Maternal Code Blue Improvements after OB In Situ Simulations

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BACKGROUND

• Define Problem/Reason for action:
  Inpatient Maternity Care services moved from Menino toYawkey building in Jan. 2016. This move had impact on emergency team response for cardiac arrest. The new unit was on one floor with an unfamiliar footprint in a building that was not a typical code blue response area.
  • The average hospital wide code blue calls for the entire institution was under 10 per month, making this a low volume, high acuity situation. Maternal code blues occurred at an even lower volume.
  • In situ simulation based education has been shown to provide opportunities for staff to practice low volume, high acuity situations in their workplace. In situ simulations also assist in identifying process and system issues in real time.
  • American Heart Association (AHA) 2015 statement on cardiac arrest in pregnancy stated: “There should be one call to action that activates the maternal cardiac arrest team, notifies all members, and ensures that specialized equipment is brought to scene without delay.”

• Provide baseline performance data:
  • Declining number of code blues at BMC related to implementation of Rapid Response Teams (RRT) and earlier detection of worsening patient clinical status.

• Define project scope:
  • A series of 2-hour in situ sessions on the new unit focusing on a maternal cardiac arrest scenario to provide both maternal care team and internal medicine code team responders with ability to practice code blue response in the new maternity setting

AIM

• Measurable goals:
  • Response time of adult code blue team: Way finding and access to the new unit
  • American Heart Association (AHA) 2015 statement on cardiac arrest in pregnancy stated: “There should be one call to action that activates the maternal cardiac arrest team, notifies all members, and ensures that specialized equipment is brought to scene without delay.”

• Objectives:
  • Testing systems for new maternal inpatient space in Yawkey building
  • Provide continued support of OB-DYN team department training goals
  • Prove viability of an ongoing in situ simulation training program

• Project outcome metrics:
  • Improve maternal cardiac arrest response by decreasing arrival time of adult code blue team, allowing maternal team to respond to specific maternal code blue roles of perinatal team to deliver infants and fetal outcomes.

METHODS

Describe methods:
• Curriculum design that includes maternal cardiac arrest for in situ team training simulation.
  • Program to be 2 hours in length, offered twice a month on 1st Monday of the month in the morning and 3rd Monday of the month in the evening.
  • Participants to include all members of responding teams:
    • OB, MDs, Family medicine, (neonate nurse midwives), RNs, Anesthesia, OR scrub
    • Code Blue-Inpatient Medicine MDs, Anesthesiology, Resource Room, ICU RNs, Respiratory Therapy, Pharmacy, Transport, Security, OMM/NMM, Social Work, and materials management
  • Simulation to be followed by comprehensive team debriefing lead by trained facilitators from OB, Internal Medicine, and Nursing
  • Debriefing to include discussion of the following aspects of situation and response:
    • Notification process for the code blue,
    • Response route, access
    • Medical care and algorithm
    • Maternal arrest interventions
    • Crisis Resource Management principles: communication, leadership, roles, and resource usage
    • Identification of trends, performance gaps, and participant process suggestions that arise from simulation observation and debriefing discussion with interdisciplinary participants
  • Facilitators to document for each session:
    • Page response/ overhead response
    • Team member arrival times
    • Time to identification of the ACLS algorithm
    • Time to implementation of appropriate interventions
    • Gaps identified form scenario observation and debriefing discussion
  • Data all identified to be shared with all group designers to review the curriculum for the next session to further test gaps and solutions

ISSUES & CONCLUSIONS

An explanation of the changes made to achieve improvement in the targeted process

• Clarity of paging: Misleading pages
  • Confusion on exact location-old location building part of initial pages misdirecting staff to wrong unit
  • Telecom to set up code page with building, but Yawkey was not a choice available- this was added to the paging tree
  • Multiple units on one level (I&D, OB/PACU, Trauma, 2 Mother-baby wings, Nursery, NICU)
  • Nomenclature for calling a code blue on Yawkey 4 developed

• Roles and Responsibilities: What is the role of each responder, who leads the code?
  • Table developed to outline each responders roles and responsibility (see table)

• Special considerations for a maternal code: per AHA statement:
  • Development of role and responsibility table and visual aid for code cards (see below, “Maternal Cardiac Arrest Reminders”)
  • Delivery of maternal Code Blue Policy (48 pregnant patients no matter where located in the hospital)

Maternal Perinatal Cesarean Delivery (PMCD) and timely arrival of the emergent Cesarean case in setting maternal cardiac arrest: identified delays of 10 minutes to bring maternal team to patient’s bedside
  • Scrub tech added to pager # 147147 to bring scalpel, betadine and kit to code setting

RESULTS

Summary of performance results
• There have been 9 sessions since January with 113 participants
  • All trainings were truly multidisciplinary: if entire team not able to be present, or the in situ area had no space, the session was canceled
  • Debriefing discussions identified process and system issues leading to policy changes
  • Clarification of maternal code blue paging and addition of Yawkey to code blue response tree

In situ simulation based education has been shown to provide opportunities for staff to practice low volume, high acuity situations in their workplace. In situ simulations also assist in identifying process and system issues in real time.

• Addition of perinatal Cesarean delivery to pediatric, NICU, maternal code blue role of perinatal team to achieve immediate delivery of infants and fetal outcomes.

