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:

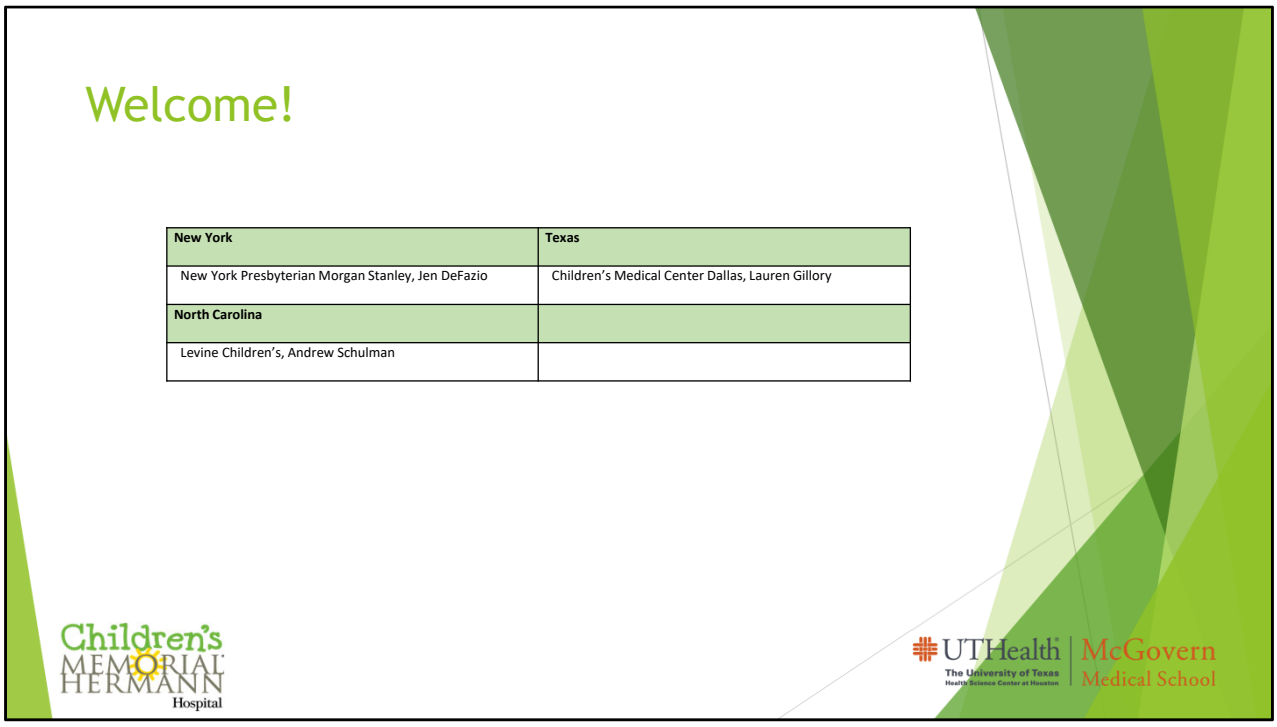
1) To reduce the likelihood of feedback during the call, we've muted everyone.
2) Please use the chat function to ask questions. We have time at the end of the presentations to respond to any questions submitted during the webinar, and, we'll open to a Q&A format at the end
3) The webinar is being recorded. 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.

Here is our agenda for today.

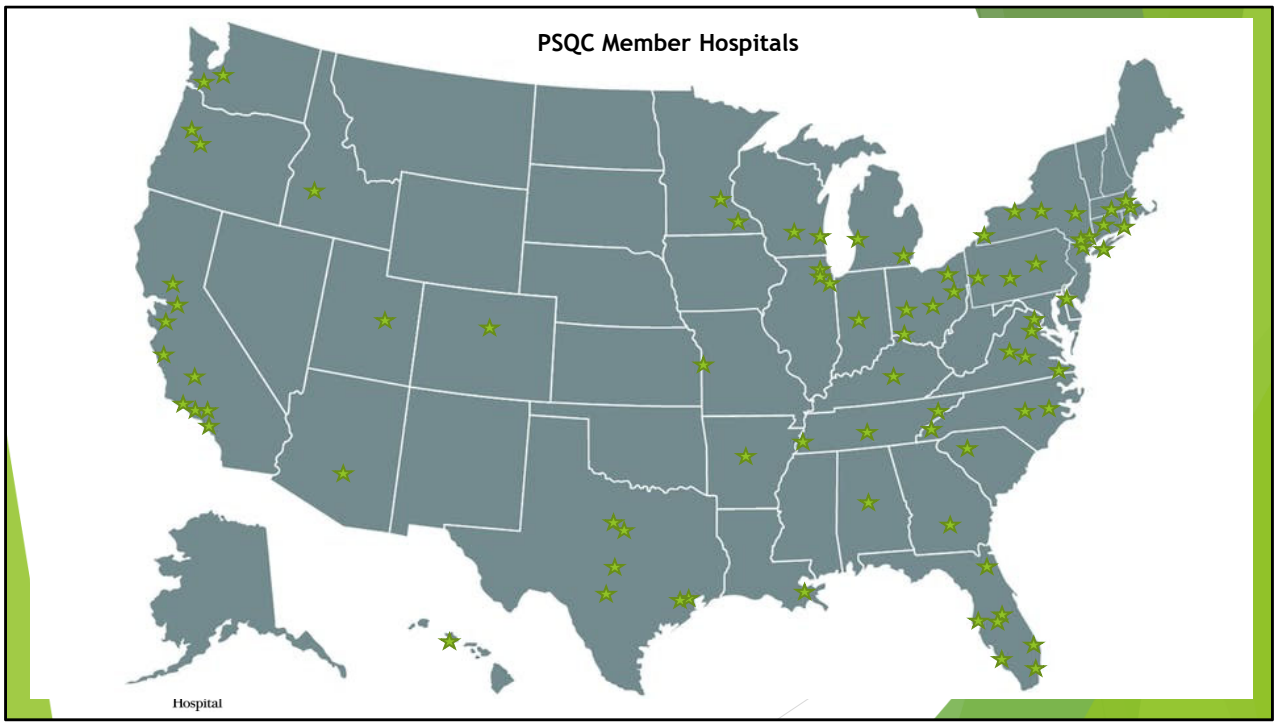
1) Welcome
    1) Introduce new PSQC member hospitals since our last meeting in November 2021

