THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Automating and Integrating Breast Imaging Workflows to Improve Efficiency and Quality

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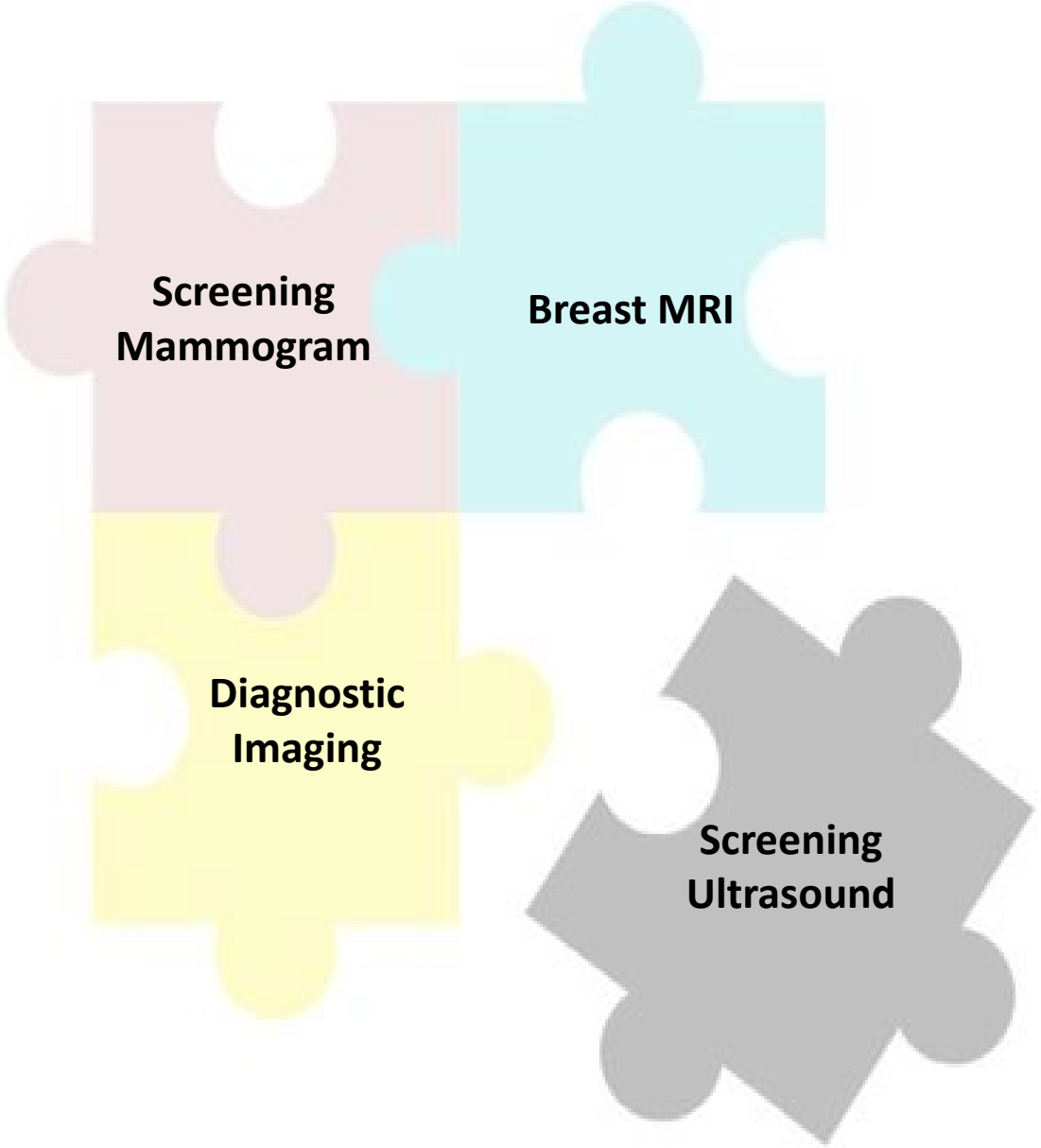
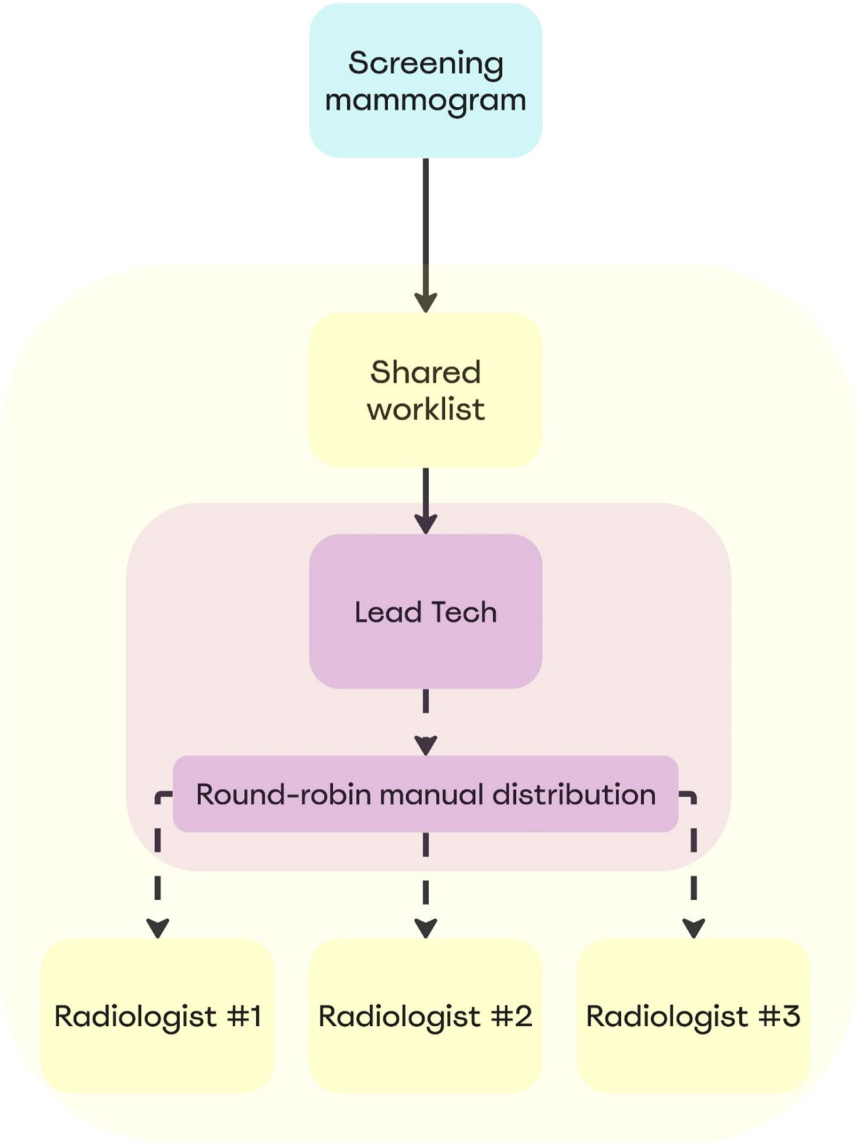
Breast Imaging Workflow Dilemma

