

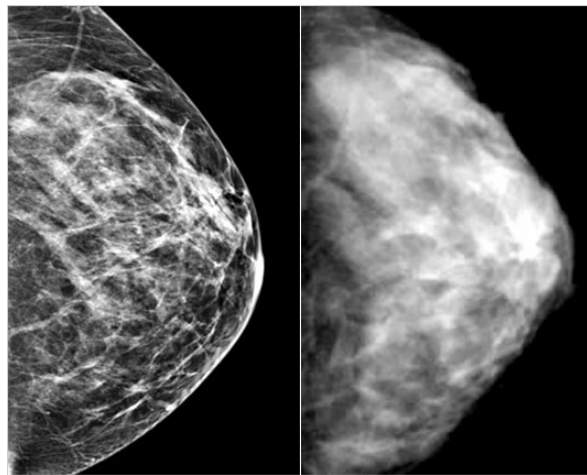
Using Quick Changeover to Fight Breast Cancer

By: Bob Loose



Mammography is the predominant diagnostic and screening tool used to detect breast cancer while it is still in its early stages. As with any form of technology, Mammography has improved over time. One such improvement has been the evolution from analog to digital technology. Figure 1 illustrates that the difference between these technologies is like comparing the fuzzy Polaroid's from the 1970's to today's digital images. The improved image quality improves a Radiologist's ability to more quickly and accurately detect a cancerous mass. In addition, digital technology greatly simplifies the image storage and retrieval process. Finally, the equipment and chemicals needed to develop images (think of a dark room) are not needed in the digital world.

For these reasons, the doctors and staff of the Breast Imaging department at a large Midwestern hospital approached, Bob Loose, Operations Improvement Manager, looking for ways to improve efficiency and increase capacity on their two digital machines to the point where they would no longer need to use their outdated analog equipment.



Parker-Pope, Tara. (April 10th, 2008). Mammograms, New and Old. *NYTimes*. Retrieved

The situation reminded Bob of similar situations that he encountered during his 20+ year process improvement career in manufacturing where Shigeo Shingo's Single Minute Exchange of Die principles were used to decrease set up time and increase run time. Consequently, he organized a cross functional team of caregivers from the Breast Imaging Department and conducted a 4 day lean (kaizen) event to tackle the problem. The group consisted of the department supervisor, someone from Imaging Support Services, the Lead Mammography Technician and two other Mammography Techs. The team followed Aurora's Lean Transformation Process which consists of the following steps:

1. Evaluate the Current Situation
2. Identify Areas of Opportunity
3. Modify the Existing Process
4. Substantiate and Enumerate Improvements
5. Implement New Standard Work

Evaluate the Current Situation

Their first step was to map the current state, documenting the flow of the patient from the time they arrived for their exam up until departure. Here the team saw that while the patient was face to face with a caregiver for 29.5 of the 46 minutes. In a pure sense, the value added time was only 25 seconds – the time it takes to capture an image.

