Hello everyone and welcome! We really appreciate your continued interest in this collaborative and look forward to getting started. First we will start with a few housekeeping reminders:

1) To reduce the likelihood of feedback during the call, we’ve muted everyone.
2) Please use the chat function to ask questions. We have time at the end of the presentations to respond to any questions submitted during the webinar, and, we’ll open to a Q&A format at the end.
3) The webinar is being recorded. We will post it later and provide a link so you can review or share with any member of your team unable to be on the call. Please frame any questions with the understanding it will be part of the recording.
Meeting Agenda

• Welcome- Fisher
• PSQC Updates- Lally
• Case Studies
  • Grant Geissler- St. Joseph’s Tampa
  • Monica Lopez and Barron Frazier- Vanderbilt
  • Q&A

Here is our agenda for today.

1) Welcome
   1) Introduce new PSQC member hospitals since our last meeting in November 2021

2) PSQC Updates
   1) Project #1-CT reduction pre-op
   2) Project #2-CT reduction post-op
   3) Project #3-Antibiotic Stewardship
   4) Project #4-PSQC Pilot Projects

3) Case Studies
   1) St. Joseph’s Tampa
   2) Vanderbilt
   3) Q&A
Welcome!

<table>
<thead>
<tr>
<th>New York</th>
<th>Texas</th>
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<tr>
<td>New York Presbyterian Morgan Stanley, Jen DeFazio</td>
<td>Children's Medical Center Dallas, Lauren Gillory</td>
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<td>North Carolina</td>
<td></td>
</tr>
<tr>
<td>Levine Children’s, Andrew Schulman</td>
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Second-welcome to our new PSQC member hospitals. We are now 82 members strong.
PSQC Brief Update

Kevin Lally, MD, MS, FACS
PSQC Executive Director
Surgeon-in-Chief, Children’s Memorial Hermann Hospital
Houston, TX
This graph is from our July 2021 SAR. We continue to wait for our January SAR. We don’t anticipate seeing changes in the above before July 2022 SAR.
NSQIP supplied some preliminary data to us on the post-op CT scan rate for the 47 hospitals included in the July PSQC SAR and the corresponding organ space and SSI rate. This project will focus on reducing the use of CT post-op with a balancing measure of maintaining or reducing SSI incidence. Project leads are Monica Lopez from Vanderbilt and Derek Wakeman from Golisano.
Project #3-Antibiotic Stewardship

- Project Lead: Shawn Rangel, Boston Children’s
- Anticipate first data in fall 2022
- Will be reaching out for workgroup members

This project will make use of the antibiotic data each site has been entering into NSQIP since January 1, 2021. We need to review the data before we set the objective of the project but we have little doubt there will be plenty of opportunity for QI in the data set.
Our 4th project will be completely PSQC generated. We are asking you, our members, to consider projects you feel will lend themselves to a quality improvement approach and have a wide ranging effect on pediatric surgery outcomes. The submission form is live and Terry will share the link when she sends out the slides after this meeting.
Case Studies with PSQC CT Reduction Implementation Guide

Grant Geissler, MD, FACS, FAAP
Chair, Process Improvement and Patient Safety
St. Joseph’s Hospital of Tampa
Pediatric Appendicitis: Improved Outcomes from Diagnosis to Discharge

Dr. Grant Geissler, MD, FACS, Medical Director of Children’s Surgery
Kirsten Yancy, RN, BSN, CPN
Children’s Surgery Program Coordinator
Background

• A review of the 2017 Semi-Annual Report for NSQIP Pediatrics appendicitis data showed a high rate of CT scanning as the initial imaging study, a low use of US before CT, and a high rate of Negative Appendectomy vs. Preoperative CT Rates.
Background

- In addition, St. Joseph’s Children’s Hospital was high (Needs Improvement) for surgical site infection (SSI) rate when compared with national averages.
Process