- Some exams require **immediate interpretation**:
  - Diagnostics mammography and ultrasound
  - Call backs
  - Imaging studies for patients with clinical appointments following imaging appointments
- Some exams require **less urgent interpretation:**
  - Screening mammography
  - Supplemental screening such as breast ultrasound or MRI
  - Breast MRI
- Must divide work to support patients and clinical colleagues AND ensure equitable division of studies for radiologists



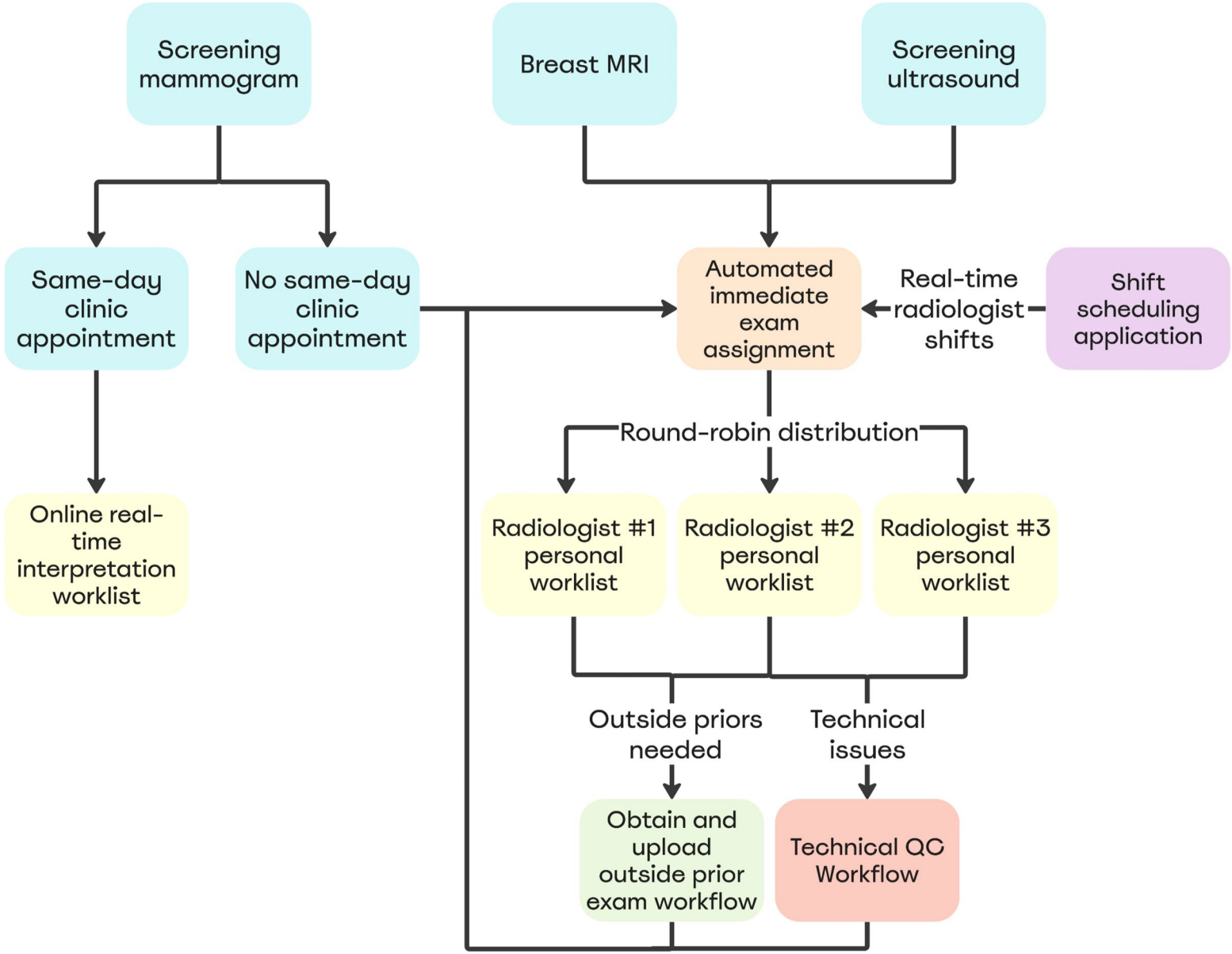
Historical Breast Imaging Workflow

- Multiple worklists including separate worklists for each modality and separate worklists for radiologists
- Lead technologist manually distributed each screening mammogram into individual radiologist's reading list on PACS when they had time throughout the day
- Radiologists read breast MRIs and screening breast ultrasound from separate lists, often leading to radiologists reading concurrent screening mammogram studies separately
- Led to inequal distribution and dissatisfaction amongst radiologists and lead technologists
- Manual steps created delays for turn-around time and opportunities for errors



New Optimized Workflow

- Focus on automation and efficiency
- Current radiologist shifts are automatically incorporated into exam assignment
- Only radiologists working eligible shifts are assigned exams
- Non-urgent screening exams including mammograms, MRI and ultrasound are immediately, equitably, and automatically assigned to radiologists who are working



