Clinical Safety & Effectiveness
CS&E Cohort #19
Inpatient Bowel Prep
The Team

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• Sponsor Department:
  – Department of Medicine, Division of Gastroenterology
Background

• Dik et al. showed that current hospitalization was an independent risk factor for poor bowel preparation (OR 1.8, p <0.001)\textsuperscript{1}

• Repeating procedures subjects the patient to the inconvenience of additional bowel preparation and increases the cardiac and respiratory risk associated with moderate sedation\textsuperscript{2}

• The purpose of our quality improvement project is to decrease the number of inpatient colonoscopies with an inadequate bowel preparation using a standardized order set
Background

• Chambers et al. reported that prior to implementation of an order set, physicians rated colon preparation as fair or poor (inadequate) in 78% of inpatient colonoscopies\(^3\)

• In their study, an electronic order set along with staff, physician, and patient education on colonoscopy preparations led to a 46.1% decrease in the number of patients with inadequate bowel preparation and decreased the number of failed colonoscopies\(^3\)
Project Milestones

• Team Created August 2016
• AIM Statement Developed August 2016
• Weekly Team Meetings Aug to Nov 2016
• Background Data, Brainstorm Sept 2016
  Sessions, Workflow and Fishbone Analyses
• Interventions Implemented Nov 29th 2016
• Data Analysis Nov 29th 2016-Dec 29th 2016
• CS&E Presentation Jan 2017
### Background Data - Inadequate Bowel Preparation

#### Inpatient Colonoscopy Bowel Preparation Ratings

<table>
<thead>
<tr>
<th>Month</th>
<th>Excellent</th>
<th>Adequate</th>
<th>Inadequate</th>
<th>Inadequate</th>
<th>Total</th>
<th>Percent Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec-15</td>
<td>17</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>28</td>
<td>25%</td>
</tr>
<tr>
<td>Jan-16</td>
<td>18</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>33</td>
<td>27%</td>
</tr>
<tr>
<td>Feb-16</td>
<td>21</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>32</td>
<td>28%</td>
</tr>
<tr>
<td>Mar-16</td>
<td>20</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>20%</td>
</tr>
<tr>
<td>Apr-16</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>22</td>
<td>27%</td>
</tr>
<tr>
<td>May-16</td>
<td>14</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>27</td>
<td>26%</td>
</tr>
<tr>
<td>Jun-16</td>
<td>16</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>27</td>
<td>30%</td>
</tr>
<tr>
<td>Jul-16</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>25</td>
<td>24%</td>
</tr>
<tr>
<td>Aug-16</td>
<td>14</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>25</td>
<td>24%</td>
</tr>
</tbody>
</table>

#### Median 26%

#### Mean 25.60%
Background Data-Inadequate Bowel Preparation

Patients With a Poor Bowel Preparation

- UCL 35.31%
- CL 25.67%
- LCL 16.02%

Month:
- Dec-15
- Jan-16
- Feb-16
- Mar-16
- Apr-16
- May-16
- Jun-16
- Jul-16
- Aug-16

Insufficient Prep:
- 5.00%
- 10.00%
- 15.00%
- 20.00%
- 25.00%
- 30.00%
- 35.00%
- 40.00%
### Background Data-Cancelled Procedure

<table>
<thead>
<tr>
<th>Date of Procedure</th>
<th>Inpatient or Outpatient</th>
<th>Delayed, Rescheduled or Cancelled (If delayed or rescheduled please include how long the delay was or how many days till rescheduled procedure)</th>
<th>Please list any contributing factors (ex. patient did not tolerate the volume or taste; bowel prep held because patient was clear, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/7/16</td>
<td>Inpatient</td>
<td>Reschedule to next day</td>
<td>Solid food until noon day prior</td>
</tr>
<tr>
<td>9/8/16</td>
<td>Inpatient</td>
<td>Reschedule to next day</td>
<td>Did not tolerate prep 2/2 bloating/nausea</td>
</tr>
<tr>
<td>9/9/16</td>
<td>Inpatient</td>
<td>Reschedule Monday</td>
<td>In spite of full prep, non clean</td>
</tr>
<tr>
<td>9/12/16</td>
<td>Inpatient</td>
<td>Reschedule to next day</td>
<td>Needed more enemas</td>
</tr>
</tbody>
</table>

- Around 10% of inpatient colonoscopies are cancelled per month, prior to starting, due to a failed bowel preparation
• The mean number of colonoscopies with a rating of fair or poor (inadequate) in our inpatient bowel preparations is approx. 25%

• Limitations: We were unable to obtain the percentage by hospital floor because patients relocate during their stay and because this data is not generally recorded when we schedule procedures
AIM statement

To decrease the number of inpatient colonoscopies with an inadequate bowel preparation score by 50%, from an average of 24% to 12%, by Jan 2017
PLAN: How the process should run

Primary team calls the gastroenterology fellow to request an evaluation for colonoscopy

Gastroenterology fellow evaluates the patient and determines the patient requires an inpatient colonoscopy

Gastroenterology fellow communicates this to the primary team and patient

The housestaff completes the standard order set including the instructions for the nursing staff
PLAN: How the process should run

Patient successfully completes a bowel preparation overnight

Patient is available the morning of the procedure and quickly arrives in the endoscopy unit