• Project outcome metrics:
  • Time to identification of the ACLS algorithm
  • Facilitators to document for each session:
    • Page response/ overhead response
    • Team member arrival times
    • Time to identification of the ACLS algorithm
    • Time to implementation of appropriate interventions
    • Gaps identified form scenario observation and debriefing discussion

Project Summary
• This process was successful in identifying issues that may have compromised patient safety and will be useful as BMC continues with the redesign and patient unit moves during the addition to the inpatient units

• Lessons learned:
  • Implementation of an in situ simulation team training highlighted system and process gaps that needed to be addressed to improve the low volume, high acuity maternal cardiac arrest response.
  • Analysis of the identified gaps and implementation of systems improvements culminated in the development of a new Maternal Code Blue policy that addressed the unique needs of this patient population based on recommendations from the 2015 AHA guidelines for cardiac arrest in pregnancy
  • In situ simulation was instrumental in identifying performance gaps related to the move of a specialty unit to an area of the hospital new to inpatients

• Summary of findings:
  • Moving a complex unit such as maternal services to a new location required in situ simulations to assess the overall functioning of the emergency response teams, both internally and hospital wide.
  • The move required new of processes and implementation of new hospital wide policy and increased awareness of cardiac arrests in this specific patient population

• Plan for sustainability:
  • This process was successful in identifying issues that may have compromised patient safety and will be useful as BMC continues with the redesign and patient unit moves during the addition to the inpatient units

• Plan for spread:
  • Expansion of in situ code blue training in other new units prior to and after location moves for system testing and performance gap identification. The interdisciplinary nature of the Simulation Center clinical leadership supports this goal

• Plan for next steps:
  • Continue with the twice monthly in situ simulation, cycling in staff who have not yet participated: goal of 100% participation over 12-18 months
  • Monitoring of all Maternal codes for implementation of process changes or identification of other issues that develop
BACKGROUND

- Massachusetts is currently experiencing an opiate epidemic
  - 1,531 Massachusetts residents died of opiate overdose in 2015.
  - A 41% increase over cases in 2013 (n=918).
- Over-prescription of opiates by physicians may be contributing to this epidemic
  - 70.3% of opiates used in non-medical purposes are obtained from a friend or relative (Jones, Paulozzi, Mack 2014)
  - 4 out of 5 current heroin users report that their opioid use began with prescription opiate analgesics (Muhuri, Grofuer, Davies 2013)

AIM

- To examine the incidence of opiate over-prescription after inpatient surgery at Boston Medical Center

METHODS

- Retrospective chart review of 13,661 BMC patients
  - Inclusion Criteria:
    - Had Inpatient surgery from 5/24/2014 to 6/30/2016
    - Hospital stay > 24 hours
    - Discharged home
  - Exclusion Criteria:
    - Any patient not discharged by 6/30/16 (5 patients).
    - Any patient who received patient controlled anesthesia (PCA) (3,013 patients).

OPIATE USE AFTER SURGERY

- 8,607 patients underwent surgery requiring an inpatient admission greater than 24 hours
- 27% of patients did not require any opiate medications in the last 24 hours prior to discharge
- Patients who were able to get off narcotics were able to stop requiring narcotics ~2.5 days after surgery
- These patients tended to be:
  - Older
  - Male
  - Have longer admissions
  - Undergo shorter surgeries
  - Have less blood loss

OVER-PRESCRIPTION ON DISCHARGE

- 41% of patients off opiates by time of discharge were prescribed opiates
- Over-prescription accounted for for 12% of all narcotics prescribed to post-operative patients
- Services with the lowest rate of patients getting off narcotics had the highest rate of over-prescription

OVER-PRESCRIPTION ON DISCHARGE

<table>
<thead>
<tr>
<th>Service</th>
<th>Length of Stay &gt; 24 hours</th>
<th>No narcotics within 24 hours prior to discharge</th>
<th>Percent of narcotics taken by time of discharge within 24 hours prior to discharge</th>
<th>Off narcotics AND discharged with opiates (OVERPRESCRIBED)</th>
<th>Percent total narcotics overprescribed (OPIATE OVERPRESCRIBED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurosurgery</td>
<td>618</td>
<td>590</td>
<td>82.2</td>
<td>62.2</td>
<td>52%</td>
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<tr>
<td>Orthopedics</td>
<td>6,045</td>
<td>5,938</td>
<td>98.5</td>
<td>98.5</td>
<td>12%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>64</td>
<td>64</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Polarity</td>
<td>214</td>
<td>214</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Complete</td>
<td>726</td>
<td>717</td>
<td>92.5</td>
<td>92.5</td>
<td>92.5</td>
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<tr>
<td>Vascular</td>
<td>64</td>
<td>64</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
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<td>114</td>
<td>95.9</td>
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<tr>
<td>Pediatrics</td>
<td>57</td>
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</tr>
<tr>
<td>Polarity</td>
<td>261</td>
<td>261</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Complete</td>
<td>1,365</td>
<td>1,363</td>
<td>99.8</td>
<td>99.8</td>
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</table>

