Internal Medicine GME: Patient Safety and Quality Improvement Learning Program

RESULTS OF EXPERIENTIAL PROJECT LEARNING FOR 2ND YEAR RESIDENTS
ACADEMIC YEAR: JULY 2017 – JUNE 2018
LAST UPDATED: 7/26/18
Program Summary: Academic Year 2017-18
Projects July 2017 – June 2018

Program Evaluation

58% (7/12) had lasting impact - presented, published, implemented, or connected to larger QI project

Impact Summary

- CVC Value Challenge Finalist, Oct 2017 (Add-on Labs)
- Change implemented in MiChart, Jan 2018 (Anion Gap)
- Change implemented at VA, Dec 2017 (Vital signs in CPRS)
- Implementation in progress, Jan 2018 (Priority Discharge)
- Further study planned with faculty mentor, May 2018 (MRI Delays)
- 1 HO2 pursuing 2-week QI elective after project month
- 1 HO3 initiating independent QI project (Advanced care planning for Liver Transplant patients)

Rotation Evaluation

Residents self-reported 34% improvement in knowledge and 43% improvement in comfort level with QI methodology (pre/post survey)
89% extremely satisfied with faculty facilitator
85% extremely satisfied with PI team member

Scholarly Work

- Poster at SHM 2018 (J. Zhang, HospMed/Onc Communication, from FY17)
- Poster at SHM 2018 (N. Houchens, Embedding performance improvement specialists in a safety and quality curriculum)
Project Topics

*Project was implemented, connected with larger project / faculty mentor, and/or resulted in scholarly work

Jul 17: Ann Arbor VA Vital Sign Incorporation into CPRS*

Aug 17: Increasing add-on lab utilization*

Sept 17: Incidental Pulmonary Nodules follow up after discharge

Oct 17: Unnoticed anion gaps leading to missed clinical opportunities*

Nov 17: Reducing Unnecessary Diagnostic Phlebotomy

Dec 17: Increasing priority discharges on resident services*

Jan 18: Appropriate triage of Hem/Onc patients in ED to General Medicine or Hem/Onc services

Feb 18: Potassium over-supplementation in CHF patients*

Mar 18: Hemostasis time and bleeding complications in heart cath patients

Apr 18: Delays in MRI leading to poor patient outcomes and increased LOS*

May 18: PPIs: Why do we start them, and why do we continue them?*

Jun 18: Improving P2Y12 Inhibitor Use in NSTE-ACS
Program enhancements poster accepted at Society for Hospital Medicine 2018

PARTNERS IN QUALITY: EMBEDDING PERFORMANCE IMPROVEMENT SPECIALISTS INTO A SAFETY AND QUALITY CURRICULUM

Nathan Howchens, MD, Lauren Heidemann, MD, Christopher Petrilli, MD, Tammy Effie, Matthew Johnson, Katie Schwalm, Elizabeth Spranger, John Del Valle, MD, Scott Flanders, MD

BACKGROUND

- An effective patient safety and quality improvement (PSQI) curriculum is imperative for CME training programs, yet many health systems lack pedagogical training in these methods.
- Learning often takes the form of group project work, yet projects may not reflect institutional priorities, duplicate efforts, or remain unfinished after allotted time.
- As a result, residents feel their contributions to the broader missions of PSQI within the institution are limited and of little value.

INTERVENTION

- The University of Michigan’s Internal Medicine Residency partnered with the Department of Internal Medicine’s Quality and Innovation Program to develop a novel curricular method aligning PSQI resident group project work with institutional goals.
- Engineering experts were embedded as co-facilitators into resident groups to assist in providing:
  - Weekly educational modules
  - Focus on lean methods and A3 thinking
  - Emphasis on scholarly activity
  - Access to institutional data, resources
  - Pre- and post-presentation surveys

CONTINUOUS QUALITY IMPROVEMENT

- Implemented with a micro-designated team and leadership involvement
- Reduced costs
- Improved patient outcomes
- Decreased length of stay
- Reduced nosocomial infections
- Developed a framework for sustainability by embedding metrics into quarterly reports

CONCLUSIONS

- Embedding engineering experts into residency programs’ PSQI teaching efforts creates a multidisciplinary team focused on aligned institutional initiatives.
- This partnership results in improved resident satisfaction with PSQI training, higher quality group project work, and higher likelihood of intervention implementation and dissemination.
Ann Arbor VA Vital Sign Incorporation into CPRS

This work was piloted on one unit at the VA in December 2017, and will be rolled out to all units if the pilot goes well.
This group independently submitted their project to the CVC Value Innovation Challenge and were selected as finalists.