1. Decrease CT usage by following PAS score to stratify risk.
2. Increase US before CT, increase overall US usage and decrease overall CT usage.
3. Decrease surgical site infections in complicated appendicitis patients by implementing a standardized approach from diagnosis to treatment to intraoperative grading, operative technique, and unified post operative care guidelines.
Process

• Multidisciplinary Collaborative including ER, Radiology and Surgery developed the diagnostic appendicitis algorithm, focusing on the PAS score before imaging.
Process

• Evidence Based Medical (EBM) Team created a Clinical Standard
  
  BayCare Best Practice Medical Standard
  Reduction of CT use in Evaluating for Pediatric Appendicitis
  
  Developed by: Children’s Service Line
  Endorsed by: ED Collaborative

• EBM created a power plan in the EMR that included the diagnostic algorithm and required the PAS score to enter prior to ordering a CT scan

• EMB rolled out clinical standard and power plan to all 13 BayCare EDs which saw 131,750 pediatric patients in 2019.
Process

Result- Phase 1

- From 2017 to 2019 St. Joseph’s Children’s Hospital (SJCH) increased US before CT from 68% to 90%, US only increased from 46% to 54%, and CT only decreased from 31% to 11%.
- Surgical complications from complicated appendicitis fell from 22% in 2017 to 4% in 2019.
- Surgical site infections fell from 6% in 2017 to 3% in 2019.
### NSQIP-Pediatric Results 7/1/20-6/31/21

#### Targeted - Appendectomy Complicated

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<tr>
<th>Total Cases</th>
<th>Observed Events</th>
<th>Pred Obs Rate</th>
<th>Expected Rate</th>
<th>Odds Ratio</th>
<th>95% C.I. Lower</th>
<th>Upper</th>
<th>Outlier</th>
<th>Decile</th>
<th>Adjusted Percentile</th>
<th>Adjusted Quartile</th>
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<td>4</td>
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#### Targeted - Appendectomy Uncomplicated

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<th>Upper</th>
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<td>T APPY Uncomp Length of Stay (morbidity excluded)</td>
<td>105</td>
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<td>0.96%</td>
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<td>4.83%</td>
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July 2021 Negative Appendectomy vs. Preoperative CT Rates

Aggregate Cohort Rate (2.5%)

Preoperative CT Rate (%) vs. Negative Appendectomy Rate (%)

Hospital: Negative Appendectomy Rate = 2.9% and PreOp CT = 3.7%
CT Usage Results

• After reviewing NSQIP-Pediatric data and data from the analytics team findings included:
  • US before CT has increased
  • Still large number of patients receiving CT scans
Phase 2- Further Decrease CT usage

• PSQC presented Implementation Guide in August 2021
• Dr. Geissler sent email to ED and Radiology 8/24/21 with implementation guide and call to action
• Dr. Ihsan Mamoun- Pediatric Radiology Director-lead for Radiology
  • SJH Radiology: 35 board certified/fellowship trained providers
    • 3 pediatric radiologists, 1 pursing pediatric certification via the alternative pathway through the American board of radiology
    • Fall 2021 Pediatric Radiology has a reading room M-F
  • Reviewed 6 months of US Appendicitis data
    • 33% of ultrasounds completed visualized the appendix and gave a definitive positive or negative finding
• Next Steps included:
  • Advanced training for US technicians to improve accuracy of identifying appendix (November 2021-January 2022)
  • Standardize US Appendicitis report (PSQC Implementation Guide)
    • Grade 1- Grade 4 utilizing the Pathway for Management of Pediatric Patient with Right Lower Quadrant Pain and Suspected Appendicitis in the ED that was published in the American Journal of Emergency Medicine in 2021
  • Provide education to all ED providers at the ED collaborative 2/11/22
Lessons Learned

1. St. Joseph’s Children’s Hospital, within a large adult system, is making a large impact system wide. Performance Improvement Project Manager was essential to successful implementation across the large system.

2. ED communication and collaboration: buy-in for evaluation and risk stratification of abdominal pain patients, break down of barriers and previous expectations lead to success of roll-out.

