

# Improving Radiologist Interpretation Confidence for Appendix Ultrasound Through Standardized Performance and Reporting

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# INTRODUCTION

Increasing radiologist certainty in the ultrasound diagnosis of acute appendicitis through standardized exam performance and reporting has been proven to decrease CT utilization, unnecessary surgeries and hospital length of stay. The goal of this project was to decrease the number of indeterminate studies in a community hospital setting and two free-standing emergency departments (FSEDs) by 50% over a period of 9 months.



# Methods



## PQI Project with retrospective review

- appendix ultrasounds in a suburban combined adult with two affiliated FSEDs
- December 2020 to June 2022
- before and after implementation of a nationally standardized pediatric appendix ultrasound protocol, sonographer worksheet and reporting template.



In September 2021 a 2-hr live hands-on training workshop was offered to credentialed radiologists and sonographers.

In March of 2022 a 2-hour virtual training with CME was mandated for all reading radiologists and all sonographers



N = 308:

Before voluntary 2-hr live hands-on training N = 80/308 (Period 1)

After voluntary 2-hr live hands-on training N = 129//308 (Period 2)

After a mandatory 2-hr virtual training, N = 99/308 (Period 3)



Tracked :

- Standard protocol, standard sonographer worksheet and standard reporting template utilization
- Post-appendix ultrasound additional imaging
- Length of stay (LOS)
- Certainty of report impression defined as: positive for appendicitis, negative for appendicitis, equivocal (conflicting US findings), or merely descriptive
- Diagnostic accuracy



# RESULTS



Period 1-mean age 10.67 years  
Period 2-mean age 10.41 years  
Period 3-mean age 10.17 years



No statistically significant difference in mean scan times between time periods (P=0.0874)



**LOS in time period 1 was significantly different from time period 3 (adj P=0.017). LOS decreased by 3.8 hrs between periods 1 & 3.** No significant difference between periods 1/2 (adj P=0.585) or periods 2/3 (adj P=0.11). Figure 1



Indeterminate/exams declined by time period (Fisher P=0.004). **Indeterminate/descriptive exams in P3 significantly different from P1 (Fisher adj P=0.004). Decrease in indeterminate exams from P1 to P3 by approximately 50.62%**

No statistically significant difference between time periods 1/2 (Fisher adj P=0.25) or 2/3 (Fisher adj P=0.06). Figure 2



Percent of accurate exams was significantly different between time periods (Fisher P=0.0075). Figure 2. **Significant increase in percentage of accurate exams between periods 3 and 1 (Fisher adj P=0.009).** No statistically significant difference between time periods 1/2 (Fisher adj P=0.15) or 2/3 (Fisher adj P=0.13). Figure 2.



No significant change in the percent of exams that included Post U/S CT (Fisher P=0.07). Figure 3.



