- Neutropenia
12. Nurse-driven continuous sedation in PICU
13. Obstetrical hemorrhage management
14. Rapid Strep-A: The compliance gauge
15. Reducing blood antibody delays & resources
16. SAWT: Sub-atmospheric Pressure Wound Therapy
17. Streamlining nursing workflow for flu vaccine screening
18. Supplier quality performance improvement
19. Treat it like it’s real
20. Voriconazole therapeutic drug monitoring protocol
**All Hands On Deck:**
A Multidisciplinary Approach To Ensure Availability Of Advanced Airway Equipment For Respiratory Emergencies

**Background**
- The workflow for Emergency response to Dr. CART and Anesthesia overhead calls requires the Department of Anesthesia and Critical Care (DACC) to bring specialized airway supplies and medications for intubation.
- The Anesthesia Resident on call is required to carry a suitcase containing these supplies and medications, including a controlled substance, at all times for the entirety of their shift.
- The Anesthesia resident is responsible for the replacement of all medications/supplies after each event.
- The process does not allow for a quick turnaround time for additional airways supplies/medications in the event simultaneous emergency calls are made.

**Aims**
To create a process for the timely delivery of airway supplies/medications to Dr. CART and Anesthesia Overhead calls.

**Project Design/Strategy**
- Members from Rescue Care, QPI, DACC, Pharmacy, RT, Supply Chain and Transportation met bi-monthly to create process.
- UHC-list serve utilized to assess process for delivery of Airway equipment at other medical centers.
- Brainstorming led subcommittee to determine 3 separate components of process required restructuring:
  1. Basic Intubation Equipment
  2. Intubation Medications
  3. Advanced Airway Equipment
- Gantt chart utilized to measure progression of key changes to each component of the proposed new workflow.

**Changes Made**
- 12 Airway carts were placed in designated locations throughout the hospital.
- Airway bundles for basic intubations created and placed in all ICU supply rooms and in drawer 5 of every Adult Crash cart.
- Medication kits were stocked in every Adult Omniscell.
- Processes for delivery of Advanced Airway Cart and Medication Kit to every Dr. CART and Anesthesia overhead call were created.
  - Medication Kit
  - Basic Intubation Equipment
  - Advanced Airway Cart
- PDSA cycle used to make incremental improvements in the workflow including:
  - Minimizing waste in supplies and resources by changing the delivery of Advanced Airway Carts from every Dr. CART activation to by request per DACC.
  - Expansion of Respiratory Care Services role in managing the airway in collaborations with DACC by providing training on supplies and equipment in the carts.
  - Redesign of Airway Bundles in order to minimize waste of unused supplies

**Outcomes & Lessons Learned**
- Increase in frequency of cart checks for equipment readiness.
  - RCS now checking carts every shift vs. once daily.
- Improvement in exchange process to decrease turnaround time for new carts and prevent loss of equipment stored in cart.
  - Teletracking changes made which allow same destination for cart delivery.
  - Visual aids created to increase awareness of exchange process.
  - Implemented paging process between Supply chain and RCS to locate missing carts when par level is low.

**Acknowledgements**
Dr. Apfelbaum, Dr. Howell, Jason Keeler, Daryl Wilkerson, Jonathan Stegner, Michael Fons, Scott Melinauskas, Kristen Becker, Pat Gwizdalski, Harold Dillow, Denise Franklin, Denise Washington, Craig Creek

**Authors:** Meredith Borak, Dr. Allan Klock, Patricia Balow, Julie Aggen, Nicole Twu, Steve Mosakowski, Samantha Ruokis, Dr. Dana Edelson
Blood Culture Pathogen Automated Alerts

Background

- *Staphylococcus aureus* bacteremia (SAB) and Candidemia are associated with high rates of mortality.
- Delays in initiating optimal therapy for these infections have been shown to result in poor outcomes.
- The UCM Antimicrobial Stewardship Program (ASP) implemented an alerting system in Epic®, identifying in ‘real-time’ patients with blood cultures positive for either *Staphylococcus aureus* or yeast to ensure timely initiation of optimal therapy. These alerts began in September 2012.
- A member of the UCM ASP (ID Pharmacist, ID Fellow, or ASP ID Attending) evaluates all patients identified to ensure compliance with national and institutional guideline recommendations on optimal management and monitoring.

Aims

The primary aim of implementing blood culture pathogen automated alerts was to ensure optimal management of high-risk SAB, and Candidemia. The intended result of ensuring optimal management is to improve outcomes in patients with these infections.

Project Design/Strategy

- Daily review of all positive blood cultures with *Staphylococcus aureus* and yeast is performed by the UCM ASP.
- Approximately 2-3 blood culture alerts trigger per day (alerts sent to Epic® ‘In Basket’) on individual patients, not all require a specific intervention however all alerts are reviewed.
- Interventions made include those relating to optimization of therapy (dosing, duration, agent selection) and safety/monitoring (obtaining ophthalmology consults for patients with Candidemia, follow-up blood cultures, echocardiography as indicated, monitoring toxicities of antimicrobial therapy, removal of lines when possible, etc.)
- All interventions are documented/track by ASP, and reviewed/summarized in ASP annual report.
- ASP Pharmacists, ID Fellow, and ASP ID Attending’s, in addition to Pharmacy IT personnel are integral to the successful implementation of the alerts and the interventions provided when optimization of therapy is needed.

Changes Made

- Between 7/1/2013-3/25/2015, 36 blood culture alerts for *Staphylococcus aureus* and Candida required at least 1 intervention.
- Specific interventions are shown in Figure 2.
- Of the blood cultures requiring an intervention, 10 patients were on no antimicrobial active against the isolated pathogen at the time of review.
- 7 culture results following patient discharge were reviewed that required at least 1 intervention for optimization of therapy (Figure 3).
  - (1) alternative therapy, (4) additional agent, (6) safety/monitoring, (1) dose adjustment, (2) duration of therapy
- 5 required the recommendation for readmission (3 were readmitted to UCM or other hospital, 1 to follow-up ID clinic)
- 87% of interventions made were accepted.
- The most common interventions that are not implemented are related to obtaining echocardiography if multiple daily blood cultures positive, or removal of lines – often related to clinical factors precluding their implementation

Outcomes & Lessons Learned

- Blood culture alerts have allowed for more expeditious review of patients with high-risk infections by ASP.
- Antimicrobial regimens for several patients were optimized with interventions from ASP, including patients that were discharged prior to culture result availability.

Next Steps

- Expand alerts to include other pathogens in blood cultures.
- Track and provide clinical outcome data as a result of interventions provided.

Authors: Natasha N. Petitt, PharmD; Zhe Han, PharmD; Anish Choksi, PharmD; Donna Voas-Marzowski, PharmD; Angella Charnot-Katsikas, MD; Jennifer delaCruz, MD; Emily Landon, MD; Jennifer Pisano, MD

Acknowledgements: John Hinchey, PharmD; Benjamin Brielmaier, PharmD; Kathleen Beavis, MD
Care Companion Reduction Task Force

**Background**
- Care Companions (also known as sitters) are individuals, usually nursing assistants, who provide constant observation for patients that may pose a safety risk to themselves.
- Care Companions may be mandatory (for suicidal patients) or non-mandatory (for patients that may exhibit other self-harm behaviors such as pulling at lines or getting out of bed unassisted).
- Care Companion usage has not been proven to improve patient outcomes such as reducing falls.
- Care Companion usage results in increased costs and limits available resources such as nursing assistants who could be utilized for direct patient care and supporting the overall workload needs of a unit.

**Aims**
Goal: To utilize an evidence-based nurse-driven algorithm for adult inpatient units to appropriately assign patient care resources while maintaining nursing-sensitive quality outcomes.

**Project Design/Strategy**
- Outcome measures: Maintain positive quality outcomes while decreasing care companion utilization hours for behavioral (non-mandatory) cases.
- Who: Nursing Support Assistants, Registered Nurses, Clinical NurseLeaders, Assistant Care Managers, Patient Care Managers
- Where: All Inpatient Adult Units
- Process measures: Daily Care companion Huddles, 48 hour PCM Task Force Review Panels, Biweekly Committee meetings, Monthly data review of utilization and quality data.
- QI tools: Literature Review, Nurse Driven Algorithm, Care Companion Evaluation Tool, 3SE/SSW Care Companion Pilot

**Changes Made**
- Increased awareness of Care Companion utilization at UCM through process measures such as daily care companion huddle and bi-weekly committee meetings.
- Significant decrease in amount of hours and FTE usage.
- Increased availability of nursing support throughout the organization.
- With the reduction in care companion hours in utilization, we did not see an increase in falls or falls with injuries on the adult inpatient units, as measured through NDNQI and safety reporting data.

**Outcomes & Lessons Learned**
- There is no correlation between falls and care companion utilization.
- Decreased care companion usage results in better utilization of resources and increased cost effectiveness.
- Through the collected data, we have shown our process to be effective and successful in reducing care companion utilization while maintaining positive quality outcomes and patient safety.

**Next Steps**
- Continue data collection and analysis.
- Increase positive outcome measures.
- Identify areas to improve current processes.
- Future state: Pediatric Inpatient Unit Roll-out.

**Authors:** Stephenie Blossomgame, BSN, RN; William Marsack, MS, RN, CMSRN; Sally Pirowski, BSN, RN
Changing the Culture of Transfusions via Order Design

Background
- Even in the era of leukoreduced packed red blood cell (pRBC) transfusions, risks remain including:
  - Transfusion-associated circulatory overload (TACO), transfusion-related acute lung injury (TRALI), potential to develop antibodies
  - Rates of TACO have been reported between 1 to 8% of patients transfused.
  - Several studies show no harm & improved outcomes with a restrictive transfusion strategy (Hb<7).
  - Transfusions are costly ranging $800 to nearly $3000 per unit.

Aims
- Reduced unnecessary pRBC transfusions.
- Simplify the blood ordering process
- Improve safety of transfusions for special populations

Project Design/Strategy
- The Clinical Quality of Blood Use Committee is a multidisciplinary team established in February 2014. Our members are diverse in both position and department representing nursing, blood bank, anesthesia, general surgery, pediatrics, internal medicine, hematology/oncology, & pulmonary critical care.
- Data on previous number of RBC transfusions in total and by location was collected from eSimon billing data.
- Reviewed literature and strategies employed by other blood utilization committees.
- Changes to epic orders were reviewed with additional ordering providers for outside feedback prior to implementation.

Changes Made
- Eliminated separate orders for preparing & transfusing blood products leaving transfuse orders only.
- Created new orders encouraging single unit transfusions: “Packed Red Blood Cells- 1 unit” and “Packed Red Blood Cells >1 unit.”
- The order for 1 unit appears on all preference lists; the order for >1 unit is only on facility lists.

Orders now require providers to list the indication for the pRBC transfusion

Unique blood processing needs are explicit and carry throughout admission

Outcomes & Lessons Learned

14.9% reduction in pRBC transfusions with the new orders
- Majority (54%) of orders were for one unit only since implementation on November 1, 2014.
- 57% of patients transfused received only one unit per day (vs 47% prior to implementation).

References

Next Steps
- Future projects: reducing iatrogenic anemia; educational links to literature in orders; standardizing pre-op blood prep; improving massive transfusion protocols; validating point of care hemoglobin testing.

Authors: Jacqueline Poston MD and Eleanor Valenzi MD, Angela Treml MD, Michael O’Connor MD
**The CT Imaging in the “Fast Lane”**

**Improving Emergency Department CT Non-Contrast Exam Throughput**

**Background**

- Growing demands in the number of patients needing to be seen in the Emergency Department (ED) has driven the need to decrease patient wait times and reduce concerns associated with the number of ED patients who left without being seen and/or are delayed in immediate care and treatment, etc.
- Increased wait times in the ED may be indirectly related to delays for imaging, as decisions to move patients in or out of the ED system are often dependent upon diagnostic imaging.
- Non-contrast CT exams require minimal exam preparation, and can be an effective diagnostic tool for an ED physician who must make a quick yet comprehensive imaging assessment.

**Aims**

Improve the ED patient experience through a targeted reduction in CT non-contrast exam wait times. Measured monthly, the goal was to begin 80% or more of these exams within 60 minutes from the time the exam was ordered.

**Project Design/Strategy**

Two methods were used to evaluate quality improvement:

**I. Manual Data Collection:** CT staff conducted a week-long audit each month to document exam times and delays encountered.

**II. Automated Data Collection:** A monthly automated report of all CT non-contrast (ED) exam throughput was produced and used as an objective measure of performance trends.

- CT manager reviewed the results with CT team leads, CT leads then shared the results with frontline CT staff at MDI huddles.
  - Interventions were largely based upon problem solving suggestions from the entire CT Imaging Team.
- CT leadership periodically met with ED stakeholders at the director, manager and frontline leadership levels to discuss concerns and performance trends.

