

## Quality Improvement

**Establish a** protocol for on-call breast ultrasound study interpretations, with an aim to improve preliminary report and final signature times

### Purpose:

- Inpatient and emergency department breast ultrasound studies are relatively infrequent and may present a workflow dilemma to on-call residents and staff
- Absence of a defined protocol leads to delays of more than 24 hours in final interpretation, diminishes value to referring providers and possibly contributes to suboptimal patient care (Eberhardt, 2018)
- Primary endpoints: maintain emergency department preliminary report times to less than 70 minutes and improve final signature turnaround times to less than 12 hours

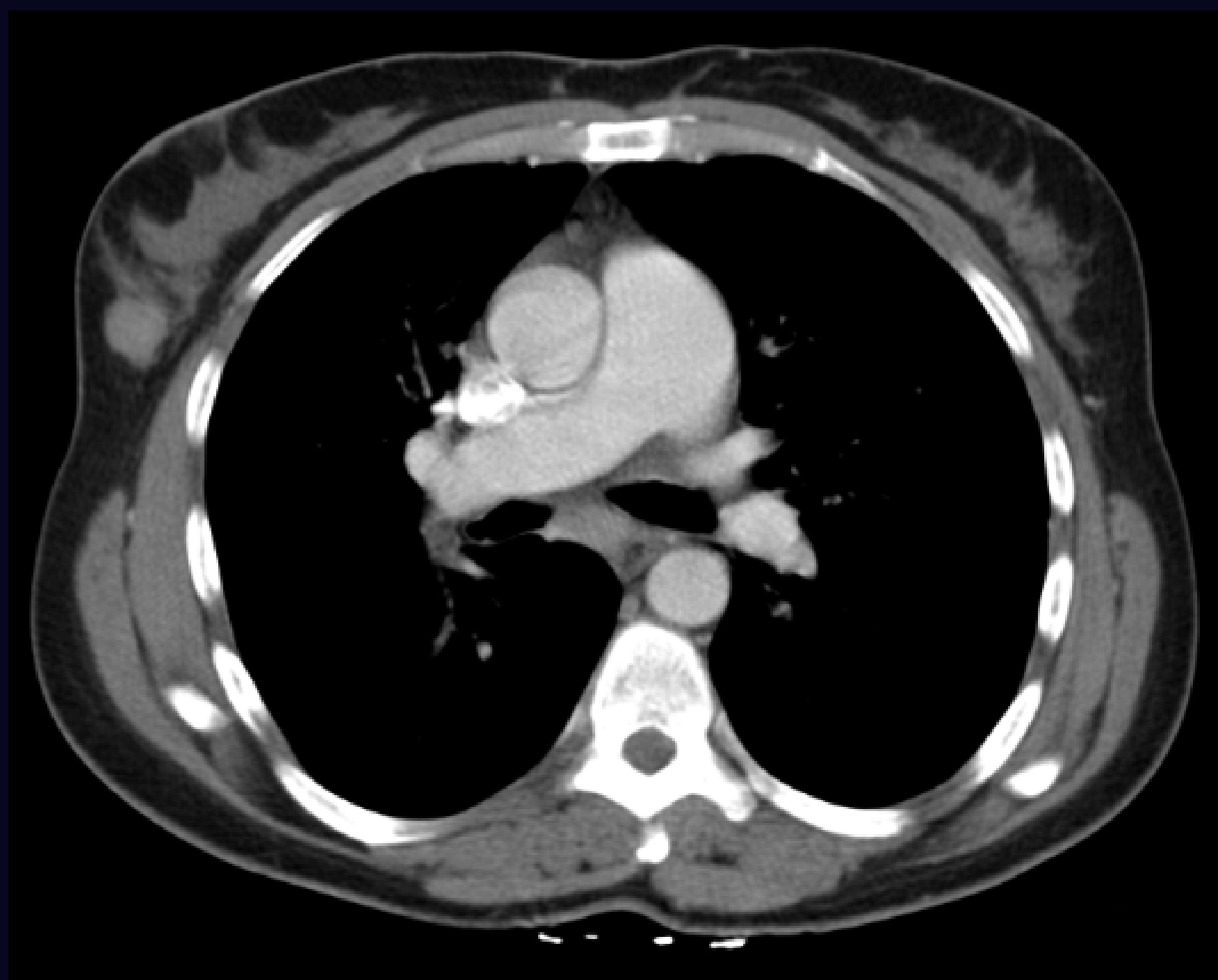


Figure 1. Axial CT image of a woman in the emergency department with chest pain demonstrating an incidental right breast mass. Optimal assessment with mammogram and/or ultrasound at a breast care center is recommended however a emergency department breast ultrasound study may be obtained.