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



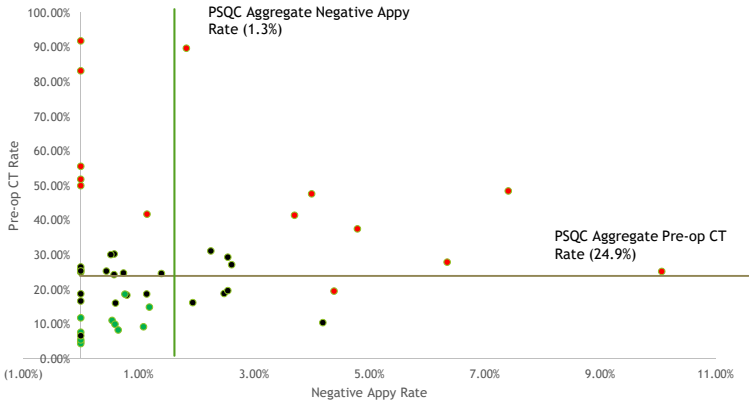
Second-welcome to our new PSQC member hospitals. We are now 82 members strong.


PSQC Member Hospitals
Hospital

PSQC Brief Update

Kevin Lally, MD, MS, FACS
PSQC Executive Director
Surgeon-in-Chief, Children's Memorial Hermann Hospital
Houston, TX

