Back To The Future: Improving Reading of Screening Mammograms With a Batched Workflow Utilizing a Live Reading Room Transcriptionist

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Background

- Screening mammograms contribute to a large workload in the breast imaging department
  - Approximately 500-600 mammograms are performed each week

- Timely issuance of the final radiology report is important to provider and patient satisfaction

- An efficient and sustainable workflow that avoids burnout is necessary to facilitate prompt completion of screening mammography reports and decrease distraction to minimize error and improve patient safety.

- Improved efficiency and decreased distraction and fatigue may reduce errors and improve patient safety

- PROBLEM: At our institution there was an accumulation of unread screening mammograms and delayed reporting resulting in peak weekly mean report turnaround time of 198 hours (8.25 days)

Root Causes & Quality Interventions

Root Cause	Quality Intervention
1 Interruptions and distractions during the workday	"S" Assignment (Uninterrupted, batch reading with live transcriptionist)
2 Inefficient paper chart-based workflow	Conversion to paperless, all digital workflow
3 Cumbersome report dictation software workflow	Efficient updates to dictation process

Traditional Workflow States:

N - Interrupted reading of screening mammograms while performing breast procedures without a trainee or transcriptionist

T - Interrupted reading of screening mammograms while performing breast procedures with a trainee but no transcriptionist

QI Initiative:

S – Creation of new assignment with uninterrupted batch reading of screening mammograms with a live transcriptionist
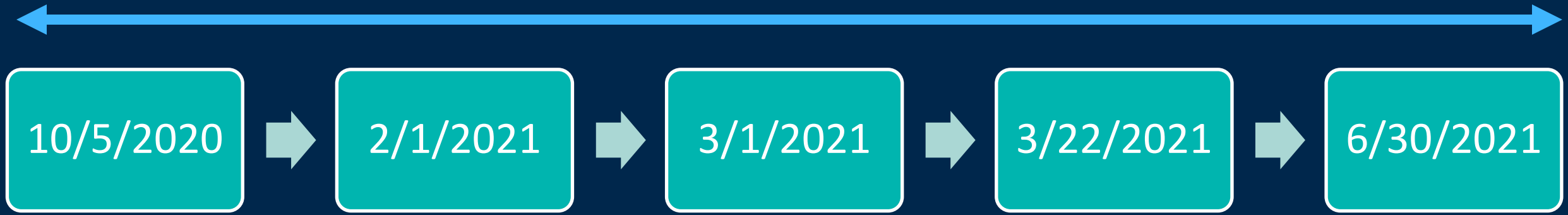
Metrics & Goals

- Total number of studies read per assignment
  - Digital mammogram = 1 point
  - Digital breast tomosynthesis = 2 points
- Study Interpretation Time (minutes/point)
- Report Turnaround Time (TAT, hours)
  - Goal to reduce to < 72 hours
- Survey data on radiologist ratings of fatigue and distraction in the quality initiative (S) vs. traditional assignments (N, T)
  - Goal was to reduce radiologist fatigue and distraction to a rating < 3
- Cost analysis
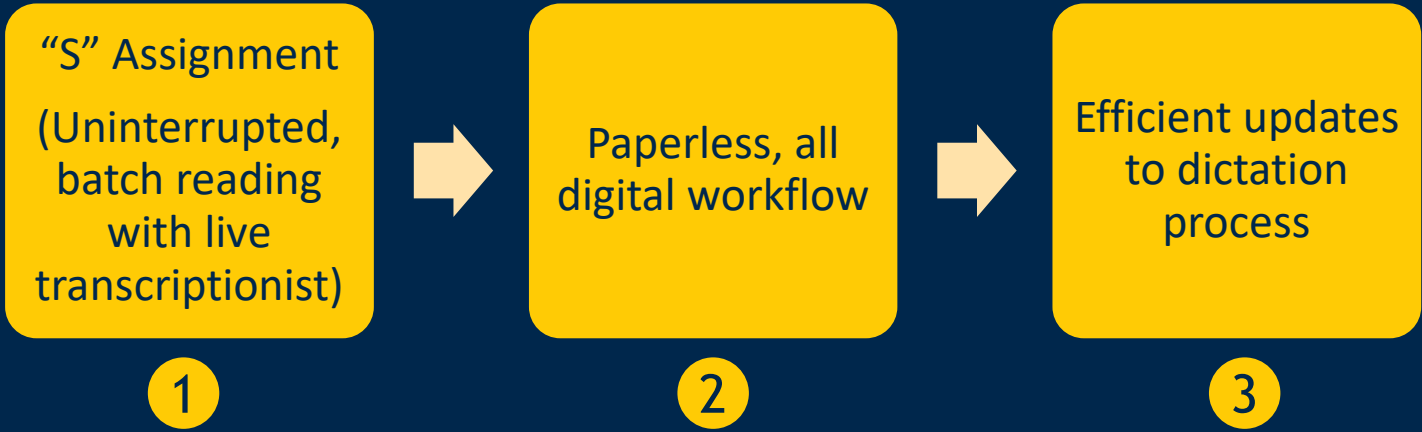- GOAL – Reduce TAT, fatigue and distraction, and interpretation time after 4 months of implementing QI initiatives

