

## Introduction

- Abdominal ultrasound (US) is the first line imaging used for suspected pediatric appendicitis. However, it tends to produce more equivocal and variable findings. This is due to:
  - Technician dependent exam producing highly variable accuracy, sensitivity and specificity compared to CT
  - Difficult assessment with larger body habitus
  - Lower negative predictive value than than CT imaging, making it difficult to rule out appendicitis if appendix is not visualized
- Community hospitals are more likely to use Computed Tomography (CT) imaging for diagnosing suspected pediatric appendicitis, compared to more specialized children's hospitals<sup>1, 2</sup>
- This study investigates the differences in imaging utilization between a community hospital (Beaumont Troy) and a children's ED hospital (Beaumont Royal Oak)

## Aims and Objectives

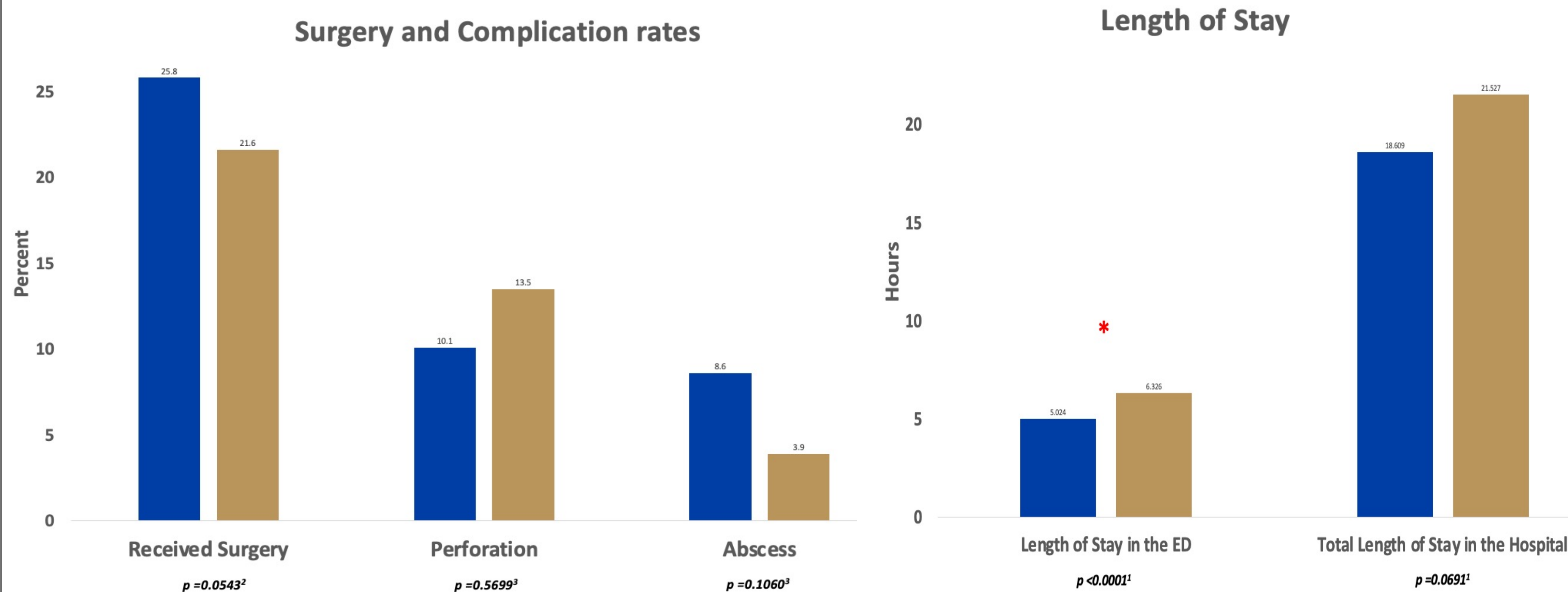
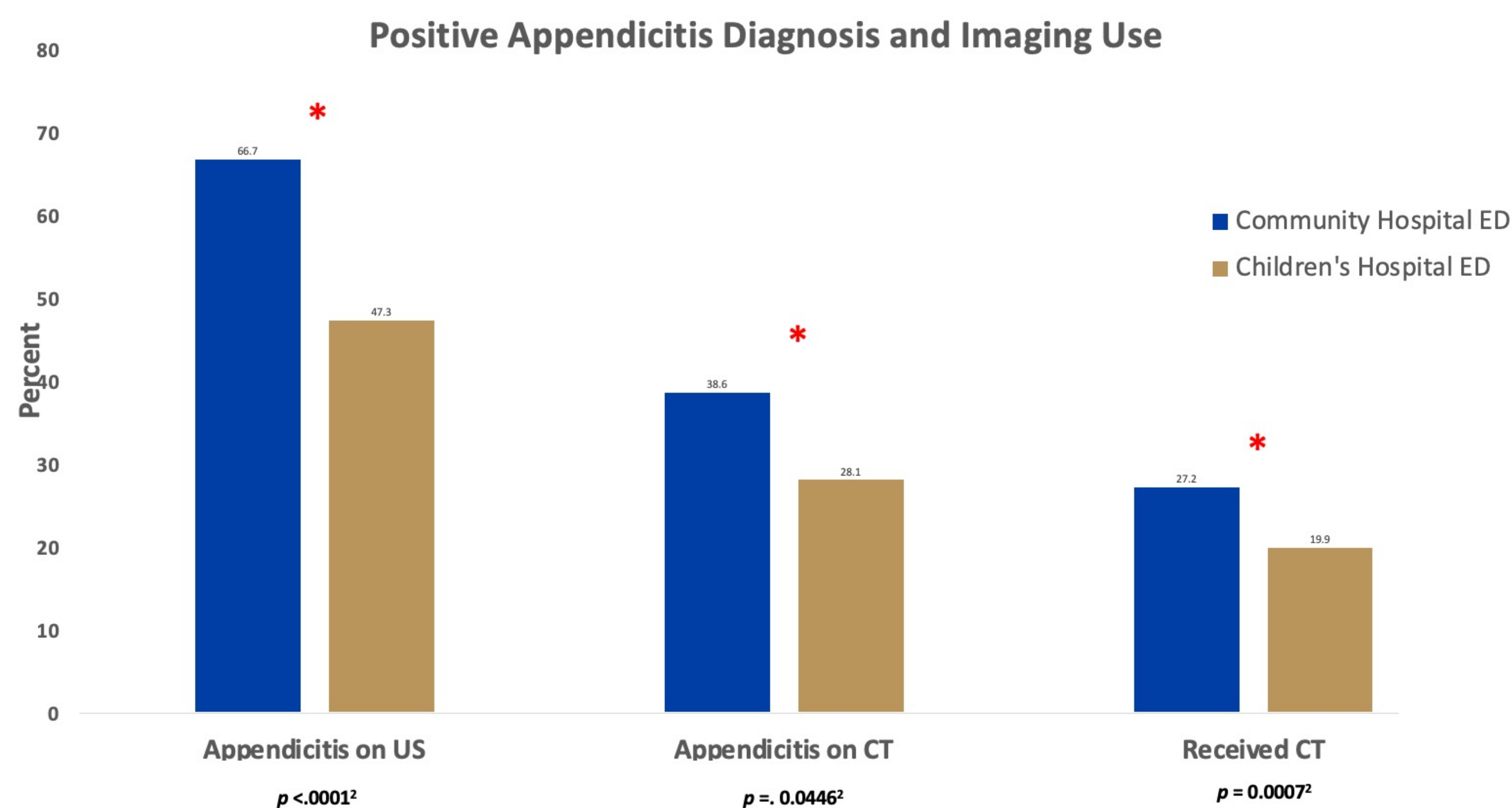
- I: Quantify differences in the utilization of CT imaging versus US in suspected cases of pediatric appendicitis at two emergency departments (ED) in the Beaumont Health System
- II: Characterize institutional differences in patient outcomes, including percent who underwent surgery (appendectomy), length of hospital and ED stay, and complications of appendicitis (abscess, perforation)
- III: Highlight the need to reduce unnecessary CT use due to its radiation exposure using our study findings
- IV: Promote institutional collaboration to share knowledge about appropriate utilization of imaging studies while maintaining excellent patient outcomes