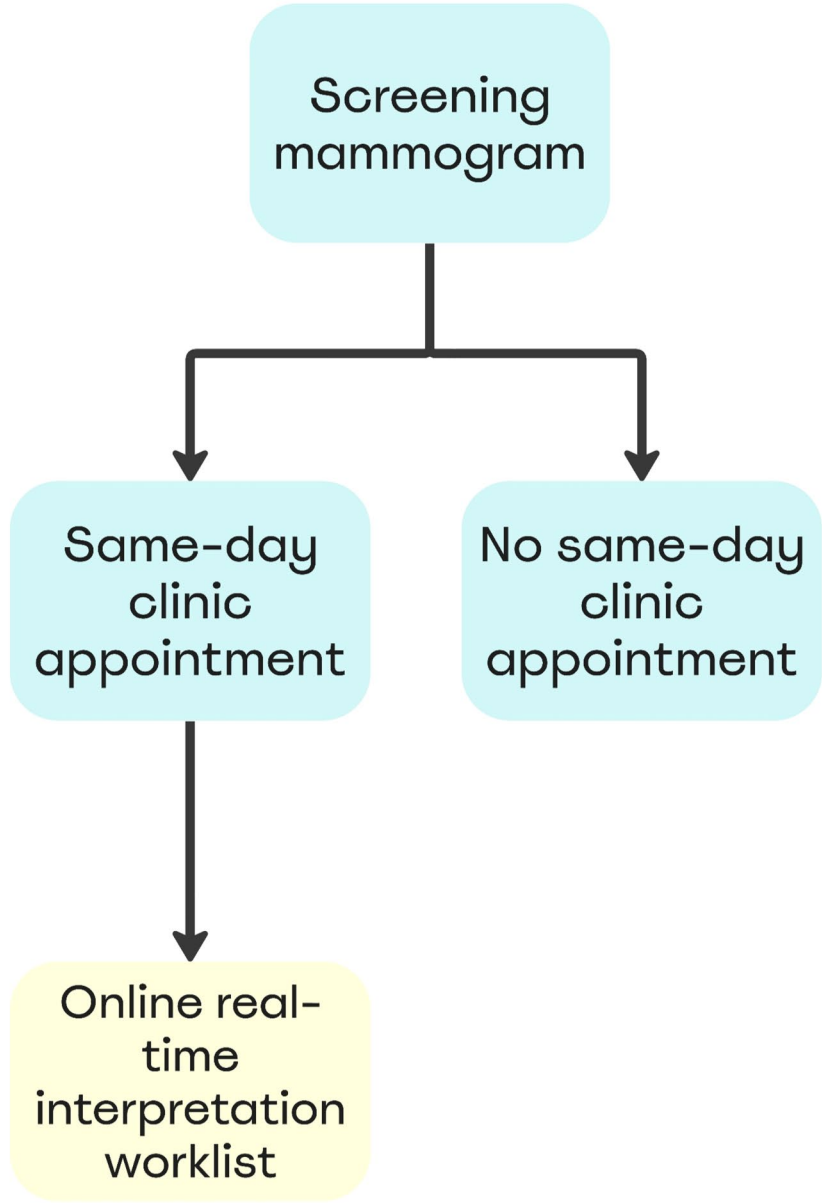
New Optimized Workflow Real Time Screening

Automatically assigns same-day screening mammogram and screening breast ultrasound to same radiologist

Screening mammograms with same day clinic appointment are coded by mammography