OPIATE USE AFTER SURGERY

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Length of Stay &gt; 24 hrs</th>
<th>Off narcotics within 24 hrs prior to discharge</th>
<th>On narcotics within 24 hrs prior to discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Patients</td>
<td>6,045</td>
<td>5,938</td>
<td>98.5</td>
</tr>
<tr>
<td>Number of Admissions</td>
<td>9,895</td>
<td>2,092</td>
<td>7,003</td>
</tr>
<tr>
<td>Age (Mean ± Min-Max)</td>
<td>45.8 ± (1–97)</td>
<td>46.7 ± (1–97)</td>
<td>42.8 ± (1–97)</td>
</tr>
<tr>
<td>Sex (Male/39%)</td>
<td>0.54</td>
<td>0.54</td>
<td>0.54</td>
</tr>
<tr>
<td>BMI (Mean ± Min-Max)</td>
<td>29.5 ± (18.8–38.0)</td>
<td>27.6 ± (18.8–38.0)</td>
<td>32.2 ± (18.8–79.6)</td>
</tr>
<tr>
<td>Length of Stay (days)</td>
<td>5 (1–302.4)</td>
<td>5.0 (1–302.4)</td>
<td>4.4 (1–86.4)</td>
</tr>
<tr>
<td>Weight of Previous meals (kg)</td>
<td>88.4 (70.4–194.4)</td>
<td>91.1 (70.4–194.4)</td>
<td>95.5 (70.4–194.4)</td>
</tr>
<tr>
<td>Blood pressure (mm Hg)</td>
<td>95 (1–288)</td>
<td>76 (1–705)</td>
<td>99 (1–798)</td>
</tr>
</tbody>
</table>

OPIATE USE AFTER SURGERY

<table>
<thead>
<tr>
<th>Opiate Prescription and Consumption</th>
<th>Number of Admissions</th>
<th>Number of Patients discharged home on opates</th>
<th>Mean time of last opiate taken in 24 hours prior to discharge (mg oxycodone)</th>
<th>Mean time of last opiate on discharge (mg oxycodone)</th>
<th>Total opiate on discharge (mg oxycodone)</th>
<th>Mean time of fast opiate from discharge (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Admissions</td>
<td>9,895</td>
<td>2,092</td>
<td>7,003</td>
<td>0.01</td>
<td>2,772,931</td>
<td>0.7</td>
</tr>
<tr>
<td>Mean time of last opiate taken in 24 hours prior to discharge</td>
<td>5.0 (1–302.4)</td>
<td>5.0 (1–302.4)</td>
<td>4.4 (1–86.4)</td>
<td>29</td>
<td>29</td>
<td>2,772,931</td>
</tr>
<tr>
<td>Mean time of last opiate on discharge</td>
<td>20.0 (1–302.4)</td>
<td>20.0 (1–302.4)</td>
<td>20.0 (1–302.4)</td>
<td>0.01</td>
<td>0.01</td>
<td>2,772,931</td>
</tr>
<tr>
<td>Total opiate on discharge (mg oxycodone)</td>
<td>2,772,931</td>
<td>2,772,931</td>
<td>2,772,931</td>
<td>20.0</td>
<td>20.0</td>
<td>2,772,931</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- Over-prescription of opiates after surgery occurs regularly at BMC
- A simple model could eliminate over-prescription and standardize narcotic prescription

NEXT STEPS

- Implement a EMR-based protocol to recommend opiate prescription at discharge
- Track opiate prescription and determine if the protocol is able to reduce over-prescription

REFERENCES

BACKGROUND

CANCER CARE SERVICES AT BMC
• Provide comprehensive, multi-specialty team-based care for a wide range of cancer types
• Recipient of American College of Surgeons’ Commission on Cancer Accreditation for comprehensive cancer center
• Continuously review care outcomes and patient satisfaction to improve quality
• Readmissions may lead to reduced quality of life and quality of death

ADVANCED CARE PLANNING (ACP)
• ACP is an important component of person centered care
• ACP improves alignment of care with patient wishes and reduces intensive treatments and hospitalizations at the end of life, results in earlier and increased referrals to hospice care, increases patient and family quality of life and satisfaction with care.

PRELIMINARY STUDY
January - June 2014 a retrospective chart review of all readmitted patients from the hematology and Oncology service at BMC in a 6 month period
Mortality rate within 1 year of discharge: 32.8% (non-elective readmissions) 19/58
• Mean days to death from readmission discharge: 65 days (range 0-252)
• 84.2% of those who died had metastatic cancer in index admission
• Only 37% ever had a palliative care consult placed (all on readmit)
• Only 17% had a documented EOL discussion on index admission
• 38.5% of patients had lung CA (22% of all non-elective readmissions)

ADVANCED CARE PLANNING (ACP) AT BMC

SOLUTIONS: SEVERITY OF ILLNESS TOOL (SOI)

AIM
• Identify characteristics of patients who are readmitted to the oncology service
• To standardize the trigger for Palliative Care Consults and ACP discussions (administration of a novel Severity of Illness (SOI) tool on all admitted oncology patients)
• To determine if the addition of earlier ACP discussions and palliative care improves specific patient outcomes?
  • Quality of life/death (measured through reported patient experience, and access to support services)
  • Readmissions rate

METHODS
• A novel Severity of Illness (SOI) tool was created by the interdisciplinary team
• ACP discussions and/or palliative care consults were indicated within 72 hours for those who score 4 or greater on the tool.
• Hematology- Oncology providers were educated about the intervention during grand rounds, at team meetings and during huddles on the unit.
• All patients admitted to the hematology-oncology service from January 4, 2016 through June 30, 2016 were scored during daily interdisciplinary rounds.
• Retrospective chart reviews determined whether the proposed interventions were completed and documented.
• BMC providers created a new ACP documentation template in the electronic health record.
• Mortality outcomes of study participants will be followed for 1 year post-completion of the study

RESULTS
• Standardization the trigger to initiate ACP discussions and access to Palliative Care in the oncology inpatient population was beneficial to improving communication for the team and patients.
• Even with the SOI there was a communication gap amongst with primary oncologist in regards to ACP at this institution
• SOI Tool was administered at daily rounds to inpatients admitted to the Hematology/Oncology Service January 4, 2016-June 30, 2016
• 96% of patients admitted to the Hematology/Oncology service had the SOI completed
• 48% of patients that scored in with 4 or greater on SOI had an ACP discussion with either Palliative Care or primary team.