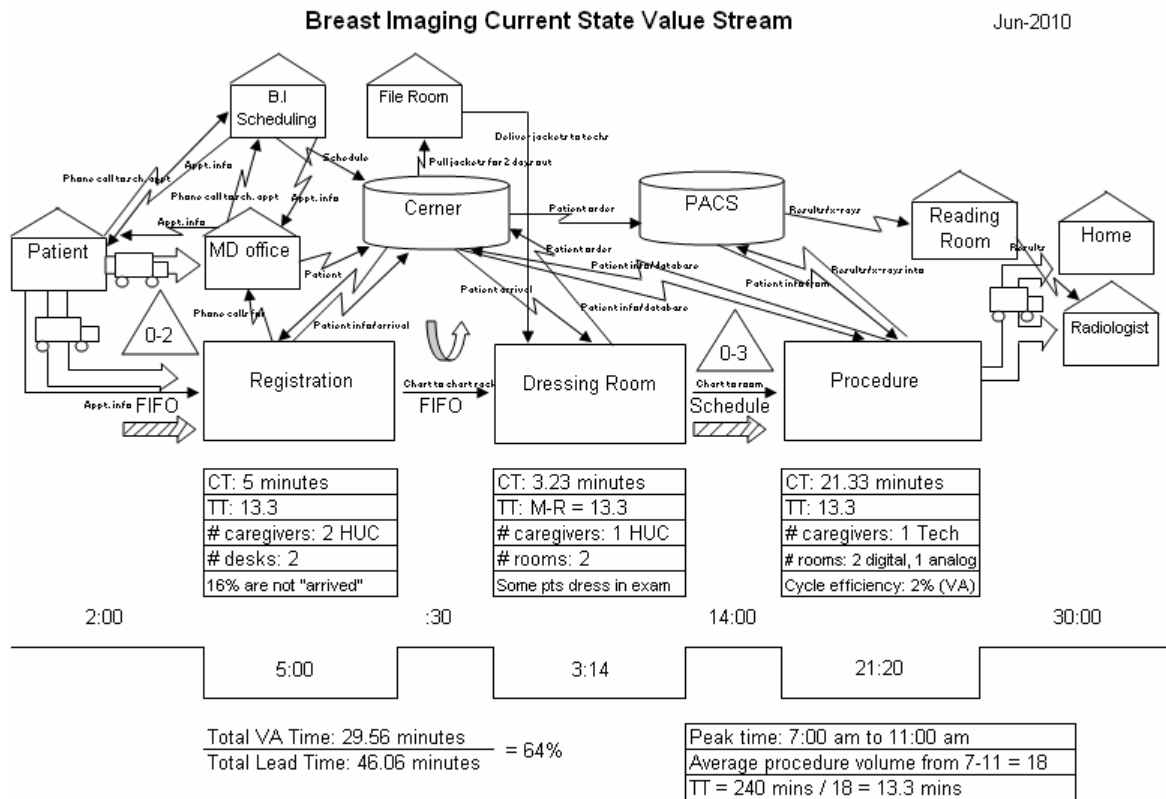


Figure 2: Current State Value Stream Map

Next, the team created a spaghetti diagram (Figure 3) to track the movement of the patient and the Mammographic Technician. They also documented the activities that were taking place while the patient was in the imaging room. The average time spent in the imaging room was 27 minutes per patient.

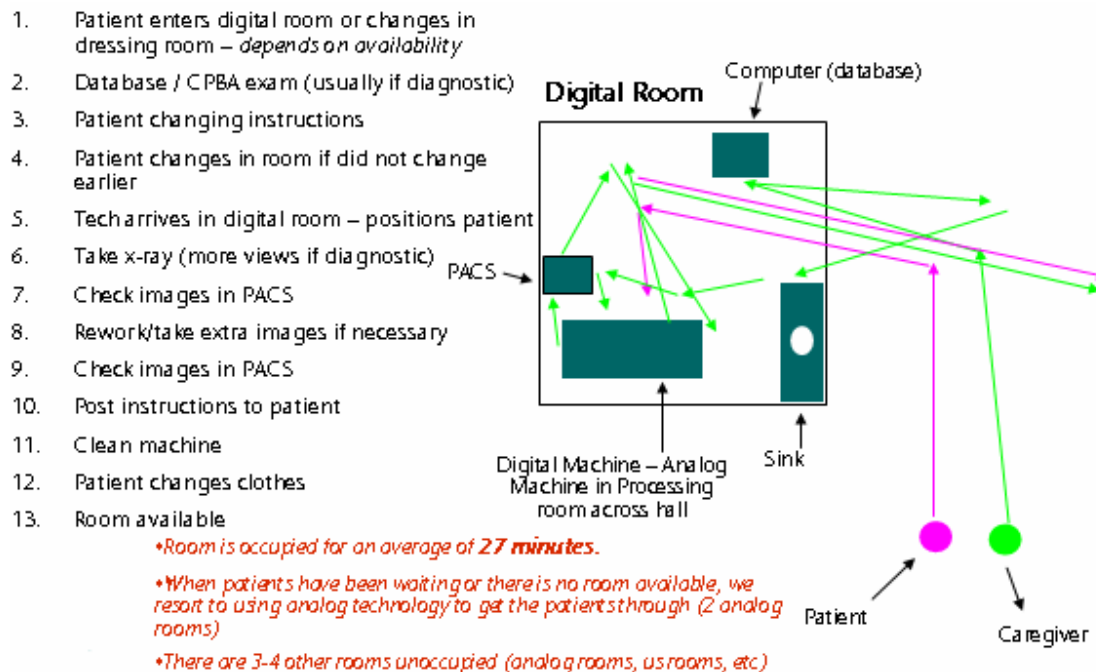


Figure 3: Spaghetti Diagram

Identify Areas of Opportunity

When reviewing the list of activities taking place in the imaging room, the team asked the question, “Does this really need to be done in this room while the machine is idle or can it be done somewhere else while the machine is running?” Using this thought process, the team identified tasks that could be done outside of the digital room (“external tasks” such as changing clothes, prep work, database entry, etc.) and those tasks that needed to stay inside of the room (“internal tasks” such as actually taking the digital image, positioning the patient, etc.).