## Materials and Methods:

### ACT

- Adoption of changes to improve practice
- Continued resident education to use standardized templates and new workflow

### STUDY

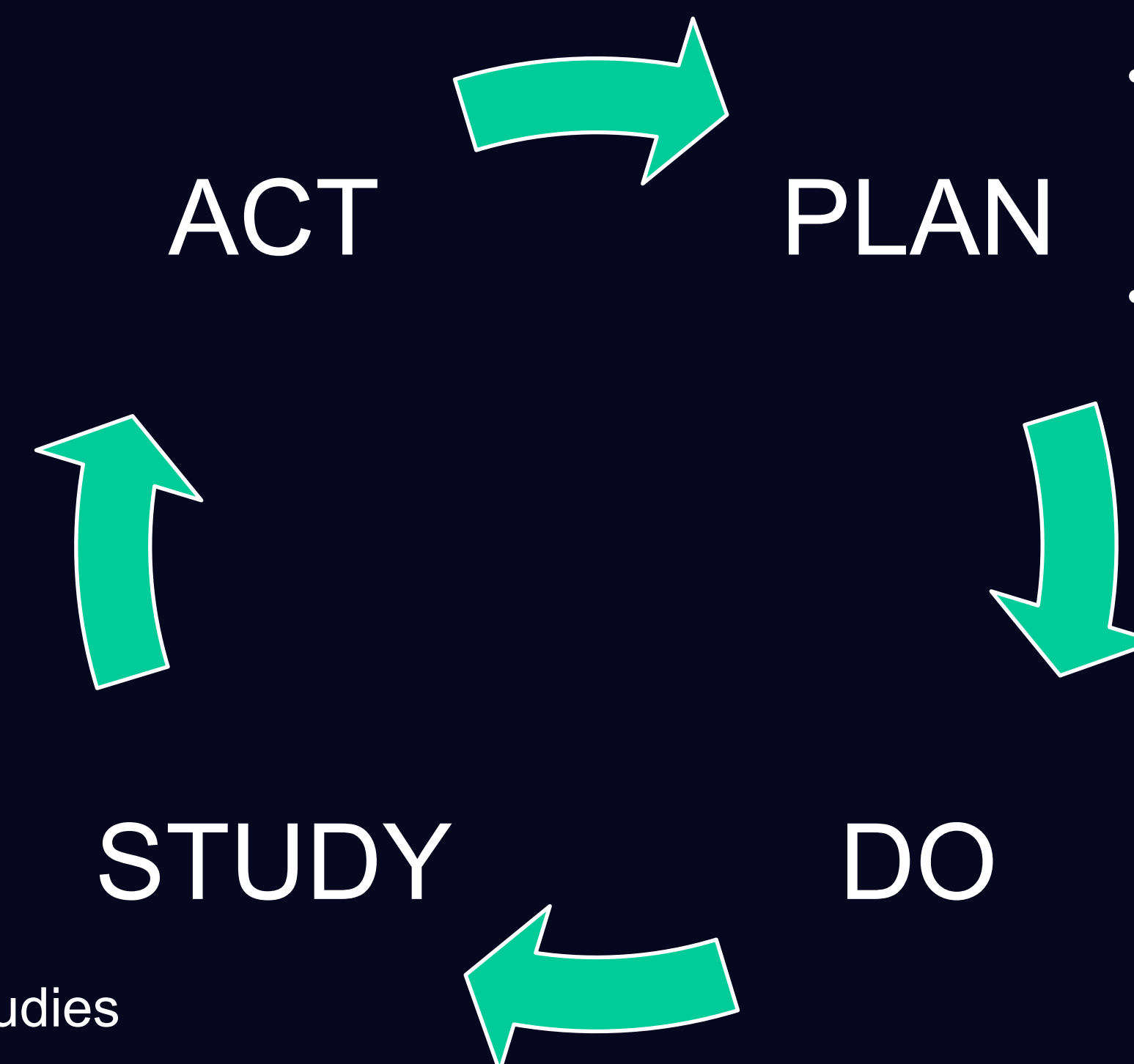
- 53 Emergency Department breast ultrasound studies from July 2019 – November 2020 were studied (30 studies pre-implementation, 23 studies post-implementation)
- Average time to and range of preliminary resident signature and final signature times were assessed with new protocol implemented July 2020
- Post-implementation there was a significant decrease in final sign times from 15 hours 35 minutes to 4 hours 36 minutes (p-value 0.01), range of final sign times decreased from (18 minutes to 85 hours) to (34 minutes to 44 hours)
- Post-implementation there was not a significant difference in preliminary report times from 30 minutes to 55 minutes (p-value >0.05), range of preliminary sign times were (3 minutes to 2 hours) to (11 minutes to 3 hours)
- The baseline results met our target goal