CONCLUSIONS
• This work suggests more investigation is needed to identify specific communication and organizational barriers to ACP services such as Palliative care
• This study revealed the value a structured SOI tool can provide to a busy interdisciplinary team as a trigger for ACP

NEXT STEPS
• Utilize an electronic objective SOI Tool to Identify patients with advanced illness and to trigger ACP in the inpatient oncology population at BMC.
• Validate the SOI novel tool with a retrospective chart analysis performed on a similar subset of (300-350) Hematology/Oncology patients.
• Data points to be examined
  • Score on Tool
  • Age, gender, living situation, admit diagnosis
  • Readmissions, days to death, symptomatology, symptom type
  • ACP discussions, Palliative Care consults
• Explore the attitudes and beliefs of the Hematology/Oncology team in regards to ACP. Collect qualitative data via interviews to gain perspective on ways to positively impact culture and partnerships.

Contact: Nicole.Lincoln@bmc.org with any questions
**BACKGROUND**

Clostridium difficile infections (CDI) are the leading cause of healthcare-associated diarrhea, and is reported to cause 500,000 patient infections in the United States per year. The Centers for Medicare and Medicaid Services (CMS) has established a target for reducing the number of CDIs.

Boston Medical Center’s reported CY2013 Standardized Infection Ratio (SIR) for Hospital Onset CDI was 1.573, above the US National Benchmark of 1.

In Scope: Inpatient, Emergency Medicine; ordering of C Diff PCR testing; Laboratory acceptance/ rejection of samples; Nursing collection processes

Out of Scope: Ambulatory Care, Observation Unit, Laboratory and Nursing processes outside of In Scope

**AIM**

- Reduce the SIR Hospital Onset Clostridium difficile infections reported to CMS expected ratio of ≤1 by June, 2016.

**METHODS**

- Using Quality Improvement methodologies a multidisciplinary team addressed the appropriateness of C. diff PCR testing and increased patient isolation through the use of the electronic medical record.
- Methods for data collection included the creation of Workbench reports (Epic eMR), Clarity Reports (data warehouse), and chart review

**RESULTS**

- Through the use of QI and leveraging changes in the eMAR can improve appropriate testing and patient isolation reducing the risk of hospital acquired Clostridium difficile infections

**CONCLUSIONS**

- Establish sustainment plan including the monitoring of performance
- Establish of thresholds for performance on when future interventions are required

**NEXT STEPS**

- Decreased test volume by 54%
- Reduced inappropriate repeat testing:
  - 7 day negative by 80%,
  - 30 day positive by 66%
- Improved Contact Plus Isolation at time of test order from 12% to 84%

**OUTCOME MEASURE:**

- Achieved SIR 4 quarter average 0.78, better than national goal.
### Background

- Vaso-occlusive episodes (VOE) is the most common reason adults with sickle cell disease (SCD) seek care in the Emergency Department (ED).
- Providing timely treatment for acute VOE in the ED setting is challenging, as 1st parenteral dose should be given within 1 hour of arrival and subsequent doses every 15-30 minutes.

### Objective

To improve care for VOE, based on national guidelines:
- Triage acute VOE as emergency severity index (ESI) 2
- Provide 1st parenteral (IV/IM) opioid within 60 mins of arrival
- Provide 2nd parenteral (IV/IM) opioid within 30 mins of 1st dose
- Initiate PCA in the ED for those requiring admission

### Methods

- Setting: Adult level 1 trauma center with 120,000 visits annually within an academic, urban, safety-net hospital.
- 200 adults with SCD receive care at BMC Adult Hematology
- Study Sample:
  - Uncomplicated vaso-occlusive pain episodes
  - Exclusion dx: Fevers, ACS, atypical chest pain, priapism, abdominal pain, headache, severe anemia, DVT/PE
  - Moderate or severe pain (≥5 of 10 on Numeric Rating Scale)
  - Received 2+ doses of parenteral opioids (IV or IM)
- Interventions:
  - Multidisciplinary team: MD (ED and hematology), RN, pharmacy, data analyst
  - Standardized algorithm
    - ESI=2 at triage
    - 1st parenteral opioid dose given within 60 minutes of arrival
    - Total of 3 doses of opioids given every 30 minutes
    - Start PCA for admitted patients
  - Individualized care plans: Brief clinical snapshot and doses for opioids, including PCA settings
  - Education for all ED staff
    - QI lead met with RN staff in Oct 2015 & Feb 2016
    - Email communication with residents & attendings
  - EPIC Order set: Can order 1st parenteral dose + 2 additional doses prn