3. Direct surgeon involvement in evaluation of patient and guaranteed clinical follow-up for low suspicion appendicitis patients reduces unnecessary studies and inpatient admissions.

4. Have IS involved early- needed to embedded hard stop for CT order, PAS calculation, and algorithm population.

5. A consensual standardized surgical approach to complicated appendicitis led to lower surgical site infections.

6. Engagement in PSQC allowed sharing of implementation guide with Radiology group to the show them initiatives in a national context.
Case Studies with PSQC CT Reduction Implementation Guide

Monica E. Lopez, MD, MS, FACS, FAAP
Vice Chair for Surgical Quality and Evidence-Based Systems
Monroe Carell Jr. Children’s Hospital at Vanderbilt

Steven Barron Frazier, MD
3rd Year Fellow, Pediatric Emergency Medicine (PEM)
Monroe Carell Jr. Children’s Hospital at Vanderbilt
REDUCING COMPUTED TOMOGRAPHY IMAGING IN A PEDIATRIC EMERGENCY DEPARTMENT FOR SUSPECTED APPENDICITIS

- Barron Frazier, MD  
  Pediatric Emergency Medicine
- Monica E. Lopez, MD, MS  
  Pediatric Surgery
- Martin Blakely, MD  
  Pediatric Surgery
- Caroline Godfrey, MD  
  General Surgery
- Anuradha Patel, MD  
  Pediatric Surgery Research Fellow
- Marta Hernanz-Schulman, MD  
  Pediatric Radiology
- Melissa Danko, MD  
  Pediatric Surgery/NSQIP Champion
- Jenny Overfield, MD  
  Pediatrics
BACKGROUND

- Appendicitis is a common pediatric surgical emergency
- Despite its frequency, there is significant practice variability for appendicitis, particularly at children-specific hospitals
- Despite many other diagnostic tools, computed tomography imaging continues to be used frequently
- Pediatric radiation exposure = increased lifetime risk of cancer
- Pediatric Surgery Quality Collaborative engaged members, particularly those who overutilize CT imaging, to use QI methodology to reduce this imaging modality for diagnosing this condition
Reduction of CT utilization for Pre-op Imaging of Pediatric Appendicitis

Aim Statement

By June 30, 2022, the aggregate CT utilization rate for the Collaborative will be reduced from 24.6% to 17%.

Balancing Measure

The negative appendectomy rate for the Collaborative will remain at or below 1.75%.
In preliminary review of the implementation guide, our group felt these change strategies were uniquely applicable in our setting and would fill existing gaps in our processes.
CT UTILIZATION PERFORMANCE
CT UTILIZATION PERFORMANCE

DOING BETTER.
SMART & GLOBAL AIMS

Smart Aim
▪ To reduce CT utilization in the pediatric emergency department for the evaluation of children without underlying GI disease who present with suspected appendicitis from 32% to 15% by June 2022.

Global Aim
▪ We will minimize radiation exposure in the evaluation of suspected intra-abdominal pathology.
1. Numerator: Computed tomography of abdomen/pelvis
2. Denominator: Patients with suspected appendicitis
3. Interval Measure: Cohorts of 30 patients
4. Data sources: Compiled data from Epic
5. Measurement period: 2 years
6. What’s the frequency of the process you’re measuring? Weekly
7. Baseline data? 11 months
8. Inclusion: Pediatric patients who have a final diagnosis of appendicitis OR any patient who undergoes a limited U/S to evaluate the appendix
9. Exclusion: Patients who are referred from an OSH with imaging or have underlying GI disease
10. Process Measures: PAS Score documentation, Radiology Template Usage
11. Balancing Measures: Negative Appendectomy Rate, ED LOS, Return within 72 hours with appendicitis diagnosis
Reducing computed tomography imaging in a pediatric emergency department for suspected appendicitis

Key Driver Diagram

SMART Aim
To reduce CT utilization in the pediatric emergency department for the evaluation of children without underlying GI disease who present with suspected appendicitis from 32% to 15% by June 2023.