Faculty Facilitator: David Stewart
PI Consultant: Tammy Ellies
House Officers: Catherine Wilson, Kaitlyn Vitale, Christopher Grondin, Jackson Murrey-Ittmann, Khalid Abdul Majeed
Other: Zach Haupt (VA)

Team Members: Kaitlyn Vitale, MD; Christopher Grondin, MD; Catherine Wilson, MD; Khalid Abdul Majeed, MD; David Stewart, MD; Zachary Haupt, MD; Christopher Petrilli, MD; Tammy Ellies, MBA
Incidental Pulmonary Nodules: Handoffs from Inpatient to Outpatient Care (September 2017)

Faculty Facilitator: Jen Stojan
PI Team member: Katie Schwalm
House Officers: Justin Sovich, Patrick Green, Tori Nault, Lina Brinker, Alicia Alvarez

Incidental Pulmonary Nodules follow up after discharge
Mind the gap: unnoticed anion gaps leading to missed clinical opportunities - Structured Problem Solving A3 - 10/2017

From gap (AG) is the difference between cations and anions in blood. Traditionally set an AG value of 12 with values greater than 12 suggesting that there are other abnormal cations in blood (most commonly lactate, acetates, and citrate). Inaccurate AG calculations can lead to missed clinical opportunities.

Recognizing AG clinically is important as elevated AG is associated with increased hospital readmissions, hospital mortality, and ambulatory long-term mortality outcomes.

There have been adverse outcomes and re-admissions of Michigan Medicine due to unnoticed AG (including cases discovered as part of this project).

**Implement Plan**

Over 1000 patients every year are discharged with an elevated anion gap. These are not clinically commented on in terms of documentation (<2% documented) and laboratory work-up for etiologies. Over 50% of discharges have a serum bicarbonate in the normal range with an elevated anion gap.

∙ In order to better understand the reasons behind unrecognized anion gaps at the time of a patient’s discharge, we performed a root cause analysis.

∙ There were four main reasons for unnoticed anion gaps including:

  ∙ Lab not drawn
  ∙ Not calculated
  ∙ Error in calculation
  ∙ Lab does not report separately

∙ We felt that the best opportunity to improve the recognition of anion gaps was to address the reporting of anion gaps. We felt this would require a medium amount of effort and would provide a medium-high level of impact. In further analysis, a number of barriers to lab reporting were found including:

  ∙ Inability to calculate
  ∙ Machine/Assay capabilities
  ∙ MiChart (not requested, not capable with current setup, concern for alarm fatigue)

Follow Up

∙ As is described above, at this time patients are being discharged from the hospital with unrecognized anion gaps that may be associated with an increased chance of recurrent hospital presentation.

∙ Our goal is to improve the recognition of anion gaps based on review of hospital documentation by at least 50% by January of 2018.

Anion Gap Calculations Reported to MiChart

Effective the week of January 1st, the Chemistry Lab will begin reporting Anion Gap calculations [Sodium – (Chloride + CO2)] to MiChart. The AGAP reference range (normal) will be 4-12 mmol/L.