**Acknowledgements**

Special thanks to the CT Imaging Team, Paul Mosebach, Monica Geyer, Dr. Tom Spiegel, Dr. Linda Drueling, Vikas Ghayal, and Ed Gutierrez for their efforts, and influence towards the success of this quality improvement initiative.

**Changes Made**

- Improved manual data collection tool helped identify concerns and target interventions.
- Incorporated automated data collection tool to gather objective results of TAT effort.
- Adjusted both outpatient exam schedule to align scanner availability with peak ED volumes in the early afternoon to evening hours.
- Restructured staff scheduled to include additional mid-day staffing support during busiest time of day based upon exam volume.
  - Daily assignment of dedicated CT staff technologist to triage, facilitate communication and perform CT ED exams as needed. (7AM-7PM)
- Developed “CT Quick List” which is a short list of exams that technologists are able expedite without need for excessive exam preparation (e.g. call for patient prior to the radiologist protocol of the exam).
- CT lead staff were invited to ED charge nurse huddles twice weekly to exchange feedback and share mutual needs affecting ED/CT patient care.

**Outcomes & Lessons Learned**

- Engagement of staff at MDI huddles was most effective in identifying needs and encouraging process improvement.
- Median TAT more accurately depicted the improvement felt by ED services.
- Average non-contrast exams were performed in 45 minutes.

**Next Steps**

- Conduct future state ED mock exercise to review ED/CT patient care workflow.
- Target intervention for external delay factors (e.g. transportation, patient availability, order entry errors).
- Review process improvement methods targeting IV contrast (ED) CT exam requests.

Authors: Kris Johnson, Kate Haas
Dollars and Sense: Using Clinical and Financial Models to Determine the Cost of New Technology

Background

- Reducing Hospital Acquired Pressure Ulcers (HAPU) is an organizational goal and a clinical quality indicator required for Magnet Recognition.
- Moisture Associated Skin Damage (MAD) due to incontinence is a major risk factor for HAPU.
- In FY2015, MAF became an institutional Nursing Quality Measure with a target of 3.96%; the mean MAD rate for calendar year 2014 was 4.01%.
- Oclusive incontinence products, such as diapers and blue chux, are known to increase the risk of MAD; incontinence pads that wick moisture are considered an evidence-based standard.
- UCM primarily used blue chux and diapers for incontinence care.
- An early cost model estimated an incremental $1M for implementation of disposable incontinence pads that wick moisture.

Aims

A clinical and financial model was developed to determine the true cost of adding disposable incontinence pads to the formula. The clinical and financial model was presented to Senior Leadership for approval of the incontinence pad as a formulary item for incontinence care.

Project Design/Strategy

- In a trial of disposable incontinence pads on 2 units, employees rated the pads as highly satisfactory and no HAPUs or MAD developed (Prevalence Survey data).
- A clinical and financial model was developed to determine the cost of adding disposable incontinence pads to the formula.
- Analytics provided data on all adult and pediatric inpatients age 4 and up that scored a 3 (least moisture), 2, or 1 (most moisture) on the Braden Moisture Subscale between August 2013 and July 2014. With this data, a daily anticipated pad usage was calculated and used to determine an annual usage of disposable incontinence pads. (Fig. A)
- Next, current Blue Chux usage and the cost model for disposable incontinence pads was used to determine the annual cost impact of $99,000. (Fig. B)

Changes Made

- The CNO and the VP of Supply Chain and Logistics approved implementation of the disposable incontinence pads based on the data provided. Disposable incontinence pads are now available for incontinence care as well as management of moisture from other sources.

Outcomes & Lessons Learned

- One month after implementation of the incontinence pads (mid-January 2015), the actual usage was slightly less than estimated usage based on Braden Moisture Subscale Score model (Fig. A) and rates had decreased.
- Best practice requires input from clinical experts and purchasing to model estimated usage and determine the true cost of implementing new technology/products.

Next Steps

- MAD becomes an institutional Nursing Quality Measure. The prevalence of MAD will be tracked to determine the efficacy of the disposable incontinence pads on rates.
- To further validate the clinical and financial model, the actual units of incontinence pads used will be compared to the estimated usage periodically.

Acknowledgements

Debi Albert, John Stegner, CAUTI Taskforce members, Eric Tritch, Judy Doty, Mary Maroney, Katherine Pakieser-Reed, Cyndi LaFond nursing leadership, RNs & NSAs of pilot units: SSW and BW, Core Analytics team

Authors: Susan Solmos RN, MSN CWCN and Megan Moorman
Image Quality and Radiation Dose for PA and Lateral CXRs

Background

- Until 2013, all chest radiographs (CXR) at UCM were acquired using computed radiography (CR), and radiation exposure data was reported in terms of Fuji's proprietary "S" numbers, which are inversely correlated to exposure to the detector.
- Radiologists had been tracking S numbers for consistency.
- Since 2013, GE digital radiography (DR) units were installed and used for chest imaging, in addition to the Fuji CR units. Exposure parameters including kVp, mAs, and the Exposure Index (EI)* are recorded and are displayed in the patient image overlay on the image archive (PACS).

*EI standardized by the International Electrotechnical Commission and the American Association of Physicists in Medicine
- Inconsistencies in image quality were seen on GE posterior-anterior (PA) CXRs. Underexposure was identified as a cause for poor image quality.
- Overexposure was occurring on GE and Fuji lateral CXRs. Long exposure times resulted in motion blur.

Aims

1. Improve image quality in GE PA chest radiographs while reducing patient overexposure in lateral chest radiographs.
2. Ensure that x-ray exposure in LAT CXR views, measured in mAs, is at most three times the exposure (in mAs) in the PA view.

Project Design/Strategy

- Institute regular meetings to review CXR image quality and technique factors and to plan and assess imaging protocol changes
- Work with manufacturer representatives
- Conduct testing with anthropomorphic chest phantom
- Adjust automatic exposure control (AEC) settings and manual exposure settings appropriately
- Develop different strategies for different x-ray radiography systems
- Match protocol settings across identical x-ray units
- Verify and match AEC sensitivity across identical x-ray units

Changes Made

Regular meetings were held to plan and assess interventions to improve image quality and image consistency, as well as lower patient doses in CXR. Meetings included a radiologist, the area manager, radiologic technologists and the medical physics team.

- 8/2014: Technologists instructed to use AEC for chest PA views.
- 9/9/2014: GE digital radiography: consultation with GE application specialist; adjustment of AEC ion chamber configuration for PA views (use of center cell). Technologists instructed to use manual technique for LAT views, and to select mAs based on that in PA view.
- 9/26/2014: Medical physics to verify AEC cell sensitivity on Fuji CR; subsequent matching of AEC sensitivity of both units with field service engineer.
- 10/14/2014: Review of adjustments.
- 10/14/10/21/2014: AEC cell adjustment on GE to use left-right center cells for small and medium size patients; AEC cell sensitivity increased by changing speed from 400 to 160. Approach tested with anthropomorphic phantom.
- 10/28/2014: Based on radiologists’ feedback, more radiation was needed for large patient sizes for PA views. Therefore, a large patient CXR protocol was created on GE systems. When “large patient” was selected, all three AEC cells will be used for the PA, resulting in more radiation dose for the PA view. Also, the mA setting was increased to the maximum choice of 630 mA, shortening exposure times and reducing the effect of patient motion.
- 10/30/2014: Fuji representative implemented exposure decrease for lateral view.

Outcomes & Lessons Learned

- GE PA chest radiographs now have consistently sufficient image quality.
- Lateral radiation exposure has been significantly reduced for both GE and Fuji units
- Close collaboration between radiologists, technologists, and medical physicists was necessary in order to resolve all issues that caused image quality degradation and inconsistencies.

Next Steps

Data will be monitored and compared with baseline to maintain reduction in number of underexposed PA and overexposed lateral CXRs.

Authors: Kevin Little, Ingrid Reiser, Zheng Feng Lu, Florence Baker, Tiffany Kinsey, Lavita Cole, Karin Dill, Steve Montner, Alex Funaki, Brent Greenberg, Heber MacMahon
Improving Accessibility to Outpatient Physical Therapy Utilizing an Overbooking Strategy

**Background**
- Access to outpatient physical therapy (OPPT) has been identified as an area in need of improvement.
- Wait list for new patient OPPT evaluations averaged between 20-30 business days in 2013 and 2014
- "No show"/Same Day Cancellation rate for patient visits identified as chief contributor at 24%  
  - Same day cancelled slots unable to be filled
  - Unfilled slots = Loss of Revenue

**Aims**
- Identify, analyze and address obstacles affecting OPPT wait list
- Reduce Wait list to less than 5 days

**Project Design/Strategy**
- Assistant Director identified staff members to assist with problem solving
- Brainstorming by selected staff members and Assistant Director for solutions to problem
- Overbooking slots similar to method used by airlines suggested

**Changes Made**
- Created method for therapists to coordinate evaluation times to allow for overbooking
- Decided how many slots to overbook by based on expected "no shows"/cancellation rate from 2013-2014
- Educated other PT staff and clinic coordinators of over booking strategy and collaborate on best method to conduct check in and registration
- Streamlined method for rooming patients by PT techs
- Devised contingency plan if attendance 100%
- Conducted trial runs to allow for trouble shooting before fully implementing program
- Identified metrics to measure and monitor to determine the effectiveness of program

**Q3 Results – Evals Completed**

**Q3 Results – Visits per Day**

**Outcomes & Lessons Learned**
- Initial results suggest program is positively affecting all 3 established metrics when compared to historical data
- Improving the Wait List requires:
  - A team approach from Managers, Therapists and Support staff
  - Creativity to turn a negative ("No Show"/Cancellation rate) to a positive

**Next Steps**
- Assess factors contributing to "No show" rate to see if this can be improved as well
- May have to limit number of overbooked slots if "No show" rate improves

**Month** | **Days (Avg)**
---|---
January | 2.33
February | 5.11
March | 10.94

*Lost 2 FTE's in March

**Acknowledgements**
The Outpatient PT team, Therapy Services Clinical Coordinators, and PT technicians

Authors: Steven Jackson PT OCS, Jennifer Gilbertson PT, MHS, OCS Craig Hensley PT, DPT, OCS, FAAMOPT
Improving Quality of Handoffs in the Pediatric Intensive Care Unit

K. Siruguppa, MD¹, L. Yuen, APN², C. Humikowski, MD¹
Department of Pediatrics, Section of Pediatric Critical Care¹ and Pediatric Surgery²

Background
- Structured handoffs are shown to reduce errors in pediatric patients.¹
- Handoffs in our PICU are face to face interactions incorporating all levels of providers but are not structured in content and are often disrupted.

Aims
- We hypothesized that the quality of handoffs in our PICU was low and that implementing structure in process and content would improve communication during handoffs.

Project Design
- We designed a prospective interventional study in four phases.
- In the first phase, we conducted a needs assessment survey of PICU physicians to assess perceptions of handoffs.
- In the second phase, we assessed the quality of handoffs using a validated tool (CEX)², which scores setting, communication and professionalism on a scale of 1-9. We quantified the time required for each handoff session, and recorded number of interruptions. We also surveyed the post call team to assess their perceptions of handoff received.
- In the third phase, based on the results of phases one and two, we designed a process intervention aimed to decrease number of interruptions, including:
  - New private location for handoffs
  - Systematic protection from telecommunication interruptions (phones, pager) for physicians involved
  - Physicians not involved in the handoff assigned to cover patient care during the protected time
- In the fourth phase, we reassessed the quality of handoffs after this process intervention using the same qualitative and quantitative measure as in phase two.

Results

<table>
<thead>
<tr>
<th>CEX domain</th>
<th>Pre-intervention (n=50)</th>
<th>Post-intervention (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>7 (3-6)</td>
<td>7 (5-8)</td>
</tr>
<tr>
<td>Communication</td>
<td>8 (3-6)</td>
<td>8 (7-8)</td>
</tr>
<tr>
<td>Professionalism</td>
<td>8 (1-6)</td>
<td>8 (7-9)</td>
</tr>
<tr>
<td>Overall</td>
<td>8 (7-9)</td>
<td>7 (6-8)</td>
</tr>
</tbody>
</table>

Table 1: Phase 2 pre-intervention qualitative data. Overall quality of handoffs in the pre-intervention phase was higher than predicted. No significant difference was noticed in the post-intervention period.

Outcomes
- In our study, standardized handoff protocol resulted in decreased time to handoff each patient and fewer interruptions per session.
- The overall quality of handoffs (based on needs assessment, CEX observation, and post-call survey) was higher than expected, possibly related to positive features of current practice (face-to-face communication, set time and location, includes all levels of providers).
- Critical deficiencies such as interruptions and need for more focused flow of information were identified by needs assessment survey and direct observations of handoffs.

Next Steps
- Despite these high quality ratings, the needs assessment and survey responses suggest a need for more focused information flow.
- The next stage of intervention will include a structured template based in the EMR to further optimize information flow during times of handoff.