technologist to distribute to diagnostic worklist for immediate interpretation

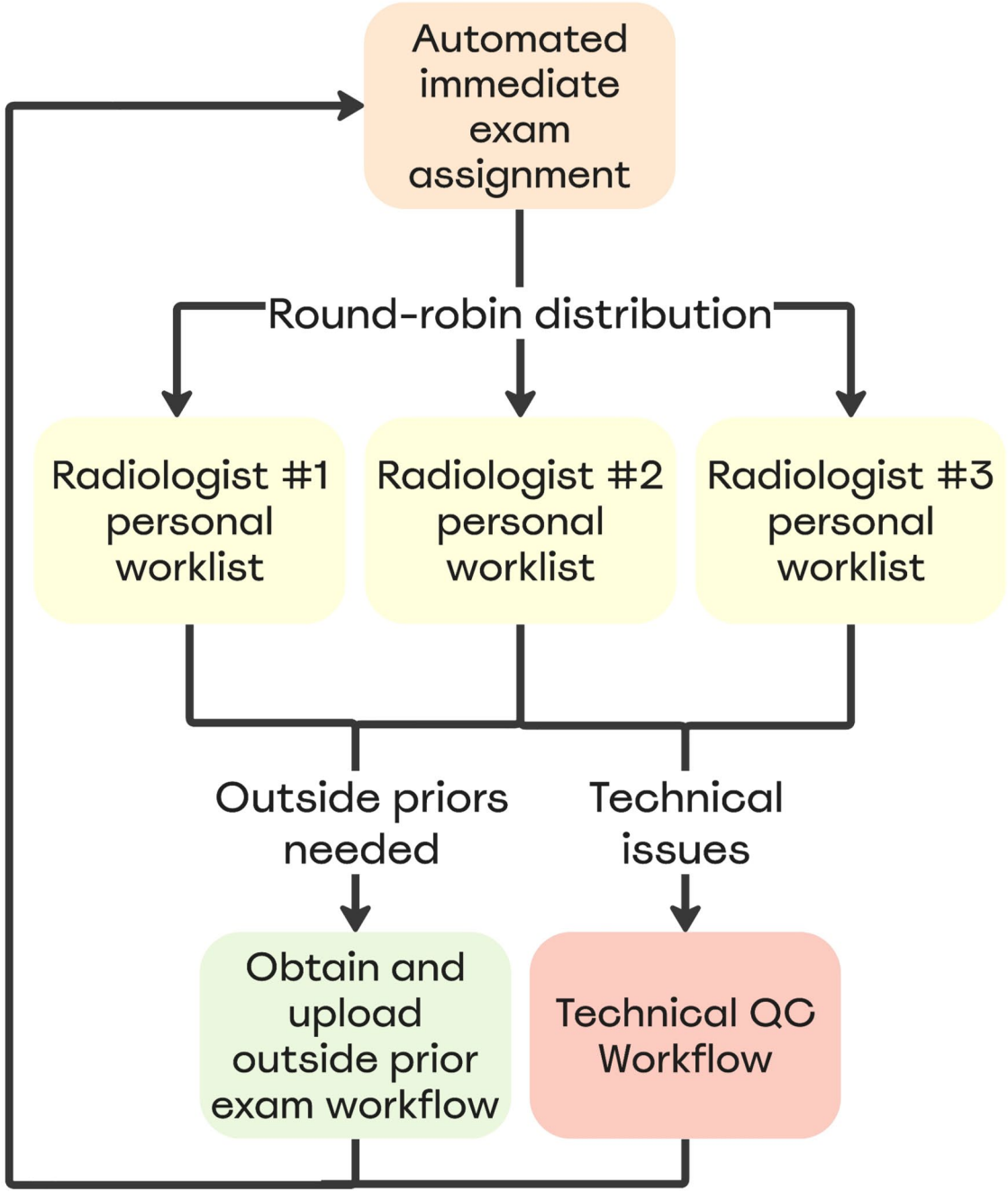
Patients who have a screening mammogram appointment and a breast clinical appointment the same day are interpreted online immediately following completion.