Project #1-CT reduction pre-op appy



Children's Memorial Hermann Hospital

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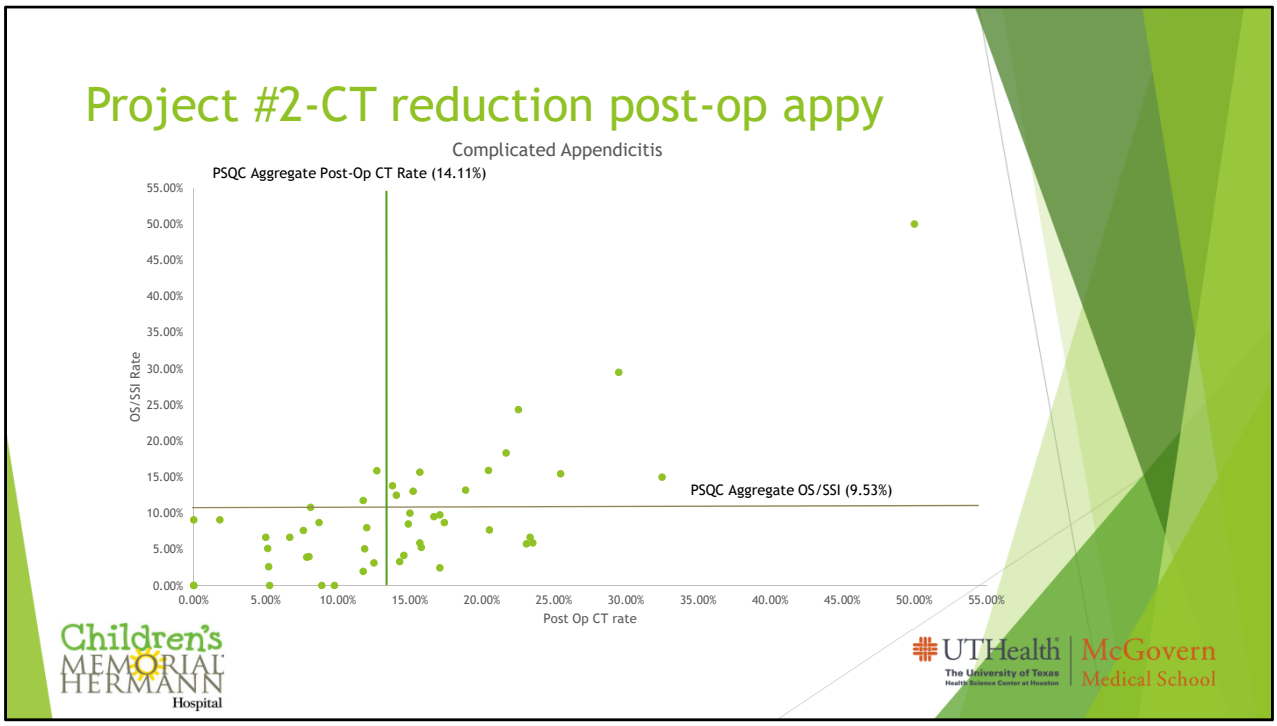
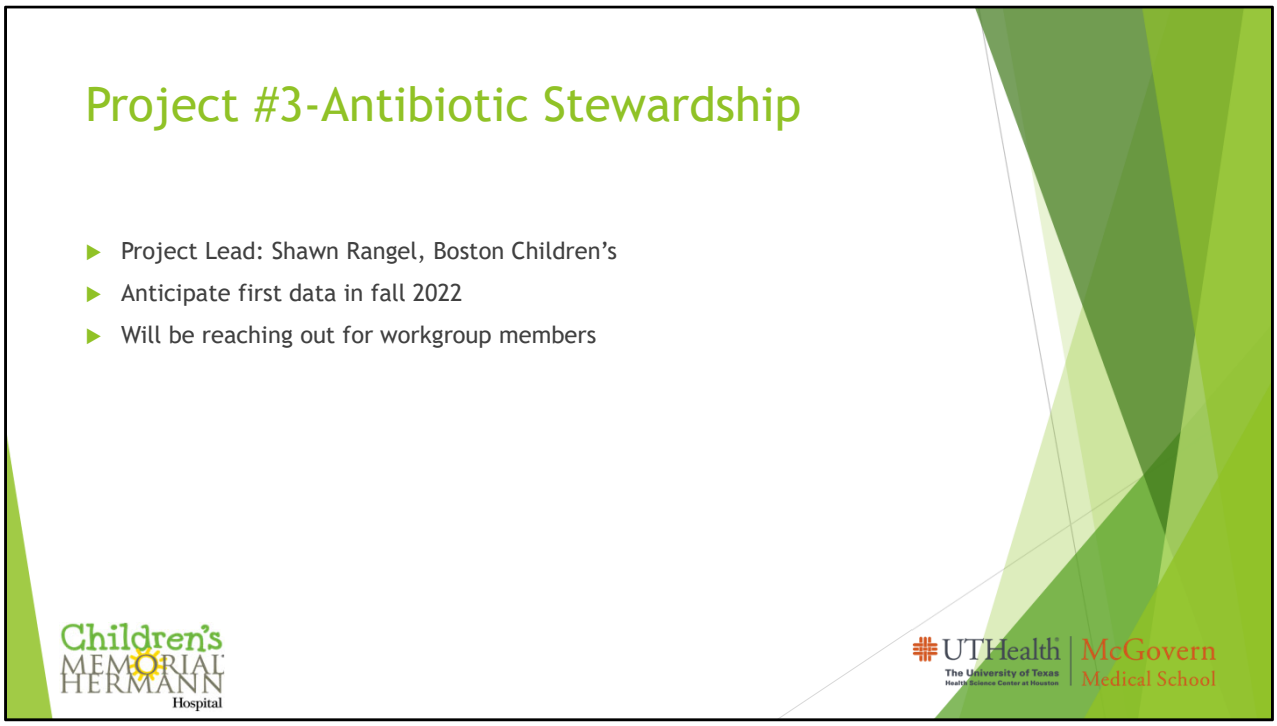
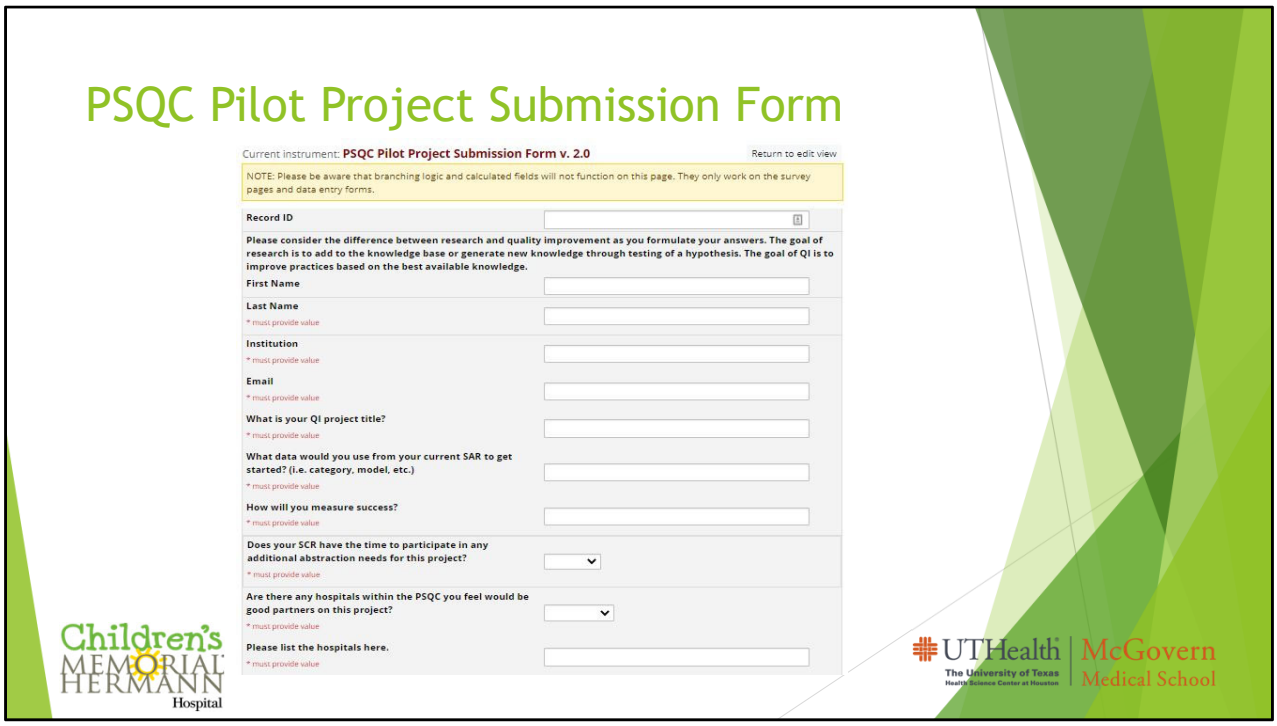
This graph is from our July 2021 SAR. We continue to wait for our January SAR. We don't anticipate seeing changes in the above before July 2022 SAR.



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.



