Improving the Patient Experience in Breast Imaging by Using Lean Principles to Reduce Waste and Errors

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**Background**
Radiology’s Division of Breast Imaging and Intervention started a Lean journey empowering staff to improve patient experience. Our team’s efforts focused on reducing wait time for screening mammogram patients. 63% of a screening mammogram patient’s 39 minute lead time was waiting/waste (Figure 1).

**Objectives**
Decrease the average screening mammogram patient’s total lead time from 39 minutes to 29 minutes by 12/31/2015. Additional goals included reducing hand-offs, eliminating batching, improving communication via visual management, decreasing paperwork stacking errors, and improving patient satisfaction.

**Methods**
- A multi-disciplinary team developed a value stream map (VSM) illustrated in Figure 2 to analyze the screening mammogram practice which averages 150 patients per day.
- Using Lean principles, potential improvements were tested from August-November 2015.
- The spaghetti chart in Figure 3 shows waste related to walking, waiting and hand-offs. The previous workflow involved a clinical assistant or CA (blue lines) batching patients (purple lines) from the lobby to the subwait, having patients use changing booths, sit and wait in subwait chairs and finally being escorted to the mammogram room by a technologist (green lines).
- To get to our future state as shown in the VSM (Figure 5), we performed a total of 9 Plan-Do-Study-Act (PDSA) cycles.
- Initial PDSAs involved a single mock patient, a single room and one technologist and then the team progressed through additional PDSAs involving multiple technologists and additional rooms for hours, one day and then a complete week of exams.
- Some of the significant improvements are shown in Figure 4 (over 50% less waiting) and Figure 5 (focused improvement bursts).
- As the spaghetti chart in Figure 6 shows, the new streamlined workflow uses a technologist (green) to escort an individual patient (purple) directly from the lobby to the mammogram room to change and have their exam. While certain rooms require a minimal amount of additional technologist walking, the CA and patient walk less and the patient waits less in the improved process.
- The completion/implementation worksheet illustrated in Figure 7 is an example of the PDSA documentation for each cycle.

**Results**
The use of the subwait location was discontinued. Patient surveys and comments indicate remarkable satisfaction with the new workflow. We eliminated two hand-offs, reduced batching, minimized paperwork stacking errors and decreased wait time by over 50% (compare Figures 1-3 with 4-6). Eight months after implementation, average screening mammogram lead time decreased from 39.4 minutes to 26 minutes (Figure 8).

**Conclusions**
By utilizing Lean methodology in our screening mammogram practice, patient experience has improved while waste and errors have been significantly reduced.