Patient undergoes a colonoscopy with an adequate bowel prep rating

Patient recovers and returns to the floor
PLAN: Brainstorming

• Lack of communication between nurses and patients
  – Implement an order set that facilitates triaging bowel preparation issues
  – Educate nurses on where we are lacking during patient bowel preparation
  – Gastroenterology fellows could better prepare patients for the process of bowel preparation so they know when to bring up issues with the nurses

• Lack of communication between nurses and housestaff
  – Implement an order set that instructs nurses when to inform the housestaff of bowel prep issues
  – Educate nurses on when they should be communicating bowel prep issues to the house staff
  – Educate the housestaff on how they should be triaging bowel prep related issues overnight

• No order set for NG tube
  – Implement an order set that instructs the nurses when notify the housestaff the patient is nauseated and may require NG tube
  – Educate the housestaff on being more proactive on using an NG tube for bowel prep intolerance
  – Gastroenterology fellows could better prepare patients for expecting an NG tube if they cannot tolerate a bowel prep

• No standard order set for bowel prep instructions
  – Implement an order set with standard instructions for nurses and patients
DO: Order Set Example

Chambers et al. Improving Inpatient Colonoscopy Preparation in a University Hospital: An Evidence-Based Practice Project.
DO: Order Set

Order Set

Diet-
Clear liquid diet
NPO at midnight except for bowel prep
Unsweetened tea or diet lemonade to be added to bowel preparation

Nursing-
Notify provider- For: prep not tolerated
Notify provider- For: nausea continuing after decreased frequency of bowel preparation
Notify provider: For: stool not clear at completion of prep

Medications:
Golytely powder-Instructions: Begin 2 L of bowel preparation at 8pm the night prior to the colonoscopy. This is to be finished in 2 hours or 8 ounces every 15 min. Begin the second 2 L of bowel preparation at 4 AM the morning of the procedure. This is to be finished in 2 hours or 8 ounces every 15 min.
DO: Order Set
### DO: Order Set

#### Medications

<table>
<thead>
<tr>
<th>Order</th>
<th>Dose</th>
<th>Dose Units</th>
<th>Route</th>
<th>Frequency</th>
<th>PRN</th>
<th>PRN Reason</th>
<th>Nursing Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Lavage Powder</td>
<td>1</td>
<td>Bottle</td>
<td>Oral</td>
<td>Once</td>
<td></td>
<td></td>
<td>Begin 2 L of bowel preparation at 8pm the night before procedure.</td>
</tr>
</tbody>
</table>

#### Nursing

- **Nursing Care**
  - [Subject] [Frequency] - Notify provider: For prep not tolerated by the patient
  - [Subject] [Frequency] - Notify provider: For nausea continuing after decreased frequency of bowel preparation
  - [Subject] [Frequency] - Notify provider: For stool not clear by 7 AM the day of the procedure

#### Nutrition Services

- **DIET Liquid Diet Order**
  - Able to Call: Not appropriate (chef choice w/... Type: Clear Liquid [Oral Supplement] [Amount of Oral Supplement]
  - Instructions: Clear liquid diet previous day: Unsweetened tea or diet lemonade to be added to bowel preparation

- **DIET NPO Order (no tube feedings)**
  - Type: NPO except meds w/ sips water
  - Instructions: NPO at midnight except for bowel prep

#### Respiratory Therapy

#### Pharmacy

### Drug Info
DO/STUDY: Education

• Internal medicine housestaff was educated on appropriate triaging of problems that arise during inpatient bowel preparation

• Weekly reminders were used to reinforce that the order set was in use and requested feedback
STUDY: Communication

• Feedback was requested from the nurses regarding the order set and is currently pending
STUDY: Post-Intervention Data

• We collected data for the month following implementation of the intervention to assess if the percentage of inpatient colonoscopies with an inadequate bowel preparation decreased
# Post-Intervention Data

<table>
<thead>
<tr>
<th>Inpatient Colonoscopy Bowel Preparation Ratings</th>
<th>11/29-12/29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate Excellent</td>
<td>Adequate Good</td>
</tr>
<tr>
<td>WEEK 1</td>
<td>7</td>
</tr>
<tr>
<td>WEEK 2</td>
<td>6</td>
</tr>
<tr>
<td>WEEK 3</td>
<td>3</td>
</tr>
<tr>
<td>WEEK 4</td>
<td>3</td>
</tr>
<tr>
<td>WEEK 5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>
Post-Intervention Data

Patients With a Poor Bowel Preparation

Percentage undergoing colonoscopy with a poor bowel preparation

- UCL: 35.31%
- LCL: 16.02%
- Post-Intervention Data: 10.00%
Post-Intervention Data

• We achieved our goal of a 50% decrease in the number of colonoscopies with an inadequate rating in the first month after implementing the order set
Return on Investment

• For each day we prevented patients remaining in the hospital solely to repeat a colonoscopy, it is estimated we saved approx. $2,050.00

• As our AIM of decreasing by 50% was reached, the system potentially saved $30,000 in the first month following intervention
ACT: Sustainability

• Since we showed that using the order set can decrease the number of inadequate bowel preparations we hope this will ensure continued use throughout our department

• We will continue to collect feedback from the nurses as well as the housestaff

• Once we have optimized the order set, integrating the feedback, we plan to prospectively follow usage and its impact on bowel preparation long term
ACT: Future Plans

• We plan on improving the types of bowel preparations available at UHS to more palatable versions

• We plan on improving the scheduling of inpatient procedures to minimize wait times
References


Questions?