Maine Medical Center Quality and Safety Storyboards: Operational Excellence as Platform for Improvement

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Maine Medical Center Quality and Safety Storyboards:
Operational Excellence as platform for Improvement

Physician and other healthcare learners and clinicians must prepare to assume an active role in the design, implementation, and improvement of emerging models of health care delivery while concurrently improving quality, workflow efficiency and safety. While these expectations are building, few practicing clinicians have training or experience with these challenges. Maine Medical Center’s Operational Excellence Team builds on a framework of Lean Thinking, the Model for Improvement* and PDSA cycles** to advance improvement capacity among care teams across our organization. Interprofessional Teams are coached to use proven tools and techniques to identify and remove barriers to care and establish sustainable workflow improvements. MMC’s growing portfolio of improvement work bears witness to the success of this effort, and promises advancing capacity for improvement work across our organization.

The storyboards selected for presentation below reflect the complexity of our academic medical center, and illustrate how interprofessional teams are leveraging Operational Excellence as a platform for making sustainable improvements.

Sources


**The Plan-Do-Study-Act (PDSA) cycle was originally developed by Walter Shewhart as the Plan-do-Check-Act (PDCA) cycle. W Deming modified Shewhart’s cycle to PDSA, replacing “Check” with “Study”. (See Deming WE. The New Economics for Industry, Government and Education. Cambridge, MA: The MIT Press 2000.)
The Development and Implementation of a Reliable Method for Educating Provider Groups on Stroke Discharge Order Sets

Executive Sponsor: Kathryn Cope and Mark Parker Facilitator: Ruth Hanselman, Sunecia Nayak, Stephen Tyzik, Amy Sparks, Brendan Lilley
Team Members: Deborah Gregoire, Shawn Taylor

Problem/Impact Statement:
In the U.S., a stroke occurs every 40 seconds and is the fifth leading cause of death. More than 800 patients come through Maine Medical’s stroke center every year. Maintaining the highest level of available care allows Maine Medical Center (MMC) to have dramatic, positive impacts on thousands of affected individuals. Comprehensive Stroke Certification was received from Joint Commission in February of 2018. To keep up with the standards, MMC created/revised the 15 stroke order sets to ensure providers could easily place the correct orders for every stroke patient. Following certification, inconsistent documentation indicated additional room for improvement and high potential risk for stroke patients. Without proper stroke order sets being used, specified protocols, pathways and best practices may not align with AHA/ASA guidelines and could contribute great risk to patient safety.

Scope:
In scope: MMC departments supporting organization of stroke treatment plans and care: Critical Care, Neurosurgery, Neurology, Neurocritical care, AIM, Nursing, ED, IR, CT, and Rehab Medicine
Out of scope: Other Maine Health Hospitals that are not CSC

Goals/Objectives:
1. Increase team’s awareness of chargeable items, item cost, and reasons behind charging patients. This will also discourage wastage of items.
2. Decrease safety risk for team & patients when emergency or safety supplies are not readily available.
3. Align SCU’s workflows with the hospital Annual Implementation Plan goal of Affordable Care through fiscal responsibility via charging appropriate items to the correct patient or unit/department.
4. Eliminate lost revenue from our budget, possibly opening up finances for needed items/improvements.

Baseline Metrics/Current State:
Initially trained 49 total providers out of 1658, consisting of 4 different provider groups (AIM, neuro-critical care, neuro-hospitalists, and neurosurgery)

Root Cause Analysis:
Problem: Missing documentation of neuro checks and vital signs
Why?
Proper order set was not used
Why?
Many providers do not know which stroke order set to use
Why?
Not all providers were educated on the stroke order sets
Why?
Initial focus was only on attending AIM, neuro-hospitalists, neuro critical care, and neurosurgery providers
Why?
The perception was only those specializing in or focusing on stroke would need to use stroke order sets
Fact Cause: Due to the possibility of stroke occurring in any department/service, the perception that only those specializing in or focusing on stroke would need to use the order set was incorrect

Countermeasures

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Implement daily KPI of neuroscience and critical care order sets</td>
<td>Deb Gregoire, Shawn Taylor, SCU9</td>
<td>May 2018</td>
<td>Completed</td>
</tr>
<tr>
<td>• Daily audit of patient charts for correct documentation</td>
<td>Deb Gregoire, Shawn Taylor, SCU9</td>
<td>May 2018</td>
<td>In Progress</td>
</tr>
<tr>
<td>Develop educational opportunities for stroke order sets</td>
<td>Deb Gregoire</td>
<td>Jan 2018</td>
<td>Completed</td>
</tr>
<tr>
<td>Develop action items based on education options</td>
<td>Deb Gregoire</td>
<td>Ongoing</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Educational PowerPoints sent out to all medical groups</td>
<td>Deb Gregoire</td>
<td>6/13/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Develop method with Medical Chiefs to implement education into onboarding process for new providers</td>
<td>Deb Gregoire, Medical Chiefs (Dr. Cushing, Dr. Sawyer, Dr. Roy)</td>
<td>Ongoing</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Integrate stroke order sets into resident education</td>
<td>Deb Gregoire</td>
<td>July 2018</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Ongoing audits and just-in-time education for providers when incorrect order set is used (admission and discharge order sets)</td>
<td>Deb Gregoire</td>
<td></td>
<td>Continuous</td>
</tr>
</tbody>
</table>

Outcomes

Stroke Discharge Order Set Utilization

Now reaching entire medical staff excluding provider groups with no chance of encountering stroke (ex. Dermatology, noted by red portion), consisting of 1263 out of 1658 total providers

Next Steps
Complete KPI to effectively reach providers with the education
Work with medical chiefs to implement education of resident groups, APPs, and PAs
Maintain highest level of stroke certification

Figure 1
Stroke Discharge Order Set Utilization CY 2017

Figure 2
Figure 2 examines the use of proper discharge order sets through the 729 total stroke cases in 2017

Figure 3

Figure 4

Figure 5
Figure 5 examines the use of proper discharge order sets through the 729 total stroke cases in 2017 as well as several months of 2018, with each month averaging about 61 total stroke cases

https://knowledgeconnection.mainehealth.org/jmmc/vol1/iss1/18
Strategies to Increase Early Discharges to Reduce Avoidable Patient Days and Improve Patient Flow