### Results

<table>
<thead>
<tr>
<th>Item</th>
<th>n=130 subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr; average (SD)</td>
<td>29 (12)</td>
</tr>
<tr>
<td>Female, # (%)</td>
<td>66 (51%)</td>
</tr>
<tr>
<td>Hb SS genotype, # (%)</td>
<td>78 (60%)</td>
</tr>
<tr>
<td># ED visits for VOE, median (range)*</td>
<td>2 (1-44)</td>
</tr>
</tbody>
</table>

* among those with an ED visit; 30% adults with SCD not seen in ED during this time

### Summary

- Time to first pain medication met guidelines of 60 minutes, times to subsequent doses (medians) trending towards goal of 30 minutes
- No change seen in proportion discharged

### Limitations

- Process measures; need to collect data on outcomes such as patient satisfaction, 30 day readmission rates

### Conclusions

- Proof that one of the busiest EDs in the country can provide high quality care for VOE by using an algorithm & individualized care plans

### Acknowledgements

- Adults living with SCD and their families
- Department of Emergency Medicine: Jon Olshaker, MD
- Hospital Leadership: Alistair Bell, MD, MBBS; Stan Hochberg, MD; James Moses, MD, MPH
**Initiation of a Pharmacologic Prophylaxis Program to Prevent Obstetric Associated Venous Thromboembolism**

**BACKGROUND**
- While the absolute risk for venous thromboembolism (VTE) is low, VTE persists as a leading cause of preventable maternal mortality in the United States. (Creanga et al 2015, Obstet Gynecol. Jan;125:1)
- Pregnant and postpartum women are at elevated risk for a VTE during pregnancy; pregnancy was found to confer four times the risk of experiencing a VTE event compared to non-pregnant counterparts in a 30-year population-based study. (Heit et al 2005, Ann Intern Med. Nov 143:10)
- Prior to the start of the current effort, medical students initiated a project employing a teach-back method to educate patients on their VTE risk and appropriate prophylaxis measures. At baseline, providers in Labor and Delivery used paper forms to assess risk using the Physician-Patient Alliance for Health & Safety (PPAHs) guidelines, and entered the result in the patient’s chart. (Nath et al 2015, Obstet Gynecol. Jan;125:1)
- To prevent VTE in high risk women delivering at BMC.
- An estimated 45% of the patient population in Labor and Delivery at BMC are at high risk for a thromboembolic event per Safe Motherhood Guidelines. (Heit et al 2005, Ann Intern Med. Nov 143:10)

**AIM**
- To adopt new set of VTE risk assessment and prophylaxis guidelines and train all frontline providers on L&D by December 2015.
- Increase the percentage of L&D admitted patients who have a VTE risk assessment documented to 80% by June 2016.
- Increase the percentage of VTE risk assessment result documented in the patient’s problem list to 80% by June 2016.
- Increase the percentage of high risk postpartum women receiving prophylactic enoxaparin in-house to 80%
- Roll out a hard coded VTE Risk Assessment and order set by July 2016.

**METHODS**
- We used the Institute for Healthcare Improvement (IHI) Model for Improvement and a Plan-Do-Study-Act methodology.
- We developed a chart abstraction tool to gather data on risk assessment practices during antepartum and postpartum admissions as well as to measure prophylaxis practices.
- We determined a multimodal strategy involving provider education on risk assessment and patient education on the risk of VTE would encourage delivery and acceptance of prophylactic measures. Provider teaching and performance feedback occurred during regularly scheduled meetings and patient teaching was delivered at the bedside. We also developed an informational handout for patients (Figure 1).
- First, second and third-year medical students audited antepartum and delivery admission charts on a weekly basis.
- Providers performed a retrospective chart audit to establish our baseline data set.
- We initiated a plan for an ongoing dashboard of key metrics from the project, including percentage of patients with documented risk assessment, percentage of patients who are high risk based on risk assessment, percentage of high risk patients who receive or have a documented declaration for enoxaparin, and percentage of high risk patients who have a prescription for enoxaparin at discharge.
- Future opportunities for improvement include adding Meds to Bed (process mapping ideal state and ensuring providers have administrative support).
- **RESULTS**

**BACKGROUND**

**AIM**

**METHODS**

**RESULTS**

**CONCLUSIONS**

**NEXT STEPS**
Reducing Length of Hospitalization for Neonatal Abstinence Syndrome Through Non-Pharmacologic Care & Methadone

Elisha Wachman, MD; Susan Minear, MD; Bobbi Philipp, MD; Ginny Combs, MSN, RN; Karan Barry, RN; Kristine Smith, RN; Cathleen Dehn, RN, PhD; Donna Stickney, RN; Kate Mitchell, RL; Rachel Goldstein, RN; Nicole Penwill, RN; Sheila Jane Lewis, NP; Rishitha Bollam; Nancy Desai; Jennifer Driscoll, RN, IBCLC; Robin Humphreys, RN, IBCLC; Hannah Simons, RN; Judy Burke, RN; Lauryl Ramakrishnan, NP; Camilla Farrell, PharmD; Katie Yasigian, SW; Jordana Price, MD; Michelle Sia, DO; Kelley Saia, MD; Davida Schiff, MD.


BACKGROUND
- Neonatal Abstinence Syndrome (NAS) due to in-utero opioid exposure has increased 5 fold over the past decade.
- BMC specializes in the care of women with opioid use disorders in pregnancy, caring for them through Project RESPECT.
- BMC cares for ~120 newborns/year with in-utero opioid exposure, accounting for 12% of all opioid-exposed infants in the state.
- Infants who require pharmacologic treatment for NAS are hospitalized for 2-3 weeks with a significant burden on the inpatient pediatric services.
- Pre-intervention, BMC was pharmacologically treating 82% of all infants.
- BMC was utilizing neonatal morphine as first-line pharmacologic treatment with a mean LOS for treated infants of 20 days.