Anion Gap will be added to the end of the following panels:

- Electrolytes (LYTES)
- Basic Metabolic Panel (BASIC)
- Renal Panel (RENAI)
- Comprehensive Metabolic Panel (COMP)

This value will be available to pull into notes using the base name AGAP.
Medical Vampirism: Reducing Unnecessary Diagnostic Phlebotomy

Faculty Facilitator: David Stewart
PI Team member: Liz Spranger
House Officers: Rachel Criner, Emily Hautman, Kelli Paice, Suraj Suresh
Other: Obsinet Merid (Hospital Medicine)

Goal

- Reduce the number of unnecessary blood draws
- Improve patient experience
- Improve workflow

Metrics:
- Reduces number of unnecessary blood draws by 31% to 22%
- Reduces unnecessary blood draws collected within 4 hours from 17% to 10%
- Reduces unnecessary blood draws between 10 pm and 6 am from 21% to 10%
- For more residents on each medicine teams
- Timeline: 3 months

Implementation Plan:
- Monthly Incentive Program
- McKnight algorithm to track unnecessary lab draws
- Initiate pilot program on general medicine teams
- Unnecessary draw = “Brille”
- Senior residents receive weekly site total
- Teams with least absentees win

Resident Education:
- Dedicated lab report topic in boot camp sessions
- Reinforcement during noon conferences
  - Monthly
  - Chief’s weekly updates
  - Published reference card

Future Steps/Unresolved Problems:

- “Lab” interface for labs on McKnight

Problem Statement:
On general medicine services, 50% of patients have an unnecessary blood draw at least once during their admission.
December 2017

Faculty Facilitator: Gabe Solomon
PI Team member: Tammy Ellies
House Officers: Ashley Cobb, Raymond Yeow, Emma Weeding, Max Wayne, Daniel Chun

- Increasing priority discharges on resident services
- Created slides to be used by CMR at morning report discussions.
- Meeting with Robert Chang in January 2018 about education to faculty who attend with residents.
- Received positive feedback from Priority Discharge project manager.
Appropriate triage of Hem/Onc patients in ED to General Medicine or Hem/Onc services
Potassium Over-Supplementation is a potential risk among CHF patients admitted to the University Hospital Medicine Cardiology Service

**Background**

There is a danger of over-supplementation of Potassium in patients with Heart Failure on Medication Cardiology floors, as the lab results at variable times and during provider handoffs, which leads to multiple providers seeing and potentially acting on a value that needs supplementation.

**Current Situation**

Oversight providers are getting flagged to supplement AM labs and there is both incomplete handoff as well as poor safeguards to prevent double potassium supplementation.

- Survey 344 Respondents: across all provider levels (MD’s and RN’s)
- Data Results: 14 month - 8 instances of double K supplementation. 1 missing AM handoff

**Goal**

Eliminate instances of double supplementation of potassium in patients with Heart Failure on the Medicine Cardiology Service

**Analysis**

Common root causes:
- Difficulty in reporting of non-causal potassium supplementation
- Difficulty in reporting of when to supplement for MD’s and RN’s
- Difficult to track supplementation: no automated "steps" in MAR
- Visibility of when morning labs are ordered and recorded

**Plan**

1. Low Effort, High Impact Recommendations
   - Altering hand off sheet to include unscheduled potassium supplementation lab
   - Documenting unscheduled potassium supplementation during hand off

2. High Effort, High Impact Recommendations
   - Create soft step in MICHAIR esp. potassium supplementation orders
   - Institute electrolyte protocol on the floor
   - Implementation of a diuresis flow sheet

**Implementation of a diuresis flow sheet**

1. MICHT ticket submission for generation of inpatient diuresis flow sheet including hour-by-hour tracking of:
   - Urine output
   - Serum chemistries
   - Electrolyte supplementation
   - Vital signs
2. Contact MICHT physician champion: Dr. Robert Chang
3. Reassess progress of IP Diuresis Flow Sheet implementation in two weeks
4. Informative emails regarding new flow sheet once implemented (morning report, Chief's weekly)

**Follow-up**

2 months following implementation, repeat survey assessing:
- Efficiency of morning workflow
- Concerns for double supplementation

2 months following implementation, repeat chart review assessing:
- Number of incidents
- Avg number of cancelled morning potassium

**Recommendations**

- MCIT is incorporating this idea into a comprehensive rounding flowsheet with possible roll-out by mid April 2018.
Hemostasis time and bleeding complications in heart cath patients