Last Updated: 6/27/2018

Executive Sponsor: Joy Moody, RN, Mark Parker, MD  
Facilitator: Catherine Palleschi, RN, Suneeela Nayak, RN, Stephen Tyzik, Ruth Hanselman, Amy Sparks

Team Members: Erica Weightman, RN, Cecilia Inman, RN, James Powers, MD, Marcia Andrews (Care Management), Bill Hewitt (Pharmacy), Mary McNulty (Care Management), Joe East (Patient Access and Flow), Tom Santusianio (Laboratory), Alyssa Stiles (Pharmacy) and Patricia Johnson, NP

Problem/Impact Statement:
Discharging a percentage of patients early in the day has many advantages: It helps reduce congestion in the Emergency Department, smooths out the patient churn (admissions, discharges and transfers) within the unit throughout the day and has very important patient safety implications. R9W, like many other Medical/Surgical patient care units, experiences peaks in patient churn in the early to late afternoon which causes a myriad of challenges to patients and staff. As a result, R9W aims to increase the number of discharges by 11am and streamline key discharge planning activities.

Scope:
In Scope: All patients that will be discharged through R9W to a SNF or home
Out of Scope: All other patients on the unit that will be transferred to another floor and/or level of care

Goals/Objectives:
1. 25% of discharges by 11am by the end of FY18
2. 50% of discharges by 2:00pm by the end of FY18
3. 90% of discharges by 6:00pm by the end of FY18
4. 90% pending discharge usage by the end of FY18
5. Average confirmed D/C to D/C < 2 hours by the end of FY 18

Baseline Metrics/Current State:

<table>
<thead>
<tr>
<th>Discharge Metric</th>
<th>Baseline</th>
<th>MMC Average</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>D/C by 11am</td>
<td>15%</td>
<td>11%</td>
<td>25%</td>
</tr>
<tr>
<td>D/C by 2pm</td>
<td>34%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>D/C by 6pm</td>
<td>51%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>% Pending D/C Usage</td>
<td>32%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Avg. Confirmed D/C to D/C (hours)</td>
<td>1.4</td>
<td>2</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>% of Confirmed D/C &lt; 120 min</td>
<td>46%</td>
<td>45.5%</td>
<td>79%</td>
</tr>
<tr>
<td>Confirmed D/C by Time of Day</td>
<td>12:30pm</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Root Cause Analysis:

Countermeasures

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment of visual display board</td>
<td>R9W multi-disciplinary team</td>
<td>October 2017</td>
<td>Complete</td>
</tr>
<tr>
<td>KPI #1: 100% of the time pending D/C will be entered in Tek-Tracing</td>
<td>R9W Nurses</td>
<td>October 2017</td>
<td>Complete</td>
</tr>
<tr>
<td>Conduct a root cause analysis with a multi-disciplinary team to include MDs, APPs, RNs, SWs, Rehab, Pharmacy, Patient Experience</td>
<td>Catchy Palleschi &amp; Stephen Tyzik</td>
<td>12/19/17</td>
<td>Complete</td>
</tr>
<tr>
<td>Develop a multi-disciplinary standard work flow to include DRG, anticipated date of discharge and discharge appointment time</td>
<td>Catchy Palleschi &amp; Stephen Tyzik</td>
<td>1/9/18</td>
<td>Complete</td>
</tr>
<tr>
<td>Deployment of IDCR standard work to include discussion about DRG, anticipated date of discharge and discharge appointment time</td>
<td>R9W multi-disciplinary team</td>
<td>February 2018</td>
<td>Complete</td>
</tr>
<tr>
<td>KPI #2: 100% of the time the daily discharge and IDCR sheet will be completed by the RN and MD</td>
<td>R9W Nurses</td>
<td>March 2018</td>
<td>Complete</td>
</tr>
</tbody>
</table>

Outcomes

![Discharge % By 11:00 on R9W](image)

Next Steps:

- Reviewing DRG specific readmission rates to make sure we’re not negatively impacting readmissions and Emergency Department visit rate
- Retail Pharmacy will attend Inter-Disciplinary Care Rounds as a way to improve HCAHPS through bedside teaching
- Coaching change management on four other Nursing units for their early discharge

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Sustaining Daily Management with Gemba Walks: A Scheduling Model

Last Updated: 7/27/2018

Executive Sponsor: Omar Hasan & Mark Parker, Facilitator: Suneela Nayak, Ruth Hanselman, Stephen Tyzik, Amy Sparks


Problem/Impact Statement:
Every weekday, 10 GEMBA walks (11 walks, including a weekly (500 Walk on Wednesdays) to 109 Operational Excellence teams across 4 campuses. The current framework for improvement focuses on daily data collection through the PDSA methodology. Our expanding program demand is challenging limited leadership resources to visit all KPI Boards everyday. This has led to consideration of reduced frequency Gemba walks to departments who met specific maturity/performance criteria.

Scope:
In scope: 13 teams pre-identified for the pilot, whose workflows tend to be weekly. Team must have a baseline level of performance, established by a minimum 6 months live on OpEx. Out of scope: MMC teams, teams without a baseline, and/or MaineHealth Teams

Goals/Objectives:
1. Teams will maintain baseline or advance from their current performance level with the KPI Process and Daily Management during the 8-week pilot.
2. Teams included in the pilot progress will be similar to control group (all other departments live with OpEx at MMC).

Baseline Metrics/Current State:
Teams evaluated on the following criteria, using a 4 pt. Likert scale:
1. Leader present at KPI Board
2. Different Team Members present at the board
3. Evidence of team collaboration on KPIs
4. Strategic Deployment used
5. KPIs appropriately strategically aligned
6. Improvement plans for present for goals
7. KPI Board Documents are used correctly
8. KPI Board Documents are up to date
9. Closed KPIs submitted through the OpEx Site

Root Cause Analysis:
Setting clear expectations for walk participation produced no statistically significant change in participation in the morning Gemba Walk process between 2016 & 2017.
Walkers were willing to participate, but the timing and frequency remained a barrier.
(MMC OpEx Annual Survey, 2017)

Next Steps:
1. Continue coaching pilot teams, to ensure that performance continues to advance, and conduct quarterly audits to monitor advancing capacity for improvement work.
2. Add other MMC units to the adjusted frequency walk that meet the following criteria:
   • Teams with weekly/project-based workflows
   • Teams with stable baseline performance
   • Teams with engaged leadership and stable staffing
3. Explore how adjusted walk frequencies be successful on nursing units and in clinical areas. Pilot featured interprofessional teams, ancillary services, and administrative departments.