All other screening mammograms are distributed evenly and automatically between the radiologists working eligible shifts that day.



New Optimized Workflow Automatic Assignment

- Fully automated closed loop system
- Radiologist shifts are automatically updated in the exam distribution application
- All screening exams are immediately assigned to an eligible radiologist upon completion
- Patients with multiple exams are assigned the same radiologists for concurrent interpretation
- If priors or technical repeats are needed, separate closed loop workflows are triggered by radiologists
- When priors are obtained and loaded into PACS or technical repeats obtained the study is then immediately assigned to a radiologist



New Optimized Workflow What is needed?

- Our new workflow relies on several key applications that work together to automate a complex dynamic workflow
- Our radiologists, technologists, and IT support teams have worked together iteratively to produce this workflow – it took time, creativity, flexibility, and perseverance!

Radiologist scheduling application containing real time shift information

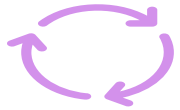
Must pass shift data in real time to worklist application

Application to assign imaging studies to eligible radiologists based on shift data

Must be configurable for different rules and scenarios

Radiologist worklist application to display assigned imaging studies

Must allow for prioritization of studies that need read immediately vs non urgently



Closed loop workflows for obtaining priors and addressing technical QC

Once technical QC complete or priors obtained study needs reassigned

New Optimized Workflow Results & Next Steps

Faster turnaround times (TAT):

Routine screening mammograms:

TAT reduced from 109 minutes to 90 minutes

Breast MRI:

TAT reduced from 287 minutes to 169 minutes

At least 7.5 hours per week of time is saved each week by our lead technologists using these automated workflows.

Ideas for next steps

Incorporate shift interruptions

- Limit assignments during meetings or procedures
- Adjust shift timing dynamically for early or late shift start/end

Incorporate AI

- Triage exams with suspicious findings
- Distribute cases more evenly based on complexity
- Proactively identify Tech QC issues

More efficient reporting

- Automate report population with data from PACS like prior exams
- Automatically import AI results into report like breast density

Shift based auto assignment beyond breast imaging

- Efficiency improvements
- Eliminate cherry picking
- Must accommodate emergent scenarios

Conclusion

- Breast Imaging Divisions are under intense pressure to increase volume while improving quality and decreasing exam interpretation times.
- Different workflows are needed to address urgent and non-urgent breast imaging studies allowing radiologists to read the right studies at the right times.
- Recognizing differences in exam acuity and wRVUs allows for equitable distribution making sure each radiologist has an equal opportunity to read the different breast imaging studies.
- Using workflows built on dynamic prioritized and personal worklists, physician scheduling applications, and technologist inputs can help alleviate this pressure.