Initials:		
Date:		
Assignment (S, B, X, Call):		
Did you use an RRC live transcriptionist for all or majority of the session? (Circle Yes or No)	Yes	No
Did you work with a resident or fellow trainee? (Circle Yes or No)	Yes	No
Total number of 2D screeners read*:		
Total number of 3D screeners read*:		
Total time spent reading screeners (exclude breaks):	hours	minutes
Total Break Time:	hours	minutes
Circle level of distraction during session	1 2 3 4 5 6 7 8 9 10 Low High	
Circle level of fatigue during session	1 2 3 4 5 6 7 8 9 10 Low High	

Example of survey administered to radiologists

Turnaround Time Improvements
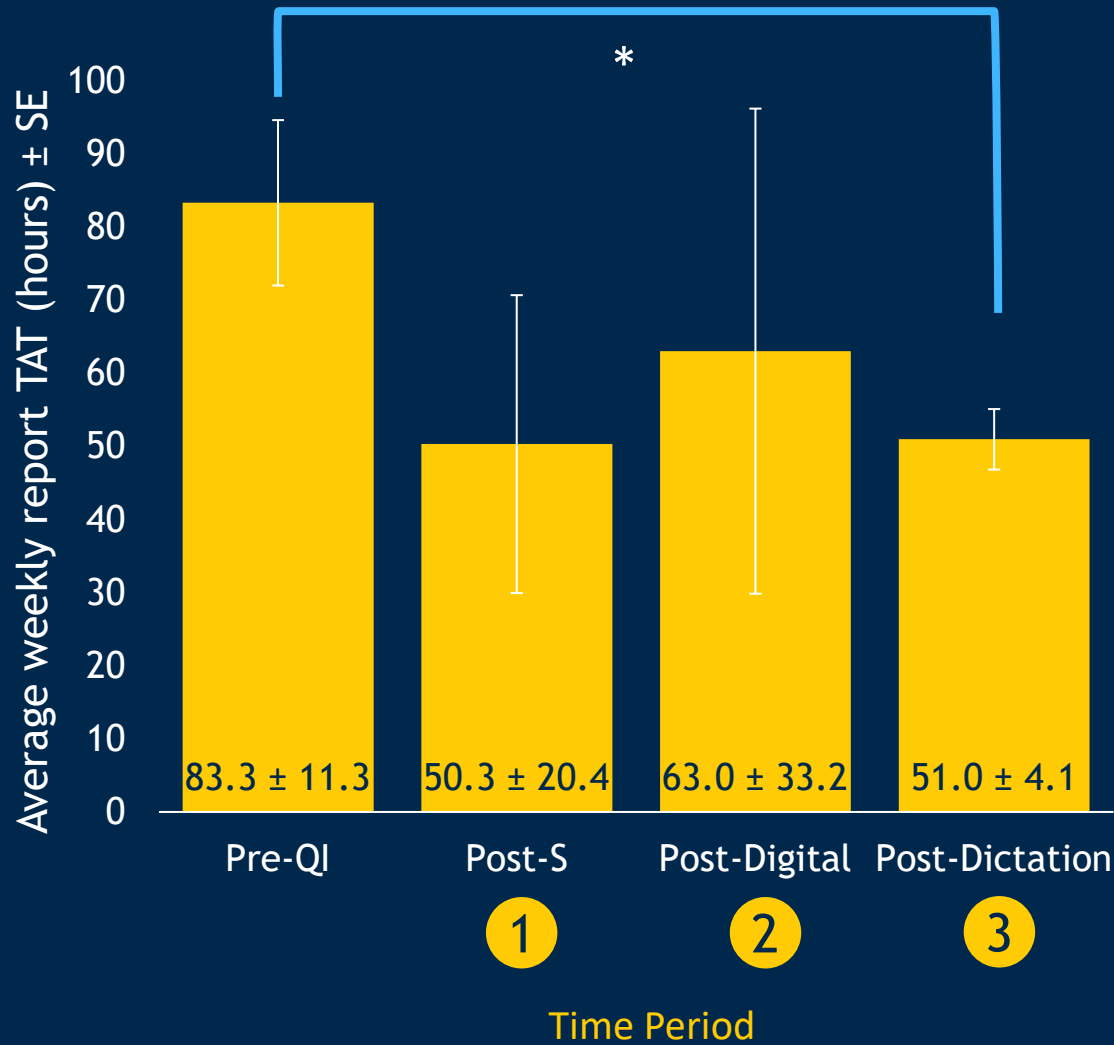
Mean Weekly Report TAT Improvement