Outcomes:
1. 12 of 13 teams advanced their performance score
2. 3 teams advanced two engagement levels (e.g., red to yellow)
3. 7 teams advanced engagement level (e.g., orange to yellow)
4. 1 team dropped an engagement level (green to yellow)**

Root Cause Analysis:
Barriers to Walk Participation

Countermeasures

<table>
<thead>
<tr>
<th>Countermeasure</th>
<th>Owner</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaders of departments with an adjusted walk frequency sign contract to support and sustain team engagement with Op Ex.</td>
<td>Suneela Nayak</td>
<td>11/13/2017</td>
</tr>
<tr>
<td>Survey sent to department leaders for feedback on progress after 1 month</td>
<td>Ruth Hanselman</td>
<td>12/14/2017</td>
</tr>
<tr>
<td>Weekly evaluations of pilot teams</td>
<td>OpEx Team, Gemba Coaches</td>
<td>2/1/2018</td>
</tr>
<tr>
<td>Continued team coaching (as provided to all other teams live on Operational Excellence)</td>
<td>OpEx Team, Gemba Coaches</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>

Outcomes:

- 10% of Leaders
- 20% of Leaders
- 30% of Leaders
- 40% of Leaders
- 50% of Leaders
- 60% of Leaders
- 70% of Leaders
- 80% of Leaders
- 90% of Leaders
- 100% of Leaders

Frontline leaders 2016-2017

Senior Leaders 2016-2017

% of Leaders

<table>
<thead>
<tr>
<th>Department</th>
<th>Nov 2017</th>
<th>Department</th>
<th>Nov 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVS</td>
<td>2.78</td>
<td>Palliative Care</td>
<td>3.44</td>
</tr>
<tr>
<td>Facilities Development</td>
<td>1.38</td>
<td>Patient &amp; Guest Relations</td>
<td>2.11</td>
</tr>
<tr>
<td>Facilities Management</td>
<td>1.22</td>
<td>Rehab</td>
<td>3.44</td>
</tr>
<tr>
<td>Geriatrics</td>
<td>2.33</td>
<td>Risk &amp; Patient Safety</td>
<td>2.44</td>
</tr>
<tr>
<td>Infection Prevention</td>
<td>2.44</td>
<td>Safety-Emer. Mgmt</td>
<td>1.78</td>
</tr>
<tr>
<td>Linen Services</td>
<td>2.46</td>
<td>Security</td>
<td>1.56</td>
</tr>
<tr>
<td>ODC</td>
<td>2.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EVS: 2.78 2017 1.33 2016 2.00 2.44 2017
Facilities Develop.: 1.33 2016 2.00 2.44 2017
Facilities Mgmt: 1.22 2016 2.00 2.44 2017
Geriatrics: 2.33 2016 3.00 3.33 2017
Infection Prevention: 2.44 2016 3.11 3.33 2017
Linen Services: 2.44 2016 3.11 3.44 2017
ODC: Warehouse: 2.11 2016 2.11 2.33 2017
Palliative Care: 1.66 2016 2.11 2.33 2017
Patient & Guest Relations: 2.33 2016 3.00 3.33 2017
Rehab: 2.44 2016 3.11 3.33 2017
Risk & Pt Safety: 2.44 2016 3.33 3.33 2017
Safety-Emer. Mgmt: 2.78 2016 2.44 2.22 2017
Security: 1.56 2016 1.89 2.56 2.78 2017

Study

<table>
<thead>
<tr>
<th>% Change in Team Performance</th>
<th>November 17 – June 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Nov-17</td>
</tr>
<tr>
<td>EVS</td>
<td>-20%</td>
</tr>
<tr>
<td>Facilities Develop.</td>
<td>-20%</td>
</tr>
<tr>
<td>Facilities Mgmt</td>
<td>-20%</td>
</tr>
<tr>
<td>Geriatrics</td>
<td>-20%</td>
</tr>
<tr>
<td>Infection Prevention</td>
<td>-20%</td>
</tr>
<tr>
<td>Linen Services</td>
<td>-20%</td>
</tr>
<tr>
<td>ODC - Warehouse</td>
<td>-20%</td>
</tr>
<tr>
<td>Palliative Care</td>
<td>-20%</td>
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<tr>
<td>Patient &amp; Guest Relations</td>
<td>-20%</td>
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<td>Rehab</td>
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<td>Risk &amp; Pt Safety</td>
<td>-20%</td>
</tr>
<tr>
<td>Safety-Emer. Mgmt</td>
<td>-20%</td>
</tr>
<tr>
<td>Security</td>
<td>-20%</td>
</tr>
</tbody>
</table>

* Control – MMC Departments live on OpEx
** Team Performance lagging due to increased case load

Conclusion:
- Daily Management will advance with less-than daily Gemba Walks
- Pilot teams experienced a higher % change than teams receiving daily Gemba visits

Act

1. Continue coaching pilot teams, to ensure that performance continues to advance, and conduct quarterly audits to monitor advancing capacity for improvement work.
2. Add other MMC units to the adjusted frequency walk that meet the following criteria:
   • Teams with weekly/project-based workflows
   • Teams with stable baseline performance
   • Teams with engaged leadership and stable staffing
3. Explore how adjusted walk frequencies be successful on nursing units and in clinical areas. Pilot featured interprofessional teams, ancillary services, and administrative departments.
Strategies to Increase Early Discharges to Decrease Hospital Length of Stay and Avoidable Patient Days for Neuro-Spine Patients

Last Updated: 9/6/2018

Executive Sponsor: Joy Moody, Mark Parker Facilitator: Corey Fravert, Suneela Nayak, Stephen Tzynik, Ruth Hanselman, Amy Sparks

Team Members: R6 Staff, Care Managers (R6 and Trauma), Rehab, Neurosurgery (Director, Neuro Navigator and Data Analyst)

Problem/Impact Statement:
Delays in discharge of hospital patients causes a backlog for new admissions from the Emergency Department, PACU, Admitting and SCU. Poor patient flow within and between units results in lack of access to care, long wait times, reduced quality of care and patient satisfaction, physician and staff frustration and negative impact on financial health.