Figure 1

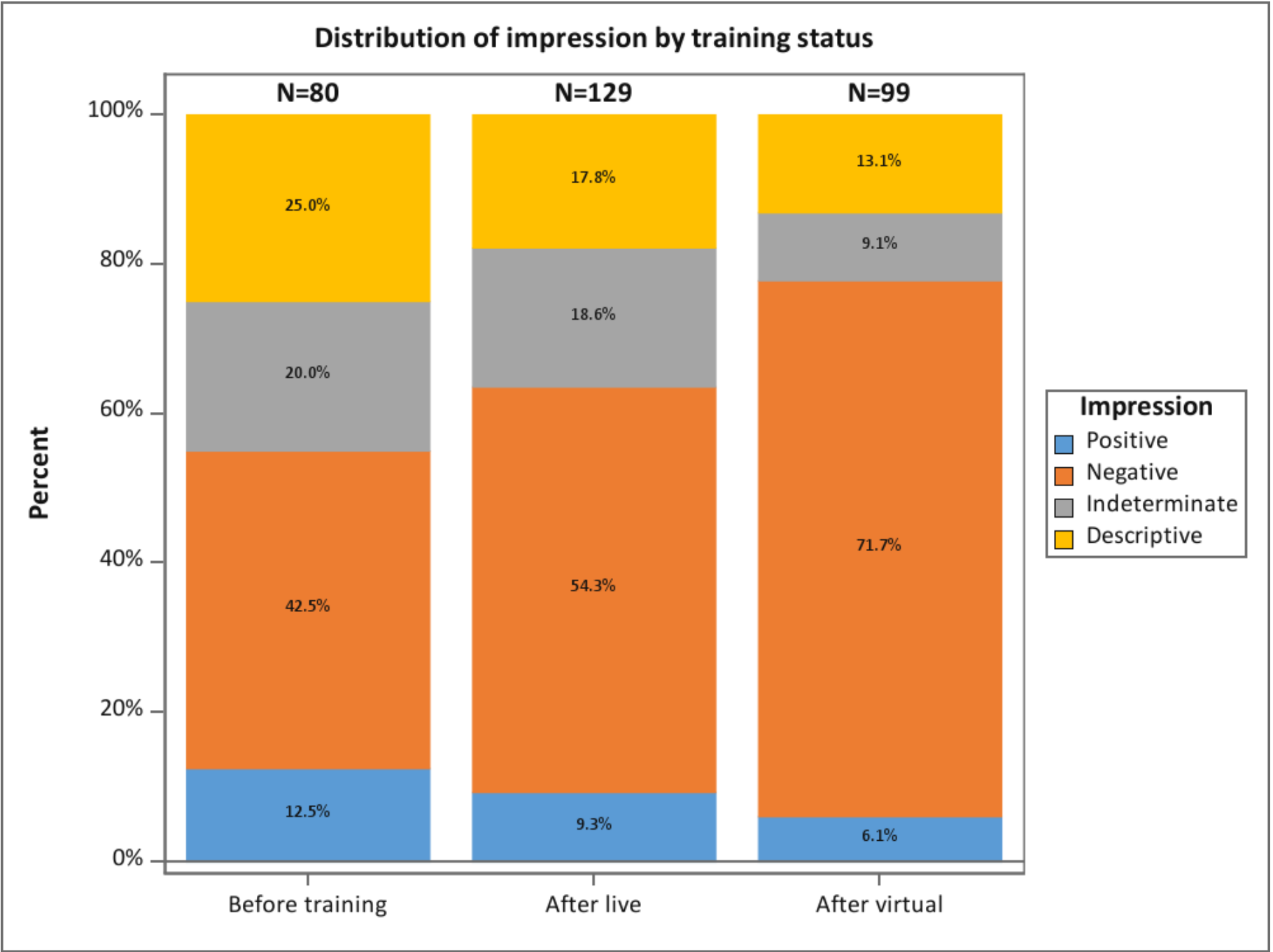


Figure 2

Post U/S CT  
No  
Yes

### Post U/S CT Utilization

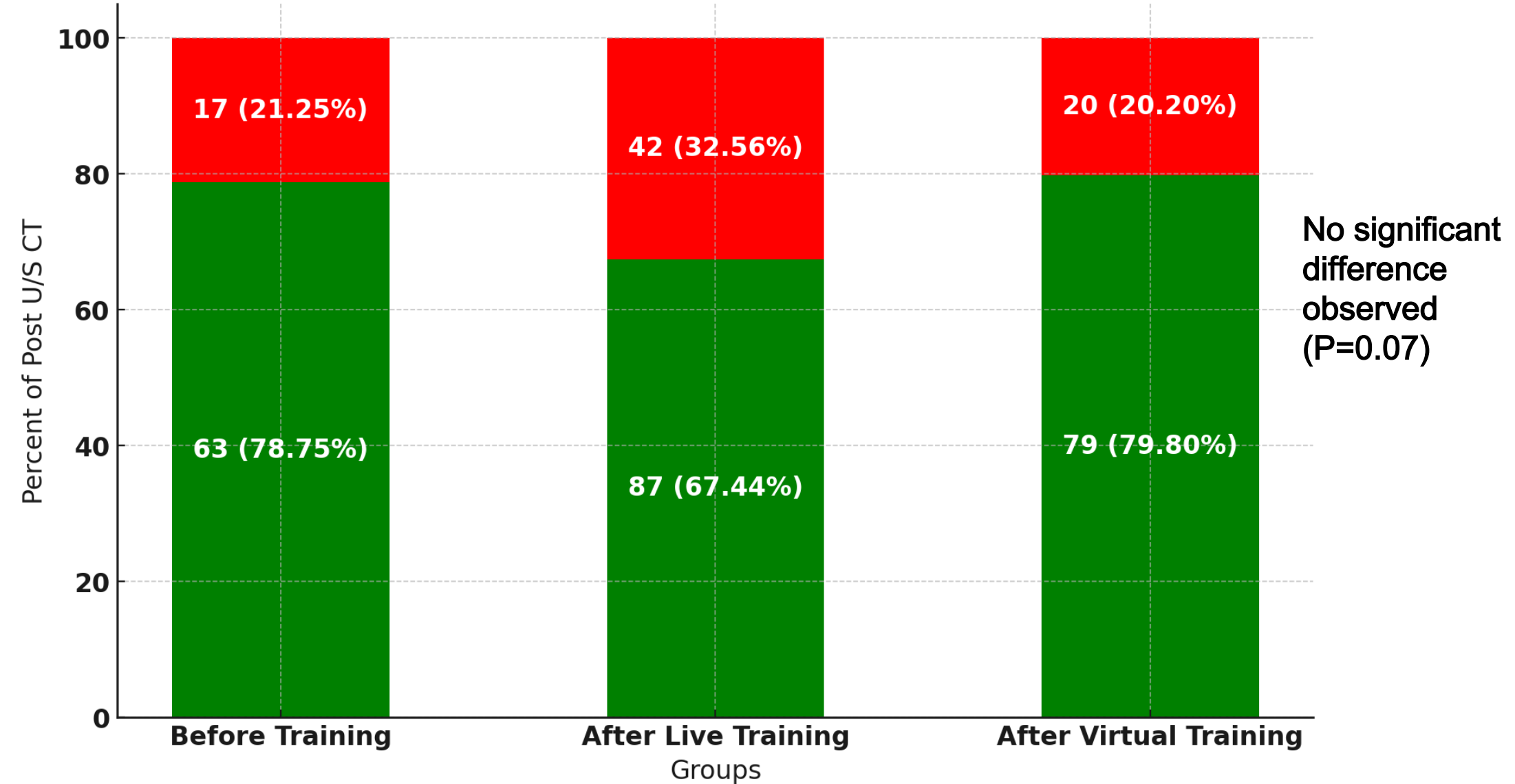


Figure 3



# DISCUSSION

- 50.62 % decrease in indeterminate/descriptive US impressions between periods 1 and 3.
- LOS intime period 1 was significantly different from time period 3 (adj P=0.017). LOS decreased by 3.8hrs between periods 1 & 3.
- No significant change in post -appendix ultrasound imaging utilization in our care setting during this time frame.
- Limitations include undefined impact of Covid 19 pandemic on healthcare utilization and other variables. Although training was mandated, only 22/25 (88%) sonographers and 13/37 (35.1%) interpreting radiologists completed the training.



THANKS

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The free appendix  
ultrasound training  
can be accessed here