Faculty Facilitator: Sandro Cinti
PI Team member: Matt Johnson
House Officers: Henry Dust, Jessica Jou, Adewunmi Nuga, Daniel Perry
Other members:
April 2018

Faculty Facilitator: John Gosbee, MD
PI Team member: Katie Schwalm
House Officers: Sarah Alexan, Nicole Hadeed, Amanda Huey, Anastasia Wasylyshyn

Delays in MRI leading to poor patient outcomes and increased LOS

- Structured Problem Solving A3 - 4/20/18
 Owners: Sarah Alexan, Nicole Hadeed, Amanda Huey, Anastasia Wasylyshyn
 Sponsors: John Gosbee & Katie Schwalm

Background:
- Delays in outpatient adult MRIs (75% of residents state free to sometimes)
- MRIs are cancelled/delayed due to patient factors such as inability to lie flat, claustrophobia, anxiety, pain, DVT/PE needs and patient size
- Previous CTO on MRI delay due to patient factors
- Impact: RN, MD resources wasted, increased LOS (hospital crowding, SS), improper treatment rendered, mortality

Current Situation:
- Process Map

Problem Statement:
For the first 3 months of 2018, 34% of outpatient MRIs were cancelled. This delay necessitates frequent re-ordering and re-scheduling, which results in longer time to result. This delay time results in lower patient satisfaction, adverse events of delayed/inappropriate treatment and increased length of stay.

Recommendations:
- Electronic: Document with info on studies for MDs (selected for implementation)
- Screening questions in MRI order
- Have questionnaire generate "to do" in MRI task list
- MDs notified of MRI screening results in Result Review with abnormal flag (selected for implementation)
- RN Assessment of patient pain, anxiety & ability to lie flat
- Work with the MRI QC screening tech to change their protocol and page the first contact MD if specific questions from the screen are positive

Implementation Plan / Follow-Up:
- Discern electronic document and make residents aware through conference/meeting report that document is available for access on UpToMD website
- Continue to work with *Check about making screening questionnaire more visible, and for its re-titled as “result” for physician review

Follow-up plan would be to pull the MRI data about total cancellations (using the same methods as above) for the 3 months following a high impact intervention to assess if improved, and if not, create a new process map to re-analyze the situation.

Delays in MRI leading to poor patient outcomes and increased LOS

Katie Wilson (HO-2) trying to look further into MRI issues – looking to utilize this team’s data to move forward in her investigation

Mentored by MFH faculty (Jessie King)
PPIs: Why do we start them, and why do we continue them?

**Background:**
PPIs are one of the most common medications we see on patient’s medication lists. For data review, somewhere between 30-45% of patients are already on a PPI when they come into the hospital. When patients are initiated on a PPI, they are usually started on a PPI for a variety of reasons, including 30-40% of the stress ulcer prophylaxis in the ICU. Whether the PPI was started as an inpatient or an outpatient, many patients are on them without proper indication (30-70%). Furthermore, many of these PPIs are continued upon discharge (30-70%).

**Current Situation:**
As inpatients, we often receive patients from the ICU who have been started on PPIs for stress ulcer prophylaxis, and we have noticed that sometimes, these PPIs are continued when they are discharged from the hospital. With the aforementioned glaring data regarding PPI use with inappropriate indications, we wanted doctors here at UM on general medicine services thinking about their understanding of PPIs, specifically, whether they were familiar with common indications and common adverse effects. For our survey, we found that most doctors have done for a patient coming from the ICU on a newly started PPI (not a home medication). However, a large proportion of respondents (11%) did not routinely discontinuе the PPIs (prescribed sometimes, rarely, or never). We found that 70% would continue the PPI if they were unsure if a previous indication had resolved, and 26% would continue the PPI if they were unsure why it had been started. We also turned into ideas about using PPIs for prophylactic purposes and found that the majority of doctors would use a PPI in a 90% ppi patient or 40 mg prophylactic alone and in a 5-10% patient on DAPT. Doctors were generally aware of the adverse effects of PPIs, including AML, C. difficile, and C. difficile post-progression.

