

Evaluation of a pharmacist-driven stress ulcer prophylaxis protocol in a community hospital setting

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Disclosures

The speaker has no actual or potential conflict of interest in relation to this presentation

Learning Objective

- Recognize the impact of a pharmacist-driven stress ulcer prophylaxis discontinuation protocol on prescribing habits of acid suppressive therapy in a community hospital

Mercy Hospital — Springfield, Missouri

- 886-bed acute care community hospital
- Level 1 adult trauma, STEMI, and burn center
- Level 2 pediatric trauma, and stroke center
- Fully integrated electronic health record system with computerized physician order entry



Background

Stress-related mucosal disease

- Acute, erosive gastritis ranging from stress-related injury to stress ulcers
- Reported incidence ranges from 75% to 100% in critically ill patients

Stress ulceration

- Deep mucosal damage penetrating the submucosa with high risk for bleeding
- Reported frequency of gastrointestinal bleeding is 2.6%

Background

Pathophysiology

Hypoperfusion of
the upper
gastrointestinal
mucosa

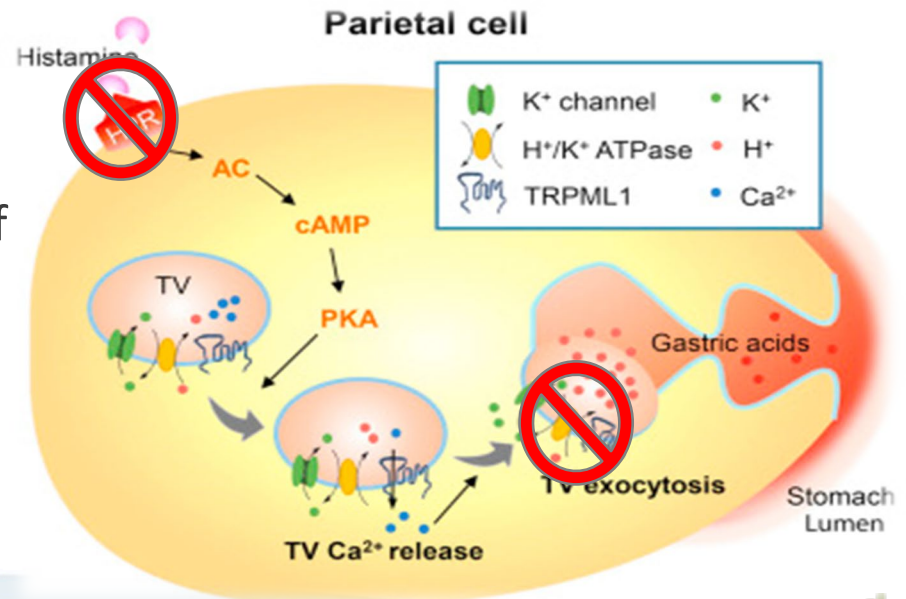
Increased hydrogen
ions, oxygen
radicals, and toxic
substances

Mucosal damage
and ulceration

Background

Standard of Care for Stress Ulcer Prophylaxis

- Histamine-2 receptor antagonists (H2RA)
 - Competitive inhibition of histamine at H2 receptors of the gastric parietal cells, inhibiting gastric acid secretion
- Proton pump inhibitors (PPI)
 - Suppression of gastric acid secretion through inhibition of the parietal cell H^+/K^+ ATP pump



Background

Long Term Effects of Acid Suppressive Therapy

- Associated with nationally observed increases in rates of *Clostridioides difficile* and nosocomial pneumonia



- Additional risks associated with acid suppressive therapy:
 - Bone fractures
 - Hypomagnesemia and vitamin deficiencies
 - Thrombocytopenia

Background

ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis

- Mechanical ventilation > 48 hours
- Coagulopathy
 - Platelet count < 50, INR > 1.5, or PTT 2x baseline
- GI bleed within the last year
- Traumatic brain injury
 - GCS < 10 or unable to obey simple commands
- Major burns affecting > 35 % of the body surface area
- Multiple trauma or spinal cord injury
- Hepatic insufficiency
 - Total bilirubin level > 5 mg/dL, AST > 150 U/L, or ALT > 150 U/L
- Two of the following
 - Sepsis
 - ICU stay > 7 days
 - Occult bleeding
 - Steroids with a daily dose > 250 mg of hydrocortisone