Global Aim
We will minimize radiation exposure in the evaluation of suspected intra-abdominal pathology.

Key Drivers

- Standardized Approach to Suspected Appendicitis
- Greater Diagnostic Yield of Ultrasound
- Earlier Surgical Involvement
- CPOE system that standardizes approach
- Transparency of Performance

Interventions

- Creation and use of an evidence-based clinical practice guideline
- Incorporate use of Pediatric Appendicitis Score/pARC into practice
- Templated Consult Note
- Surgical evaluation prior to CT imaging
- Create ultrasound report templates
- Educate surgical and emergency physicians regarding appendicitis
- Creation and implementation of best practice advisory alerts that provide live clinical decision support
- Multidisciplinary review of performance
- Focused feedback to providers

Gold shaded box – in progress
Dashed line – future work
P-CHART

CT Utilization Rate for Evaluation of Suspected Appendicitis in the Pediatric Emergency Department

- Multidisciplinary Team Decision Making
- Clinical Practice Guidelines (CPGs) Compliant
- OSG (Standing Order published with accompanying order set readmission)
- Educational Campaign/Program
- Short List
- Individual Feedback

DOING BETTER.
INTERVENTIONS: CLINICAL PRACTICE GUIDELINE

1. Begin
2. Child 3-4 yr old suspected appendicitis

PEDiatric APPendicitis Score (PAS)
- Anorexia
- Rejection or Vomiting
- Nausea or Vomiting
- Temperature > 37.6°C
- Diarrhea/fever/persistently tender abdomen
- History of appendicitis or sibling
- Leukocytes > 10,000/mm³
- Nonspecific stool > 7.000

PAS is the cumulative point score (0-10) from all clinical findings
* Use for children 2-4 years

DOING BETTER.
INTERVENTIONS: COMPLAINT-BASED PANEL
**INTERVENTIONS:**

**COMPLAINT-BASED PANEL**

- **CBC with differential**
  - Neutrophil count at least 8,000
  - Hemoglobin level at least 10 g/dL

- **Laboratory data:**
  - Hematocrit level at least 35%
  - Platelet count at least 150,000

- **Clinical assessment:**
  - Presence of fever
  - History of recent illness

- **Imaging studies:**
  - Chest X-ray
  - Abdominal ultrasound

- **Diagnostic testing:**
  - Stool culture
  - Urinalysis

**Exclusion criteria for:***

- **Leukopenia:**
  - White blood cell count less than 5,000

- **Thrombocytopenia:**
  - Platelet count less than 150,000

- **Hypoglycemia:**
  - Blood glucose level less than 50 mg/dL

**Patient assessment and decision:**

- **Stability:**
  - Monitor patient closely
  - Provide fluids and electrolytes

- **Hospitalization:**
  - Consider admission to hospital

- **Consultation:**
  - Consult with infectious disease specialist

**DOING BETTER.**
INTERVENTIONS: COMPLAINT-BASED PANEL
OTHER & FUTURE INTERVENTIONS

- Standardized Ultrasound Interpretation Templates (February 2022)
- Individual Feedback for Ongoing Process Learning/Refinement (January 2022)
- Biweekly meetings to review data with QI team
- Surgical Consult Note Templates
LESSONS LEARNED

▪ Changing culture is difficult, particularly when transitioning from imaging-confirmed appendicitis to clinical prediction tool logic
▪ COVID-19’s abdominal pain presentation led to a period of skepticism when evaluating children with suspected appendicitis
▪ Engaging other subspecialties can take time and requires ‘patient persistence’
▪ Ongoing process learning is important to learn unforeseen process failures and establish potential solutions
THANK YOU!

- Barron Frazier, MD  
  steven.b.frazier@vumc.org

- Monica Lopez, MD MS  
  monica.lopez@vumc.org
Questions

Terry Cell: 832-441-6314
The slide deck and a link to the recording of this webinar will be forwarded to all as soon as it is available. It will also be posted on our website.