Acknowledgements
Special thanks to Vineet Arora, MD and the house staff at The University of Chicago Comer Children's Hospital

References
Improving Patient Workflow in CT & MRI through the Efficient Use of Point of Care Testing

Paul Mosebach, ARRT(N), MBA, Janina Resurreccion, MT (ASCP), MBA, David McClintock, MD, Monica Geyer, CNMT, MBA, Kateland Haas MA, Kristan Johnson, BS, ARRT(C), Zikaya Smith, MT (ASCP), Wendy Stirkorb, BS, ARRT(MR)

*Department of Radiology; †Department of Pathology, The University of Chicago Medicine, Chicago IL

**Background**
- The Departments of Radiology and Pathology joined to implement Creatinine/eGFR Point of Care Testing (POCT) in Computed Tomography (CT) and Magnetic Resonance (MR).
- Contrast infused CT and MR exams require current (within 30 days) Creatinine (Cr) and estimated Glomerular Filtration Rate (eGFR) results for safe administration of contrast.
- Thirty percent of contrast outpatient procedures did not have the required current labs.
- Long delays, decreased patient satisfaction, and reduced efficiency were attributed to a lack of required lab results.

**Primary Aims**
- Address operational issues to improve wait times, CT/MR scanner efficiency, and patient/staff frustration.
  - Decreased patient satisfaction: Frustrated patients required longer walk from Mitchell Radiology to DCAM (820 steps each way, up to 32 min round trip).
  - Expected minimum TAT for STAT Cr/eGFR blood analysis in central lab was 50 to 60 min (transport plus analyzer time).
  - Reduced scanner efficiency and lost scanner appointments.
  - Re-work by staff requiring review of EPIC results, calling referring MD to order Cr/eGFR labs, review of STAT lab results prior to imaging.
  - Prearranging for patients to arrive 2 hours prior to their scheduled appointment for labs to be drawn was not sustainable.
  - Negative downstream effects for other clinic/appointments, such as missing other clinic appointments or referring MD's not having same day CT/MR results available to discuss with patient.
  - Comply with UCM contrast administration policy and American College of Radiology's safe administration of contrast guidelines in “at-risk” patients:
    - Greater than 60 years of age
    - History of medically controlled hypertension
    - History of kidney disease as an adult (renal transplant, single kidney, renal insufficiency or failure, prior renal surgery)
    - History of previous contrast reaction
    - On hemodialysis or peritoneal dialysis
    - Diabetes
    - Taking potentially nephrotoxic medications (e.g. Metformin).

**Acknowledgements**
Purchasing, POC, CT and MRI Teams for all of their hard work in making this a successful project.

**Project Strategy and Changes Made**

**Plan**
1. Create audit form, determine inclusion/exclusion criteria
2. Pre go-live: determine workflow and existing barriers to obtaining labs at risk population
3. Purchase Alert POC systems and negotiate supply contracts

**Do**
1. Gather baseline data
2. Instruct Technologists to gather pre-intervention data
3. Perform POC verification testing with existing methods, Amend CLIA license

**Act**
1. Train 46 staff members in CT, MR and RN support departments
2. Monitor and support staff during initial implementation
3. Re-evaluate after 6 months

**Study**
1. Review baseline data (Tables 1 & 2)
2. Model impact of the intervention (Figure 1, Table 3)
3. Establish go-live dates

**Outcomes**

**Table 1: Delays in Appointment Time for Patients Without Labs**

<table>
<thead>
<tr>
<th>Prevalence of Missing Lab Type</th>
<th>Avg Time Spent Pre-App on Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Arrived Without Labs, but orders were present in Epic</td>
<td>40%</td>
</tr>
<tr>
<td>Patient Arrived Without Labs and No Lab Orders in Epic</td>
<td>29%</td>
</tr>
<tr>
<td>Patients who arrived and on-site screening determined required labs</td>
<td>25%</td>
</tr>
<tr>
<td>All Missing Labs Patients in Sample</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Table 2: Delays for Prearrival Patients Without Labs**

| Patient Arriving Early for Pre-arrival Labs: Difference Between App & Time and Actual Scan |
|---------------------------------|-----------------------------|
| MD Contacted to Refer from Lab | 1:03 |
| Patient Sent to Lab to Return | 0:46 |
| PT Waiting to Labs Available | 0:53 |
| Labs available to exam start | 0:32 |
| App to Actual Start | 1:18 |

**Figure 1: Direct Time Savings Impact for Patients**

**Table 3: Human Resources Impact, Time (Top) and Cost (Bottom)**

| Time Spent Checking for Labs | 0:29 |
| Time spent Checking for Lab Orders | 0:18 |
| Total | 0:47 |

| Average number of workdays: |
| 260 |
| Total number of hours (hrs/mm) spent / year: |
| 205:59 |
| Annual labor cost of 3rd shift checking labs: |
| $6,175.00 |

**Conclusions**
- In two months since go-live, POC has been utilized for 339 patients.
- Improvement in Press Ganey score for “informed about delays” question since go-live.
- Directly impacts on “on-time” exam starts.
- Patients are no longer experience delays in care and subsequent clinic appointments are not delayed (post scan).
- Patients no longer have to walk to DCAM for lab draws.
- MRI had zero schedule delays in the first two months since project go-live.
- Positively Impacting department volumes.
- Positively Impacting employee satisfaction.
Indication-based Antimicrobial Derestricion: Cefazidime Derestriction for Febrile Neutropenia

Background

- Febrile neutropenia (FN) is a common condition in children receiving chemotherapy and can be life-threatening.
- FN is recognized as a time-sensitive disease state with a clear indication for empiric antibiotic use.
- The University of Chicago Comer Children's Hospital has a rigorous antimicrobial restriction and prior authorization policy overseen by the Antimicrobial Stewardship Program (ASP).
- Cefazidime (CTZ), our agent of choice for FN, is restricted. Use requires calling Infectious Diseases (ID) on call for approval, followed by ID calling pharmacy with authorization, leading to a potential delay in order processing.

Aims

- To promote the most appropriate, targeted and timely care to those high-risk pediatric FN patients.
- To minimize the time between initial patient presentation and time to antibiotic administration.
- To provide targeted guidance for the initial workup and antimicrobial management via the revised FN clinical pathway.

Project Design/Strategy

- FN clinical pathway was revised, removing the need for prior approval of CTZ use ("derestriction"). Prospective audit and feedback of CTZ use was performed by the ID pharmacist.
- To evaluate the change in CTZ use, ongoing retrospective monthly data was collected, before and after derestriction.
- Displayed data show CTZ use in the same 6 months (January - June) before (2013) and after (2014) derestriction.
- Data collected includes: indication for CTZ use, time to administration of 1st dose in the emergency department (ED), oncology clinic and inpatient unit, number of CTZ days, time to appropriate discontinuation, rate of positive blood cultures, types of organisms isolated in blood cultures, and patient outcomes.
- Total number of patient-days and ID consults were also collected.
- Data was analyzed using Stata 13.0, College Station, Texas. P values reported using standard t-test used for Table 1 data. Chi-square and Fisher Exact tests used for Table 2 and 3 data.

Table 1: Time to administration of CTZ, duration of CTZ course, and length of stay (LOS)

<table>
<thead>
<tr>
<th>Time (min) to CTZ admin</th>
<th>CTZ duration (days)</th>
<th>LOS Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE CTZ derestriction</td>
<td>65.07 (57.70)</td>
<td>0.19 (8.09)</td>
</tr>
<tr>
<td>POST CTZ derestriction</td>
<td>56.51 (39.06)</td>
<td>0.25 (9.04)</td>
</tr>
<tr>
<td>P value</td>
<td>0.8590</td>
<td>0.4683</td>
</tr>
<tr>
<td>N=93</td>
<td>N=117</td>
<td>N=24</td>
</tr>
</tbody>
</table>

Table 2: Time to administration of CTZ by location

<table>
<thead>
<tr>
<th>ED (Mean (SD))</th>
<th>Clinic (Mean (SD))</th>
<th>Inpatient unit (Mean (SD))</th>
<th>ED vs. Clinic</th>
<th>ED vs. Inpatient unit</th>
<th>Clinic vs. Inpatient unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE CTZ derestriction</td>
<td>88.61 (63.55)</td>
<td>107.96 (60.54)</td>
<td>N=29</td>
<td>N=14</td>
<td>N=24</td>
</tr>
<tr>
<td>POST CTZ derestriction</td>
<td>92.11 (63.94)</td>
<td>97.92 (60.54)</td>
<td>N=42</td>
<td>N=17</td>
<td>N=24</td>
</tr>
<tr>
<td>P value</td>
<td>0.213</td>
<td>0.7499</td>
<td>0.4074</td>
<td>0.8095</td>
<td>0.9370</td>
</tr>
</tbody>
</table>

Outcomes & Lessons Learned

- Indication-based antibiotic ordering and derestriction can be successfully implemented in an ASP with a historically restriction-based system, with significant change in the appropriate use of the derestricted agent, rate of bloodstream infections or patient outcomes.
- The ED serves as the most efficient administrator of CTZ within the goal of less than 60 minutes.
- Other units (i.e. clinic and inpatient unit) do not meet the desired less than 60 minute standard.
- Removing the step of communication directly with ID to approve antibiotics did NOT decrease time to antibiotic administration.

Next Steps

- Results will be shared with Pediatric Hematology-Oncology physician and nursing staff in clinic and inpatient units.
- We will work with physicians, pharmacy and nursing to identify barriers to timely receipt of antibiotics in this vulnerable population.
- Based on the success of this pathway with CTZ de-restriction, we will identify additional conditions for which we can implement antimicrobial derestriction with ongoing monitoring. Such conditions may include: Concern for sepsis in the NICU, concern for ventriculo-peritoneal shunt infection, genitourinary candidiasis.

Acknowledgements

We would like to acknowledge our Pediatric Hematology-Oncology colleagues, as well as our clinical pharmacist team, who collaborated with us on the revised febrile neutropenia pathway and have been active in its appropriate execution.

Authors: Colleen B. Nash, MD, MPH; Palak H. Bhagat, PharmD, BCPS; Allison H. Bartlett, MD, MS, University of Chicago Medicine
Nurse-Driven Continuous Sedation in the Pediatric Intensive Care Unit

Background

- Children with respiratory failure require continuous sedation for safety and comfort while being supported with mechanical ventilation. Frequent assessment and real-time dose adjustment are necessary for optimal management.
- Considerable variation exists in practice, and few pediatric intensive care units (PICUs) have protocols for titration of continuous sedation in mechanically ventilated patients.
- Protocolized sedation based on objective scoring systems has been shown to be safe and effective in intubated pediatric patients.
- In our PICU, no standardized approach to assessment or provision of sedation currently exists.

Aims

1. Establish consistent goals with objective parameters for the level of intended sedation in intubated PICU patients, using the validated Slate Behavioral Scale (SBS)
2. Develop and implement a sedation protocol that allows bedside nurses to titrate sedative agents in real-time to specific goals set by PICU physicians
3. Increase the frequency of SBS scoring in our PICU
4. Decrease the number of drug classes, total drug exposure, and sedation-related pharmacy costs for mechanically ventilated children in the PICU

Project Strategy

- Project group established, including PICU pharmacists, nurses, and physicians
- Evidence-based protocol was developed
- Pre-implementation nursing survey was performed to assess nursing knowledge of SBS scoring and comfort with sedation protocol
- Intensive 1-on-1 nursing education with interval competencies was achieved, and recurrent monthly physician education is now underway
- Detailed Epic-based order set was developed and approved, incorporating protocol into user work flow

Progress to Date

50 nurses responded to a pre-intervention survey. 84% said nurse-driven sedation will increase nursing satisfaction. 96% said nurse-driven sedation will be helpful to patients.

We are currently providing ongoing training to all Board Certified Pediatric Intensive Care physicians, Pediatric Critical Care Fellows, pediatric residents, and PICU nurses.

The SBS scale (Figure 2) is provided on ID badges for quick reference.

The Algorithms pictured below have been approved for use.

Implementation will begin this month, with follow-up assessment ongoing.

Figure 1: Early education efforts have led to assignment of SBS scores in 80-90% of intubated patients in the PICU

Figure 2: SBS scale

Figure 3: PICU nurse-driven continuous fentanyl algorithm (left panel) and PICU nurse-driven continuous fentanyl + midazolam algorithm (right panel)

Outcomes & Lessons Learned

Achieving approval for the protocol was an important challenge, and took longer than we expected. It was imperative to ensure that this idea was safe as viewed by various oversight committees before implementing widely among highly vulnerable patients in a high-risk environment

Next Steps

We are excited to implement this protocol and assess the effects, with serial assessment of SBS scoring and follow-up evaluation of pharmacy costs and drug exposure.

Acknowledgements

Thank you to the PICU nurses, house staff, pharmacists, members of the P&T committee, Critical Care Committee, and the Office of Patient Safety and Compliance.