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 dubt 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

Children's Memorial Hermann Hospital

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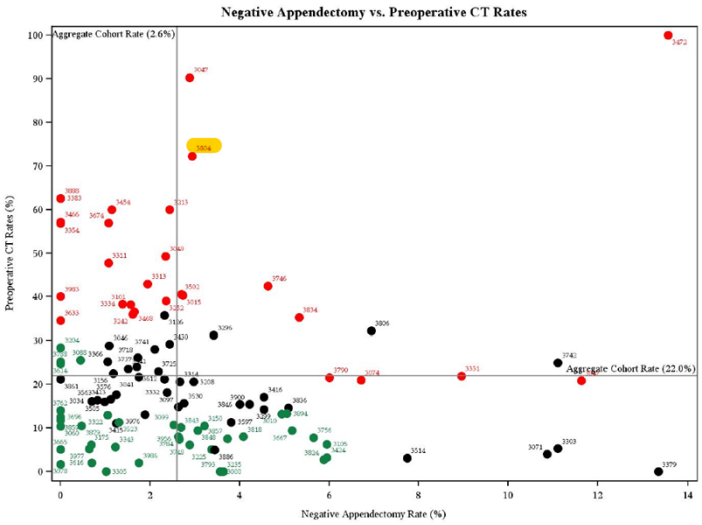
Pediatric Appendicitis: Improved Outcomes from Diagnosis to Discharge

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

St. Joseph's Children's Hospital
BayCare KiDS

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.

Targeted - Appendectomy Complicated

	Total Cases	Observed		Pred Obs Rate**	Expected Rate	Odds Ratio	95% CI		Outlier	Decile	Adjusted Percentile	Adjusted Quartile	Assessment*
		Events	Rate				Lower	Upper					
T APPY Comp OS SSI or Drainage/Aspiration	40	10	25.00%	21.20%	12.52%	1.91	0.98	3.75		9	82	4	Needs Improvement
T APPY Comp Revisit	40	6	15.00%	14.01%	13.57%	1.04	0.63	1.71		6	54	3	As Expected
T APPY Comp Emergency Department	40	6	15.00%	13.54%	12.85%	1.06	0.63	1.78		7	56	3	As Expected
T APPY Comp Readmission	40	4	10.00%	7.89%	6.98%	1.14	0.60	2.18		9	61	3	As Expected
T APPY Comp Morbidity	40	6	15.00%	13.11%	10.33%	1.31	0.63	2.73		7	65	3	As Expected
T APPY Comp SSI	40	6	15.00%	10.84%	6.36%	1.81	0.83	3.94		10	80	4	Needs Improvement

Targeted - Appendectomy Uncomplicated

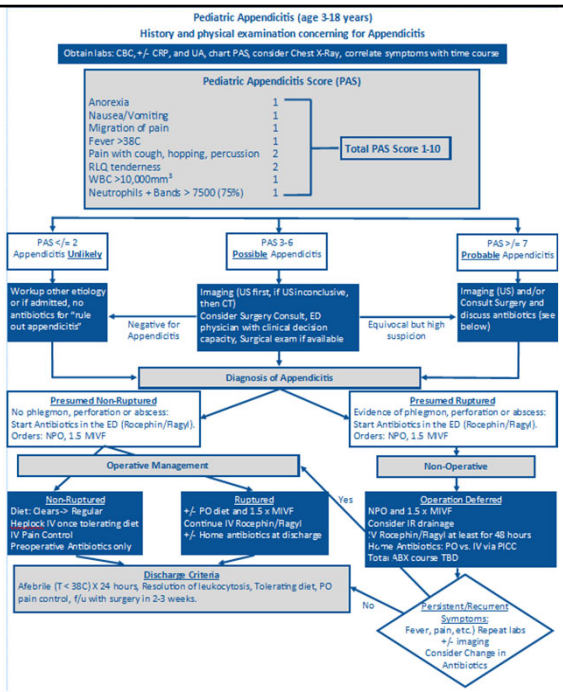
	Total Cases	Observed		Pred Obs Rate**	Expected Rate	Odds Ratio	95% CI		Outlier	Decile	Adjusted Percentile	Adjusted Quartile	Assessment*
		Events	Rate				Lower	Upper					
T APPY Uncomp OS SSI or Drainage/Aspiration	164	3	1.83%	1.20%	0.83%	1.46	0.59	3.65		9	70	3	As Expected
T APPY Uncomp Revisit	164	6	3.66%	5.42%	6.81%	0.78	0.51	1.21		1	26	2	As Expected

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.



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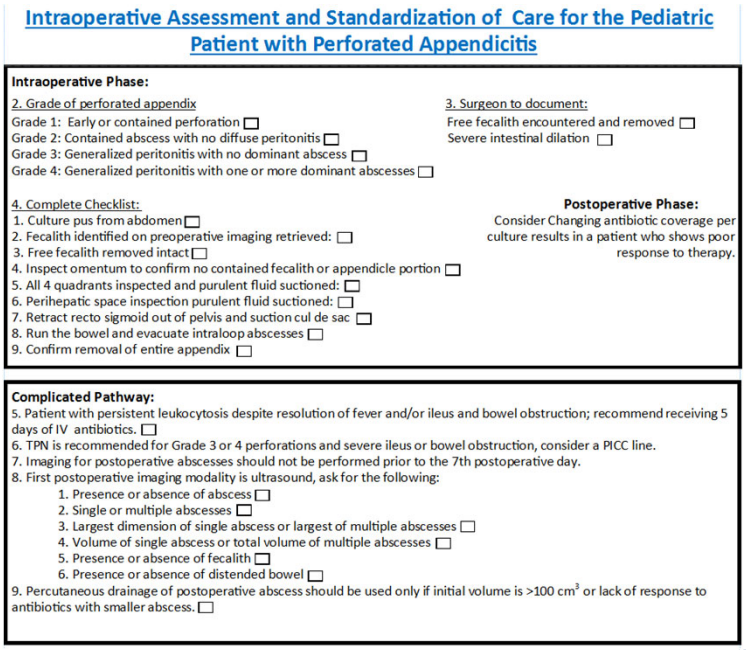
Process

- Evidence Based Medical (EBM) Team created a Clinical Standard

- EBM created a power plan in the EMR that included the diagnostic algorithm and required the PAS score to entered 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

- Pediatric Surgeons met and formalized an intraoperative standardization of care based on an article published in December 2017 Journal of Pediatric Surgery “Standardization of care for pediatric perforated appendicitis improves outcomes” by Yousef at McGill Montreal Children’s Hospital (JPS, Vol 52, NO 12, Dec 2017, pp1916-1924).



