BRIGHAM HEALTH

BWH BRIGHAM AND WOMEN'S HOSPITAL

Electronic Worklist Improves Timeliness of Screening Mammogram Interpretation in an Urban Underserved Population

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Background

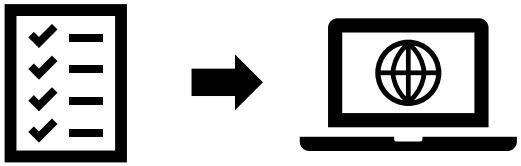
- Mobile mammography provides much-needed access to breast cancer screening for women of low socioeconomic status and minorities[1-4] , but challenges of mobile mammography include lack of IT resources[5].
- At our institution, lack of resources prevented instantaneous image transfer from our mammography van to central PACS. Manual image transfer was overseen by our clinical coordinators who performed a duplicative manual tracking process.
- A safety event occurred where a screening exam was omitted from the reading list by human error and not interpreted until after a significant delay.
- This safety event prompted a quality improvement initiative to prevent future events as well as to decrease overall screening mammogram interpretation time for a population already prone to delay in imaging follow-up[6-7].

1. Coronado GD, et al. Cancer Epidemiol Biomarkers Prev. 2016. 2. Massin-Short SB, et al. Public Health Rep. 2010. 3. Mizuguchi S, et al. J Oncol Pract. 2015. 4. Chen YR, et al. Cureus. 2016. 5. Carkaci S, et al. AJR. 2013. 6. Vang S, et al. Prev Chronic Dis. 2018. 7. Stanley E, et al. AJR, 2017.

Objective

To evaluate the impact of electronic worklist management on interpretation time and time to diagnostic imaging for screening mammography performed on our urban mobile mammography van and at an urban community health center.

Methods



- Prior to 10/15/2019, screening exams for the mammography van and urban community health center were made available for interpretation to a single designated radiologist via a pen-and-paper list.
- On 10/15/2019, exams were routed electronically onto PACS for any breast radiologist across our Network to interpret.
- Interpretation time, time to diagnostic imaging, and time to tissue sampling were collected for pre- and post-implementation periods (6/1-9/30/2019 and 11/1/2019-2/29/2020, respectively).