Authors: A. Thompson, Pharm D; A. Sebring, MD; S. Padilla, MD; K. Hikino, MD; G. Orchowski, RN; M. Gonzalez, RN; N. Nastanski, RN; J. Sierra, RN; C. Humikowski, MD
Obstetrical Hemorrhage Management

Authors: Ariana Dye MT, MPH, Ruth Barnes MSN, APN  Project Leads: Angela Trent MD, Michael O’Connor MD, Barbara Scavone MD, Kenneth Nunes MD

Background

- The Blood Bank relocated to CCD in 2013 but Labor & Delivery (L&D) and Mother-Baby units remained in Mitchell Hospital. Clinical specimens and blood products are transported between the two departments using the pneumatic tube system.
- The pneumatic tube system is comprised of several pathways between Mitchell and CCD but one or more pathways was frequently out of service. The Blood Bank did not have a process established for transporting blood products in case of a pneumatic tube system outage.
- Walking time between the Blood Bank and Labor Delivery is 12 or more minutes
- Labor & Delivery staff did not receive adequate training for the Massive Transfusion Protocol (MTP).

Aims

Within one year, implement a process to ensure timely delivery of blood products and facilitate the safe and efficient management of hemorrhaging mothers in Labor & Delivery.

Project Design/Strategy

- Project Design: Held an unannounced simulation in L&D to identify process deficiencies then collaborated with stakeholders to implement process improvements. Led a second simulation to measure the effects of implemented improvements.
- Process Measure: Blood product delivery turn-around-time using a runner
- Outcome Measures: The number of MTP activations, maternal morbidity.
- Key Stakeholders: Labor & Delivery, Mother-Baby, Blood Bank, Inpatient Pharmacy, Risk Management, Quality Improvement, CBIS, Clinical Laboratory
- Quality Improvement Tools Used: Process Mapping, Failure Modes and Effects Analysis (FMEA)

Changes Made

- Held an unannounced simulation in L&D OR to identify process improvement opportunities.
- Partnered with Inpatient Pharmacy to establish Blood Runner system for blood delivery when pneumatic tube system is down.
- Secured a mobile refrigerator for L&D Operating Room to ensure blood products are stored appropriately during an MTP.
- Created an Epic Obstetrical MTP transfusion order automatically preset with blood product quantities for MTP pack.
- Provided training and education for nurses, medical technologists, pharmacy techs and physicians.
- Created a scripted exchange between L&D and Blood Bank to ensure critical information is communicated.
- Led a second unannounced simulation to measure the impact of process improvements made.
- Conducted an FMEA with key stakeholders to evaluate additional improvement opportunities.

Pre Training Simulation

<table>
<thead>
<tr>
<th>MTP Pack #1</th>
<th>MTP Activation</th>
<th>Patient Transfused</th>
<th>Elapsed Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8:09 pm</td>
<td>8:40 pm</td>
<td>31 minutes</td>
</tr>
</tbody>
</table>

Post Training Simulation

<table>
<thead>
<tr>
<th>MTP Pack</th>
<th>MTP Activation</th>
<th>Units Transfused or Refrigerated</th>
<th>Elapsed Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pack #1</td>
<td>9:18 pm</td>
<td>9:39 pm</td>
<td>21 minutes</td>
</tr>
<tr>
<td>Pack #2</td>
<td>9:40 pm</td>
<td>9:55 pm</td>
<td>15 minutes</td>
</tr>
</tbody>
</table>

Outcomes & Lessons Learned

- Turn-around-time for initial MTP pack with a runner reduced from 3 minutes to 15 minutes. Time to receive an additional pack was 15 minutes.
- Pharmacy techs will be the designated runner if the tube system is down.
- All staff received appropriate MTP training.
- Communication between L&D and Blood Bank improved using scripts and assigned responsibilities.

Next Steps

1. Expand the MTP to adult and pediatric Emergency Rooms and Critical Care locations.
2. Incorporate MTP into clinical staff’s Continuing Education programs

Acknowledgements

UCM Obstetrics, Blood Bank, Nursing and Nursing Education, UCM Simulation Center, UCM Inpatient Pharmacy, Center for Quality
Rapid Strep-A: Moving The Compliance Gauge

Authors: Gabe Campos, MSN, RN; Sean Thomas, RN; Molly Salvatori, BSN, RN; Leah Finkel, MD; Nick Bitlick, BSN, RN; Megan Hughes, RN(UIC); Amy Kozmani, MSN, RN; Samara Qadir, MHA; Alison Tothy, MD

Acknowledgements: The following departments were instrumental in this project: Microbiology, Point of Care Testing, EPIC

Background

In the Comer Emergency Department (CED), we have the ability to perform Rapid-Step-A Point of Care Testing (RST). Our compliance rate for negatively reported RST with Beta Strep Throat Culture (BSTC) during the time period of January 1, 2014-May 31, 2014 is 48% (n=509). In order to be in compliance, every RST result has to be manually entered into the electronic medical record; when an RST is negative the follow-up process is for a BSTC to be sent to Microbiology as per institutional policy and per regulatory agencies. In addition, the documentation and procedure ordering process were cumbersome.

Objectives

1. Improve our compliance of BSTC sent and completed to >/= 90%
2. Improve the EPIC nurse ordering and documentation process. This will help in streamlining the ordering process, potentially reduce errors in ordering.

Project Design/Strategy

- This project is taking place in the Comer Emergency Department
- Participants included: 1) Laboratory: Lab Techs, Managers, & Medical Director, 2) Nursing: ED Staff Nurse, Nurse Manager, Nurse Educator, Nursing Student, ED Tech, 3) PED Medical Staff: Medical Director, 1st Year PEM Fellow, 4) EPIC Rep: Nursing Informatics, 5) Quality Improvement Specialist.
- Initially we identified a problem, performed a literature search, and held a brainstorming session. Then we held a process mapping session, and finalized our measures.
- Project implementation included protocol review with staff, project champions, email reminders, request for Epic enhancements, and monthly discussion of data.
- Because we are not able to directly track the number of BSTC sent, for our outcome measure we are using the percent of BSTC completed based on negative RST.

Comer ED Rapid Strep-A Test Process Map

![Process Map Image]

With the project kick-off we emphasized to our nurses the criteria for RST, to obtain a BSTC simultaneously with RST, and to order the BSTC as “per-protocol”. We also emphasized to both our nurses and providers the need for BSTC if RST was negative, as a matter of compliance.

Outcomes & Lessons Learned

- The measures tracked show an increase in BSTC sent and completed after implementation.
- Though we did not achieve our first objective, >/= 90% completion, we had dramatic improvement from 48% to >70%. Our second objective was also achieved with improved satisfaction of the nurse ordering process.

Next Steps

- Develop ability to measure “per-protocol” RST order entry in EPIC (Process Measure)
- Develop ability to measure BSTC sent vs. completed
- Re-evaluate RST protocol
Reducing Blood Antibody Delays & Resources

Background

• Clinicians are not always aware their patients have clinically significant red blood cell antibodies
• Patients without antibodies are electronically cross-matched vs. patients with antibodies require extensive manual testing and it can take hours to find compatible blood that is safe to transfuse
• Many times blood bank personnel are not aware patients may need transfusion and are unable to provide an estimation of how long it will take for blood to be available
• If blood products are matched to the patient and not used, many times these units are wasted at substantial cost burden to the hospital

Aims

Reduce transfusion delays and wasted resources for patients with clinically significant antibodies by facilitating communication between the blood bank personnel and clinicians

Project Design/Strategy

• This issue affects both inpatients and outpatients equally
• Goal is to reduce time to blood transfusion and decrease cross-match to transfuse ratio
• Blood bank can only bill for cross-matches if the blood is actually transfused
• The non-billable time that is freed up by implementing new orders can increase productivity in other areas of the blood bank
• Originally removed Blood Product Prep order, but realized this order is important for antibody positive patients
• Strategy was to generate two new orders in the electronic medical record to facilitate communication between the blood bank and clinicians

INPATIENT

• Created “Special Blood Preparation Order”
• Can be ordered by any ordering provider
• If a patient is found to have positive antibodies, providers can use this order to communicate with the blood bank
• Able to select whether patient has upcoming surgery or imminent transfusion
• Blood bank will perform extended cross-match ahead of actual transfusion order
• Reduces time to transfusion delays and increases patient safety
• Allows blood bank personnel to prioritize work

OUTPATIENT

• Created “Hemoglobin Trigger Order”
• Can only be ordered by Oncologists
• Many oncologists create target lab values for their patients to reduce risks of bleeding
• Facilitates communication between oncologist and blood bank personnel
• Blood bank will automatically perform extended cross-match testing ahead of an actual transfusion order
• This reduces delays to transfusion and also allows blood bank personnel to prioritize their work
• Available April 30, 2015

Work in Progress

• We have facilitated communication between blood bank and ordering providers
• No data currently available if there is a decrease on time to transfusion
• Still working on solution to communicate to providers the patient’s antibody status more effectively

Acknowledgements

Kim Quiroz, Yash Attanayake, the Quality of Blood Use Committee, Hematology Oncology, Blood Bank

Authors: Ross Gaudet, MD, Ariana Dye, MT, MPH, Michael O’Connor, MD, Angela Tremml, MD

Next Steps

• Explored being able to update patient header, but unsuccessful
• Continue to explore options within EPIC to communicate to providers their patients’ antibody status
Sub-atmospheric Pressure Wound Therapy (SAWT): What Happens when an Academic Medical Center Switches to a Low-Tech Method?

**Background**

- Cost of wound care accounts for almost 4% of total health system cost
  - Medicare payments for rental pumps between 2001 and 2007 increased 583% from $24 million to $164 million
  - KCI®, KCl™ system – daily cost of $95 to $150 per day, or $2,850 to $4,500 per month²
- Benefits of SAWT?
  - Reduction of wound size and promotes wound healing
  - Can reduce the need and complexity of surgical therapy
  - Faster transition patients from inpatient to outpatient setting
- New technology expands the range of treatment options available to patients, but it does so by replacing lower-cost option with higher-cost services. We must also provide a better outcome on a lower cost platform

**Aims**

The equipment typically used for Subatmospheric Wound Therapy (SAWT) is expensive. This expense can limit the use of SAWT in facilities where budgets are constrained, particularly in public hospitals and for patients who are underinsured or uninsured. We examine the utility and cost savings of using a low-tech gauze suction method for a single academic medical center.

**Project Design/Strategy**

A retrospective chart review of all patients treated with sub-atmospheric pressure wound therapy: one university hospital

4027 patients treated with SWAT between July 1, 1999 and June 30, 2014.

Vacuum Assisted Closure (VAC®, KCl™) was utilized in 2132 patients (20365 days on SAWT, average days 9.55, range 2-40 days).

A low-cost occlusive gauze suction was utilized in 1895 patients (16508 days on SAWT, average days 8.18, range 2-39 days). Both methods utilized sub-atmospheric pressure either via VAC devices or wall suction.

Disposable material as well as labor costs were analyzed using our prospectively managed wound therapy database

**Changes Made**

<table>
<thead>
<tr>
<th>NPWT system</th>
<th># patients</th>
<th># days on</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAC</td>
<td>1999-2011</td>
<td>2132</td>
</tr>
<tr>
<td>G-SUC</td>
<td>2006-2014</td>
<td>1895</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4027</td>
<td>3587</td>
</tr>
</tbody>
</table>

- Massive cost to the hospital for rental the appliance and supply for 1999-2011: TOTAL $ 2,424,042.30
- Rental $ 1,349,503.67; Supplies $ 1,074,538.76
- G-SUC dressing was significantly less expensive, easier to use and clinically equivalent to the VAC.
- This translated into $204,337.00 institutional saving ($25,542.00/year) over the study period replacing VAC with our low-tech G-SUC method of SAWT
- It has led us to use G-SUC exclusively in our hospital
- Clinician initiated, unfunded comparative effectiveness research was used to addressed problem related to SAWT at our hospital

**Outcomes & Lessons Learned**

- Therapy Service Department and Plastic Surgery Section at our institution did two a prospective randomized trial to compare the efficacy of VAC and G-SUC in respect to:
  - change in wound size and cost
  - to secure skin grafts.
- Results of studies were published in 2012 and 2015
- G-SUC provide an alternative SAWT that is at least as effective as VAC with respect to wound volume and surface
- G-SUC offers significant cost savings to the hospital

**Next Steps**

SAWT dressing is not panacea for all wounds and all the time. Develop guidelines how to identify those wounds that would not respond to SAWT

**Acknowledgements**

The authors thank Director and Assistant Director Therapy Services Diane Davis and Maria Robinson for their help and support.

**Authors:** Mieczyslawa Franczyk PT, PhD, MPH, Lawrence J. Gottlieb MD, FACS, David H. Song, MD, MBA, FACS
Streamlining Nursing Workflow to Improve Influenza Vaccine Screening Rates

Background

- Seasonal influenza vaccination is an important intervention to decrease morbidity and mortality.
- Over 200,000 people in the US are hospitalized each year with complications from influenza (CDC, 2011).
- Between 3,000 and 49,000 people die from influenza and its complications (CDC, 2015).
- As part of the Inpatient Quality Reporting program, the Centers for Medicare and Medicaid Services (CMS) require hospitals to report influenza immunization screening and administration if indicated.
- In 2014, influenza immunization was added to the Value-Based Purchasing Program.
- Performance is publicly reported on Hospital Compare.