Intraoperative Assessment and Standardization of Care for the Pediatric Patient with Perforated Appendicitis

Intraoperative Phase:

2. Grade of perforated appendix
Grade 1: Early or contained perforation ☐
Grade 2: Contained abscess with no diffuse peritonitis ☐
Grade 3: Generalized peritonitis with no dominant abscess ☐
Grade 4: Generalized peritonitis with one or more dominant abscesses ☐

3. Surgeon to document:
Free fecalith encountered and removed ☐
Severe intestinal dilation ☐

4. Complete Checklist:
1. Culture pus from abdomen ☐
2. Fecalith identified on preoperative imaging retrieved: ☐
3. Free fecalith removed intact ☐
4. Inspect omentum to confirm no contained fecalith or appendicle portion ☐
5. All 4 quadrants inspected and purulent fluid suctioned: ☐
6. Perihepatic space inspection purulent fluid suctioned: ☐
7. Retract recto sigmoid out of pelvis and suction cul de sac ☐
8. Run the bowel and evacuate intraloop abscesses ☐
9. Confirm removal of entire appendix ☐

Postoperative Phase:
Consider Changing antibiotic coverage per culture results in a patient who shows poor response to therapy.

Complicated Pathway:
5. Patient with persistent leukocytosis despite resolution of fever and/or ileus and bowel obstruction; recommend receiving 5 days of IV antibiotics. ☐
6. TPN is recommended for Grade 3 or 4 perforations and severe ileus or bowel obstruction, consider a PICC line.
7. Imaging for postoperative abscesses should not be performed prior to the 7th postoperative day.
8. First postoperative imaging modality is ultrasound, ask for the following:
   1. Presence or absence of abscess ☐
   2. Single or multiple abscesses ☐
   3. Largest dimension of single abscess or largest of multiple abscesses ☐
   4. Volume of single abscess or total volume of multiple abscesses ☐
   5. Presence or absence of fecalith ☐
   6. Presence or absence of distended bowel ☐
9. Percutaneous drainage of postoperative abscess should be used only if initial volume is >100 cm^3 or lack of response to antibiotics with smaller abscess. ☐

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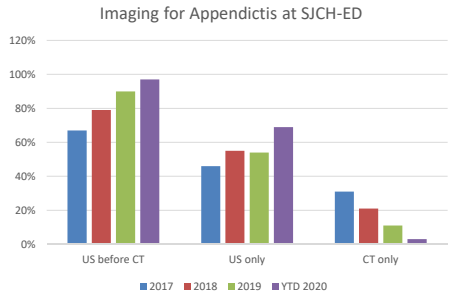
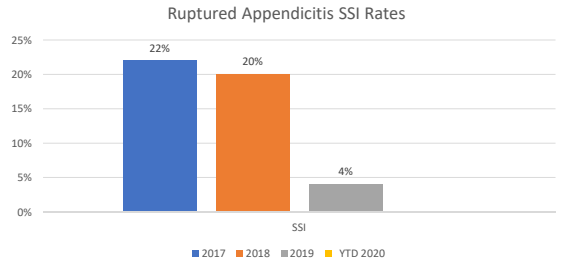
Result- Phase 1

- 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.





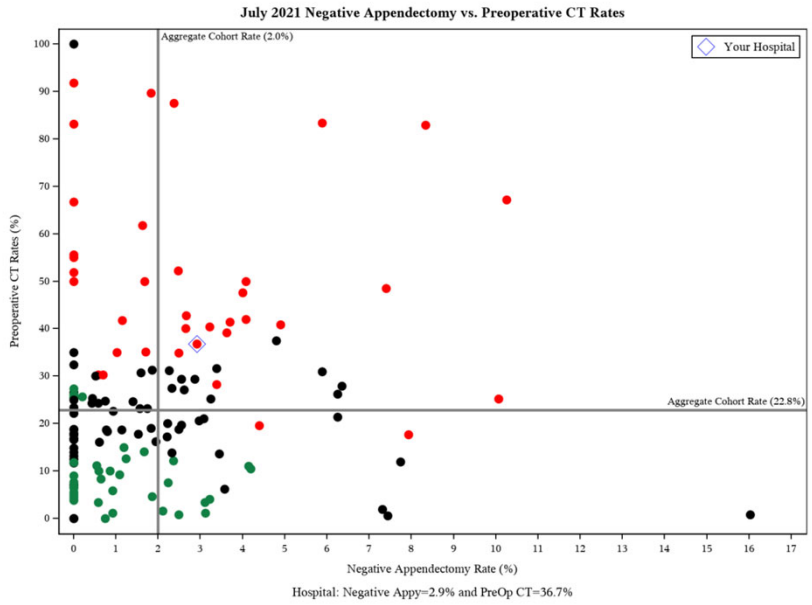
NSQIP-Pediatric Results 7/1/20-6/31/21

Targeted - Appendectomy Complicated

	Total Cases	Observed Events	Observed Rate	Pred Obs Rate**	Expected Rate	Odds Ratio	95% C.I. Lower	95% C.I. Upper	Outlier	Decile	Adjusted Percentile	Adjusted Quartile	Assessment*
T APPY Comp OS SSI or Drainage/Aspiration	41	0	0.00%	5.96%	10.84%	0.51	0.22	1.15		1	16	1	Exemplary
T APPY Comp Revisit	41	5	12.20%	13.18%	13.48%	0.97	0.63	1.51		4	47	2	As Expected
T APPY Comp Morbidity	41	1	2.44%	6.05%	9.65%	0.60	0.25	1.42		2	25	1	Exemplary
T APPY Comp SSI	41	0	0.00%	5.20%	10.78%	0.45	0.18	1.11		1	15	1	Exemplary
T APPY Comp Length of Stay	41	4	9.76%	14.59%	22.66%	0.55	0.27	1.12		1	18	1	Exemplary
T APPY Comp Length of Stay (morbidity excluded)	40	4	10.00%	13.75%	18.67%	0.66	0.32	1.36		2	26	2	As Expected

