Anticipating and Preventing ADEs: Decreasing the Need to Rescue Hospitalized Patients from Opioid-related Complications

Session BP5, February 11, 2019
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Conflict of Interest

Craig Havican, BSN, RN
Has no real or apparent conflicts of interest to report.

Ashley Meyers, BSN, RN-BC, PCCN-K has the following relationships to disclose:

Consulting Fees (e.g., advisory boards): serving as subject matter expert for “Alternatives to Opioids in the ED” through Michigan Health and Hospital Association (HIIN grant funded)
Fees for Non-CME Services Received Directly from a Commercial Interest or their Agents (e.g., speakers’ bureau): previously served as an unbranded onsite nurse expert for Mallinckrodt Pharmaceuticals, have not served in this role in > 12 months
Agenda

• Background
• Identification of the problem
• Evidence-based solutions
• Implementation
• Results
Learning Objectives

• Identify the key elements required to develop a robust MOSS (Michigan Opioid Safety Score) which includes health risk assessment, respiratory rate, and other clinical assessments

• Outline how to design an IT-enabled nursing workflow using standard processes for nursing documentation to capture the data elements required to generate a MOSS score and populate clinical decision support and ordering

• Analyze how to incorporate unit level reporting tools to drive MOSS assessment compliance by the nursing staff

• Outline how to generate a risk for respiratory depression care plan for patients with high MOSS scores to help prevent the need for rescue and promote timely intervention when rescue is necessary
Sparrow Health System

» Sparrow Hospital
  » 10,500 Caregivers
  » 733 beds
  » 31,645 discharges
  » CARF Accredited
  » Level 1 Regional Trauma Center
  » Sparrow Carson (61 beds)
  » Sparrow Specialty Hospital (30 beds)

» Sparrow Clinton (25 beds)
» Sparrow Ionia (22 beds)
Local Problem

• We are in an opioid public health emergency
• Opioid administration in hospitalized patients too often harms those it is intended to help (ADE)
• Inpatient administration of the opioid antagonist naloxone for overmedication is evidence of overuse or misuse
• Our data suggested that we could do better
• Timely identification and intervention for patients at risk or with early evidence of respiratory depression should help (effectiveness, safety, cost)
Local Problem

- Validated tools exist to decrease the risk of iatrogenic overdose
  - Assessment of level of sedation
  - Determination of Michigan Opioid Safety Score (MOSS)
  - Triggering interventions before naloxone rescue is required
- Well-designed, pervasively used EMR tools should help improve clinical outcomes and decrease costs
- No EMR-integrated tools and workflows to improve
Drivers to Take Action: 2012-2014

• Escalating national opioid crisis; Michigan’s ranking (10th, 18th)
• Joint Commission Sentinel Alerts
• American Society for Pain Management Nursing Guidelines
• MHA Keystone Center Opioid ADE Prevention Initiative

The Joint Commission, 2012
Jarzyna et al., 2011
Front-Line Nurses Leading the Way

• Sparrow Pain Resource Nurses (SPRNs) began looking at quality data in 2014

• Nearly 1% of patients we were treating with opioids in the hospital experienced opioid-induced respiratory depression (OIRD) requiring naloxone rescue

• To improve this, we set a hospital goal to decrease the rate of OIRD requiring naloxone rescue using:
  – People: Governance, leadership, clinicians, IT
  – Processes: Policies, workflows, Lean methods, PDCA
  – Technology: IT (EMR); devices (ETC0₂ - capnography)
Sparrow Baseline Data

- Sparrow rate of opioid-induced respiratory depression (OIRD) as measured by percent of inpatients on opioids requiring naloxone rescue administration
  - 2014: 0.72%
  - 2015: 0.73%
  - and increasing

Narcotics Accounting for Naloxone Use

- Fentanyl
- Hydromorphone
- Oxycodone
- Hydrocodone/APAP
- Morphine
2015 Naloxone Rate Trend Before MOSS Implementation

- MOSS Documentation = 0%
Project Description and Goal

In acutely ill adult inpatients, does implementation of an EMR-integrated risk assessment tool using accepted nursing workflows that is aimed at preventing OIRD, decrease the incidence of OIRD compared to no risk assessment as measured by naloxone use?

Goal: To decrease rate of IP naloxone rescue to ≤0.65%
Benchmarks

• Naloxone Target Rate: 0.65%
  
  • Numerator: # of patients received opioid & naloxone
  • Denominator: # of patient received opioid (any route)
  • Aligned with MHA Keystone Pain Management Collaborative and HIIN
Design and Implementation

• The **knowledge tools** we decided to use
  – Pasero Opioid-Induced Sedation Scale (POSS)
  – Michigan Opioid Safety Score (MOSS)

• The **IT tool** we decided to use: **Epic**, because…
  – Our key to the Sparrow Way and care transformation
  – Where clinical care gets done…and documented
  – Decision support: Risk scores, BPAs, care plans

• If this works, we can share it with Epic organizations!