Aim

- Streamline nursing workflow to improve influenza vaccine screening rates to >97% during FY15 influenza season.

Project Design/Strategy

- An interprofessional workgroup consisting of nurses, quality intelligence specialists, pharmacists, informaticists, and physicians was formed.
- CMS core measure requirements for inpatient seasonal influenza immunization were reviewed.
- Changes in requirements from prior year were identified.
- Prior year screening, ordering, and administration processes reviewed.
- Prior year performance reviewed. Reasons for non-compliance identified.
- Gaps in performance and opportunities for improvement identified.
- Tip sheets outlining vaccine screening, ordering, and documentation process were developed and distributed to nursing units.
- Revised workflow presented at Patient Care Services Leadership meeting and Nursing Practice Council Forum.
- Outreach to targeted physician groups was performed to communicate details of the protocol and allow for discussion prior to implementation.
- Records of patients discharged between October 1, 2014 and March 31, 2015 were audited for compliance with the CMS core measure requirements.

Outcomes & Lessons Learned

- Influenza immunization rate improved from 96.92% (FY14) to 99.33% (FY15).
- Reasons for FY14 influenza screening failures were eliminated.
- Focused auditing was required to support improvement.
- Interprofessional teamwork was imperative to achieving success.

Next Steps

- Re-convene interprofessional workgroup to review outcomes and lessons learned.
- Conduct gap analysis.
- Further define EMR documentation to facilitate report automation.

Changes Made

- Nursing admission screening tool was reviewed and updated to reflect current CMS requirements.
- Best Practice Alert re-instated to remind nurses to place vaccine order for appropriate patients.
- Influenza vaccines added to automated dispensing cabinets on adult inpatient units/floors.
- Daily Vaccine Status Report developed.
- Nursing Leadership reviewed outlier cases with staff to address influenza immunization screening and administration or documentation of contraindication for hospitalized patients.
- Quality Intelligence Specialist reviewed CMS core measure failures and sent outlier letters to Nursing Leadership to reinforce influenza screening and administration requirements with staff.

Acknowledgements

Authors: Carmen Barc, MSN, RN; Judy Doty, MSN, RN; Amy Krizmanic, MSN, RN; Natasha Pettilt, PharmD, BCPS-ID; Jennifer Pisanlo, MD
Supplier Quality Performance Improvement

**Background**
Supply Chain works to improve Suppliers' Performance through use of quality tools and PDCA problem solving approach.

**Aims - Plan**
Close gap between supplier performance and UCM expectations.
- Quality: Zero defects
- Cost: Best in market total cost
- Delivery: 100% complete and on time
- Technology/Innovation: At the Forefront
- Service: Best in class customer service

**Project Design/Strategy - Plan**

**Measuring Performance - Identify opportunity for improvement**
- Supplier Scorecard
- MDI Board

**Focus Suppliers:**
- Stryker
- Medex
- Airgas

**Quality Improvement Tools Used:**
- Run Chart - monitors over time
- 5 Why - used to determine root causes
- Scatter Plot - examine relationships
- Pareto - used to prioritize
- Fishbone - shows cause and effect

**Acknowledgements**
AirGas Cylinder Compliance: David Grace from AirGas, Ed Gutierrez the Mitchell ED manager
Loaner Tray tracking: Shanda De La Paz, Chatoma Scott, and Jon Brickman from CSP, Chris Kellner from Sourcing
MedEx arrivals: Jeffrey Collins, Michael Pieroni from MedEx
Supply Chain: Gary Lennon

**Changes Made - Do, Check, Act**

**Do - implement countermeasures**
- Stryker - Delivery of Loaner Trays improved
- Implemented countermeasures for root causes
- Clearly defined expectations to Stryker management
- Weekly meetings to manage performance

**Check - determine effectiveness of countermeasure**
- **Stryker**
  - Measured late deliverables
  - % Late Arrivals of Scheduled Discharges 2015
  - % Late Deliveries

**MDEx - Arrival Times improved by Management changes**
- Arrivals shifted because of changed target based on time study
- Variation reduced because of improved management of resources

**AIRGas - Compliance Violations have gone down**
- Added cylinder compliance to SS checklist
- Added safety metric to ED Management MDI board
- Attended MDI huddles to align expectations
- Created and posted Standard Work Instructions for air cylinders
- AIRGas technicians trained clinicians

**Outcomes & Lessons Learned**

**What did the measures you tracked show you?**
- Trays: Started with 76% late, reduced to 35%
- MedEx: Needed to align expectations for arrivals and manage to UCM's standard
- AirGas: Reduction of safety compliance violations

**Did you accomplish what you set out to do?**
- Trays: Goal is zero late, current is 35%
- MedEx: Reduced late arrivals
- AirGas: Reduced violations 60% toward goal of zero

**How can you prove it did or did not work?**
- Data shown in charts
- Gate charts show post-countermeasure "check" found no problems

**Next Steps**
- Trays: Take action on second tier tray suppliers
- Apply approach and lessons learned to pick-up process
- MedEx: Implement monitoring within MDI process
- AirGas: Adding safety check to all MDI boards' SS checklist
- Apply approach and lessons learned from the ED to the clinical unit with the next most violations

Authors: Jon Aggen, Sunny Harnett, Gabriel Sperber
Treat It Like It’s Real: In-Situ Simulations to Assess Systems Issues Related to Emergency Response

Background

- The Cardiac Arrest Response Team (Dr. CART) is called when a cardiac arrest is suspected.
- With the opening of the Centre for Care and Discovery, dual team coverage was put in place with emergency equipment responsibilities placed on specific teams.
- Prior training methods were classroom based, limited to those who held Advanced Cardiac Life Support certification and/or lacking a multidisciplinary component.
- An accurate measurement of compliance and response times would be beneficial to address system issues requiring immediate resolution.

Aims

- Implement a process improvement initiative to identify systematic barriers in our emergency response system that could be improved upon to ensure patient safety and quality of care is exceptional and timely.

Project Design/Strategy

- The Adult CPR Committee composed of representatives from multiple disciplines such as Nursing, Medicine, Anesthesia, Pharmacy and Respiratory Therapy were part of the design process.
- Location and intention of each scenario were based on real patients or the evaluation of new protocols associated with cardiac arrest.
- In-Situ Simulation was chosen as a means to address the dynamic, complex nature of the healthcare setting in which healthcare team function.
- Outcomes metrics were specific to each and decided on by the Adult CPR Committee.
- All sessions were video recorded to provide constructive feedback to participants and all for retrospective, detailed analysis of the simulations.

Outcomes & Lessons Learned

- Implementation of in-situ simulations came with technical and logistical challenges that led to last minute changes to scenario design.
- In-situ simulation is an innovative tool to identify systems failures and risk in the clinical environment.

Next Steps

- Collaboration with Quality Performance Improvement and Risk Management/Patient Safety to utilize In-situ simulation as a method to address compliance and quality measures.

Authors: Meredith Borak, Robert Burgin, Melissa Cappaert, Dr. Dana Edelson
Voriconazole Therapeutic Drug Monitoring Protocol

**Background**
- Voriconazole (VRC) serum concentrations are correlated with efficacy and drug toxicity.
  - VRC trough values >2.0 mcg/mL are associated with efficacy.
  - VRC trough values >5.5 mcg/mL are associated with toxicities such as hepatotoxicity, neurotoxicity, and ocular toxicity.
- Therapeutic drug monitoring (TDM) of VRC is implemented in clinical practice to ensure efficacy, safety, and guide dosing.
- In November 2011, the antimicrobial stewardship program (ASP) implemented a TDM protocol that provides guidance to clinicians on proper dosing, monitoring, and recommended dosage adjustments based on trough concentrations (refer to Figure 1).

**Aims**
- To assess the effectiveness of the implementation of a TDM protocol in addition to pre-existing ASP restriction requiring prior authorization and post-prescriptive review for all patients initiated on VRC in ensuring appropriate dosing and TDM.

**Protocol Implementation**
- Protocol developed and implemented by ASP 11/2011
- ASP reviews all orders for voriconazole on a daily basis to ensure consistency with protocol

**Primary Endpoint**
- Rate of success in achieving therapeutic trough concentration (TTC) of VRC before and after TDM protocol

**Secondary Endpoints**
- Rate of TDM, appropriately drawn trough, time to TTC, TTC achieved with first level, loading dose (LD) administered

**Experimental Design**
- Retrospective, single center, cohort
- Post-protocol data analysis period: 10/20/2012-7/23/2013
- Pre-protocol data analysis period: 5/1/2011-1/20/2012

**Inclusion criteria**
- Age ≥ 18 yo, receiving therapeutic VRC for ≥48 hours with a trough obtained while inpatient for primary endpoint (TTC defined as any trough >2.0 mcg/mL)
- Secondary endpoint of percentage of TDM and receipt of LD included any patient receiving therapeutic VRC during the analysis period ≥48 hours (inpatient and outpatient).

**Changes Made**
- 25 patients received VRC as empiric/directed therapy following implementation of TDM protocol
- 20 (80%) of patients had a TTC (median trough: 4.3 mcg/mL) (Figure 2)
- Median time to obtain a VRC trough was 6 days following initiation
- 19 (76%) of patients received an appropriate LD in the primary endpoint analysis group
- 17 (89.4%) of patients receiving a LD had a TTC
- Compared to historical data at our hospital, the percentage of patients receiving VRC for treatment with a TTC at the first level increased by 7.8% (Table 2)
- TDM was performed in 36.1% more patients receiving therapeutic VRC

**Table 1: Baseline characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation (N=33)</th>
<th>Post-Implementation (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>55</td>
<td>68</td>
</tr>
<tr>
<td>Gender (Male), n (%)</td>
<td>20 (60.6)</td>
<td>18 (72)</td>
</tr>
<tr>
<td>Hematologic Malignancy, n (%)</td>
<td>25 (75.8)</td>
<td>16 (64)</td>
</tr>
<tr>
<td>SOT, n (%)</td>
<td>2 (6)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Solid tumor, n (%)</td>
<td>3 (9.1)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Other Primary disease (e.g. Structural lung disease), n (%)</td>
<td>3 (9.1)</td>
<td>7 (28)</td>
</tr>
</tbody>
</table>

*Patients with initial LD performed, included in TTC analysis

<table>
<thead>
<tr>
<th>Graph 2: VRC Trough Concentrations (Post-Implementation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRC 12 mcg/mL</td>
</tr>
<tr>
<td>VRC 3.5 mcg/mL</td>
</tr>
<tr>
<td>VRC 0.5 mcg/mL</td>
</tr>
</tbody>
</table>

**Outcomes & Lessons Learned**
- Following the implementation of a TDM protocol, 80% of patients receiving therapeutic VRC had a TTC (≥2 mcg/mL)
- Compared post-implementation data, a greater number of patients had TDM performed, received a LD, had an appropriately drawn initial trough, and achieved a TTC with the first level

**Next Steps**
- Evaluate clinical outcomes with improved dosing/monitoring of VRC as a result of the protocol
- Assess appropriateness of dosage adjustment recommendations

Authors: Natasha Pettit, PharmD; Zhe Han, PharmD; Mildred Vicente, PharmD; Allison Bartlett, MD; Emily Landon, MD; Jennifer Pisano, MD

*For pre-implementation period, 30 pts received therapeutic VRC ≥144/hrs, TDM performed in 37 pts (84% had adequate troughs). For the post-implementation time period: 36 pts received therapeutic VRC ≥144 h, however TDM performed in 28 pts (67%) with adequate levels or on therapy outpatient prior to admission.

**Table 2: Secondary Endpoints**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation (N=80)</th>
<th>Post-Implementation (N=34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDM achieved</td>
<td>37 (46.2)</td>
<td>28 (82.3)</td>
</tr>
<tr>
<td>LD administered</td>
<td>44 (55)</td>
<td>22 (61)</td>
</tr>
<tr>
<td>Initial trough achieved (within 2hrs before or after admission)</td>
<td>18 (54.5)</td>
<td>25 (73.5)</td>
</tr>
<tr>
<td>Time to trough attainment (median)</td>
<td>Day 6</td>
<td>Day 5</td>
</tr>
<tr>
<td>TTC achieved with first level</td>
<td>13 (22.9%)</td>
<td>20 (60.6)</td>
</tr>
</tbody>
</table>

*For pre-implementation period, 80 pts received therapeutic VRC ≥144 h, TDM performed in 37 pts (84% had adequate troughs). For the post-implementation time period: 36 pts received therapeutic VRC ≥144 h, however TDM performed in 28 pts (67%) with adequate levels or on therapy outpatient prior to admission.