Background

- Stress ulcer prophylaxis is administered without an indication at rates as high as 68.1%

- Once initiated, prophylaxis is continued in 81.2% of patients transferred from the ICU

- Patients are at risk of being continued on stress ulcer prophylaxis at hospital discharge

Background

Impact of a clinical pharmacist stress ulcer prophylaxis management program on inappropriate use in hospitalized patients

Objective	Evaluate the clinical and economic impact of a novel pharmacist-managed stress ulcer prophylaxis program in ICU and general ward patients																												
Outcomes Measures	<ul style="list-style-type: none"> • Mean percentage of patient days of inappropriate stress ulcer prophylaxis • Incidence of hospital acquired adverse clinical outcomes • Drug acquisition costs 																												
Design	Single center, retrospective, pre- and post study (N = 1134)																												
Results	<table border="1"> <thead> <tr> <th></th> <th>Pre</th> <th>Post</th> <th><i>P Value</i></th> </tr> </thead> <tbody> <tr> <td>Inappropriate Use</td> <td>14.4%</td> <td>6%</td> <td>< 0.001</td> </tr> <tr> <td>Inappropriate Cont.</td> <td>67.8%</td> <td>38.9%</td> <td>< 0.001</td> </tr> <tr> <td>Inappropriate DC</td> <td>29.9%</td> <td>3.6%</td> <td>< 0.001</td> </tr> <tr> <td>Total Costs</td> <td></td> <td></td> <td></td> </tr> <tr> <td> ICU</td> <td>\$6247.17</td> <td>\$1752.21</td> <td>< 0.001</td> </tr> <tr> <td> General Ward</td> <td>\$13,805.53</td> <td>\$1528.28</td> <td>< 0.001</td> </tr> </tbody> </table>		Pre	Post	<i>P Value</i>	Inappropriate Use	14.4%	6%	< 0.001	Inappropriate Cont.	67.8%	38.9%	< 0.001	Inappropriate DC	29.9%	3.6%	< 0.001	Total Costs				ICU	\$6247.17	\$1752.21	< 0.001	General Ward	\$13,805.53	\$1528.28	< 0.001
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Limitations	<p>Single center, retrospective evaluation</p> <p>Single post-implementation period</p>																												

Primary Objective

Evaluate the effects of a pharmacist-driven stress ulcer prophylaxis discontinuation protocol on...

- Incidence of inappropriate acid suppressive therapy prescribed in the critical care unit and general medical unit

Secondary Objectives

Evaluate the effects of a pharmacist-driven stress ulcer prophylaxis discontinuation protocol on...

- Incidence of inappropriate acid suppressive therapy prescribed in the critical care unit
- Incidence of inappropriate acid suppressive therapy prescribed in the general medical unit
- Continuation of acid suppressive therapy without an indication upon transfer from the critical care unit
- Continuation of acid suppressive therapy without an indication upon discharge from the hospital
- Medication cost savings

Mercy Protocol

Upon identification, Mercy Springfield clinical pharmacists will discontinue inappropriate acid suppressive therapy in adult patients