Alignment to Organizational Strategic Plan: Affordable Care by reducing LOS

Scope:
In scope: Neurosurgical spine patients on R6 a 33 bed Neurosurgical/Trauma Unit
Out of Scope: Patients not on R6

Goals/Objectives:
KPI #1: 100% of the time an inter-professional meeting will occur Monday → Friday to identify two neuro spine patients who would be discharged by 11 AM Tuesday through Saturday.
KPI #2: Two neuro or trauma patients will be discharged by 11 AM Tuesday through Saturday.
Overall Goal: Utilize multidisciplinary approach to identify barriers to discharge and coordinate discharge plan.

Baseline Metrics/Current State:

- R6 Discharges by 11:00am

- Cumulative discharge % by hour of day

Root Cause Analysis:

- Reasons Patients Were Not Discharged by 11:00am

Next Steps

We will continue to have our afternoon huddle with Charge Nurse, Care Coordination, and Neuro navigator. We will continue to do our red caps survey to measure our early discharges for the next 4 months. We will continue to identify targeted patients with the lobster boat and discussion at morning IDCR. We will continue to meet monthly at our length of stay committee.

Countermeasures

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of 2 Neuro spine patients to be discharged by R6</td>
<td>R6 Nurses</td>
<td>8/14/2017</td>
<td>In Process</td>
</tr>
<tr>
<td>Improvement Plan #1 - Charge nurses, case managers, neuro navigators, and rehab to huddle early afternoon to determine two potential patients (this huddle is in addition to the morning IDCR and is specific to identifying patients who can be discharged by 11 AM the following day). Charge nurse then notifies the on call APP to give them the patient's name. Charge nurse notifies the bedside nurse caring for the targeted patients to assure they are set up for a pre-11 AM discharge. Care Managers notify the patient/family to coordinate discharge plan. Lobster placed on white board as a visual cue to the multidisciplinary team.</td>
<td>R6 Charge Nurses, Neuro Navigator, Care Managers, Rehab, and APP's</td>
<td>8/14/2017</td>
<td>Completed</td>
</tr>
<tr>
<td>Improvement Plan #2 - Changed spine population to any neuro population (need more patients).</td>
<td>R6 Charge Nurses, Neuro Navigator, Care Managers, Rehab, and APP's</td>
<td>8/18/2017</td>
<td>Completed</td>
</tr>
<tr>
<td>Improvement Plan #3 - Rehab no longer to attend huddle and will check with charge nurse for updates</td>
<td>R6 Charge Nurses, Neuro Navigator, Care Managers, and APP's</td>
<td>11/15/2017</td>
<td>Completed</td>
</tr>
<tr>
<td>Improvement Plan #4 - Changed patient population to include Trauma patients</td>
<td>R6 Charge Nurses, Neuro Navigator, Care Managers, and APP's</td>
<td>12/1/2017</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Outcomes

- Quantitative Outcomes
  1. RNs all attend IDCR
  2. DRGs Utilized for all Patients to drive anticipated date of discharge
  3. RNs believe their opinion on D/C is valued and needed
  4. Decrease in ancillary calls to ancillary teams and Providers

- Discharges by 11:00am
  - Baseline (March 2017): 13%
  - July 2017: 23%
  - December 2017: 28%

- Cumulative discharge % by hour of day
Interprofessional Engagement in Lean Improvement in an Academic Healthcare Organization

Last Updated: 9/17/2018

Executive Sponsor: Mark Parker, MD
Facilitator: Suneele Nayak, Stephen Tyzik, Ruth Hanselman, Amy Sparks, Linda Simonsen
Team Members: Fernando Moreno, Ursula Nebr, Dan Meyer, Ross Isaac, Jay Powers, Med C APPs, Trauma APPs, Virginia Eddy, Nora Cheung, Tom van DerKloot, Angie Leclerc, Critical Care APPs Elizabeth Eisenhower, Jennifer Aronson, John Bancroft, Hector Tarraza, Mike Baumann, Beth Wilson and Steve DiGiovanni

Problem/Impact Statement:
Despite advances in medicine and technology, healthcare teams remain challenged in their quest to deliver safe, reliable and effective care. Engaging providers in interprofessional LEAN applications in our academic tertiary care hospital is essential for safe, reliable and effective patient care.

Scope:
In Scope: Clinical providers including Staff Physicians, Advanced Practice Practitioners (APPs) and learner Physicians who practice at Maine Medical Center's (MMC) Main Campus and are live with Operational Excellence (Op Ex), MMC's Lean adaptation to healthcare.

Minimum Definition of Inter-Professional Engagement: Nursing (RN and CNA), Clinical Provider(s) and/or APPs with Op Ex. Our goal is to achieve a mark of 50% within 5 years of go-live.

Goal/Objective:
Within 3 years of Go-live, 30% of MMC's Main Campus based clinical teams have shown Inter-Professional engagement with Op Ex. Our goal is to achieve a mark of 50% within 5 years of go-live.

Baseline Metrics/Current State:
1. Employed staff physicians – majority not formally trained in quality improvement methodologies. Expected to participate in QI activities with performance incentives. Hostipal physicians developed an Op Ex Gemba board in 2017. Other pockets of participation – e.g., trauma physicians.
2. Contracted private practice physicians – majority not formally trained in QI. Limited participation – e.g., nephrologist at dialysis board
3. APPs – sporty interest. Majority not formally trained in QI. Recent Cardiology APP participation.

Root Cause Analysis:

Types of LEAN:
• Lean adaptation to healthcare.