- Pre-QI: 83.3 ± 11.3
- Post-S (1): 50.3 ± 20.4
- Post-Digital (2): 63.0 ± 33.2
- Post-Dictation (3): 51.0 ± 4.1

Average weekly report TAT (hours) ± SE — Time Period
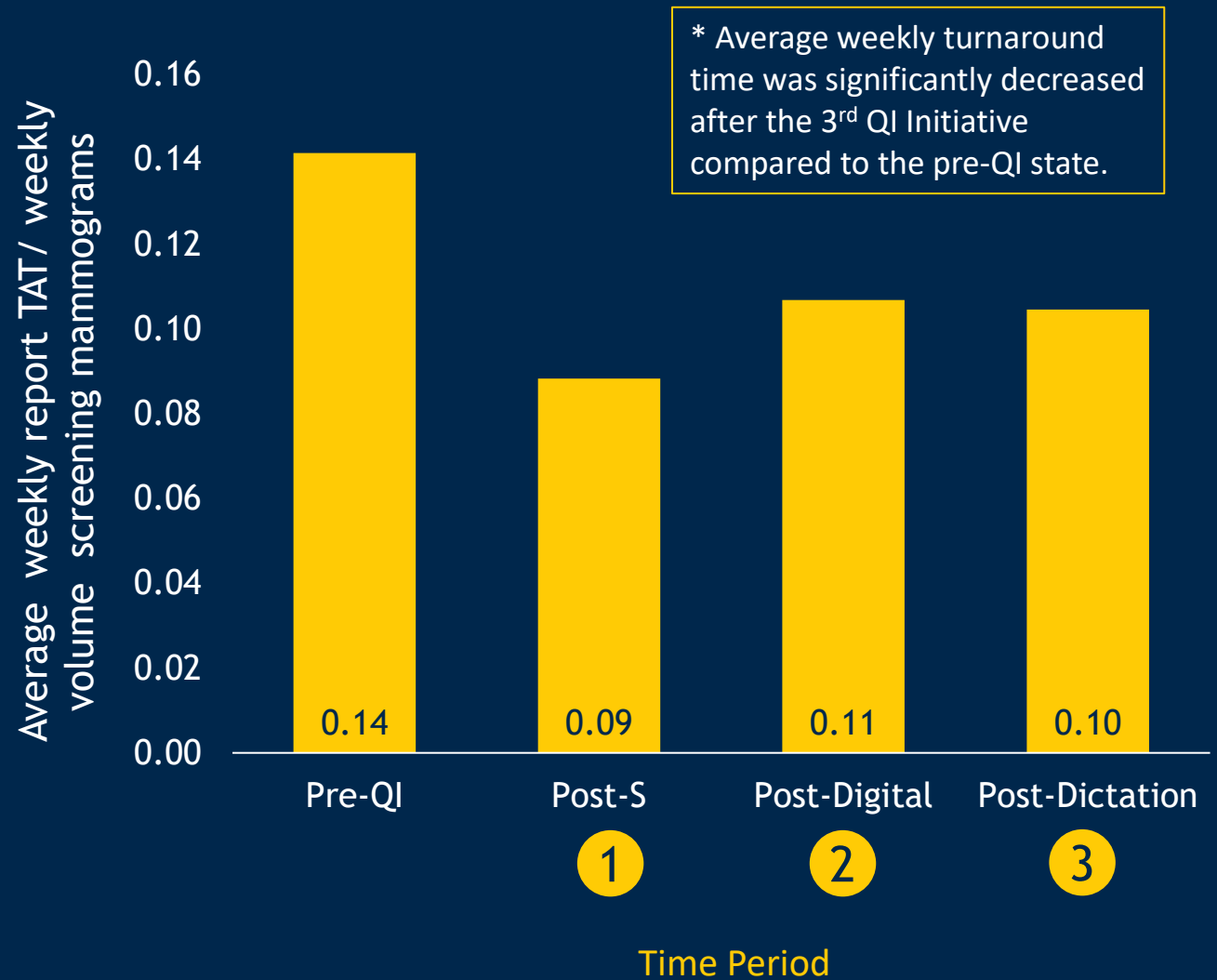
Relative TAT / Number of Screens