Targeted - Appendectomy Uncomplicated

	Total Cases	Observed Events	Observed Rate	Pred Obs Rate**	Expected Rate	Odds Ratio	95% C.I. Lower	95% C.I. Upper	Outlier	Decile	Adjusted Percentile	Adjusted Quartile	Assessment*
T APPY Uncomp OS SSI or Drainage/Aspiration	106	0	0.00%	0.40%	0.45%	0.89	0.33	2.39		4	44	2	As Expected
T APPY Uncomp Revisit	106	3	2.83%	4.01%	4.61%	0.86	0.50	1.51		3	37	2	As Expected
T APPY Uncomp Emergency Department	106	3	2.83%	3.88%	4.46%	0.87	0.49	1.54		3	38	2	As Expected
T APPY Uncomp Readmission	106	0	0.00%	1.03%	1.32%	0.78	0.34	1.80		2	35	2	As Expected
T APPY Uncomp Morbidity	106	1	0.94%	1.49%	1.65%	0.90	0.43	1.88		4	43	2	As Expected
T APPY Uncomp SSI	106	1	0.94%	1.45%	1.61%	0.90	0.42	1.93		4	44	2	As Expected
T APPY Uncomp Length of Stay	106	1	0.94%	1.95%	4.97%	0.38	0.12	1.15		1	19	1	Exemplary
T APPY Uncomp Length of Stay (morbidity excluded)	105	1	0.95%	1.93%	4.83%	0.38	0.12	1.19		1	20	1	Exemplary

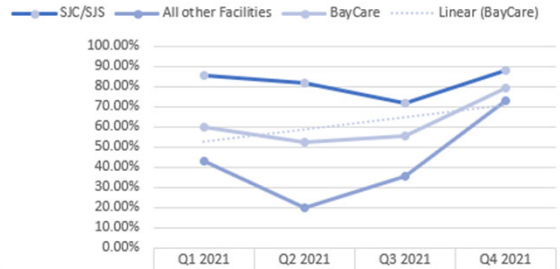


NSQIP-Pediatric Results 2020

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

US performed prior to CT in Pediatric Appendicitis



	Q1 2021	Q2 2021	Q3 2021	Q4 2021
SJC/SJS	85.71%	81.82%	71.43%	88.24%
All other Facilities	42.86%	20.00%	35.29%	72.73%
BayCare	60.00%	52.38%	55.26%	79.49%

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

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Vice Chair for Surgical Quality and Evidence-Based Systems
Monroe Carell Jr. Children's Hospital at Vanderbilt

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3rd Year Fellow, Pediatric Emergency Medicine (PEM)
Monroe Carell Jr. Children's Hospital at Vanderbilt

Children's Memorial Hermann Hospital

UTHealth The University of Texas Health Science Center at Houston | McGovern Medical School

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

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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

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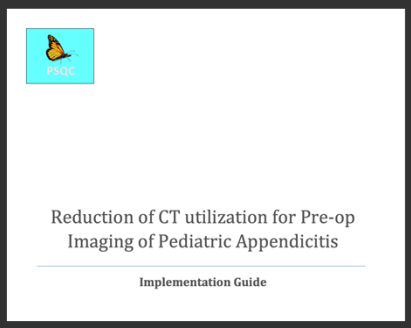
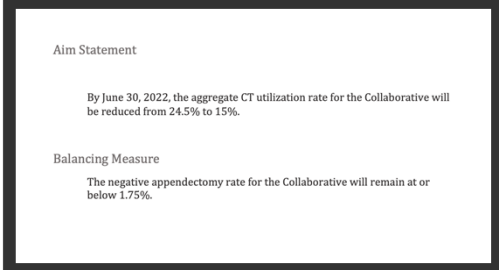
PSQC IMPLEMENTATION GUIDE