Misperceptions:
• Not informed about Lean practices
• Lack of understanding of Lean and its application in the medical setting

Compartmentalization of clinical roles:
• Clinical, educational requirements

Misperceptions:
• Not understanding Lean concepts and its application

Limited Provider Participation in Operational Excellence

Root Cause Analysis:

Root Cause Analysis:

Misperceptions:
• Not informed about Lean practices
• Lack of understanding of Lean and its application in the medical setting

Compartmentalization of clinical roles:
• Clinical, educational requirements

Misperceptions:
• Not understanding Lean concepts and its application

Countermeasures

Action
Owner
Due Date
Status

1. Present educational sessions:
   a. Surgical Grand Rounds, October 2016, Anesthesia Grand Rounds, June 2016,
   b. Retired Physicians Reunion Sep 2016, Geriatrics Grand Rounds June 2017,
   c. Provider Staff Meetings (multiple venues)

2. Engage Op Ex and Chiefs of Service to lead Gemba Walks

3. Recruit Chief of Pediatrics as Gemba Coach

4. Learner Physicians are now being introduced to a formally developed quality improvement curriculum to achieve:
   a. IHI Quality and Safety certificate, white belt, optional green belt, Op Ex capstone, participation in the Gemba walks and contribute to the overall analysis process

Next Steps

Next steps are to reach a target of 50% engaged by July of 2020. To achieve this goal, we plan to continue using strategies that have yielded good results: Engaging the Chief Medical Officer (CMO) and Service Chiefs as key stakeholders yielded strong engagement among hospitalists and employed attending providers. Engaged Chiefs, Hospitalists and Ambulatory Care Providers became strong role models and served as peer coaches to others resulting in standardization and spread across not only our hospital, but also across our health system where these providers also cared for patients. Lastly, we noted a significant uptick in engagement and enthusiasm when hospital executives demonstrated understanding of the concerns of the frontline, and took action to remove barriers.
Reducing O Negative Usage in a Tertiary Care Academic Medical Center

Last Updated: 9/7/2018

Executive Sponsor: Mark Parker  Facilitator: Wendy Weiler, Tracy Cook, Stephen Tzyzik, Sunela Nayak, Ruth Hanselman, Amy Sparks

Team Members: Kendra French, Spencer Wood, Corinne Coslet, Wendy Weiler, Chris Langlois, Kathy Carmichael, Liz Winslow, Beth Nitschke, Carol Farlow, Lynne Atienza, Meredith Farnham, Rebecca LaBranche, Damon Verrill, Karen Ross, Deborah Agneta, Cindy Cummins, Kami Hirots, Tracy Cook, Eric Evers

Problem/Impact Statement:
O negative red blood cells are the universal donor and can be used for most patients in an emergency situation. Unfortunately, only 7% of the blood supply is O negative and there is the potential for misuse. We do not want to inappropriately use O negative red blood cells on non O negative patients. We strive to be good stewards of our blood products by respecting the donors in the blood supply and staying within blood supplier guidelines.

Scope:

In: O Negative Red Blood Cell Transfusions at MMC
Out: O Negative Red Blood Cell Emergency Release Transfusions or appropriate transfusions of O negative red blood cells.

Goal/Objective:

O negative red blood cells should make up less than 12% of all blood types transfused by fiscal year 2018.

Baseline Metrics/Current State:

<table>
<thead>
<tr>
<th>2017 Reasons for Usage of O- Red Blood Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfusions</td>
</tr>
<tr>
<td>O- to O- (Appropriate)</td>
</tr>
<tr>
<td>Uncrossed Match</td>
</tr>
<tr>
<td>Antigen Testing</td>
</tr>
<tr>
<td>Pediatric</td>
</tr>
<tr>
<td>Short-Dated Units</td>
</tr>
<tr>
<td>Blood Type X1</td>
</tr>
<tr>
<td>Inventory</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>ABO Discrepancy</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>2017: 565</td>
</tr>
<tr>
<td>2018: 316</td>
</tr>
</tbody>
</table>

Root Cause Analysis:

<table>
<thead>
<tr>
<th>Problem</th>
<th>O negative usage rate was at 14%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why?</td>
<td>O- is a universal donor, so using it was viewed as a convenience without staff having the larger context to the O- supply nationally.</td>
</tr>
<tr>
<td>Why?</td>
<td>The importance of conservation was not communicated to staff and there was no clear SOP</td>
</tr>
</tbody>
</table>

Countermeasures:

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff meeting reiterated the need for conservation of O negative red blood cells.</td>
<td>Blood Bank</td>
<td>4/3/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Be aware of criteria to choose O negative red blood cells for non O negative patients.</td>
<td>Blood Bank</td>
<td>4/3/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Be aware of the potential surcharge from our blood supplier for O negative red blood cell usage higher than industry standards.</td>
<td>Blood Bank</td>
<td>4/3/18</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Blood type X1 PDSA: Choose Rh positive or type specific Rh negative red blood cells for appropriate antigen screening.

Pediatric PDSA: Order type specific antigen negative or crossmatch/crossmatch negative units from supplier.

Inventory PDSA: Maintain appropriate inventory of A negative, B negative, AB negative red blood cells, avoiding the use of O negative units to maintain the biggest opportunity for improvement for the blood bank staff.

ABO Discrepancy PDSA: Review the use of O negative red blood cells for an ABO discrepancy with senior staff.

Blood type x 1 PDSA: Retrieve other laboratory specimens or order a second specimen to complete confirmatory blood type x 2 if the biggest opportunity for improvement for the blood bank staff.

Next Steps:

1. Sustain average of <12% O negative red blood cell usage.
2. Review usage monthly within the Blood Bank Quality Plan.
3. Review usage quarterly with current blood supplier.
Improving the Management of Nationwide Drug and IV Bag Shortages

Last Updated: 9/21/2018

Executive Sponsor: Mark Parker, MD  Facilitator: Stephen Tyzik, Suneca Nayak, Ruth Hanselman and Amy Sparks

Team Members: Inpatient Pharmacy and Supply Chain

Problem/Impact Statement:
In September of 2017, Hurricane Maria struck the island of Puerto Rico where over 50 pharmaceutical factories had previously operated. The impact of this was felt not only in the drastic reduction of products that are produced on the island such as Baxter's mini-bags, but it also exacerbated supply chain issues for key drugs nationwide. As Pharmacists across the country raced to collect information and develop mitigation strategies for navigating these shortages, the need to streamline internal planning and communication was critical. At Maine Medical Center, the Pharmacy Department and Supply Chain did not have a consistent and reliable process for communication, planning and real-time updates. This yielded a tremendous amount of waste before, during and after the drug/IV shortage meeting.

Scope:
In Scope: The workflows that Pharmacy/Supply Chain utilize to obtain and communicate the most up to date information for drug and IV shortages at the twice-a-week Drug/IV Shortage Meeting.