We sought to further explore the magnitude of inappropriate PPI use at UM. We included all patients who received a PPI in the CORA between 2016 and 2018. We noted indication for the start of the PPI and whether patients were discharged home on a PPI. We assessed whether the PPI was discontinued appropriately indicated.

**Decision:**
2016-2018, 162 patients met our inclusion criteria. We found that 32% patients (57%) in our population were on a home PPI, and 23% of these were continued in the inpatient setting. This indicates for the inpatient PPI was “failing prior admission” about 30% of the time. Treatment in about 30% of patients; prophylactically in 15% of patients, and other in about 40% of patients. The majority of patients admitted to an ICU had a home PPI were continued on their home PPI on discharge (up to 70%). We found 17% of new PPI starts in the ICU were ultimately continued on discharge, and of these new PPI starts, 30-40% were continued with inappropriate indications.

**Goal/Target:**
- To assess knowledge among doctors on general medicine services on list of appropriate PPI indications
- To assess knowledge among doctors on general medicine services on list of PPI adverse effects
- To assess reasons why PPIs started in the ICU are continued on the floor and why they are continued upon discharge
- To identify the process by which doctors and pharmacists reconcile medications throughout an inpatient stay prior to discharge
- To identify areas in which inappropriate use of PPIs can be mitigated

**Implementation Plan:**
1. Collaborate with pharmacy — Create report on newly started PPIs
2. Confering PPI indication at transfers — Do this at transfers
3. Education — Identify areas for inpatient and outpatient

**Faculty Facilitator:** Lauren Heidemann
**PI Team member:** Matt Johnson
**House Officers:** Kale Bongers, Marcus Geer, Kayla Kolbe, Annie Park, Ben Wagner
Title: Improving P2Y12 Inhibitor Use in NSTE-ACS at the University of Michigan

**Background**

The University of Michigan is conducting a study to improve the use of P2Y12 inhibitors in patients with Non-ST-Elevation Acute Coronary Syndrome (NSTE-ACS). The goal is to optimize the use of these medications to reduce the risk of adverse outcomes.

**Faculty Facilitator:** Sandra Cinti

**PI Team member:** Tammy Ellies, Matt Johnson

**House Officers:** Eric Schwartz, Samat Kabani, Thomas Hurst, Andrew Badalamenti

**Recommendations**

- Increase awareness among healthcare providers about the importance of appropriate P2Y12 inhibitor use.
- Implement education sessions for healthcare providers to enhance knowledge on safe and effective use of these medications.
- Develop a standardized protocol for P2Y12 inhibitor use across all hospitals.
- Establish a feedback mechanism to monitor adherence to the protocol and make necessary adjustments.

**Plan**

- **Monthly Activity:**
  - September: Initial meeting to discuss the project goals and set up a baseline for current P2Y12 inhibitor use.
  - October: Implementation of the education sessions.
  - November: Monitoring of adherence to the protocol.
- **6-month Mark (December):**
  - Review of the progress made and adjustment of the protocol as needed.

**Follow-up**

After successful implementation, the project will be evaluated for long-term impact. Feedback from healthcare providers and patient outcomes will be assessed to determine the effectiveness of the intervention.

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**June 2018**
Acknowledgements

- Faculty Facilitators: John Gosbee, Lauren Heidemann, David Stewart, Sandro Cinti, Jen Stojan, Gabe Solomon
- Internal Medicine Performance Improvement Team: Tammy Ellies, Matt Johnson, Katie Schwalm, Liz Spranger, Linda Bashaw
- Chief Residents: Zach Haupt (VAMC), Kate Levy
- PSQILP Steering Committee: Nate Houchens, Chris Petrilli, Kate Levy, Lauren Heidemann
- GME Program Leadership: Nate Houchens, John Del Valle, Jen Lukela
References

- M-Box: [https://umich.app.box.com/folder/11867646521](https://umich.app.box.com/folder/11867646521)
  - Curriculum modules
  - A3 and Powerpoint slides from each monthly rotation
  - Catalog of past projects