Indications for stress ulcer prophylaxis

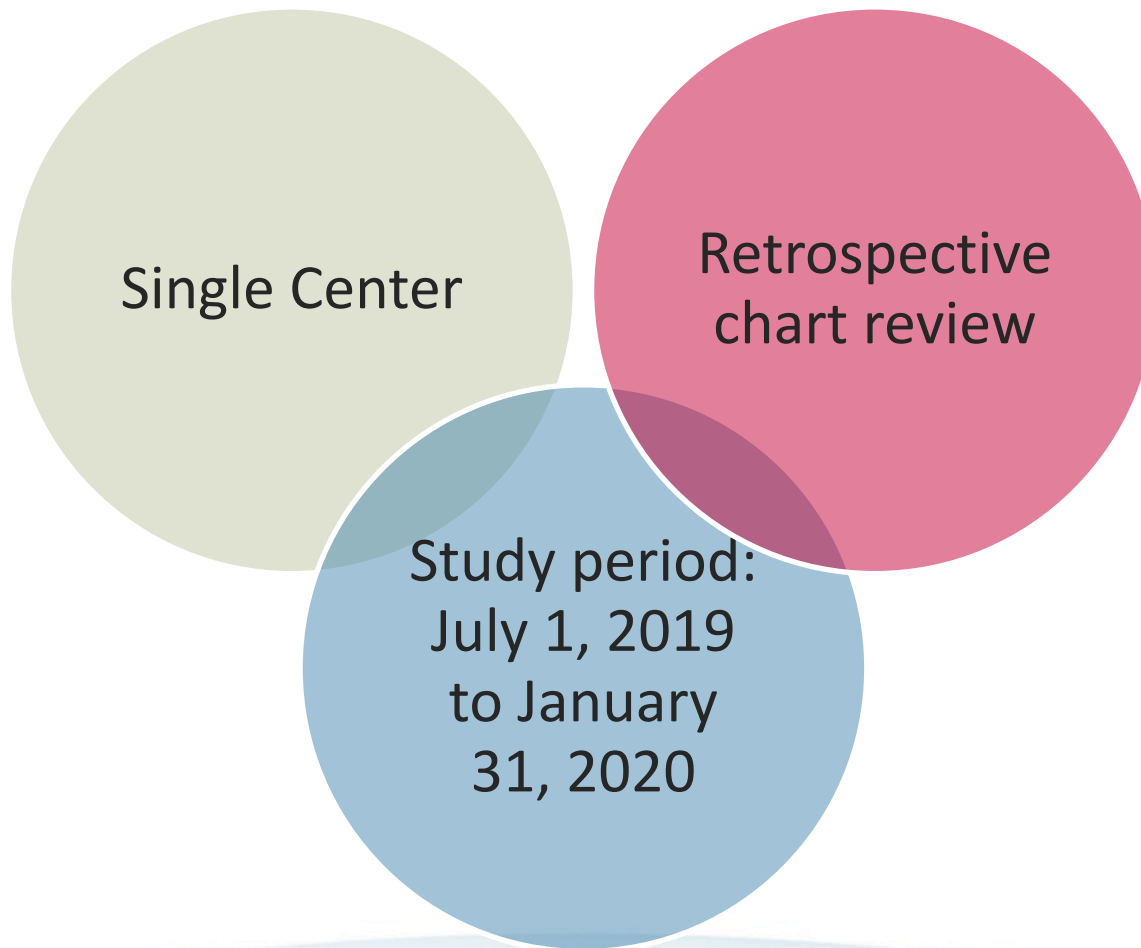
- Mechanical ventilation
- Coagulopathy
- History of GI bleed
- Traumatic brain injury
- Trauma or spinal cord injury
- Hepatic failure
- Two of the following:
 - Sepsis
 - ICU stay > 7 days
 - Occult bleeding
 - High dose steroid use

Treatment indications for acid suppressive therapy

- Acute upper GI bleed
- Barrett's esophagus
- Erosive esophagitis
- Gastric bypass
- Gastric or duodenal ulcer
- Gastroesophageal reflux
- *H pylori* treatment
- Post cardiac surgery
- Severe allergic reactions
- Zollinger-Ellison Syndrome
- Use prior to admission

Methods

Study Design



Methods

Statistical Analysis

- To achieve 80% power with a 5% significance level, a sample size of 400 total patients was required to detect a 50% reduction in inappropriate therapy
- Descriptive statistics represented as frequencies and percentages
- Study outcomes addressed using the chi-square test for categorical data
- Costs data presented in dollars per 100 patients