### PLAN

- Goal: Improve turn around times of final reports for emergency department breast ultrasounds to less than 12 hours
- Goal: Maintain preliminary report turn around times for emergency department breast ultrasound times to less than 70 minutes
- Identified ultrasound studies were not sent to morning breast attending consistently for final signature
- Identified that there was no formal workflow for breast ultrasound studies for residents on call
- Recognized standardized templates with recommendations for follow up and appropriate care at the breast imaging center may be beneficial for workflow

### DO

- Residents were informed of new workflow to send preliminary reports to the musculoskeletal clinical instructor covering the emergency department studies, breast imaging clinical instructor, or overnight queue depending on time of day
- Radiologist assistants were informed of checking the overnight queue for preliminary studies and sending the reports to the morning breast imaging attending
- New structured templates were created with instructions of how to follow up with the breast center and the pager number for the breast fellow as well as reminders to new workflow for residents



## Materials and Methods (continued):

### IMPRESSION:

A focal fluid collection in the [Location:Axilla/subareolar/clockface] [Breast side: right breast/left breast] is concerning for abscess. Antibiotics should be initiated, and drainage should be considered.

**FOLLOW-UP RECOMMENDATIONS:** After treatment of the acute clinical issues, it is recommended that the patient be scheduled for short-interval imaging follow-up at the breast care center 2 to 4 weeks after completion of antibiotics. Please direct the patient to call ##### to schedule the outpatient appointment.

[Please page the Breast Imaging fellow at ##### for all ED studies performed between 5p-9p and 6a-8a, or if you have any questions. Further workflow instructions may be found on the Intranet under Education Portal -> Residents -> Call Resources -> 1404 Call.]

Figure 2. Example of a structured template with follow up recommendations for emergency department breast imaging studies.