- Pre-QI: 0.14
- Post-S (1): 0.09
- Post-Digital (2): 0.11
- Post-Dictation (3): 0.10

Average weekly report TAT / weekly volume screening mammograms — Time Period

* Average weekly turnaround time was significantly decreased after the 3rd QI Initiative compared to the pre-QI state.

Radiologist Distraction and Fatigue Improvement

Average radiologist fatigue and distraction rating was significantly lower in the new S setting compared to the traditional workflows (N, T).

Rating ± SE

N		T		S	
5.6 ± 0.5	4.8 ± 0.4	5.7 ± 0.6	4.0 ± 0.5	2.0 ± 0.2	2.6 ± 0.2

Setting

■ Distration   ■ Fatigue

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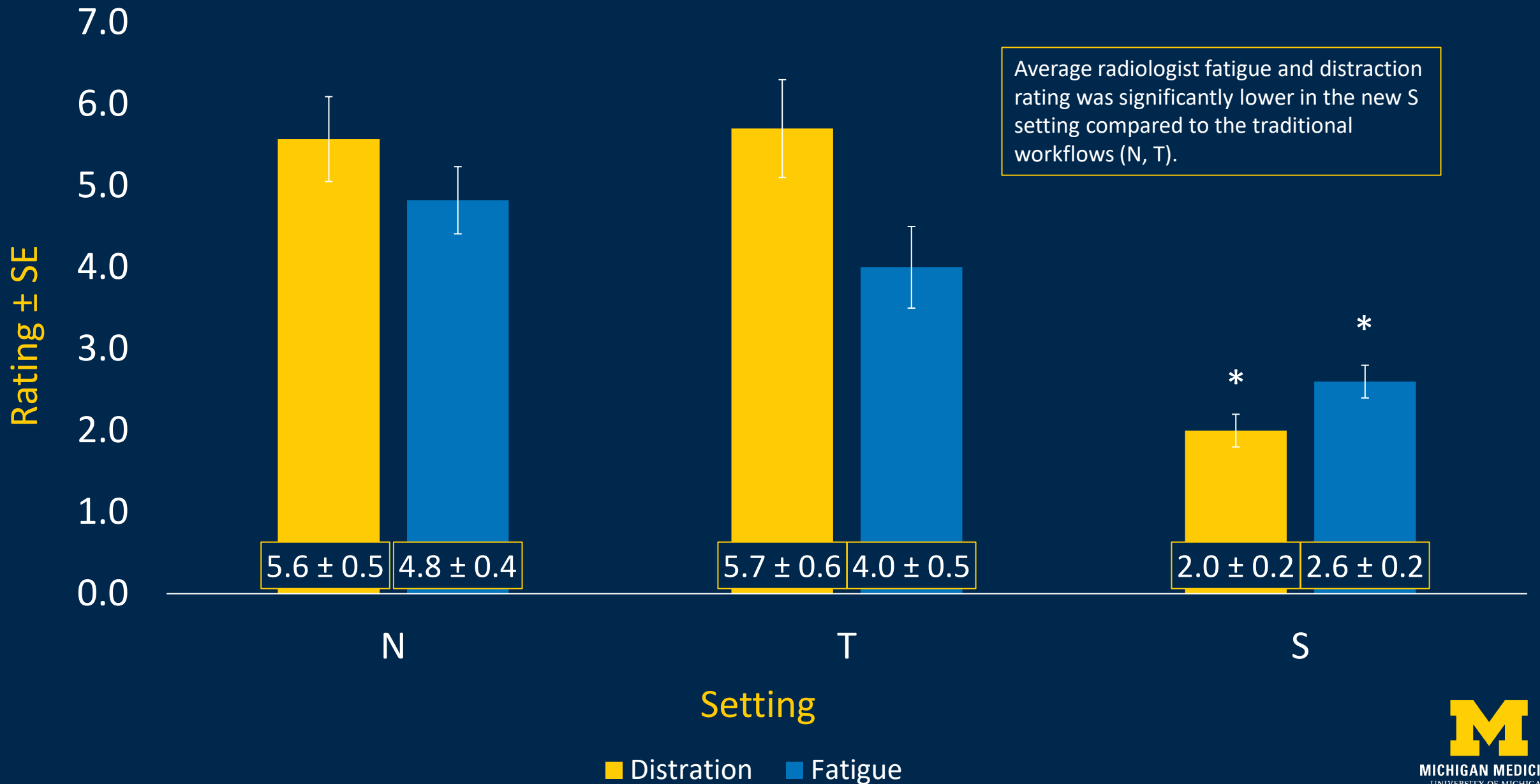
Interpretation Time & Cost Analysis