Methods

Inclusion and Exclusion Criteria

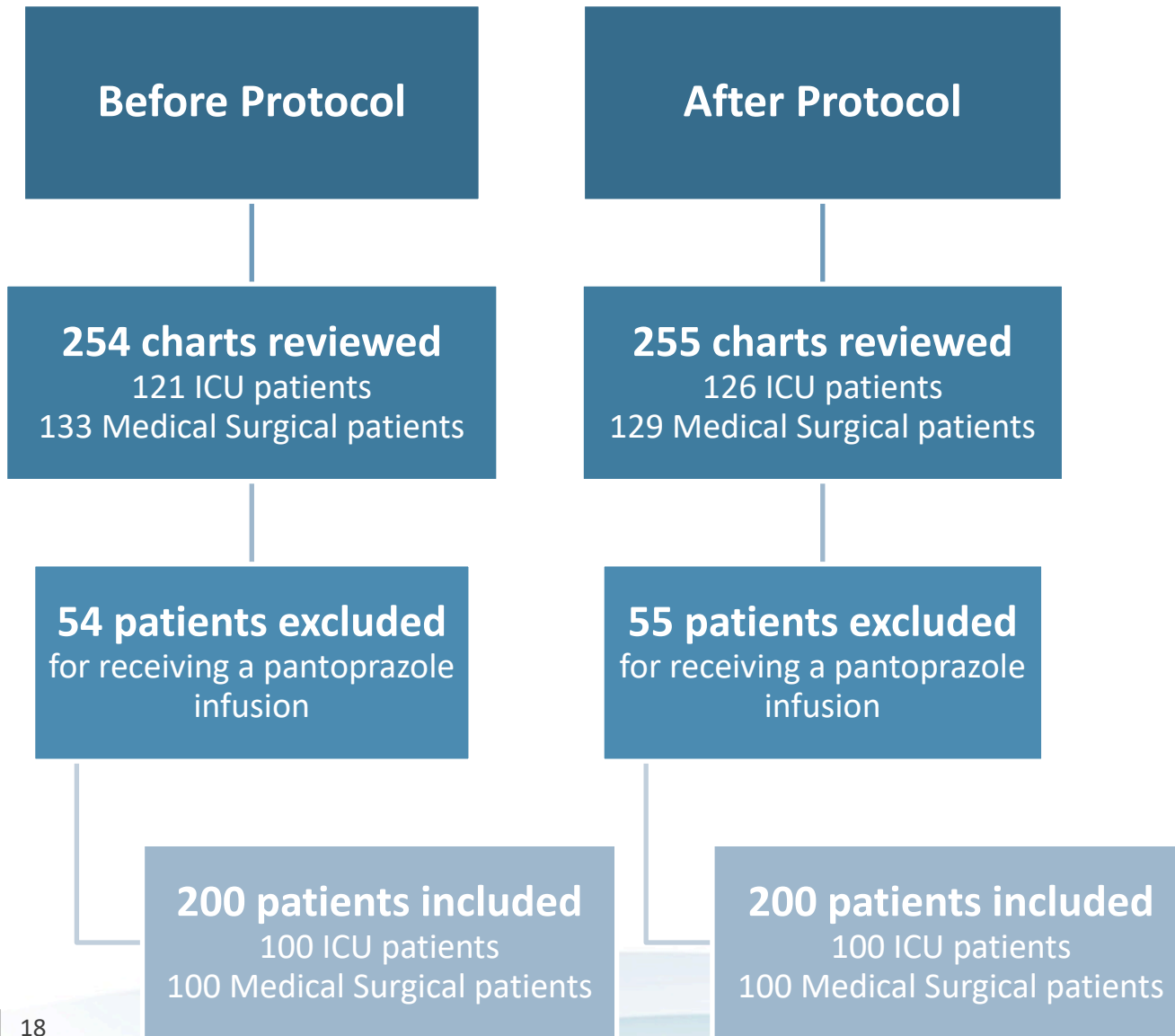
Inclusion

- Aged 18 years or older
- Received pantoprazole, famotidine, ranitidine or lansoprazole during inpatient visit