**Inclusion criteria**
- Age ≥ 18 yo, receiving therapeutic VRC ≥48 hours with a trough obtained while inpatient for primary endpoint (TTC defined as any trough ≥2.0 mcg/mL)
- Secondary endpoint of percentage of TDM and receipt of LD included any patient receiving therapeutic VRC during the analysis period (≥48 hours inpatient and outpatient)
Poster Session: Innovations in Patient Centeredness and Achievements in Quality

1. Adv culturally & linguistically appropriate services (CLAS)
2. Development of pathway to standardize frequency of therapy
3. Evaluation of scoring tool in inpt hem/onc pain management
4. Improving nursing participation in PICU rounds (CLASS )
5. INFORMED: Medical students obtaining consent
6. Medical home and specialty care connection inpt cardiology
7. Provider-led discharge follow up phone calls
8. Rounding for Care
9. Siesta: Sleep for inpatients
10. Stigma in the EMR: Exclusion of psychiatric diagnoses
11. The incidence of early formula supplementation newborns
12. Use of observational tool to describe peds periop handoffs
13. Straight A’s: Best Leapfrog Safety Rating 7 times in a row
14. Core Measure VTE-6: success in VTE prevention
15. Reducing Hospital Acquired Conditions
16. Top decile performance in Value-Based Purchasing
17. Likelihood to Recommend: Improving Patient Experience
18. Reducing central line infection rates
19. Reduction in post-operative hemorrhage or hematoma
20. Prevention of accidental puncture/lacerations (PSI 15)
Advancing Culturally and Linguistically Appropriate Services (CLAS) Standards to Eliminate Disparities in Patient Health Outcomes: The Launch of a Multi-Year Project

Background

- Disparities in care remain unacceptably common across the nation. For example, poor people received worse care than high-income people for nearly 60% of quality measures (Agency for Healthcare Research and Quality; 2014 National Healthcare Quality and Disparities Report).
- People of color, LGBT people, women, non-English speakers, and other marginalized groups experience significant disparities in health and healthcare.
- In 2010, the Institute of Medicine updated its Quality Improvement Framework to include the concept that disparities in care equate to low quality health care.

Aims

UCM believes that disparities in care and health are unacceptable. We will transform to a culturally and linguistically competent organization without variation in patient outcomes across populations as measured by stratified performance metrics.

Project Design/Strategy

Step 1
- Conduct UCM organizational assessment using CLAS Standards Framework to establish current state: strengths and opportunities.

Step 2
- Launch UCM Medical Center Committee (MCC) to lead transformation efforts at MCC as one of the three subcommittees functioning under the UCMBS/SDI Inclusion Strategy Steering Committee umbrella.

Step 3
- Engage 30 MCC members who represent key UCM departments in several rounds of CLAS Assessment review and feedback. Solicit input and recommendations.

Step 4
- Review feedback and identify themes: Clear Communication; Community Engagement; Data Collection; Organizational Change. Build a proposed multi-year strategic plan. MCC approves Strategic Plan to Advance CLAS.

Outcomes & Lessons Learned

Multi-Year Strategic Plan: Selected Activities

- Clear Communication
  Organizational health literacy assessment
- Improved communication and language assistance
- Data
  Care process and health outcome data stratification
- MCC Approach
  Act, communicate, and engage frontline staff
- Community Engagement
  Patient and community advisory boards to inform equity activities
  Address limited English proficiency in Community Needs Assessment
- Organizational Culture Change
  Build cultural and linguistic competence to advance health equity

MCC Approach

- Act, communicate, and engage frontline staff

Next Steps

- Take current MCC positivity and momentum to the broader UCM community. Engage staff at all levels.
- Implement the MCC Strategic Plan to Advance CLAS.
- Develop a logic model for change with evaluation measures.
- Evaluating Project Success Long Term: No variation in patient outcomes across populations as measured by stratified performance metrics – disparities in care eliminated.

Acknowledgements

Diversity, Inclusion & Equity Department: James Williams, Joel Jackson, Lisa Sandos, Jillian Thorpe
MCC Co-Chairs: Brenda Battle, RN, MBA & Marshall Chin, MD, MPH and MCC Members
Health Literacy Consultant: Shane Desautels, MA
Authors: Scott Cook, PhD, Jelena Todic, MSW, LCSW, & Diversity, Inclusion and Equity Department, University of Chicago Medicine
Development of a Clinical Pathway to Standardize Frequency of Therapy Sessions

Authors: Megan Teele, PT, CWS and Erin Zeleny, MS, OTR/L

Background
The use of clinical pathways are becoming increasingly important and prevalent in all settings of Physical and Occupational therapy. In other therapy settings, visits are often determined, in part, by regulatory accrediting bodies, payers and evidence based practice guidelines. Such parameters are lacking in the acute setting and there is a paucity of evidence to support a standardized approach to establishing frequency of therapy visits for acutely hospitalized patients. Prior to initiating this project, our staff determined frequencies, like many other institutions, on a variable basis. Reasoning behind frequencies was not evident and conveyed in variable ways (eg, times per week, total sessions, etc).

Aims
To minimize inconsistencies we developed and implemented a clinical pathway that would be:
- Easy to use
- Provide a consistent standardized approach in determining and communicating frequencies of therapy plans of care
- Illustrate rationale of frequency determination to providers

Project Design/Strategy
- Met with a group of senior therapists who possess between 4-25 years of clinical experience to identify key factors that are used when determining frequencies
- Using 5 key factors identified, we developed a pathway that generates a score that places patients into frequency categories
- Educated staff and implemented use of pathway for all new patients into daily clinical practice
- To determine reliability of clinical pathway, we presented staff with a series of 17 patient vignettes and asked each staff member to score patient on pathway and select a frequency for therapy visits and analyzed results

Changes Made
Since development of this pathway the Therapy Services Department has:
- Implemented use on all inpatient evaluations and re-evaluations
- All inpatient therapists now utilize standard language when communicating frequency of therapy sessions
- Provided ongoing staff education to ensure appropriate use of the pathway

Outcomes & Lessons Learned
- With use of the pathway, the majority of therapists establish the same frequencies using clearly defined logic
- Use of inpatient clinical pathways is a feasible adjunct that can be combined with clinical reasoning to determine patient frequencies
- Improving our consensus when determining frequencies and utilization of the pathway is still needed (~20%)

Next Steps
- Implement into MDI process
- Ongoing data collection
- Creation of manuscript and publication
- Ongoing staff education for sustainability
- Modification of process as needed

Acknowledgements
We would like to thank every member of the Inpatient Therapy Services team.
Evaluation of the impact of a patient scoring tool on inpatient hematology/oncology pain management in opioid-tolerant patients at an academic medical center

Background

- Pain is a common complication of cancer and is experienced by an estimated 59-64% of patients undergoing chemotherapy and 33% of patients after curative treatment.
- Despite the availability of practice guidelines from the National Comprehensive Cancer Network (NCCN) and a focus from The Joint Commission, estimates of undertreated cancer pain remain as high as 43%.
- A recent study at our institution identified opioid tolerance as a predictive factor for non-adherence to the NCCN pain management guideline recommendations. Subsequently, these patients were less likely to achieve analgesia at 24 hours from admission.
- A pain management scoring tool was developed based on the previous study’s results to identify patients with a pain score ≥4 within the past 24 hours for review by a clinical pharmacist.

Aims

- The aim of this study is to quantify the impact of a pharmacist-managed pain scoring tool on inpatient cancer pain.

Project Design/Strategy

Study Design

- Retrospective, single-center chart review
- Comparison of pain scores at 24 hours after admission between pre-implementation and post-implementation groups
- Pre-implementation group: April 1st 2011 to October 31st 2011
- Post-Implementation group: November 1st 2013 to January 15th 2014.

Primary Endpoint

- Attainment of analgesia, defined as a pain score ≤4 or a 50% reduction in pain from baseline (first recorded pain score), 24 ± 4 hours, after initiation of opioid therapy.

Secondary Endpoints

- Percent of patients with adherent regimens to NCCN guidelines
- Mean pain scores during 24 hour assessment period
- Time to analgesia (pain score ≤4 or a 50% reduction in pain from baseline)
- Opioid-induced adverse events
- Naloxone use
- Respiratory depression (respiratory rate <10 breaths per minute)
- Hypoxia (oxygen saturation of <90%)
- Mean frequency of documented pharmacist interventions

Definitions

- **Opioid tolerant:** Patients taking at least 60 mg oral morphine/day, 25 mg transdermal fentanyl/hour, 30 mg oral oxycodone/day, 8 mg oral hydromorphone/day, 25 mg oral oxycodone/day, or an equivalent dose of another opioid for one week or longer.
- **Long-acting opioids:** Agents including transdermal fentanyl, methadone, and extended-release morphine and oxycodone.
- **Short-acting opioids:** Agents including oral or intravenous morphine and hydromorphone, and oral oxycodone, oxycodone/acetaminophen, hydromorphone/acetaminophen, codeine, and codeine/acetaminophen.

Figure 1: Patient inclusion and exclusion

<table>
<thead>
<tr>
<th>Pre-Implementation Group</th>
<th>Post-Implementation Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>516 Pre-Implementation Patients Included</td>
<td>516 Post-Implementation Patients Included</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Pre-Implementation Group</th>
<th>Post-Implementation Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years (standard deviation)</td>
<td>56.1 (10.3)</td>
<td>56.0 (12.9)</td>
<td>0.97</td>
</tr>
<tr>
<td>Sex, percent male</td>
<td>13 (40.0%)</td>
<td>14 (43.8%)</td>
<td>0.77</td>
</tr>
<tr>
<td>Renal Dysfunction</td>
<td>4 (13.3%)</td>
<td>7 (21.9%)</td>
<td>0.39</td>
</tr>
<tr>
<td>Hepatic dysfunction</td>
<td>2 (6.7%)</td>
<td>3 (10.3%)</td>
<td>0.62</td>
</tr>
<tr>
<td>Metastatic disease</td>
<td>21 (70.0%)</td>
<td>12 (47.5%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Opioid Allergy</td>
<td>7 (23.3%)</td>
<td>3 (10.3%)</td>
<td>0.14</td>
</tr>
<tr>
<td>Attainment of analgesia at 24 hours</td>
<td>10 (33.3%)</td>
<td>14 (43.8%)</td>
<td>0.78</td>
</tr>
<tr>
<td>Mean pain score (standard deviation)</td>
<td>14 (8.5)</td>
<td>15 (7.9)</td>
<td>0.59</td>
</tr>
<tr>
<td>Time to analgesia, hours (standard deviation)</td>
<td>4.9 (7.0)</td>
<td>4.2 (1.6)</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Frequency of pharmacy intervention

- Within first 24 hours, (interventions, interventions per patient) 5 (0.17) 4 (0.13) 0.65
- During entire admission, (interventions, interventions per patient) 9 (0.31) 18 (0.56) 0.32

Mean frequency of nursing pain assessment in first 24 hours (standard deviation) 7.4 (2.5) 12 (4.6) <0.001

Outcomes & Lessons Learned

- Non-statistically significant improvement in attainment of analgesia was observed
- Mean number of nursing pain assessments were significantly improved in the post-implementation group
- Overall, the study shows promising results towards improved initial pain management for opioid-tolerant patients in the post-implementation group but was underpowered to detect a difference in the primary endpoint

Acknowledgements

- Anish Choksi, PharmD
- Katie Mieure, PharmD, BCPS
- Mike Mears, PharmD, BCPS

Authors: Trevor N Christ, PharmD | Jeryl J Villadolid, PharmD, BCPS, BCOP | Randall W Knoebel, PharmD, BCOP | Monica Malec, MD

Next Steps

- Further evaluation to identify patients who are poor responders to standard therapy is needed
- The newly developed pain committee will be evaluating standardized pain regimens for poor responders
Improving nursing participation during rounds in the PICU: The “CLASS” initiative
K. Siruguppa, MD; G. Woo, RN; J. Sierra, RN, BSN; N. Nastanski, RN; C. Humikowski, MD
Department of Pediatrics, Section of Pediatric Critical Care

Background
- Multidisciplinary collaboration is essential for effective care in intensive care units (ICUs).
- Morning rounds provide the only regular forum for communication between all members of the care team.
- Despite their vital role in patient care, nurses were not consistently participating in rounds in the pediatric intensive care unit (PICU), and there was no specific format for their input.

Aims
- Identify barriers to nursing participation on rounds in the PICU
- Improve nursing participation on rounds to 90% of PICU patients

Project Strategy
- An interdisciplinary team involving physicians and nurses was formed.
- Barriers to nursing participation during rounds were identified by a survey of nurses.
- Interventions were designed to target the identified barriers. These interventions were implemented in series after observing their effects, akin to the Plan-Do-Study-Act paradigm.

Changes Made
- Nurses developed an acronym to guide their input, incorporating key elements of patient care most accurately known by bedside nurses (Figure 3). The “CLASS” acronym was widely publicized and was incorporated into the nursing sign out sheet.
- The resident presentations were reformatted to avoid repetition and superfluous information, thereby allowing time for nursing input. The residents were educated monthly about the new format, and were asked to pause during their presentations for nursing input.
- The rounding order was changed to allow nurses to anticipate rounding time on their patients. Previously, rounds were directed by the post-call resident; now rounding occurs in sequential order except as needed to accommodate subspecialty consultants. This has led to more consistent nursing availability.
- In the most recent cycle of changes, the bedside nurse now begins rounds for each patient. The resident presentation then follows, avoiding the need to pause for nursing input. This has led to improved participation and preparation by the nurses, and allows the residents to incorporate nursing information into their subsequent plans.