Out of Scope: Out of scope will be all of the other workflows that Supply Chain and Pharmacy utilize to communicate with one another in between the meetings.

Goal/Objective:
1. To reduce the time of the twice-a-week Drug/IV Shortage Meeting from 75 minutes to 30 minutes
2. To reduce the time of the IV shortage discussion/planning from 35 minutes to < 10 minutes
3. To reduce the time of the drug shortage discussion/planning from 40 minutes to < 20 minutes
4. To eliminate 100% of unnecessary communication between the Pharmacy and Supply Chain outside of the Drug/IV Shortage Meeting

Baseline Metrics/Current State:
Previously, the inpatient Pharmacy team at Maine Medical Center did not have a robust process for efficiently managing the day to day information for all drugs considered to be on a "shortage". Due to the number of people that needed to be at the meetings to assess severity and properly develop mitigation strategies, each meeting came at a cost of approximately $20,637.60 and $23,733.24. Worked by the number of meetings that occurred prior to the interventions, the resulting overall cost was between $20,637.60 and $23,733.24.

Root Cause Analysis:

Study

Issues with Pharmacy/Supply Chain and Materials Management understanding of the impact on the efficiency of workflow:

- Inconsistent communication
- No one person responsible for the management of Drug/IV Fluid Shortages
- Lack of utilization of available tools (EDM, CRM, etc.)

Countermeasures

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Completion Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observe Pharmacy/Supply Chain Drug and IV shortage meeting to determine current gaps in drug/IV shortage management process</td>
<td>Stephen Tyzik</td>
<td>11/16/17</td>
<td>Completed</td>
</tr>
<tr>
<td>Develop a drug shortage prioritization matrix that the Pharmacy can use to assess criticality and feed into a priority based communication pathway</td>
<td>Stephen Tyzik</td>
<td>January 2018</td>
<td>Completed</td>
</tr>
<tr>
<td>Facilitate a meeting between Supply Chain and Pharmacy to outline gaps in current process, engage the root causes and develop agreed upon action plans/timelines/needed support to implement improvement strategies</td>
<td>Jason Tremblay and Stephen Tyzik</td>
<td>January 2018</td>
<td>Completed</td>
</tr>
<tr>
<td>Work with Supply Chain to develop an IV Fluid shortage prioritization matrix that Supply Chain and Materials Management can use to assess criticality and feed into a priority based communication pathway</td>
<td>Jason Tremblay, Rita Renaud, Jody Batsford, Katherine Anderson and Stephen Tyzik</td>
<td>February 2018</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Outcomes

FDA Strategies to Effectively Manage Drug Shortages

<table>
<thead>
<tr>
<th>Strategy</th>
<th>MMC Improvement Strategies (Implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and/or streamline internal processes</td>
<td>1. On a daily basis Supply Chain reviews items that drop below the re-order point and &lt; 7 days supply on hand (SOH) which triggers communication to the Pharmacy and development of an internal and external mitigation strategy. These &gt; 7 days SOH are triaged for discussion at the twice a week Pharmacy/Supply Chain Drug/IV Shortage Meeting.</td>
</tr>
<tr>
<td>Develop and/or streamline internal processes</td>
<td>2. On a daily basis Pharmacy utilizes a prioritization matrix (discussed below), any drugs that change to a red prioritization score with &lt; 7 days SOH trigger a mitigation strategy. These &gt; 7 day SOH get triaged to the Drug Shortage Meeting.</td>
</tr>
<tr>
<td>Improve Data and Response Tracking</td>
<td>On a daily basis, the Pharmacy updates their drug shortage spreadsheet which automatically updates a prioritization matrix so that key variables (SOH, re-order ETA, daily usage) trigger the development of an appropriate mitigation strategy.</td>
</tr>
<tr>
<td>Clarify Roles/Responsibility</td>
<td>In conjunction with the streamlined processes above, a workflow diagram was developed to articulate the roles of Supply Chain, Materials Management, Pharmacy and Risk and Patient Safety in the daily management of Drug/IV shortages.</td>
</tr>
<tr>
<td>Enhance Public Communications about Drug Shortages</td>
<td>In alignment with the development of the above mitigation strategies, each of the color codes on the prioritization matrix (Red, Orange, Yellow, Green) are associated with an associated communication plan.</td>
</tr>
<tr>
<td>Develop Methods to Incentivize and Prioritize Quality</td>
<td>The Pharmacy/Supply Chain Drug Shortage Meeting established a &gt; 250% reduction in minutes (35 -&gt; 10) which was dedicated to discussion/planning to manage IV fluid shortages and a 100% reduction in minutes (40 -&gt; 20) which was dedicated to discussion/planning to manage drug shortages.</td>
</tr>
<tr>
<td>Develop risk-based approaches to identify early warning systems</td>
<td>For Supply Chain and Pharmacy, both of them have transformed their IV Fluid/Drug shortage management spreadsheets with prioritization driven visual management. In real time, the updating of multiple variables give them real time feedback to the urgency of a situation surrounding an IV fluid and/or drug.</td>
</tr>
</tbody>
</table>

Implementation of these strategies led to a meeting time of 24 minutes, which meets the target and reduces the salary cost of the meeting from $429.95 to $171.98.

Next Steps
Continue to utilize prioritization matrix as Drug/IV Fluid shortages evolve and utilize similar process improvement strategies for challenges moving forward.
**Implementing Strategies to Reduce Central Line-Associated Blood Stream Infections**

**Last Updated: 9/19/2018**

**Executive Sponsor:** Mark Parker, MD  **Facilitator:** Sherryann St. Pierre, Suneeleaf Nayak, Stephen Tzyzik, Ruth Hanselman, Amy Sparks

**Team Members:** Barbara Bush Nurses, Nicole Manchester, Melanie Lord, and Jessica Howe

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**Problem/Impact Statement:**

Every Central Line-associated Bloodstream Infections (CLABSI) lead to poor outcomes and increased mortality for thousands of patients each year. It is estimated CLABSI's cost the U.S. healthcare system billions each year. With diligent oversight and the use of current evidenced based practices, CLABSIs are preventable. The Barbara Bush Children's Hospital's (BBCH) inpatient unit at Maine Medical Center (MMC) frequently admits and cares for pediatric oncology and pulmonology cystic fibrosis patients, who all have central lines. These high risk patients often refuse infection prevention interventions and would benefit tremendously from improvement in CLABSI prevention practices. [https://www.cdc.gov/hai/bsi/bsi.html](https://www.cdc.gov/hai/bsi/bsi.html)