Exclusion

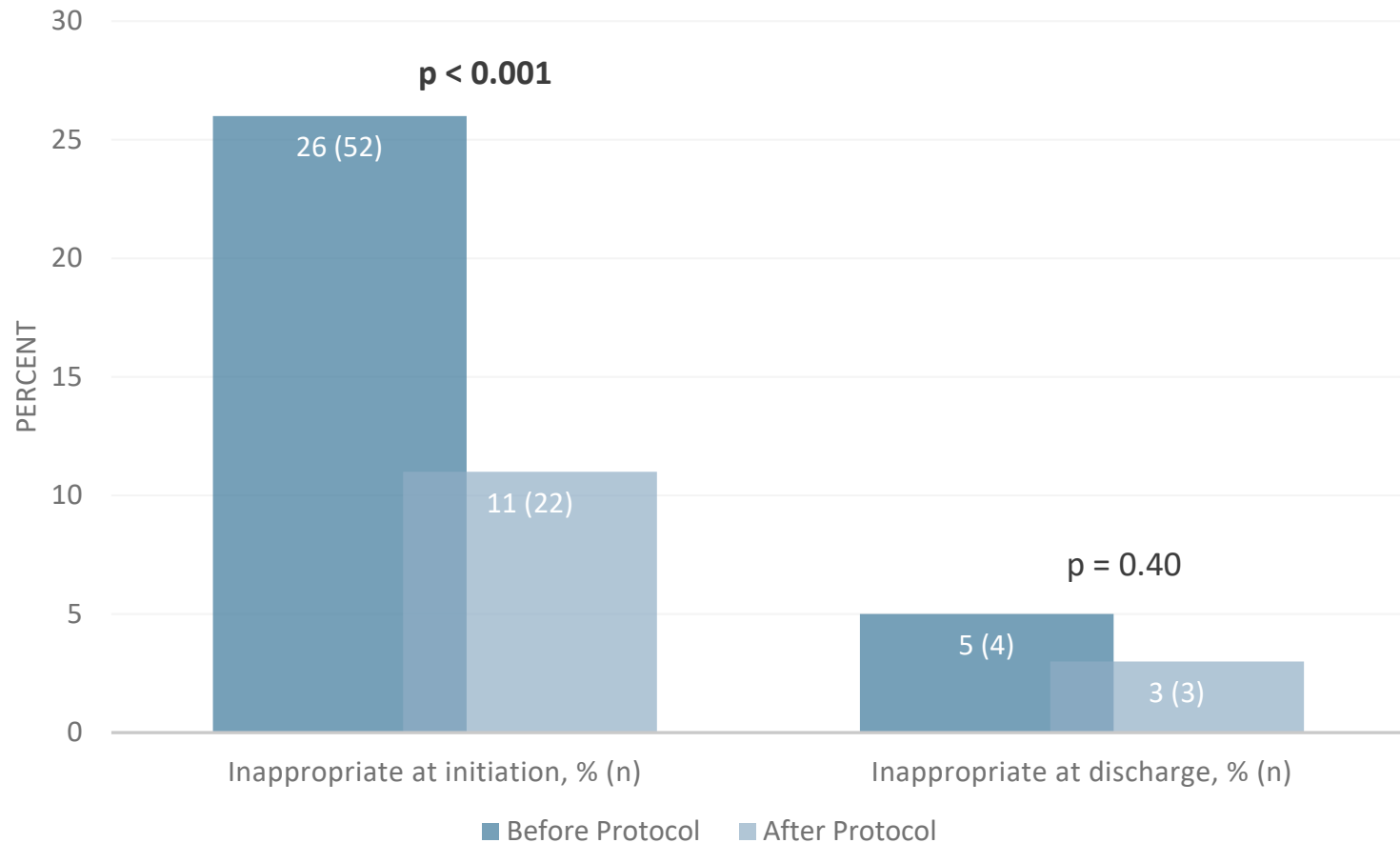
- Received pantoprazole infusion for the treatment of acute upper gastrointestinal bleeding