What does the evidence say?
- Strict use of the Finnegan NAS scale (a 20 item scale of symptoms yielding a numerical total score) for medication decisions may lead to over-treatment. Prioritizing key symptoms that impact infant functioning (“eat/sleep/console”) may be better practice.
- Non-pharm care methods such as breastfeeding and rooming-in can result in improved outcomes.
- While morphine and methadone are both commonly used, methadone may be more beneficial in reducing LOS.

AIM
- By June 2017, we aim to reduce our need for pharmacologic treatment to 50% and LOS for all opioid-exposed infants by 30%.
- By December 2016, we aim to reduce our LOS for treated infants by 20%.

METHODS
- Multidisciplinary QI team including physicians, nurses, nurse practitioners, medical and public health students, lactation consultants, pharmacists, and social workers from the NICU, Mother-Baby Unit, Pediatric Inpatient Unit, and Project RESPECT in place since 2013.
- Spring 2016: Team set new aims to reduce pharmacologic treatment rates
- Spring 2016: Lean QI methodology was used to identify causes for maternal-infant separation during the hospitalization that could impede optimal non-pharmacologic care
- Stakeholder interviews with staff and parents
- Outreach to other NAS centers who have successfully achieved these goals with BMC site visit in June 2016
- Plan-Do-Study-Act (PDSA) cycles initiated using the IHI Model for Improvement
- On-going monthly data collection of NAS inpatient outcomes: need for medication treatment, LOS, secondary medication use, parental presence at the bedside, breastfeeding rates

SOLUTIONS
- **PDSA #1: Non-Pharmacologic Care = First-line Treatment for NAS**
  1. Staff education: Resident physician education monthly; Healthstream and in-person in-services for all nurses
  2. Change in prenatal messaging about non-pharmacologic care
  3. "Bundle of Care" handout and education given to all mothers
  4. Change in physician score interpretation > focus on functioning of the baby (“eat/sleep/console”) rather than the total score
- **PDSA #2: Switch to methadone as first-line pharmacotherapy**

RESULTS

**% Pharmacologically Treated of all opioid-exposed infants 2014-2016 (n=261)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Pharmacologic care bundle</th>
<th>Change in physician NAS score interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>82%</td>
<td>40%</td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Need for Secondary Medications 2014-2016 (n=217 treated infants)

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Pharmacologic care bundle</th>
<th>Change in physician NAS score interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Length of Hospitalization full-term opioid-exposed infants 2014-2016 (n=261)

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Pharmacologic care bundle</th>
<th>Change in physician NAS score interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>18.6 days</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- LOS for treated infants: **20.3 days (pre) -> 15.5 days (post)**

**BMC Hospitalization Cost Estimation Pre and Post Intervention**

- $2091 per infant per hospitalization day
- 120 opioid-exposed infants annually

CONCLUSIONS
- Focus on non-pharmacologic care, parental engagement, and more thoughtful NAS score interpretation resulted in a 40% reduction in need for pharmacotherapy and 50% reduction in LOS for opioid-exposed newborns.
- LOS for treated infants was also reduced by 25% with no secondary agent use, suggesting benefit from the switch to methadone.

NEXT STEPS
- Dedicated volunteer cuddler program to begin in November 2016 to assist with non-pharmacologic care
- Lactation peer counselor program to begin in December 2016
- Coordinate with residential and outpatient addiction treatment programs to increase time parents spend at the infant’s bedside
- Assist parents with transportation, parking, and other barriers to being at the infant’s bedside
- Validation of new functional NAS assessment tool

Contact: Elisha.Wachman@bmc.org
The purpose of this quality improvement report is to describe the collaboration between pharmacists and medical professionals at a hospital to improve patient outcomes. We used the Model for Improvement as a framework to guide our efforts.

### Aim

- Reach 100% provision of desired pharmacy services by July 2016

### Background

- Clinical pharmacy services in renal transplant centers decrease healthcare costs and improve patient outcomes. OPTN guidelines currently suggest that transplant programs provide comprehensive pharmacy services to transplant recipients.
- Previously, transplant services at our institution were limited to medication profile review for drug interactions as part of the pre-transplant eligibility assessment and post-transplant inpatient medication profile review.
- Following an OPTN accreditation visit, transplant surgery partnered with pharmacy to increase pharmacist involvement.
- The purpose of this quality improvement report is to describe the collaboration between pharmacy and transplant surgery to provide increased comprehensive pharmacy services to kidney transplant recipients.