---

**Scope:**

**In Scope:** MMC's Barbara Bush inpatient unit patients who have a central line  
**Out of Scope:** All other MMC patients with or without central lines

**Goals/Objectives:**

- 100% of the time patients with a central line will bathe daily—either with Chlorhexidine (CHG) or soap and water
- 100% of the time, all patients with a central line will be educated about the importance of daily bathing and daily oral care to prevent infection
- Reduce the number of central line infections

---

**Baseline Metrics/Current State:**

**Daily bathing by Central Line Patients**

<table>
<thead>
<tr>
<th>Plan</th>
<th>Bathed</th>
<th>Not Bathed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-17</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Research shows that bacteria burden on the skin greatly increases a patient's risk for CLABSI. Bacteria burden is easily decreased by daily bathing.

**Central Line-Associated BSI, BBCH, Pediatrics**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total CLABSI</th>
<th>Cost per CLABSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2.50</td>
<td>$45,814</td>
</tr>
<tr>
<td>2017</td>
<td>1.96</td>
<td>$45,814</td>
</tr>
<tr>
<td>2018</td>
<td>1.40</td>
<td>$45,814</td>
</tr>
<tr>
<td>2019</td>
<td>1.15</td>
<td>$45,814</td>
</tr>
<tr>
<td>2020</td>
<td>1.00</td>
<td>$45,814</td>
</tr>
</tbody>
</table>

Cost per CLABSI ≈ $45,814

**Root Cause Analysis:**

**Why patient did not bathe:**

- Patient/Parent refused
- No reason
- New central line placed today
- Bathed before admission
- Patient too sick/high acuity

**Root Cause: Patient/Family refusing**

---

**Countermeasures**

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instituted KPI to have patients bathe daily</td>
<td>Sherryann St. Pierre</td>
<td>10/19/17</td>
<td>Completed</td>
</tr>
<tr>
<td>Oncologists, residents, and nursing asked to discuss daily bathing during bedside rounds each day</td>
<td>Sherryann St. Pierre</td>
<td>10/20/17</td>
<td>Completed</td>
</tr>
<tr>
<td>Email sent out to staff asking the CHG wipes be placed in each room for all patients admitted/receiving central line</td>
<td>Sherryann St. Pierre</td>
<td>11/2/17</td>
<td>Completed</td>
</tr>
<tr>
<td>CHG wipes approved for use—product ordered via VAC nurse</td>
<td>Sherryann St. Pierre</td>
<td>11/20/17</td>
<td>Completed</td>
</tr>
<tr>
<td>CHG wipes put into stock, RN's education started</td>
<td>Sherryann St. Pierre</td>
<td>1/8/18</td>
<td>Completed</td>
</tr>
<tr>
<td>SBAR with scripting for importance of bathing to be used during rounds disseminated to interprofessional teams on BBCH</td>
<td>Sherryann St. Pierre</td>
<td>1/16/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Central line rounds initiated by leadership to check on the patients with central lines and make sure they are bathing and using CHG wipes</td>
<td>Sherryann St. Pierre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instituted KPI to educate patients on the importance of daily bathing and daily oral care to prevent infection</td>
<td>Sherryann St. Pierre</td>
<td>4/13/18</td>
<td>Completed</td>
</tr>
</tbody>
</table>

---

**Outcomes**

- **Daily bathing by central line patients**
- **Central Line-Associated BSI, BBCH, Pediatrics**

**Root Cause: patient/family refusing**

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**Next Steps**

Continue and improve upon central line leadership rounds  
Change to only using CHG wipes after a daily soap and water bath, as many kids are not using the foam soap correctly  
Model for other departments/hospitals to follow

---

**Cost per CLABSI:**

<table>
<thead>
<tr>
<th>Year</th>
<th>CLABSI</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2 mucosal, 1 non-mucosal</td>
<td>$91,628</td>
</tr>
</tbody>
</table>

Soft savings = $229,070

---

**Graphs:**

- 3 CLABSI at MMC in FY 2018 (2 mucosal, 1 non-mucosal)  
  Soft savings = $91,628

---

**Root Cause Analysis:**

- Patient/Parent refused
- No reason
- New central line placed today
- Bathed before admission
- Patient too sick/high acuity

**Root Cause: Patient/Family refusing**

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9
Improving Revenue Capture and Patient Safety in an ICU Setting

Last Updated: 8/18/2018

Executive Sponsor: Jonathan Archibald, RN and Mark Parker, MD  Facilitator: Laura Lewis, PCT, Natasha Stankiewicz, Stephen Tyzik, Suneela Nayak, Ruth Hanselman, Amy Sparks

Team Members: Specialty Care Unit (SCU) Support Staff (CNAs, PCTs, NUAs, NUSs), RNs, SCU Leadership, APPs, Physician Learners, Service Line Chiefs and Supply Chain

Problem/Impact Statement:
In our Specialty Care Units, confusion existed around which supplies should be specifically charged to patients and which were included in regular room charges. As a result, if an item is not appropriately charged to a patient in SCU when it is used, not only do we lose revenue, but we also lose the accuracy of tracking our par level of supplies. As a result, creating potentially dangerous situations if supplies are needed in an emergency but are not available due to Materials Management not being flagged that a re-supply is needed. Thus, SCU staff have to call materials management emergently and place the order as a stat. If this results in a need greater than the supply room has on hand, the product now needs to be pulled from the offsite distribution center, thus delaying critical patient care.

Scope:
In Scope: SCU 2, 3, and 4 staff visiting employees, per diem staff, Learning Physicians, Materials Management and the Offsite Distribution Center

Goals/Objectives:
1. Increase team’s awareness of chargeable items, item cost, and reasons behind charging patients. This will also discourage wastage of items
2. Decrease safety risk for team & patients when emergency or safety supplies are not readily available.
3. Align SCU’s workflows with the hospital Annual Implementation Plan goal of Affordable Care through fiscal responsibility via charging appropriate items to the correct patient or unit/department.
4. Eliminate lost revenue from our budget; possibly opening up finances for needed items/improvements.