*Soto R, Yaldou B. J Perianesth Nurs. 2015;30:196*
Design and Implementation

1. Decide what good looks like
   - Review literature
   - Identify best practices
   - People, process, technology
   - Gather a guiding coalition
   - Communicate for buy-in

2. Build the solution in EMR
   - Assessment documentation
   - Scales & scores
   - Nursing care plans
   - CDS tools, displays
   - Policy-supported workflows

3. Test, Talk, Teach
   - Application testing
   - Integrated testing
   - MOSS education
   - FMEA, address findings
   - Policy implications

4. Go-live & PDCA
   - Nursing leadership sign-offs
   - EMR workflow training
   - Put into nursing practice
   - Measure, monitor, adjust
More about MOSS

- Combines
  - Health risk assessment
  - Respiratory rate
  - Modified POSS (mPOSS)

A SWOT Analysis to Inform Our Conversion from Paper to EMR

Strengths
- Supporting Literature
- Pain Champions
- Clear Assessment Times Multimodal Pain Management Order Sets

Weaknesses
- Double Documentation (Paper & Electronic)
- Turnover of RN/Nurse Leadership

Opportunities
- Improve Patient Safety
- Increase RN autonomy
- Decrease RRT
- Decrease Narcan

Threats
- Competing pilots
- Equipment
- Engagement

_Sisco, Cooper, & Rayburn, 2014_
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Preoccupation with Failure to Promote Success Every Step of the Way: FMEA

Plan
- Key Stakeholders
- Align with other initiatives
- Timeline

EMR Build
- Documentation Committee
- Across applications
- View for other disciplines

Educate
- Method
- Audience
- Other Disciplines
- Content

Implement
- Go-Live Support
- Timeline
- Just in time education
- PDCA follow-up plan

Evaluate
- Ongoing PI
- Risk Mgmt reporting

Harpel & Giannini, 2014
How Health IT Was Used

• Use standard processes for nursing documentation (EMR flowsheets) to capture data for MOSS value
  – Health risks: e.g., OSA, other sedatives, age
  – Respiratory rate: document once, use many times
  – mPOSS sedation assessment
How Health IT Was Used

- Program EMR to use nursing documentation to calculate MOSS value
- Display the MOSS value where nurses can see and interpret it
- Provide usable, actionable CDS to drive best practices
MOSS Scoring and Action

MOSS score calculated per Epic scoring tool

MOSS Score

MOSS < 2
- Continue to assess per policy

MOSS ≥ 2
- RN BPA to add Care Plan

MOSS ≥ 5
- RN BPA to add Care Plan
- Stop all opioids
- Notify the Physician
- Increase monitoring
How Health IT Was Used

Nursing Documentation

Display of MOSS Value

MOSS components (Last Documented)

<table>
<thead>
<tr>
<th>RR</th>
<th>Sedation Assessment (POSS)</th>
<th>Respiratory Depression Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slightly drowsy, easily aroused</td>
<td>Impaired Ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anesthesia time &gt;3hr (within 24hr) (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concomitant Sedatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other Risk Factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None (0)</td>
</tr>
</tbody>
</table>

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How Health IT Was Used

Clinical decision support

- Alerts & advises to add care plan or exclusion
- Adds and opens care plan

Unit level reports

- Department managers
- RRT nurses

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How Health IT Was Used: Care Plans

Risk For Opioid Induced Sedation and/or Respiratory Depression:
- Identify health factors that may increase risk of sedation and/or respiratory depression
- Utilize Michigan Opioid Safety Score (MOSS)
- Identify medications that may increase risk of sedation and/or respiratory depression
- Prevent opioid-induced sedation and/or respiratory depression
  - Assess pain and sedation (i.e., Pasero Opioid Score or Richmond Agitation and Sedation Scale) before and after opioid analgesic administration, every shift and as needed
  - Perform a comprehensive respiratory assessment (for a full minute during a restful sleep state in a quiet, unstimulating environment for quality, rate, depth, and regularity)
  - Increase frequency of monitoring for sedation, respiratory status, and pain
  - Utilize continuous pulse oximetry and/or capnography monitoring as needed
- Instruct patient to bring in BIPAP or CPAP to the hospital. Collaborate with Respiratory Therapy Department if the patient’s own equipment is unavailable.
- Avoid transferring the patient between levels of care, to diagnostic procedures or discharging the patient near peak effect of opioid medication unaccompanied.
- Instruct patient and family as applicable to notify caregiver for any difficulty in breathing
- Provide multimodal analgesia, an acceptable approach to pain treatment for both acute and chronic pain by combining analgesics with variable pharmacodynamics to target multiple mechanisms of pain.