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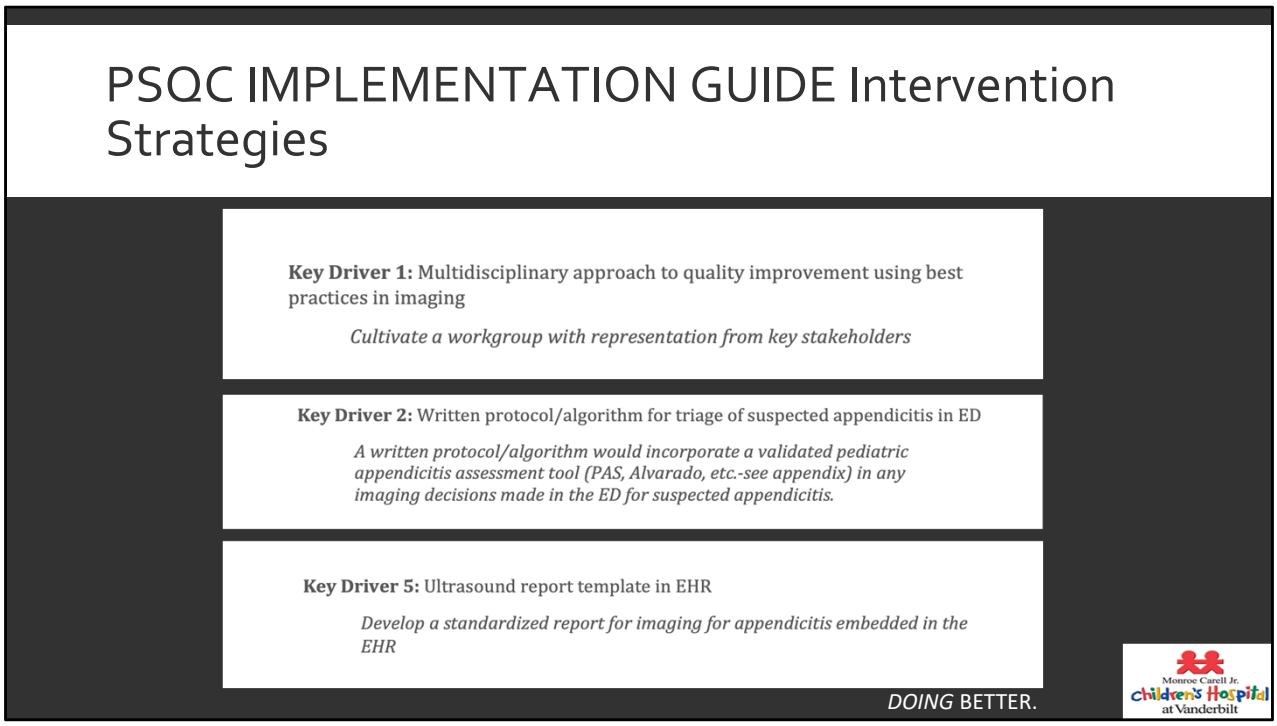
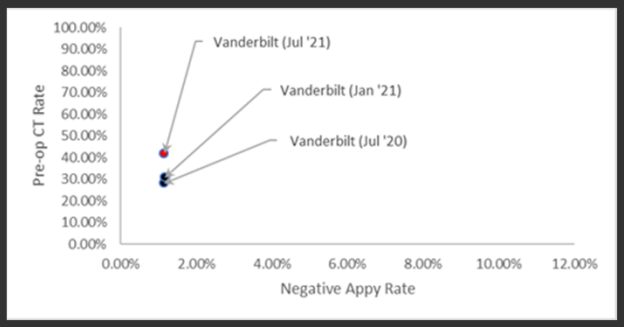


In preliminary review of the implementation guide, our group felt these change strategies were uniquely applicable in our setting and would fill existing gaps in our processes.

CT UTILIZATION PERFORMANCE



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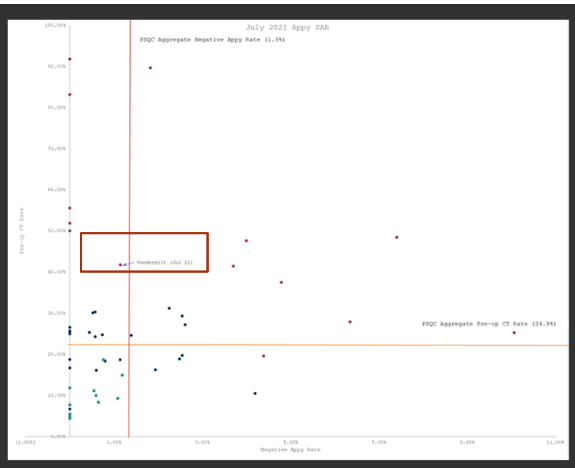
CT UTILIZATION PERFORMANCE



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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.

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BASELINE DATA/DATA PLAN

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**

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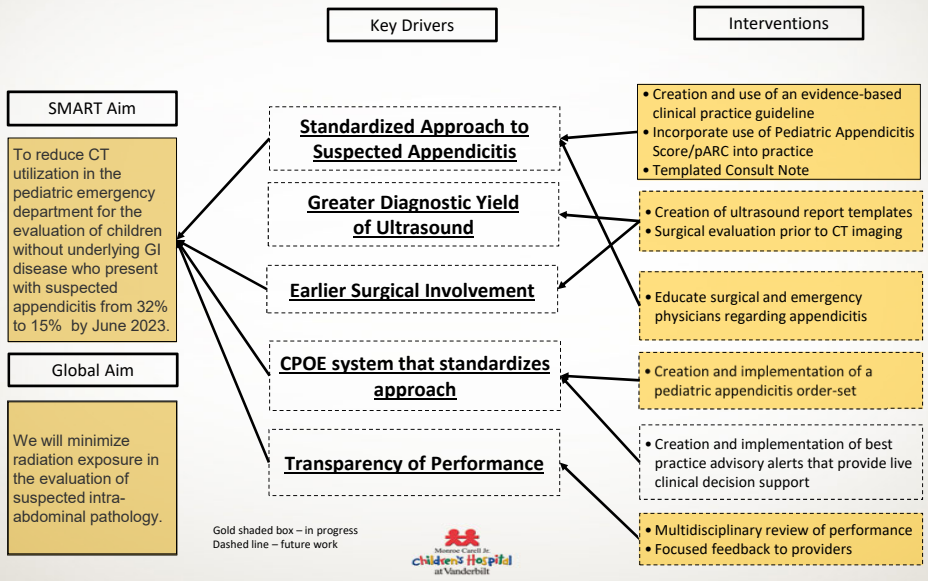
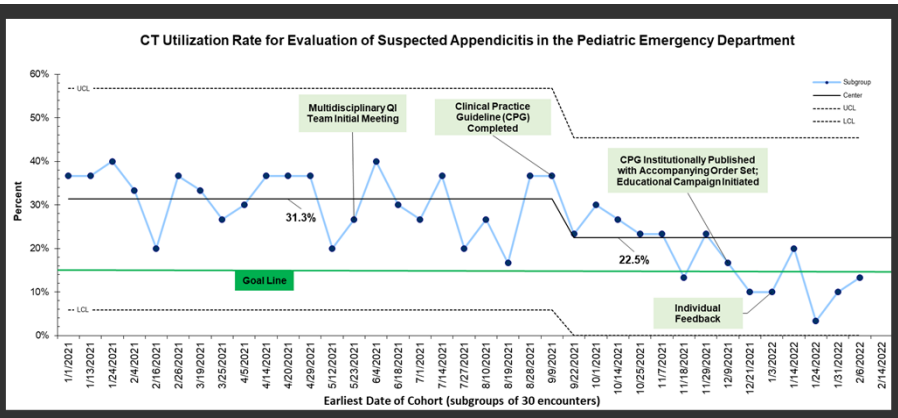
VANDERBILT UNIVERSITY MEDICAL CENTER