Baseline Metrics/Current State:
<table>
<thead>
<tr>
<th>Compliance with Charging Supplies</th>
<th>Lost Revenue Overall</th>
<th>Lost Revenue Overall – Uncharged Line Insertion Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>59.6%</td>
<td>$175,841.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$109,851.82</td>
</tr>
</tbody>
</table>

Root Cause Analysis:

5 Whys - Nursing

Problem: In 2017, the Specialty Care Units had $375,841.56 in uncaptured supply charges, which also lead to items not being available in emergent situations.

Why? Very often, Nursing Staff would grab-and-go with supplies and forget to charge those items to the patient.

Why? Staff were unfamiliar with the charging process and which items were included in a daily room charge and which items weren’t.

Root Cause: Due to competing priorities in these highly acute units, an awareness to the financial aspects of charge capture were not known.

5 Whys – Physician Learners

Problem: In 2017, the Specialty Care Units had $375,841.56 in uncaptured supply charges, which also lead to items not being available in emergent situations.

Why? Very often, Physician Learners will grab-and-go with supplies and forget to charge those items to the patient.

Why? As a result of constantly rotating through different areas of the hospital, Physician Learners are consistently given new locations for supply rooms and different processes for how to charge items.

Root Cause: The process for finding and charging items (correctly) is not consistently part of Physician Learner onboarding/education.

Countermeasures
<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Completion Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCU wide staff education, including Nursing, support staff, Providers, learner Physicians and Advanced Practice Practitioners</td>
<td>SCU Leadership</td>
<td>March 2018</td>
<td>Complete</td>
</tr>
<tr>
<td>SCU wide Replenish: 100% of the time, SCU will stock lost charges each day</td>
<td>SCU Leadership</td>
<td>March 2018</td>
<td>Complete</td>
</tr>
<tr>
<td>Discussion about charge capture in service line council meetings with administrative and clinical leadership to set expectations and shared responsibility across all disciplines</td>
<td>SCU Leadership</td>
<td>March 2018</td>
<td>Complete</td>
</tr>
<tr>
<td>Information provided through the KPI presentations has made its way to Service Chiefs who delivered this information to new Residents</td>
<td>Dave Soder, Chief of Critical Care, John Bancroft, Chief of Pediatrics and others</td>
<td>April 2018 – current</td>
<td>Complete</td>
</tr>
<tr>
<td>Signage posted at KPI board in all three SCUs to create daily awareness to current performance</td>
<td>SCU Leadership</td>
<td>April 2018 – current</td>
<td>Complete</td>
</tr>
<tr>
<td>Labeling all bins with cost of item/reminder to charge. This was implemented all three SCU’s clean utilities and medication rooms</td>
<td>SCU Leadership</td>
<td>May 2018 – Current</td>
<td>Complete</td>
</tr>
</tbody>
</table>

Outcomes

<table>
<thead>
<tr>
<th>Lost Revenue Compared to Patient Days</th>
<th>Compliance with Charging Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCU 2</td>
<td>SCU 3</td>
</tr>
<tr>
<td>$0.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Next Steps

SCU Lost Revenue Related to Line Insertion Supplies (LIS)

The next step for the SCU’s is to complete a 2 year retrospective cost benefit analysis to determine lost revenue from uncaptured LIS’s and compare it to the cost of three automated dispensing systems (Pyxis).
With an average of 8.6 total referrals every month, many of these referrals for Epilepsy Monitoring from MMP Neurology to MMC Neuro-navigators were delayed or lost, placing patients 1-3 months behind for their Epilepsy Monitoring Unit (EMU). Increased delays in the waiting process leads many patients to suffer unnecessary and unmanaged seizures as well as, in some cases, frequent trips to the ED for seizures or seizure-like symptoms, utilizing ED resources. Organizing and consolidating the epilepsy monitoring referral system would streamline the referral process and expedite care.

**Problem/Impact Statement:**

**In scope:** MMP Outpatient Neurology Practice and MMC Neuro-navigators, referrals actually scheduled, and all patients including pediatric patients

**Out of scope:** Other MaineHealth entities and outpatient practices

**Goals/Objectives:**

- 100% of the time referrals for the EMU will be sent to the Navigator Pool in Epic for booking
- 100% of the time orders for EMU will be placed by providers with no additional telephone encounter or duplicate communication

**Root Cause Analysis:**

- **Problem:** Referrals were "slipping through cracks" on the way from MMP to MMC neuro-navigators
- **Why?** The current process has many opportunities for the referrals to be lost
- **Why?** MMP PSRs were losing track of the referral orders
- **Why?** MMP providers and PSRs were unfamiliar with the referral process for EMUs
- **Why?** The referral process for EMUs is unique

**Root Cause:** The referral process does not rely on the work queue but instead relies on the MMP PSRs contacting the MMC neuro-navigators

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**Countermeasures**

<table>
<thead>
<tr>
<th>Action</th>
<th>Owner</th>
<th>Due Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMP Director took control to provide support and assistance, serving as KPI champion at MMP</td>
<td>Sara Schrock</td>
<td>2017</td>
<td>Completed</td>
</tr>
<tr>
<td>Collect data on the number of EMU referrals to establish our N (amount) (KPI 1)</td>
<td>Sara Schrock</td>
<td>12/22/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Contact PSR, Epileptologists, and members at the neurology office who often send EMU referrals and review with them how to send referrals to the navigator pool (KPI 1)</td>
<td>Sara Schrock</td>
<td>1/8/18, 2/22/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Visit MMP neurology office to see workflow and use of order queue (KPI 1)</td>
<td>Sara Schrock</td>
<td>1/8/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Meet with MMP office/operations manager to further discuss work queue and develop an action plan to educate PSR and providers (KPI 1)</td>
<td>Sara Schrock, Michelle Beane</td>
<td>3/28/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Navigators given direct access to the order queue to further discuss workflow and develop an action plan to educate PSR and providers (KPI 1)</td>
<td>Sara Schrock</td>
<td>3/28/18</td>
<td>Completed</td>
</tr>
<tr>
<td>Email providers to remove smart phrase from order set (KPI 2)</td>
<td>Sara Schrock</td>
<td>5/9/18</td>
<td>Completed</td>
</tr>
</tbody>
</table>

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**Next Steps**

- Sustain new process
- Follow up KPIs to make sure it is still running properly