Outcomes & Lessons Learned
- Qualitative assessments have shown:
  - Increased nursing participation
  - More succinct and accurate resident presentations
  - Decreased overall rounding time
- Quantitative re-assessment of nursing participation and rounding time is ongoing.
- Sustained change will be an ongoing challenge.

Next Steps
Establish roles of other key interdisciplinary members such as respiratory therapy, dietician etc. in the rounding process

Acknowledgements
Special thanks to Kathleen Zielinski, RN, the physician and nursing leadership, attending physicians, and the house staff in the Comer PICU.
How ‘INFORMED’ are Graduating Medical Students at Obtaining Consent?
Audrey L. Tanksley, MD, Nancy Steward MD, Sean Gaffney M Ed, Kristen Hirsch, Jeanne Farnan, MD, Vineet Arora MD MAPP

1University of Chicago Pritzker School of Medicine, 2University of Chicago Graduate Medical Education

Background

- Informed Consent is a required skill for all specialties.
- Most patients don’t understand consent.
- AAMC endorses Core Entrustable Professional Activities for Entering Residency (CEPAER) which includes informed consent.
- Virtually no assessment methods to gauge skill competence among graduating students.

Methods

- Objective: To evaluate graduating medical student ability to obtain informed consent.
- Design: Prior to GME orientation, four specialties participated in an e-module consisting of pre-survey, webcast, post-test, and post-survey. A guideline for obtaining consent (I.N.F.O.R.M.E.D) was introduced and an example of how to use clinically was discussed. During GME orientation an Observed Standardized Clinical Encounter (OSCE) on obtaining informed consent was completed and feedback/evaluation was given by a faculty observer. Objective performance ratings and pre- and post-survey data were used to assess the effectiveness of the curriculum.

Results

<table>
<thead>
<tr>
<th>INFORMED</th>
<th>Guide to Obtaining Consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Hello my name is Dr. X and I am the intern taking care of you.</td>
</tr>
<tr>
<td>Nature of situation</td>
<td>Your labs show that your blood counts are low and this is the likely reason for your shortness of breath.</td>
</tr>
<tr>
<td>Feasible treatment (proposed)</td>
<td>We would like to give you a blood transfusion to quickly help relieve your symptoms.</td>
</tr>
<tr>
<td>Other treatments (alternatives)</td>
<td>Other ways to help besides transfusing blood is to start iron supplements, but this will not alleviate your symptoms right away.</td>
</tr>
<tr>
<td>Risks / Benefits</td>
<td>Risks of transfusion are allergic reaction, infection, and iron overload. The benefit is that most people feel better right away and have more energy.</td>
</tr>
<tr>
<td>Most likely adverse event(s) to occur</td>
<td>Most common problem is allergic reaction which can be associated with ... but this is why we will watch you in the hospital. Infection rates are low as all blood is screened.</td>
</tr>
<tr>
<td>Effect of no treatment</td>
<td>If you do not get the blood your body will make more blood over time, but you will likely have your symptoms for a while.</td>
</tr>
<tr>
<td>Do Not Coerce</td>
<td>There is no right or wrong answer; you should make the choice that is best for you.</td>
</tr>
</tbody>
</table>

Information Consent Demographics (N=87)

| Prior Training | 72 (83) |
| Satisfied with Training | 39 (45) |
| Infon Consent Experience | |
| No Experience | 16 (18) |
| 3rd year only | 5 (6) |
| 4th year only | 23 (26) |
| Both 3rd & 4th year | 43 (49) |

Facult Comments:

- “These sessions are quite effective: any thought to develop a faculty version? I.e. some similar or even more advanced case for faculty development?”
- “Very realistic experience with anxious and fearful patient with real concerns. SP had very good feedback and was engaging with the interns. I appreciated the experience and believe it is beneficial for teaching and for my own practice.”
- “I think that this will be helpful to incoming interns - gets them thinking ahead of time.”

Conclusions

- We describe a method to obtain and report objective documentation on CEPAER for residency programs.
- Although many interns reported prior training in less than half were satisfied with the training.
- Prior experience did not influence total checklist scores but did show higher self perceived satisfaction with performance.
- Future work will establish reliability of INFORMED tool and link performance in the OSCE to actual performance in a clinical setting.

References


Acknowledgements

- Dr. M. Howell and The University of Chicago Graduate Medical Education Office
- Internal Medicine, Surgery, Pediatrics and Obstetrics/Gynecology Program Directors and House staff

We created a pocket card with a guideline for obtaining consent that includes all key elements of the conversation.

We created an OSCE for the students to practice obtaining consent in a clinical environment.
Medical Home and Specialty Care Connection Program: Inpatient Cardiology

Authors: Michael Garber MPH, Charma Alcain APN, CNP, Lolita Smith MSW, Samira Qadir, MHA
Acknowledgements: Kimberly Hobson, Brenda Battle, Kirk Spencer, Dana Butler, Britanni Bryant, CHF Pathway Team, Patient Advocate Team, Strategic Affiliations Team

Background

- CMS penalizes hospitals for excess 30-day readmissions for patients discharged with congestive heart failure (CHF).¹
- CHF patients are most at risk for adverse events in the first 2 weeks after discharge. Approximately one-third of these are preventable with early intervention.²
- Half of readmitted Medicare patients were found to have been discharged without any follow-up.³ These patients also have a higher risk of readmission within 30 days.⁴
- The Medical Home Program began in the Adult ED in 2005 to assist patients with finding a medical home.
- The program was expanded to Adult Cardiology in Dec 2013 as part of the 30-day readmission reduction program.

Goals

- Increase the number of appointments made within 7 days of discharge for Cardiology.
- Identify barriers to timely follow up and educate patients on the importance of follow-up.

Results

- On average, since December 2013:
  - Patient advocates have made 220 appointments per month.
  - Each patient receives 2 appointments (min: 1, max: 8).
- The majority of appointments (83%) are at the University of Chicago Hospitals.
- 72% of appointments are specialty care connections.

Percent of discharges each month with 1st appointment within 7 days: In February 2015, 88% of discharges had their first appointment within 7 days of discharge.

Project Design

**During hospital stay**

- Patient advocate (P.A.) attends multidisciplinary rounds – residents identify patients with follow up needs
- P.A. goes to patient room to discuss follow up
- P.A. schedules appointments
- P.A. goes to patient room to inform patient about appointments and discuss importance of follow up

**After discharge**

- 2-3 days before appointment, P.A. makes reminder call to patients (up to 2x) If necessary, appointment may be rescheduled
- After appointment date, P.A. calls patient (up to 2x) to see if they went to their appointment and if they had any issues
- Discharge summary is transferred to apt site prior to apt date.
- For CHF pathway patients - transferred prior to discharge
- Patient is discharged

References

¹CMS Readmissions Reduction Program.
³Jencks 2009 NEJM 360 1418-1428.
⁴Hernandez 2010 JAMA 303(17) 1716-1722.

Data sources: UHl Patient Advocate Log, eSIMON hospital data.

Inpatient Cards: Appt show rates
- Overall show rate for appointments scheduled is 65%.

30-day readmission rate:
- Readmission rate was lower among patients with a patient advocate apt (17.0%).
- 30-day readmission rate by appt show status: Readmission rate was lowest among patients who showed for their first appointment (16.1%).

Although not statistically significant, the effect of a patient advocate apt on 30-day readmission rate is slightly stronger after adjusting for case mix index, race, insurance status, length of stay, and number of recent hospital admissions (odds ratio=0.93, 95% CI 0.690, 1.253).

Crude and adjusted effect of patient advocate appointment on 30-day readmission rate

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude</td>
<td>0.945</td>
<td>(0.718, 1.254)</td>
</tr>
<tr>
<td>Adjusted</td>
<td>0.930</td>
<td>(0.690, 1.253)</td>
</tr>
</tbody>
</table>

Lessons Learned

- Education and contact can increase patient engagement and clinic show rates.
- Program has led to an increased focus on follow up in multidisciplinary rounds
- Building relationships with non-UIC sites is important to scheduling timely follow up.
- P.A.’s relieve clinician burden so that clinicians can focus on delivering good care.
- Program is one intervention among many which may impact 30-day readmissions.

Next Steps

- Medical home program expanding to hospitalist general medicine service.
- Cards pathway expanding to cards patients throughout the hospital (currently 5SW and 5SE only).
Provider-Led Discharge Follow-Up Phone Calls
Caitlyn Crowe AGNP-BC, Joseph Giannini ANP-BC, Brian Callender MD, Tipu S. Puri MD, Madhu Yarlagadda MD, Emily Lowder PhD, RN

Background
- Transitions of care can be challenging and stressful for patients and families
- Patients transitioning from hospital to home are at risk for re-admission to the hospital
- Readmissions increase risks to patients, are costly and occur far too often
- Post-discharge phone calls aid in patient care transitions
- Post discharge calls made by hospital staff (Setia & Meade, 2009):
  - Prevent adverse events,
  - Improve patient quality of care,
  - Identify trends that may require improvements
- Patient compliance with discharge instructions
- Hospitals’ patients education efforts

Aims
- To ensure a safe and effective transition of care upon discharge through the implementation of a provider-led discharge phone call initiative

Project Design and Strategy
- Need for post discharge calls was identified on the Advanced Practice Service
- Initiative was named Discharge Follow-Up Phone Calls
- Initiative led by service APNs
- All patients discharged from the Advanced Practice Service receive a provider based post discharged follow up phone call within 48 hours of discharge.
- Calls are logged in a Discharge Follow Up Binder
- An Event Note is entered in the patient’s electronic medical record
- “Help” initiative is where the provider completing the post discharge call aids or helps the patient in a significant way to avoid adverse patient outcomes or re-admission
- Call to a patient consist of:
  - Review of prescriptions provided at discharge.
  - Determination if prescriptions provided were filled without complication.
  - Encouragement to keep upcoming outpatient appointments
  - Closure of the inpatient provider/patient interaction with referral to PCP for additional needs
  - Provider participation in initiative is a service metric

Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Total Calls</th>
<th>Successful Calls</th>
<th>Success Rate (Goal Above 50%)</th>
<th>NA Calls</th>
<th>Helps</th>
<th>Total Cens</th>
<th>Provider Compliance (Goal 100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>October</td>
<td>102</td>
<td>69</td>
<td>67.6%</td>
<td>33</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2014</td>
<td>November</td>
<td>120</td>
<td>69</td>
<td>57.5%</td>
<td>51</td>
<td>4</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2014</td>
<td>December</td>
<td>170</td>
<td>120</td>
<td>70.6%</td>
<td>50</td>
<td>6</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2015</td>
<td>January</td>
<td>156</td>
<td>94</td>
<td>60.3%</td>
<td>63</td>
<td>8</td>
<td>148</td>
<td>100%</td>
</tr>
<tr>
<td>2015</td>
<td>February</td>
<td>125</td>
<td>72</td>
<td>57.6%</td>
<td>53</td>
<td>1</td>
<td>113</td>
<td>100%</td>
</tr>
<tr>
<td>2015</td>
<td>March</td>
<td>154</td>
<td>83</td>
<td>53.9%</td>
<td>71</td>
<td>1</td>
<td>159</td>
<td>97%</td>
</tr>
</tbody>
</table>

Table 1. Discharge Follow-Up Phone Calls
- Consistently reaching more than 50% of our patients post-discharge
- Provider compliance rate of 97-100%

Challenges
- Reaching a higher percentage of discharged patients
- Incorrect contact information in electronic medical records

Conclusions
- Provider-led initiative to improve communication during the transition from hospital to home can:
  - Reach more than 50% of patients consistently
  - Provide assistance as needed to improve patient’s post-discharge care
  - Maintain nearly 100% provider compliance with initiative

Next Steps
- Determining how best to ensure successful communication with patient
- Ensuring up-to-date contact information
- Analyzing service re-admission rates to determine the impact the post-discharge calls

Acknowledgements
Special thank you to the Advanced Practice Service for all of their hard work in the success and continued growth of this initiative. As well as a special thank you to all of our service leaders and supporters: Dr. Puri, Dr. Yarlagadda, Emily Lowder, S. Blossomgame, Debra Albert, Stephen Weber.
Rounding for Care

Background
Nurse leader rounding is an important best practice if properly managed, standardized and monitored for sustainability. It has the potential to impact patient care, safety and satisfaction. Our research has shown that by designing and implementing a robust Nurse Leader Rounding program, we successfully improved our patient satisfaction scores. UCM strived to create a patient-centric environment of caring through efforts to capture real-time opportunities for engaging patients in their care and in their service expectations.