## Methods

- Following IRB approval, this retrospective chart review analyzed patients ages 4-17, who initially received an abdominal US in the ED for abdominal pain associated with suspected appendicitis
- Included patients seen between January 1st, 2016 – January 1st, 2019 in Beaumont Troy and Royal Oak ED
- Reviewed abdominal or pelvic US reports of 3227 patients who presented to the ED with abdominal pain and found our cohort of 1672 patients suspected of appendicitis
- Radiology reports categorized as 1.) appendix visualized: positive appendicitis, 2.) appendix visualized: negative appendicitis, 3.) appendix not visualized
- Pulled variables of interest from that selected cohort
- Variables were compared between hospitals using <sup>1</sup>Unequal variance two sample t-test, <sup>2</sup>Chi-Square, and <sup>3</sup>Fisher Exact tests.

## Results

### Comparing variables between community hospital and children's hospital ED



## Conclusions

- This study confirmed our prediction and prior studies showing the community hospital utilizing more CT imaging for suspected appendicitis than the children's hospital
- Despite higher CT imaging in community hospital, it was not associated with change in percent of appendectomy performed or complication rates (Abscess and perforation) compared to children's hospital
- The community hospital also had significantly higher positive diagnosis of appendicitis on both US and CT before surgical pathology confirmation
- Length of ED stay was higher in the children's Hospital despite having lower CT usage and no difference in total length of stay between hospitals. This suggests contribution from non-imaging ED factors in the larger children's hospital lengthening ED stay such as longer wait times for receiving labs results, rooming, specialist consultations etc.
- Further investigation is necessary to decrease reliance on CT imaging after equivocal US findings in Beaumont

## References

- Anderson KT, Putnam LR, Caldwell KM, et al. Imaging gently? Higher rates of computed tomography imaging for pediatric appendicitis in non-children's hospitals. *Surgery*. 2017;161(5):1326-1333 doi:10.1016/j.surg.2016.09.042
- Saito JM, Yan Y, Evashwick TW, Warner BW, Tarr PI. Use and accuracy of diagnostic imaging by hospital type in pediatric appendicitis. *Pediatrics*. 2013;131(1):e37-e44. doi:10.1542/peds.2012-1665
- Hernandez JA, Swischuk LE, Angel CA, Chung D, Chandler R, Lee S. Imaging of acute appendicitis: US as the primary imaging modality. *Pediatr Radiol*. 2005;35(4):392-395. doi:10.1007/s00247-004-1372-8

## Acknowledgements

Thank you to the authors for their contribution. Special thanks to Dr. Kelly Levasseur, Dr. Rachel Deardon, Lauren DeSantis, Dr. Lihua Qu for help in earlier stages of the project. Data analysis and administrative work is possible with the help of Madhavi Purekar, Patrick Karabon, Derrick Dugeon, Tracy Wunderlich-Barillas, Lyndsey Schroeder, and Dr. Dwayne Baxa.