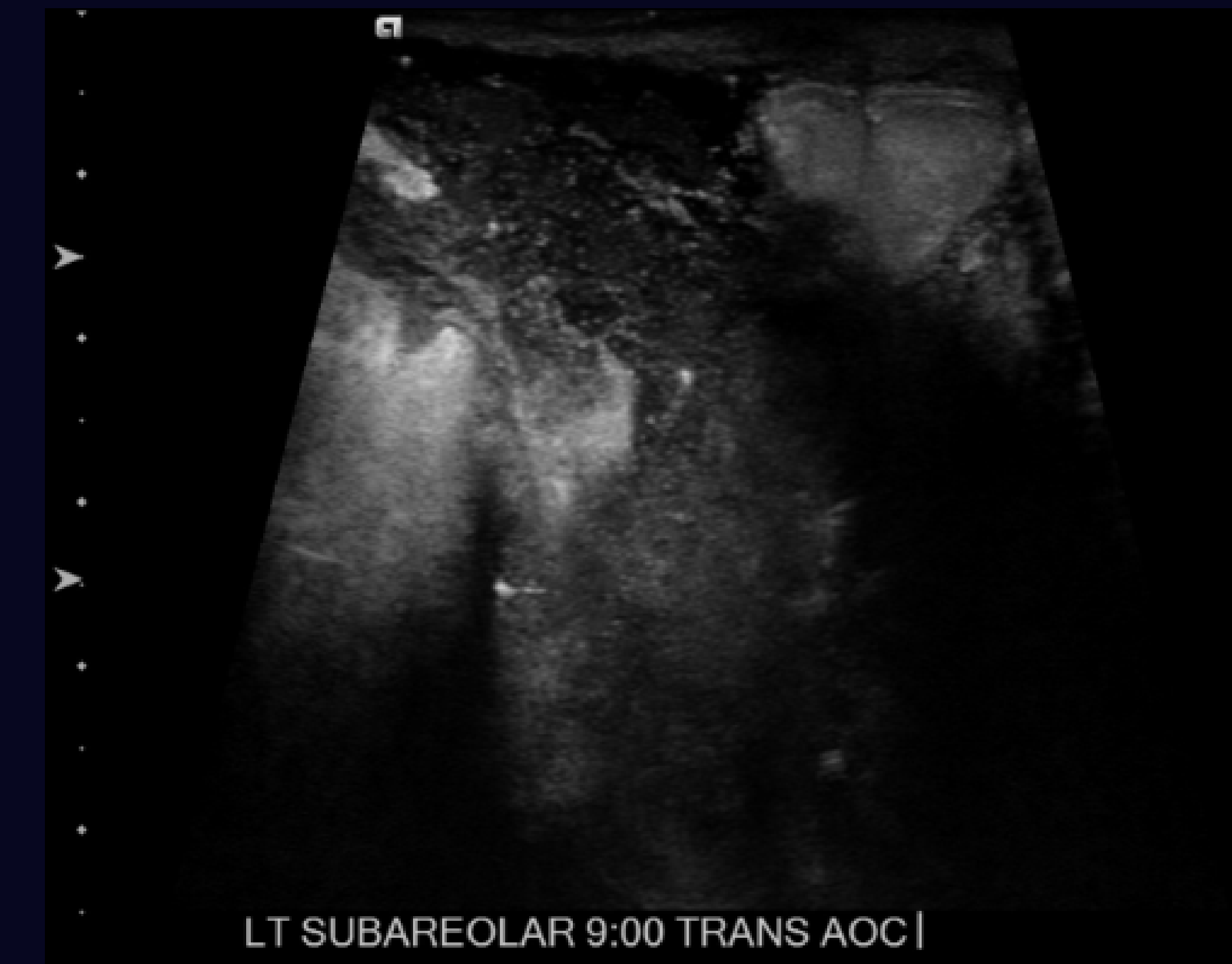


Figure 3. Ultrasound image of a left subareolar fluid collection suggestive of breast abscess in the correct clinical context.



### Results:

- Average final sign times were 15 hours 35 minutes in the pre implementation group (n = 30) and 4 hours 36 minutes in the post implementation group (n = 23), p-value 0.01

### Range:

- Pre implementation: 18 minutes to 85 hours
- Post implementation: 34 minutes to 44 hours

- Average preliminary report times were 30 minutes in the pre implementation group and 55 minutes in the post implementation, p-value >0.05

### Range:

- Pre implementation: 3 minutes to 2 hours
- Post implementation: 11 minutes to 3 hours