Modify the Existing Process

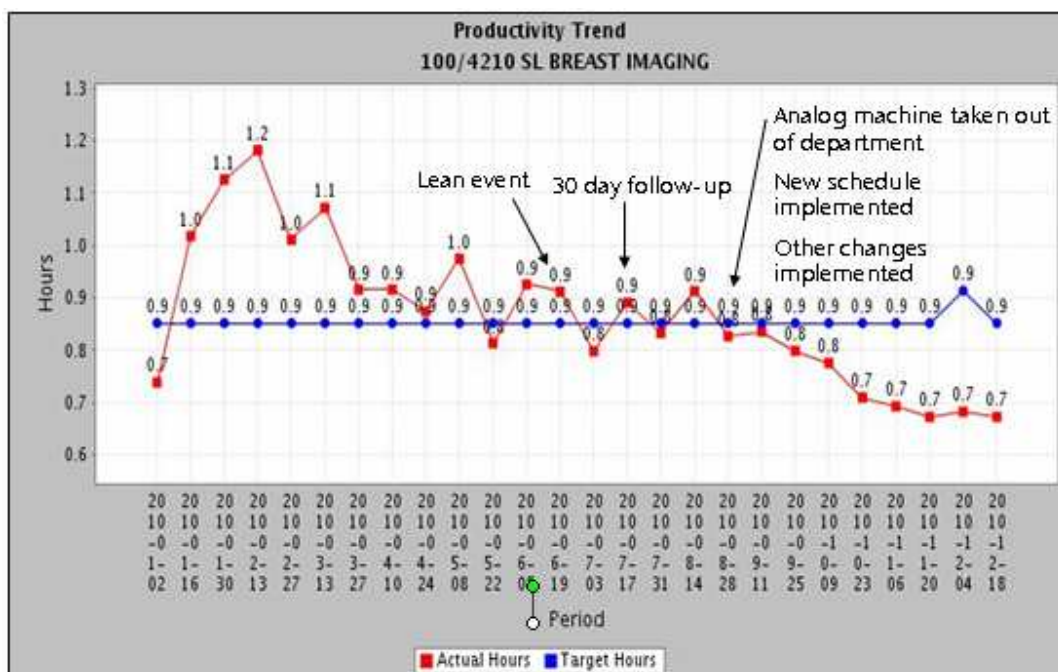
Instead of completing all activities in the imaging room, a new workflow was designed on day 3 of the Lean event which used two rooms. The patient was taken to the “Prep Room” for the completion of external activities. The patient was then escorted to the imaging room for the actual exam. 15 minutes was allowed for prep work and 15 minutes for the exam. The team’s Mammography Technicians piloted the new process for two days. No modifications were made to the schedule; appointments still were scheduled every 30 minutes. With the new process, the Technicians reported that the exam rooms were being turned over much faster and that there was now extra time between appointments.

This gave the team the confidence to schedule appointments every 15 minutes. The result was that almost twice as many patients could be seen in the same time frame. This meant that all patients could be seen on the two digital machines and that the analog machine was no longer needed. Management was so confident in the new process that ten weeks after the lean event,

the department removed the analog imaging machine along with the film processing equipment and associated chemicals.

Substantiate and Enumerate Improvements

Eliminating the analog equipment also eliminated the labor required for daily maintenance and quality checks. This, along with the implementation of the new schedule increased productivity in the department, as measured by worked hours per procedure, by over 25% as shown in Figure 4. Annual savings from the increased productivity is over \$200,000. In addition, the department spends \$23,000 less per year for chemicals and supplies. Finally, the department was able to cancel their plans to purchase an additional digital machine, avoiding a cost of \$300,000.



times, and mammographic-guided procedures, such as preoperative needle localization and galactography have been considerably shortened.”

About the Author

Bob Loose is an ASQ Certified Six Sigma Black Belt and Certified Manager of Quality/Organizational Excellence who holds a bachelor’s degree in industrial engineering and a MBA in healthcare management. After a 20-year career in manufacturing, Loose joined Aurora in 2008 as operations improvement manager, where he is using Lean Six Sigma concepts to find better ways to deliver healthcare.