Reducing computed tomography imaging in a pediatric emergency department for suspected appendicitis

Key Driver Diagram



P-CHART



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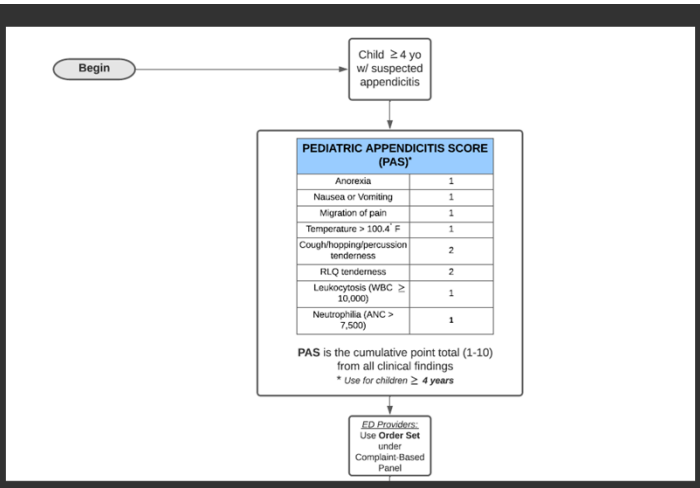
INTERVENTIONS:
CLINICAL PRACTICE GUIDELINE



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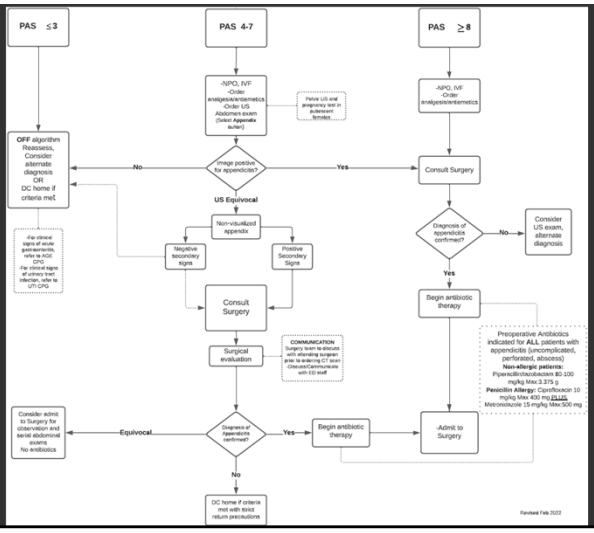
INTERVENTIONS:
CLINICAL PRACTICE GUIDELINE



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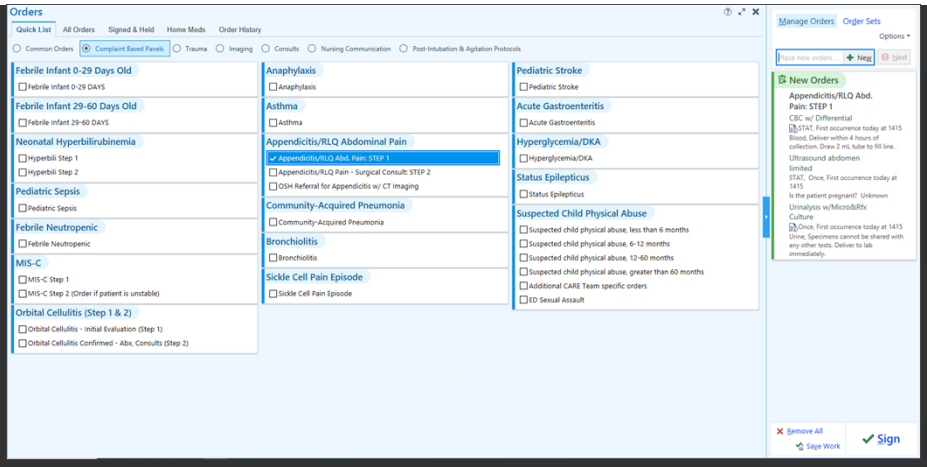
INTERVENTIONS: COMPLAINT-BASED PANEL



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INTERVENTIONS: COMPLAINT-BASED PANEL

DOING BETTER.

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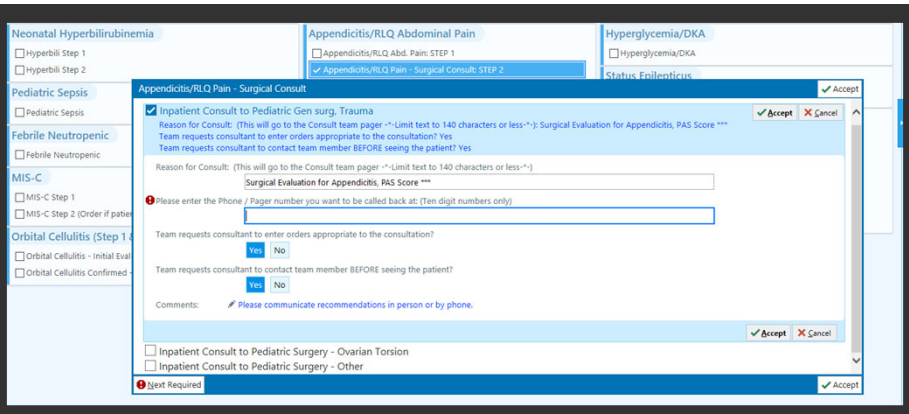
INTERVENTIONS: COMPLAINT-BASED PANEL



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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

DOING BETTER.

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

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THANK YOU!

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Questions

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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.