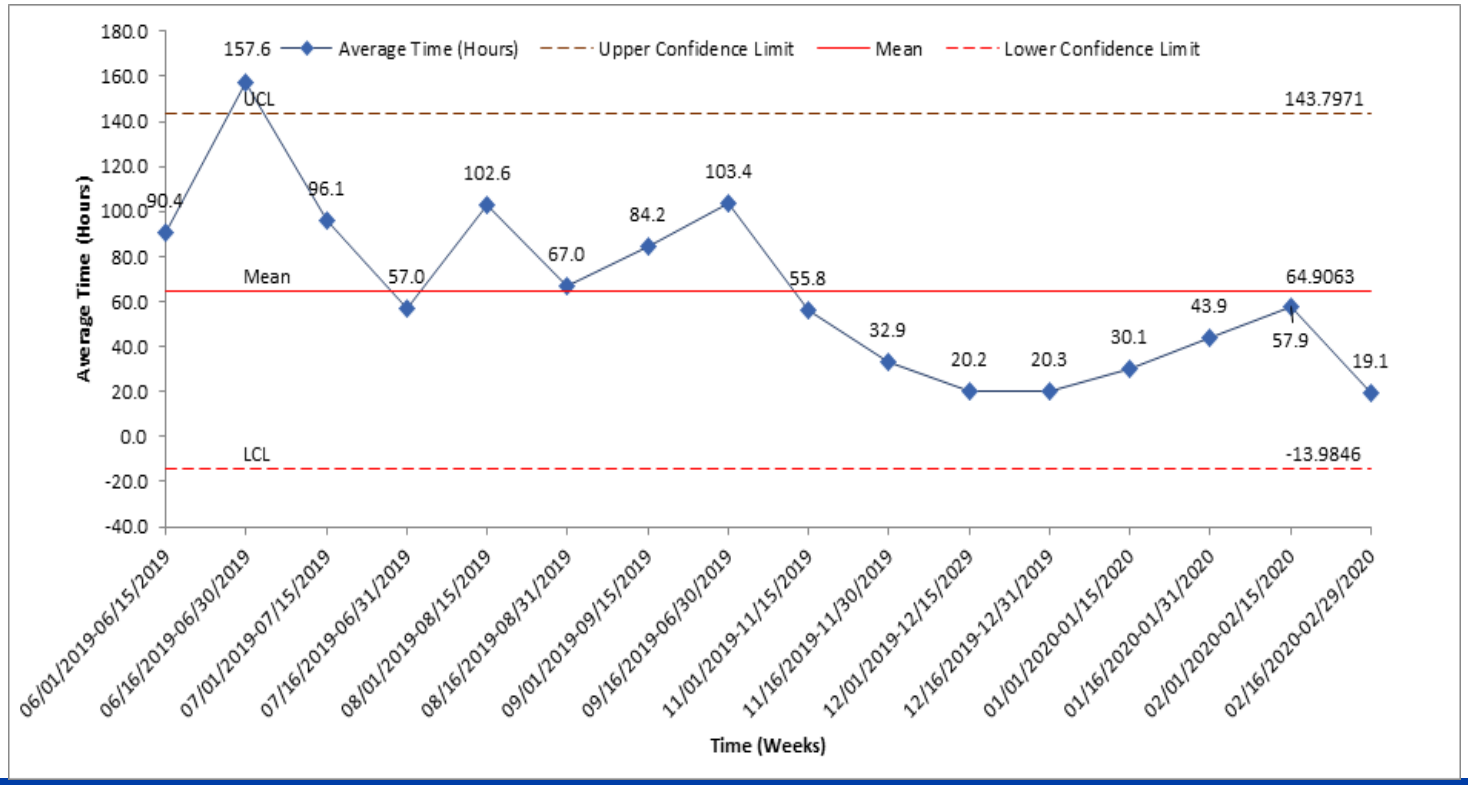
Results

- Majority of screening population are non-white, non-English speaking Medicare/ Medical beneficiaries.
- More screening exams were performed in the pre-implementation period (n=851) compared to post-implementation period (n=728) with a higher proportion of screening mammograms performed by the van than by the community site (p=0.047).
- No significant differences in patient demographic, call back rate, or cancer detection rate between the two periods.

Patient characteristics	Pre-Implementation N (%)	Post-Implementation N (%)	P-value
Screening Site:			
Van	631 (74)	507 (70)	0.047*
Community Center	220 (26)	221 (30)	
Mean age (range, years)	56.1 (39-85)	55.8 (37-85)	0.539
Race/Ethnicity			0. 452
Asian	37 (4)	22 (3)	
Black or African American	226 (27)	174 (24)	
Hispanic or Latino	134 (16)	112 (15)	
White	148 (17)	129 (18)	
Other	219 (26)	206 (28)	
Declined/Unavailable	87 (10)	85 (12)	
Primary Language (%)			
English	384 (45)	337 (46)	0.642
Non-English	467 (55)	391 (54)	
Insurance Type			
Medicaid	413 (49)	338 (46)	0.874
Medicare part A, B, and/or C	168 (20)	150 (21)	
State subsidized plans†	62 (7)	55 (8)	
Private/Others	208 (24)	185 (25)	
Screening Callbacks	134 (15.7)	101 (13.9)	0.297
Cancer Detected	2 (0.2)	1 (0.1)	0.197
Total:	851	728	

Results: Interpretation Time

After implementation of electronic workflow, interpretation time decreased by 64% with sustained decrease in mean interpretation time over a period of 4 months after intervention (101.2 to 36.4 hours, p<0.001)



Results – Time to diagnostic imaging and tissue sampling

- No significant difference in the distribution of diagnostic interpretations (BI-RADS category 1, 2, 3, or 4/5) between the two periods.
- Less women presented for diagnostic imaging in the post- versus pre-intervention period (76/101, 75% vs. 117/134, 87%, p = 0.017).
- The average time to diagnostic imaging and time to tissue sampling did not significantly change after electronic workflow.

	Pre-Implementation N (%)	Post-Implementation N (%)	p-value
Screening Callbacks who Presented for Diagnostic Imaging	117 (87)	76 (75)	0.017*
Diagnostic Interpretation **BIRADS 1** **BIRADS 2** **BIRADS 3** **BIRADS 4/5**	 41 (35) 33 (28) 26 (22) 17 (15)	 25 (33) 21 (28) 19 (25) 11 (14)	0.974
Mean time to Diagnostic Imaging (days)	39 (7-191)	45 (0-210)	0.330
Mean time to Tissue Sampling (days)	43 (19-119)	59 (28-134)	0.187

Discussion

- Implementing an electronic workflow significantly decreased interpretation time of screening mammograms for an underserved population.
- Despite a significant decrease in interpretation time, time to diagnostic imaging and tissue sampling did not decrease after implementation of new workflow.

Limitations

- Post-implementation period included major holidays season (Thanksgiving, Christmas and New Year Holiday) when patients' and facility availability possibly interfered with appointments.
- Post-implementation period coincided with the early rise of the COVID-19 pandemic, which may have affected the patients' comfort level regarding visiting healthcare facilities.

Future Directions

Future efforts should focus on continuing to improve time to imaging follow-up for those with abnormal screening mammograms.

- Providing mammography result letters in multiple languages (our institution currently only sends letters in English)
- Ensuring that follow-up reminders phone calls be conducted by speakers of patients' preferred language.
- Reviewing result letters to ensure that they are written at an appropriate reading level for patients
- Adding case managers or patient navigators to assist in scheduling diagnostic imaging after screening abnormalities.
- Given experiential and cultural beliefs regarding mammography in some minority groups[1-3], implementing a culturally sensitive, educational outreach program regarding anxiety surrounding screening call backs may be helpful.

1) Peek ME, et al. J Gen Intern Med. 2008. 2) Fayanju OM, et al. Am J Surg. 2014. 3) Scheel JR et al. J Am Coll Radiol. 2018.