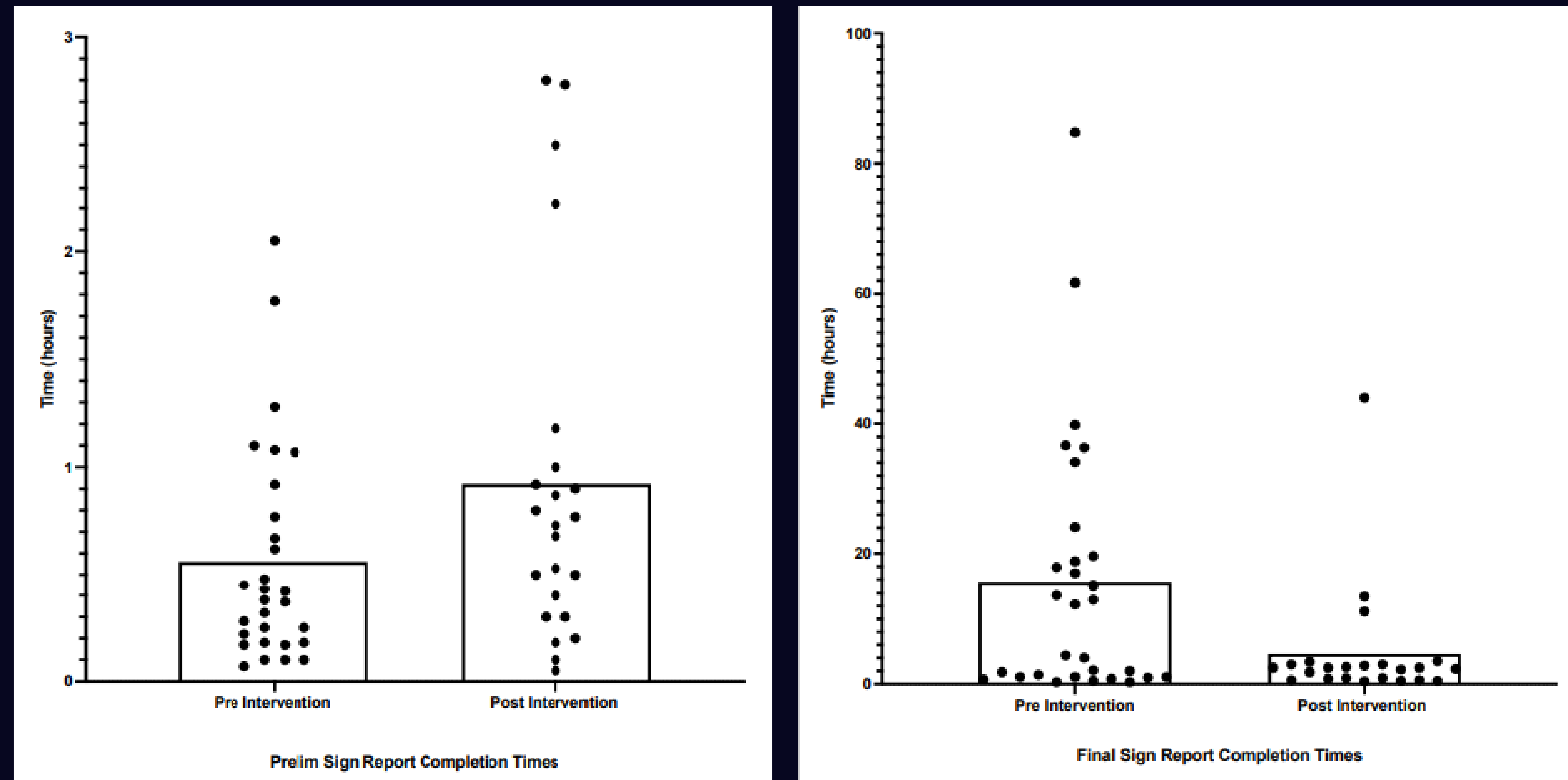


Figure 4. Breast ultrasound preliminary (left) and final (right) report completion times before and after implementation

### Discussion:

- Goal met to decrease average final sign times to less than 12 hours and maintain preliminary report times to less than 70 minutes
  - Only one final report study post implementation exceeded 14 hours in final signature time lapse, compared to 15 studies previously
- Future directions: Continued research could assess whether patient and emergency department physician satisfaction is improved with workflow changes as well as whether there is improved time to medical treatment or drainage. The new workflow will need to be repeated to new residents, with periodic resident reassessment of workflow changes.
- Limitations: Assessment of inpatient breast ultrasounds due to number of studies

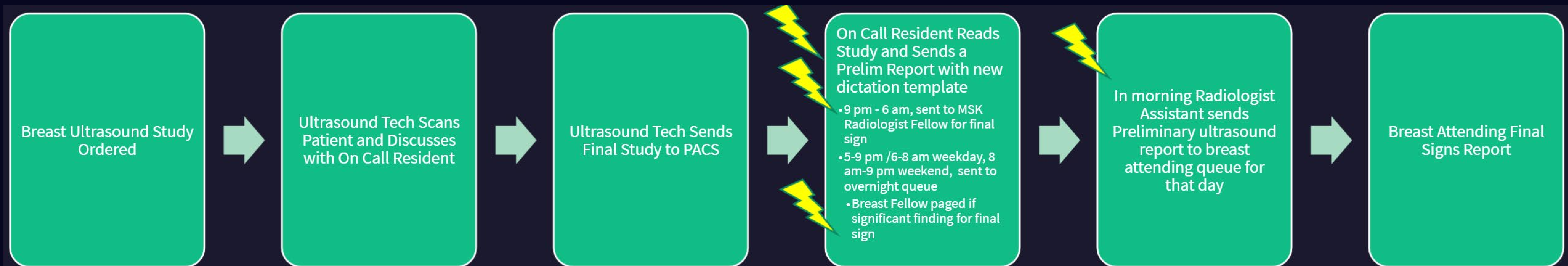


Figure 5. Workflow changes for breast ultrasound during on call hours

### References:

- Radiology Report Value Equation. Steven C. Eberhardt and Marta E. Heilbrun RadioGraphics 2018 38:6, 1888-1896