Methods



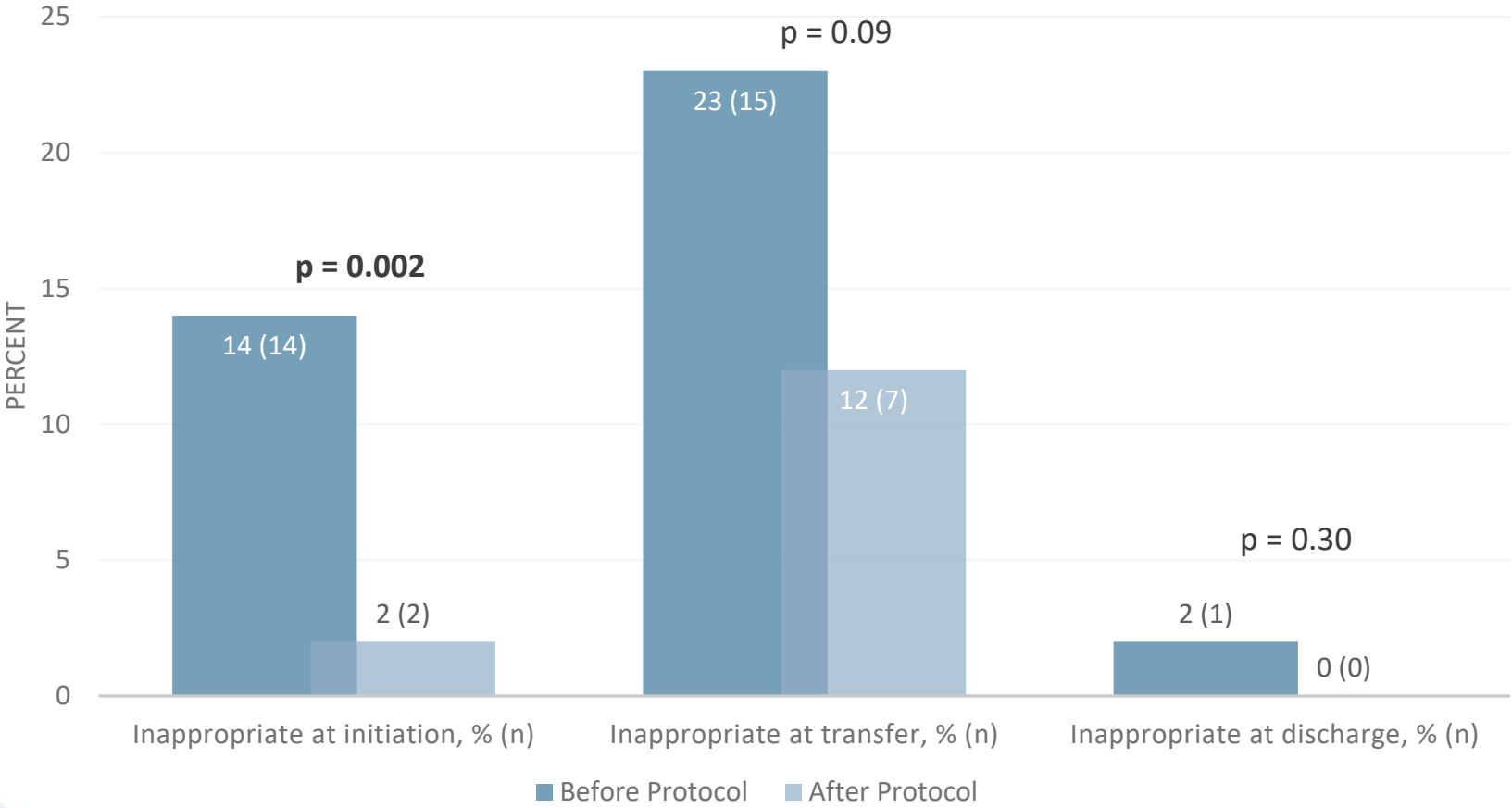
Results

Total Population



Results

Intensive Care Unit



Results

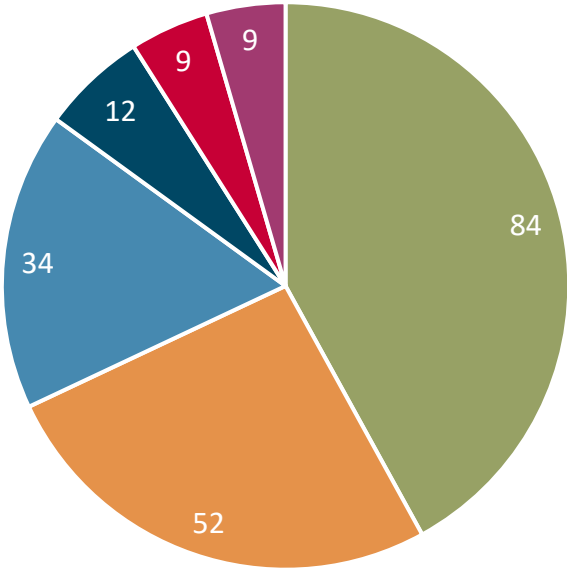
Medical Surgical Unit



Results

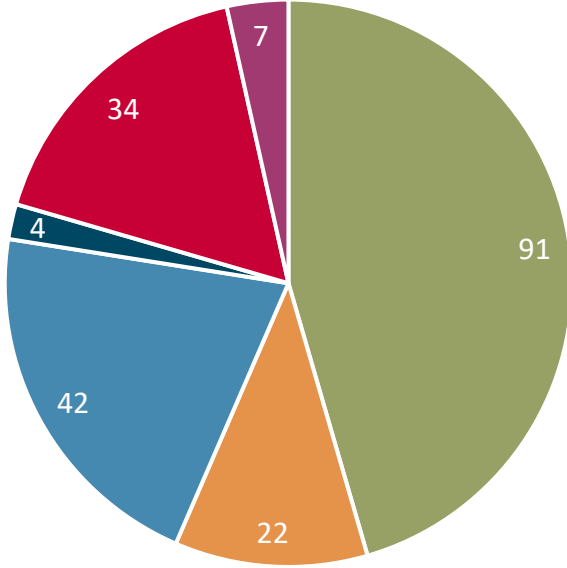
Indications for Acid Suppressive Therapy

Before Protocol (n = 200)



- PTA Med
- Intubated
- GERD/Esophagitis/GI Bleed
- Not Indicated
- Trauma
- Other*

After Protocol (n = 200)



- PTA Med
- Intubated
- GERD/Esophagitis/GI Bleed
- Not Indicated
- Trauma
- Other*

Results

Cost Analysis

Unit	Cost of Inappropriate Use (\$ per 100 patients)	
	<i>Before</i>	<i>After</i>
ICU + Medical Surgical	92.33	56.06
ICU	12.00	10.15
Transferred out of ICU	13.62	14.49
Medical Surgical Unit	159.04	87.47

Conclusions



Implementation of a pharmacist-driven stress ulcer prophylaxis protocol significantly increases adherence to the best practice prescribing of acid suppressive therapy in the ICU and medical units and reduces medication costs

Inappropriate continuation of acid suppressive therapy was not significantly reduced upon transfer from the ICU or upon discharge from the hospital as a result of the protocol

Discussion

Strengths and Limitations

Strengths

- Power met
- Analysis of ICU and Medical Surgical Units

Limitations

- Small sample size
- Retrospective
- Short postimplementation period
- Limited generalizability
- Included patients continued on acid suppressive therapy from home
- Confounding variables

Discussion

Confounding Variables

- Pharmacist-provided education may have changed prescribing habits on its own
- Minimal pharmacist utilization outside of the ICU
- Providers required to select indications for proton pump inhibitors after implementation of the protocol
 - Impacted prescribing habits and data collection

! Indication:

Gastroesophageal reflux disease (GERD)	Upper gastrointestinal (GI) bleed	Gastric or duodenal ulcer	
Helicobacter pylori (H. pylori)	NSAID-induced ulcer prophylaxis	Zollinger-Ellison syndrome	Erosive esophagitis
Stress ulcer prophylaxis	Other		

Future Directions and Application

- Larger study necessary
 - Multiple ICUs and general units
 - Exclude patients continuing acid suppressive therapy from prior to admission
 - Evaluate clinical outcomes
- Pharmacy department education at onboarding to improve utilization
- Rx Scoring Tool implementation

References

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