### Interventions

- Renal medicine pharmacist position, transplant responsibilities reallocated to surgical ICU
- PICU pharmacist assisted with cysnursing rate evaluation and discharge profile review
- UNOS/OPTN accreditation site visit led to request for expanded pharmacy services
- New ambulatory pharmacist position created (0.5 FTE for transplant clinic)
- PGY-1 pharmacy residency adherence assessment project
- Inpatient transplant pharmacy services continuing education for inpatient pharmacists
- Pharmacist began discharge medication education with kidney transplant recipients
- Discharge medication kits created (pillbox, meds, BP monitor, thermometer, pill splitter)
- Creation of specialty pharmacy management program to coordinate and mail all medications
- Start using MedActionPlan program for developing medication lists for discharge/follow-ups
- De-centralized inpatient pharmacists trained on discharge process (discharge kit, MedActionPlan discharge medication reconciliation, education, pillbox)
- Standard EHR documentation
- Standard discharge prescription quantities, instructions for outpatient pharmacy
- Outpatient pharmacy technician position created, started specialty pharmacy program
- Comprehensive transplant pharmacy services continuing education for inpatient pharmacists
- Developed and implemented consensus recommendations for immunosuppressive therapy for kidney transplant recipients
- Developed knowledge assessment questionnaire for inpatient and outpatient use
- Created pillbox teaching tool (using beads) for inpatient and outpatient use
- Applied for patient safety grant for MedActionPlan Pro (in English, Spanish, Arabic, and Haitian Creole)
- Protocol development for CYP3A5 genotype guided tacrolimus dosing and secondary hyperparathyroidism

### Results

- Increased the provision of comprehensive pharmacy services provided to kidney transplant recipients and may be associated with shorter hospital length of stay and reduced 30-day hospital readmissions.

### Lessons Learned

- The addition of an outpatient ambulatory care clinical pharmacist and technician and increased involvement of inpatient clinical pharmacists improved the provision of comprehensive pharmacy services provided to kidney transplant recipients and may be associated with shorter hospital length of stay and reduced 30-day hospital readmissions.

### Acknowledgements

- Pharmacy: Sharon Beggs, Sylvia Chan RPh, Johnny Lam RPh, Bobby Sivarath RPh
- Transplant: Sandeep Gahle MD, Arshabaud Gautam MD, Linda Pelletier RN, Karen Curreri RN, Ellen Simpson RN

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**Figure 1: Timeline of Expansion of Pharmacy Services**

- 2012: Renal medicine pharmacist position, transplant responsibilities reallocated to surgical ICU
- 2013: PICU pharmacist assisted with cysnursing rate evaluation and discharge profile review
- 2014: UNOS/OPTN accreditation site visit led to request for expanded pharmacy services
- 2015: New ambulatory pharmacist position created (0.5 FTE for transplant clinic)
- 2016: PGY-1 pharmacy residency adherence assessment project

---

**Figure 2: Discharge Transplant Pharmacy Kit**

- **Outpatient Transplant Recipient Pharmacy Eligibility Evaluation and Education**
  - % of Pts with Pre-Txp DDI
  - % of Pts with Pre-Txp Adherence Review
  - % of Pts with Pre-Txp Medication
  - % of Pts with Post-Op Pharmacy Care Note
  - % of Pts with Post-Op DDI

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**Figure 3: MedActionPlan Schedule in Spanish**

- **Outpatient Transplant Recipient Discharge Medication Reconciliation & Education**
  - % of Pts with Post-Op DDI
  - % of Pts with Post-Op Adherence Review
  - % of Pts with Post-Op Medication

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**Figure 4: Pillbox Practice with Beads with Multiple Errors**

- **Instructions**
  - Use beads in mock pill bottles and mock MedActionPlan to teach patients how to fill a pillbox independently.

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**Figure 5: Process Metrics for Desired Comprehensive Pharmacy Services**

- **Outpatient Transplant Recipient Pharmacy Eligibility Evaluation and Education**
  - % of Pts with Pre-Txp DDI
  - % of Pts with Pre-Txp Adherence Review
  - % of Pts with Pre-Txp Medication
  - % of Pts with Post-Op Pharmacy Care Note
  - % of Pts with Post-Op DDI

---

**Figure 6: Pharmacy Services Provided**

- **% Provision of Comprehensive Pharmacy Services to Kidney Transplant Recipients, 2012-Present, By Quarter**

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**Figure 7: Hospital Length of Stay**

- **Kidney Transplant Initial Visit Hospital Length of Stay (Transplant Visit Only), 2012-Present, By Quarter**

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**Figure 8: Readmission Post Transplant**

- **% Readmission After Initial Kidney Transplant Visit 2012-Present, By Quarter**

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Improving transitions of care through implementation of IPASS handoff bundle - Multidisciplinary BMC experience

Deaprtments Of Internal Medicine, General Surgery, Neurology, Family Medicine, Obstetrics and Gynecology, CIR House-staff Quality Council
Office of Continuing Medical Education

BACKGROUND

• Handoffs have been identified as a vulnerable time in patient care
• With ACGME duty hour restrictions, the number of handoffs has increased
• One of three sentinel events reported to JCAHO involves lack of adequate communication or errors in communication
• Structured handoff format and processes across all training programs and supervision of handoffs are called for by the ACOME CLER initiative
• No structured handoff format existed at Boston Medical Center (BMC)
• Baseline survey of BMC program directors showed fewer than half of residency programs had any formal training in handoffs
• There was no process for supervision of handoffs at BMC
• In a multi-site study, implementation of the IPASS handoff bundle was associated with a 30% reduction in preventable adverse events

• Total of 182 observations across five different residency programs over the year
• Median adherence to all 5 elements of IPASS was 68%
• Almost all house-staff have been trained in or exposed to IPASS
• Variability in the observed handoff quality was 14%
• BMC specific IPASS video was made to model ideal medical and surgical handoffs
• Variability in the observed adherence to IPASS may be due to new members in the workforce. Continued efforts to increase awareness and educating the house-staff is imperative to sustain the progress so far.
• There has been an increase in the trust that the written and verbal handoffs are accurate. However there was a variable trend in the perceived quality of handoffs. This may be because of improved training has helped identify the elements of a good sign-out