Oversedation and/or Respiratory Depression:
- Manage advanced sedation and/or respiratory depression (RR less than 8-10 BPM, poor chest excursion, or a POSS of 3 or 4) immediately
  - Stimulate the patient and support respirations as needed. Instruct patient to take deep breaths, perform interventions to maintain a patent airway (jaw thrust)
  - Prepare to administer naloxone (remember to complete Adverse Drug Reaction form as necessary)
Value Derived: Improved Processes Adherence to Best Practice

MOSS Documentation Rate (%)

- MOSS Documentation Rate
- Linear (MOSS Documentation Rate)
### Value Derived: Patient Outcomes Surpassed ADE Benchmark

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Naloxone Rate</th>
<th>Relative Change in Naloxone Rate</th>
<th># of Patients Receiving Naloxone Per Year</th>
<th>Mean Incidence Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.72%</td>
<td>NA</td>
<td>179</td>
<td>14.9</td>
</tr>
<tr>
<td>2015</td>
<td>0.74%</td>
<td>2.6%</td>
<td>174</td>
<td>14.5</td>
</tr>
<tr>
<td>2016</td>
<td>0.70%</td>
<td>-3.2%</td>
<td>157</td>
<td>13</td>
</tr>
<tr>
<td>2017</td>
<td>0.55%</td>
<td>-23.6%</td>
<td>113</td>
<td>9.4</td>
</tr>
<tr>
<td>2018</td>
<td>0.52%</td>
<td>-20%</td>
<td>103</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Value Derived: Patient Outcomes

Naloxone Rate (%) Trend Before vs. After Implementing EMR-Integrated MOSS Tool
Value Derived: Improved Processes & Outcomes

MOSS Documentation

Naloxone Rate
### Value Derived: Cost Avoidance as a Result of Clinical Improvements

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Naloxone Rate</th>
<th>Raw Incidence Per Year</th>
<th>Mean Incidence Per Month</th>
<th>Estimated Cost Avoidance (Raw Incidence vs. Baseline Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.72</td>
<td>179</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>0.74</td>
<td>174</td>
<td>14.5</td>
<td>$70K - $98K</td>
</tr>
<tr>
<td>2016</td>
<td>0.70</td>
<td>157</td>
<td>13</td>
<td>$308K - $431K</td>
</tr>
<tr>
<td>2017</td>
<td>0.55</td>
<td>113</td>
<td>9.4</td>
<td>$924K - $1,293K</td>
</tr>
<tr>
<td>2018</td>
<td>0.52</td>
<td>103</td>
<td>8.6</td>
<td>$1,064K – 1,489K</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td>$2,366K – 3,311K</td>
</tr>
</tbody>
</table>

Estimated cost per ADE: Non-ICU = $13,994; ICU = $19,685
Totals: 2015 – 2018 YTD

Fewer Patients Harmed:

170

Cost Avoidance:

$2.3M - $3.3M
External Recognition for our IT-enabled Best Practice: Epic Clinical Program

Reducing Opioid Prescriptions and Abuse

As always, remember your responsibilities for safe use of the software. Last Significant Update: 11/05/17

<table>
<thead>
<tr>
<th>Primary Products</th>
<th>EpicCare Ambulatory, EpicCare Inpatient Clinical Documentation, EpicCare Inpatient Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Epic Tools</td>
<td>SmartSets, Order Sets, BestPractice Advisories, Flowsheets, Patient Lists, Care Plans, Reporting Workbench, Health Maintenance, Order-Specific Questions</td>
</tr>
<tr>
<td>Last Updated</td>
<td>November 22, 2017</td>
</tr>
</tbody>
</table>

Executive Overview

Essential

This Program is Essential, which means we recommend most organizations implement it. To see all Essential Programs, search Galaxy for Clinical and Financial Programs.

Kaiser Permanente®

95% reduction in brand-name opioid prescriptions

Sparrow

0.55% opioid-related respiratory depression rate

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External Recognition for our IT-enabled Best Practice: ECRI Institute

- MOSS program recognition
  - Better processes
  - Naloxone reductions
  - Greater staff comfort
- Criteria-based prescribing restrictions (fentanyl)
- Safer order sets (PCA)
- Pushing nonpharmacologic pain management modalities (e.g., heat and cold, aromatherapy, pet therapy)
Capital and Operational Expenses

- Capital expenses = $0
- Operational expenses = $57,375

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI/Project Planning; 120 total hours</td>
<td>$3,988</td>
</tr>
<tr>
<td>Committee work; 20 total hours</td>
<td>$665</td>
</tr>
<tr>
<td>Live and online Nursing Education; 1.5 hours each</td>
<td>$49,845</td>
</tr>
<tr>
<td>Go-Live Support; 40 total hours</td>
<td>$1,329</td>
</tr>
<tr>
<td>EMR analyst time; 60 total hours</td>
<td>$1,549</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$57,375</strong></td>
</tr>
</tbody>
</table>
Lessons Learned

• Involve your frontline staff at the beginning
  – Sense of ownership of the problem and solution
• Partner with IT team at the beginning of implementation planning
• One time education & training isn’t enough
• Technology and training does not ensure sustainability
  – Clear expectations and accountability
Questions

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References