Aims
1. Understand the importance of bedside leader rounding as it applies to patient satisfaction and real time service recovery
2. Apply an approach to developing Leader Bedside Rounding on an inpatient unit

Project Design/Strategy
- UCM strived to create a patient-centric environment of caring through efforts to capture real-time opportunities for engaging patients in their care and in their service expectations
- Nurse Leaders were encourage and trained to round on inpatients on a daily basis
- Questions that were asked included care concerns, current needs of patients and any additional issues that patients needed addresses
- Focused rounding efforts on the quality of the engagement with patients and families initially rather than focus on a target number of patient rounds per day
- After inpatient encounters, patients were sent a survey asking the following questions
  - Overall rating of care given at hospital (Very Poor, Poor, Fair, Good, Very Good)
  - During your stay, did the nurse manager check on you daily to address your care and comfort need? (Yes/No)

A correlation study was done to compare the Overall Rating of Care scores for those who answered 'Yes' to rounding vs. those who answered 'No'.

Changes Made
- Rolled out the nurse leader rounding solution enterprise-wide to nurses in 32 in patient units
- Within four months, UCM nurse leaders had conducted nearly 12,000 rounds on more than 9,500 patients
- More than 2,800 positive staff recognitions were made

Outcomes & Lessons Learned
- Surveys were returned by 1466 patients discharged from inpatient units
- 77.76% of patients answered ‘yes’ in regards to experiencing nurse leader rounding on a daily basis. These patients' overall rating of care mean score was 93.62%
- Those not rounded on daily scored their overall rating of care at 80.83%
- There is a correlation between higher overall satisfaction of care received when a patient felt that they were rounded on by a leader (p-value < .0001)
- When implementing a new process, it is important to communicate its value and impact
- It is essential to acknowledge potential challenges for staff, address questions or concerns, and outline goals and value

Next Steps
- Expansion of Leader Rounding to other settings at UCM including ambulatory areas
- Determine the most appropriate time during an inpatient encounter to round on a patient to positively influence the perception of daily rounding
- Better evaluate and understand the most effective number of rounds to positively influence the perception of daily rounding

Acknowledgements
All Nurse Leaders, Andres Valencia, and LaTonya Macklin

Authors: Alison Tolty MD, Sue Murphy RN, Sunita Sastry, Mary Kate Springman, John Cursio
SIESTA (Sleep for Inpatients: Empowering Staff to Act): A Pilot Study

Background

Hospitalization: period of acute sleep loss (-2h)
• Nighttime noise exceeds safe levels
• Staff conversation #1 disruptor

The Scope of The Problem

Patients Sleep 2 Hours LESS IN THE Hospital Compared To Home

Aims

Develop, implement and evaluate an innovative educational program designed to prepare hospital staff to assist patients in obtaining better sleep in hospitals and recognize the importance of screening for sleep disorders.

Outcomes & Lessons Learned

• Piloted on general medicine service with 21 internal medicine residents & nurses
• Pre and post test & survey assessing knowledge, attitude, intent to change behavior

Referrals for inpatient sleep study increased by 89% (n=40) following the pilot of the SIESTA education and patient diagnosis of OSA increased by 66% (n=10).
• Hospitalization is a missed opportunity to screen for sleep disorders
• Although hospital staff think that screening for sleep disorders is important, they lack the ability to do so

All learners valued the SIESTA program and were inspired to change their practice
• Lack of generalizability
• Single institution
• Small pilot sample of residents & nurses

All learners (100%) reported
• video were realistic
• module was useful and effective
• Intent to change practice as a result of exercise

Next Steps

• Scale up to all nurses on a ward
• Integrate systems changes (batching optimizing vitals & labs at night)
• Examine impact of education on patient sleep and health

Project Design/Strategy

Pocket cards with STOP-BANG questionnaire & “SIESTA Checklist”

Tools (tape measures, pens) to remind staff to screen for sleep disorders

Acknowledgements

Created a trigger video vignette on common sleep disruptions based on patients report

Funding: American Sleep Medicine Foundation, National Heart Lung and Blood Institute R25 HL116372-01A1

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### STIGMA IN THE EMR: EXCLUSION OF PSYCHIATRIC DIAGNOSES FROM ACTIVE PROBLEM LISTS

#### Background
- >1,300 requests for consultation from psychiatry per annum
- **Common** for patients to receive different psychiatric diagnosis (dx) from different providers, outside institutions, and even within the same admission to hospital
  - No institutional data on how often (appropriate) psychiatric dx in EMR
  - No Specific Data in the medical literature on this subject
- Absence/incorrect documentation of psychiatric diagnosis can result in:
  - Lack of treatment and proper care
  - Failure to consult psychiatry
  - Perpetuation of other medical problems

#### Aims
To establish how well psychiatric disorders are represented in patients’ active problem list (APL), which is used as a snapshot to guide initial clinical care.

#### Project Design/Strategy
- Psychiatric Consultation Liaison (CL) Service at UCMC keeps log on all patients seen by service
- Retrospective Chart Review of 3 consecutive months (Jan-Mar 2014)
  - 125 charts randomly selected for review.
  - Exclusions: 22, 10 deceased; 5 unclear psych diagnosis; 7 incomplete or incorrect encounter or patient data.
- Compared psychiatric dx in Psychiatry Consult Note to that on Active Problem List (APL)

### PROCESS & OBSERVATIONS

#### PEOPLE
- Primary Team Consultants
- Social Work
- Case-Management

#### ENVIRONMENT
- My Chart
- Health Insurance Requirements
- HIPAA
- Patient values
- Time Constraints
- Other Medical Problems
- EMR
  - copy / paste
  - Errors in old notes

#### MATERIALS
- Computers
- Workroom
- Telephones
- Pagers

#### METHODS
- Chart Review
- Data Entry
- Dx codes
- Psych Interview

#### EQUIPMENT
- Exclusion of Psych Dx from Active Problem List

### Outcomes & Lessons Learned

<table>
<thead>
<tr>
<th>Agreement between Problems List and Consult Note:</th>
<th>Total Psychiatric Diagnosis in 125 charts=288</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict Agreement</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Modified Agreement (ex. MDD = Depression)</td>
<td>2 (0.69%)</td>
</tr>
</tbody>
</table>

#### Next Steps
Consider the need for Psychiatry Consult Service taking an active role in correcting globally available patient diagnostic information by:
1) Amending APLs to reflect proper psychiatric diagnosis.
2) Providing reminders in own notes and by way of verbal communication to primary inpatient teams to edit the problem list so future care providers will be aware of patients’ psychiatric needs

### Should this model change?
- Major discordance occurs in the documentation of psychiatric disorders despite CL service consultation

**Authors:** David Banayan MD, Marie Tobin MD
The Incidence and Explanation of Early Formula Supplementation in Newborns

Background

- The AAP recommends exclusive breastfeeding for all newborn infants for the first 6 months of life.
- Centers for Disease Control and Prevention (CDC) reports that if 90% of US women breast-fed exclusively for 6 months $13 billion could be saved due to direct and indirect medical costs.

Aims

To determine what percentage of infants born to mothers intending to breastfeed are supplemented with formula prior to hospital discharge and identify factors contributing to this trend.

Project Design/Strategy

- Retrospective chart review of Women delivering live infants at the University of Chicago department of Labor and Delivery between January 1, 2012 and June 15, 2012 and their respective infants.
- The population was broken down into those expressing a desire to breastfeed and those expressing a desire to supplement with formula.
- Demographic information, the mother’s health and prenatal history, as well as intrapartum and postpartum course was evaluated as well as the hospital course of the infant.
- Of those expressing a desire to breastfeed, their infants were further divided into 2 categories, those who were supplemented and those that were not.
- Logistic regression was employed to compare the groups.

Expectant Mothers n=650

Exclusive Breastfeeding n=218 (34%)

Non-Breastfeeding N=432 (66%)

Excluded (Faculty & Staff) n=18 (9%)

Breastfeeding n=500 (91%)

Breast and Bottle n=51 (21%)

Bottle Feeding n=264 (61%)

Supplemented during Hospitalization n=101 (51%)

Not Supplemented during Hospitalization n=19 (49%)

Supplemented at Discharge n=79 (78%)

Not Supplemented at Discharge n=22 (21%)

Table 1. Logistic Regression Results

<table>
<thead>
<tr>
<th>Odds Ratio</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td>0.989</td>
</tr>
<tr>
<td>First Time Mom</td>
<td>1.05</td>
</tr>
<tr>
<td>Delivery Complication</td>
<td>2.01</td>
</tr>
<tr>
<td>Maternal Complications</td>
<td>2.74</td>
</tr>
<tr>
<td>Multiples</td>
<td>1.39</td>
</tr>
<tr>
<td>Delivery Method</td>
<td>2.59</td>
</tr>
<tr>
<td>Teen Mom</td>
<td>1.72</td>
</tr>
<tr>
<td>NICU Admission</td>
<td>7.53</td>
</tr>
</tbody>
</table>

Outcomes & Lessons Learned

- More than 50% of the infants were supplemented with formula prior to discharge.
- The earlier the supplementation, the greater the number of instances and likelihood for supplementation at discharge.
- Cesarean delivery, transfer to the NICU, and prematurity were all risk factors for supplementation.
- The majority of incidences of supplementation were not in response to the medical indications set forth by the AAP.

Acknowledgements

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- Biostatistics services from the Department of Public Health University of Chicago.
- Guidance from my above mentioned mentors in the department of neonatology.

Next Steps

- Improve lactation consultation services available to mothers.
- Expand services offered in the Newborn Nursery to prevent transfer to the NICU for routine non-intensive care.
- Encourage rooming-in.
- Discourage supplementation when not medically indicated.

Authors: Melissa Andrianov MD, Leslie Caldarelli, MD, Bree Andrews MD, Joseph Hageman, MD, PI: Michael Schreiber MD
Use of an Observational Tool to Describe the Pediatric Perioperative Handoff Process

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Background

- Transitions of care between anesthesia and intensive care unit (ICU) have been shown to be fraught with technical and communication errors (1, 2) that have been linked to adverse events and patient harm (3).
- An association between poor quality handoffs and adverse events has been demonstrated, including technical and communication errors (4).
- Handoff failures account for half of the sentinel events rooted in “communication failures” as reported by the Joint Commission (5) and also for 20% of all malpractice claims in the United States (6).
- Improving handoffs has become a priority in efforts to improve patient safety.

Aims

To quantitatively assess the current perioperative handoff process from the operating room to pediatric intensive care unit (PICU) and identify potential areas for improvement.

Project Design/Strategy

- In 2013, attending and fellow physicians from anesthesiology and PICU embarked on a process to analyze and improve the pediatric perioperative handoff.
- In the initial phase, the literature was reviewed, personal interviews were conducted, and a needs assessment survey was sent to PICU physicians, nurses, anesthesiologists and surgeons in order to evaluate the perception of handoffs and identify barriers to communication.
- Subsequently, a standardized handoff form was developed and implemented.
- The current phase refines the handoff process analysis by objectively characterizing its components: transmission of information (accuracy, completeness, organization, and prioritization), achievement of a shared understanding of patient status and further management plans, teamwork (participation, communication, coordination and leadership), and handoff environment.
- A handoff observation tool was created and observations were recorded over a period of 2 months.

Changes Made

- The arrival time of handoff participants:
  - < 5 mins: 70% (complete)
  - 10 mins: 20% (incomplete)
  - 15 mins: 10% (incomplete)

- The transfer of information between the anesthesiologist and the PICU team is based on recall of intraoperative data from memory (89%).
- The omission of relevant facts is more frequent after long, complex cases, with higher numbers of intraoperative anesthesia handoffs.
- The handoff is mostly an asynchronous event (77%): communications occur on a 1:1 basis between various team members, at various times during handoff, sometimes in parallel. Up to 6 separate conversations were recorded.
- Surgical management plan was incompletely conveyed in 33% of the handoffs.

Lessons learned

- The quality of the handoff process is predicted by three factors: information transfer, shared understanding, and working atmosphere. Our observation tool reveals deficiencies in all these 3 domains.
- While the current standardized handoff form facilitates the transfer of perioperative information, certain important elements which are not easily captured in the broad strokes of the form are overlooked.
- The anesthetic record is electronically available for review but its integration into the handoff is cumbersome.
- Frequent discussion focuses on “numbers” and less on the substance of patient transfer - the context and rationale of intraoperative decisions and suggestions for further management.
- Lack of timely and uniform representation of all team members at the time of handoff decreases the efficiency of the process.

Next Steps

- Design an educational curriculum designed to improve the residents’ pediatric perioperative handoff skills.
- Create and utilize an EPIC integrated written intra- and peri-operative handoff template in order to facilitate accurate and systematic collection of handoff data.
- Explore interventions to increase handoff efficiency and ensure uniform participation of all involved disciplines.

References

1. Mistry K et al. Communication error during postoperative patient handoff in the pediatric intensive care unit.
3. Mazzocco K et al. Surgical team behaviors and patient outcomes.