PROJECT AIM

• To pilot IPASS handoff implementation in residency programs across BMC over a two year period to transition to a new handoff culture.
• Goals for participating programs:
  ◆All interns and residents will be trained in IPASS
  ◆All handoffs will utilize the Epic EMR handoff tool that incorporates IPASS
  ◆>80% verbal handoffs will “usually or always” use all 5 elements of IPASS
  ◆>80% verbal handoff quality will be rated as very good or excellent
  ◆>80% written handoff quality will be rated as very good or excellent

PROJECT DESIGN

• Core implementation group was formed with the support of CIR and Dept. of CME and champions from Dept.’s of Internal Medicine, General Surgery, Neurology and Family Medicine.
• Funding for implementation was obtained by the BMC Patient Safety Grant
• Interns were trained in IPASS handoffs during orientation for two consecutive years.
• Residents were trained by IPASS champions during academic half-days, dedicated sessions and grand rounds.
• Front line provider and champion training conducted using SHM IPASS curricular materials
• Handoff tool employing IPASS format was incorporated into the epic EMR
• Financial incentives provided to residents to observe intern handoffs and turn in assessments
• Medical students engaged in independent assessments of the objective measures like
• Variability in the observed adherence to IPASS may be due to new members in the workforce. Continued efforts to increase awareness and educating the house-staff is imperative to sustain the progress so far.
• BMC IPASS Implementation Committee
  ◆ Aravind Ajakanam Menon
  ◆ Emily M Jaenus
  ◆ Simy Kaharia Parikh
  ◆ A Travis Manacca
  ◆ Emma L Trucks
  ◆ Mary Iacelli
  ◆ Ryan M之前的
  ◆ Stephanie Le
  ◆ Bhavna Seth
  ◆ Maggie Collison
  ◆ Juliet Fernandez
  ◆ Aaron Richman
  ◆ James Steinckamp
  ◆ Alex Iwamoto
  ◆ Gusal Arora
  ◆ Kalyon Reddy
  ◆ Andul Seivastava
  ◆ Stephanie Talabia
  ◆ Rotane Handal-Olafcz
  ◆ Melissa Markstrom
  ◆ Selina Bell-Masterson
  ◆ James Moses
  ◆ Rhammon Iorio

Outcomes to Date

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Next Steps

• Plan for interview of night float residents using research assistants to gain insight into valuable information that was not relayed during handoff but may have helped with a recent over night shift.
• Include the curricular materials available from Society of Hospitalist Medicine and BMC specific videos and devise an online module for future orientation
• Real time feedback to the various residency programs on their performance and quality of handoffs.

Our team would like to acknowledge the support of the SHM/IPASS Mentored Implementation Program and our project mentor Troy Coffey, MD and Dr. Karin Sloan, MD.
**BACKGROUND**

High quality health care is a leading focus within the United States today. Health care providers are increasingly responsible to demonstrate that they are providing safe, effective, and efficient care to patients. A key component to provision of high quality care is communication. Communication prevents costly errors, streamlines patient care to prevent delays, increases health care provider efficiency, and improves the patient’s perception of care (BURNS, 2011; Ficke, 2012). The Joint Commission has recognized that poor communication and collaboration among health care providers has been the root cause of over 70% of major medical errors (The Joint Commission, 2014). National patient safety goals have revolved around improved communication but even with this recognition, communication and collaboration strategies fall short of expectations.

Residents and front-line nurses at Boston Medical Center (BMC) identified faulty communication among nurses and physicians and have stepped forward in hopes of developing communication strategies to improve the communication gap amongst health care providers.

Physicians use a pager system as means of communication with staff members. Many of the medical surgical floors do not have a dedicated medical team that remain on the floor on a consistent basis as the physicians and/or LIPs tend to float within different floors.

The Institute of Medicine has concluded that “a culture of teamwork is fundamental to building a learning organization and ensuring the continuity of care that yields better outcomes for patients” (Institute of Medicine [IOM], 2012, p. 9-7). With that, individuals within the organizational systems need to learn and understand ways of managing interdependence so that desired changes can be achieved.

**OUR TRIPLE AIM**

The aim of this quality on performance project was to establish a collaboration process with specific solutions to implement to facilitate effective communication between nurses and physicians.

- Decrease preventable adverse events by 25% in FY18 as compared to FY17 in STARS incident reporting system
- Improve Patient Experience by 5 points as measured on specific HCAHPS questions
- Improve job satisfaction measured on employee engagement surveys line items with any questions

**METHODS**

**Problem Statement**

- What is the deficiency?

**Goal Statement**

- What is the objective?

**Problem Analysis**

- Staff nurses and resident physicians were surveyed to gain insight into the current state
- Scheduled meetings of stakeholders (front-line RNs and MDs)
- A3 tool was utilized to define problem, current state, perform a gap analysis, define target conditions, and propose solutions
- Solutions were grouped into 3 themes
  - Technology, system fixes
  - Team training, interdisciplinary rounding
  - Relationship building
- Solutions were prioritized and voted upon by stakeholders
- Solutions voted upon are to be fully implemented in FY 17–FY18

**RESULTS**

Patient experience HCAHPS data for MDs & RNs over time