Interpretation Time per Study Point
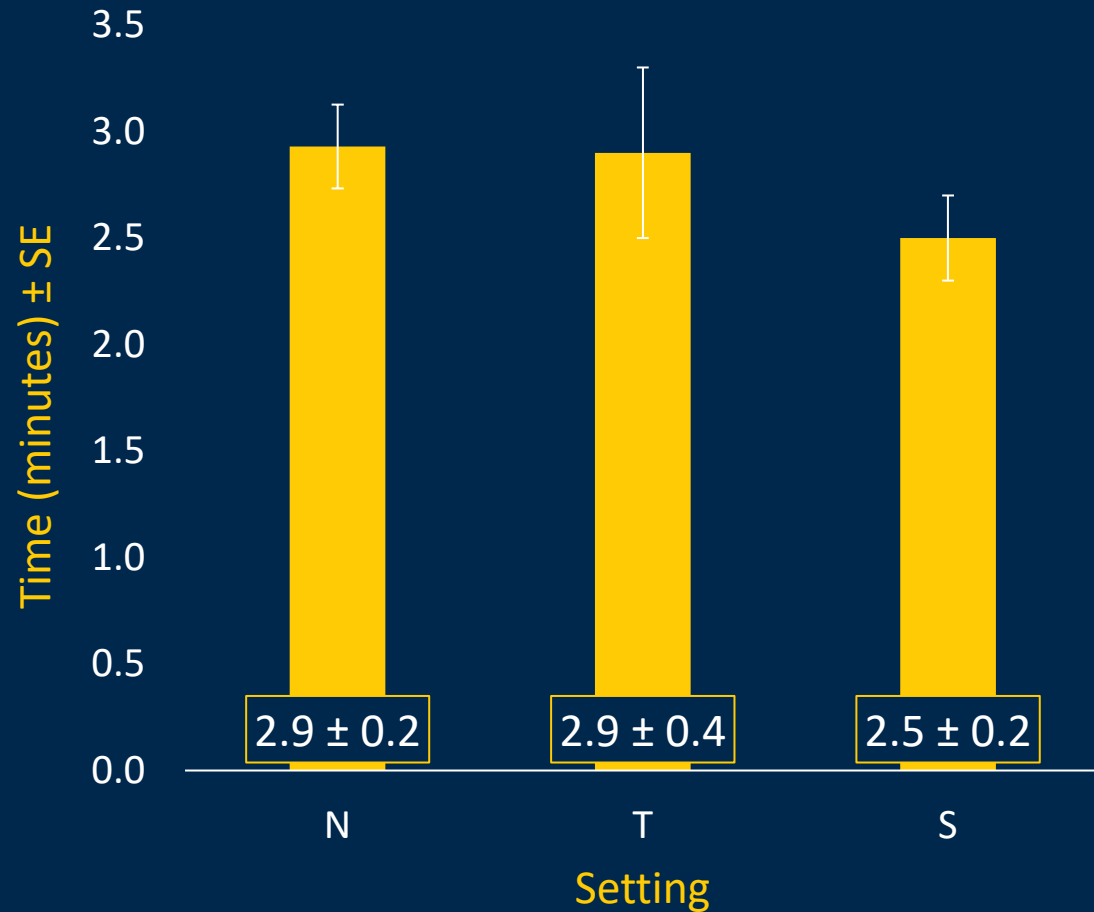
Average interpretation time was slightly lower in the new S setting compared to the traditional workflows (N, T).

Association of Administrators in Academic Radiology (AAARAD) reported payroll expense for live transcriptionist: $53,893.50/ year = $207.28/day

Given interpretation times, over an 8-hour shift, total points that can be read per assignment:
165.5 points in traditional N and T setting
192.0 points in S setting

26.5 additional points can be read per day in S
(Equates to approximately 26 2D digital screening mammograms or 13 screening digital breast tomosynthesis studies)

Institutional hospital charge for digital screening mammogram (1 point) = $725

This results in an additional daily charge of $19,200.00 for screening mammography services with a daily cost of $207.28.

Net additional charges generated = $18,992.72/ day

Limitation – Missed trainee teaching opportunities in S

Conclusions

- QI Initiatives for reading offline screening mammography resulted in
  - Decreased report turnaround time
  - Decreased radiologist fatigue and distraction
  - Improved ease of interpretation
  - An efficient and sustainable solution to providing timely reads on large volumes of offline screening mammograms

- Limitations
  - Differences in work settings in the traditional vs new S workflow limit direct comparison
    - Traditional workflow entailed interrupted reading of screening mammograms while performing procedures while in the S setting there was uninterrupted batch reading
    - This was accounted for by comparing interpretation times for screening mammography only
  - Variability of radiologist assignment to S vs traditional workflow
  - New S assignment produced improved productivity and revenue, but eliminates a teaching opportunity for trainees
  - Surveys- Variable response rates, self reported data including interpretation time

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Keys to Success and Future Directions

- Keys to Success
  - Goal was to improve ease of work to reduce burnout, which is a welcomed change to staff
  - Periodic implementation of QI-initiatives helps avoid overburdening staff
  - Open communication regarding changes allowed for easier implementation
  - Support from leadership and staff

- Future Directions
  - Expand digitization and improved safety and efficiency to other divisional workflows
  - Reduce burdensome tasks to allow radiologists to focus on image interpretation to improve safety and reduce errors