



The Impact of Online Self-Scheduling Platform Optimization on Patient Directed Access to Screening Mammography Appointments During the COVID-19 Pandemic | A Single Institution Experience

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Abstract

Objective: During the COVID-19 pandemic, screening mammography utilization declined nationally by nearly 65% compared to pre-pandemic volumes. This study assessed the impact of online screening mammography self-scheduling platform optimization on patient scheduling, rescheduling and cancellation rates during the COVID-19 pandemic.

Methods: A retrospective review of online SM scheduling utilization between October 1, 2019, and December 31, 2022 was performed. The electronic health record (EHR) was queried to extract the total number of SMs performed, online scheduling, rescheduling and cancellation rates during the busiest screening mammography months of October through December in 2019 and 2022.

Results: October to December online SM scheduling patient activity rose from 57 to 1481 patients when comparing 2019 and 2022 performance, representing a 26-fold increase in online platform utilization after EHR-tethered scheduling integration ($p=0.013$). This resulted in a concurrent 16x fold reduction in patient access specialist SM scheduling engagement. Concurrently, SM scheduling automation resulted in increases in appointment rescheduling and cancellation rates, from 14% to 22% ($p=0.005$) and 18% to 38% ($p=0.000$), respectively.

Discussion: Optimization of our online self-scheduling platform with EHR integration resulted in a 26-fold increase in online self-scheduling patient utilization and a 16x fold reduction in DI-PAS hands on SM scheduling engagement. The rates of OSS patient appointment rescheduling and cancellation also increased but the overall net gain in self-scheduling automation should not deter continued use and implementation of this program.

Keywords

Mammography, Breast Cancer, COVID-19 Pandemic, Screening, Self-scheduling, Electronic Health Record

Introduction

Annual screening mammography for age-appropriate asymptomatic women remains the only imaging modality proven to significantly reduce breast cancer mortality [1]. During the peak of the COVID-19 pandemic, national screening and diagnostic mammogram utilization was estimated to have declined by 63.7% and 42.1% when compared to pre-pandemic volumes, respectively [2]. This was felt to be related largely to the cancellation of elective procedures and preventative testing during the beginning of the COVID-19 pandemic to ensure that appropriate staffing and resources were delegated to the essential workforce treating patients with COVID-19. In a coordinated effort to improve mammography screening engagement, patient access and scheduling automation during the pandemic and beyond, our online self-scheduling platform tool underwent a series of optimizations with electronic health record (EHR) portal integration.

Methods

A retrospective review of online SM scheduling utilization between October 1, 2019 and November 30, 2022 was performed. Four platform optimizations took place during the study timeframe (Fig-1). The electronic health record (EHR) was queried to extract the total number of screening mammograms performed, type of patient scheduling pathway used (traditional versus online self-scheduled) and number of cancellations and rescheduling following initial self-scheduling appointment creation. Online scheduling, rescheduling and cancellation rates during the busiest screening mammography months of October through

December [3] were compared in 2019 and 2022, pre and post optimization, respectively. Paired sample T tests were performed. A p-value $\leq .05$ was determined to be statistically significant.

Our original SM scheduling platform consisted of a static web-based tool with demographic questions for routing to a patient access specialist (PAS) cue for scheduling. The first optimization, deployed in September 2020, condensed the original screening questions, and added the option for pre-selection of preferred imaging location ahead of PAS phone-directed scheduling. The second optimization, deployed in December 2021, allowed for direct scheduling of SM appointments into the clinical templates through EHR integration. The third optimization, initiated in April 2022, incorporated a secure EHR push notification with an embedded scheduling link to established breast imaging patients with a documented normal screening mammogram report at our institution the year prior. The final optimization, introduced in September 2022, involved creation of an EHR-tethered self-triage module visible to all female platform users over 40 years old. The self-triage module determined patient SM eligibility through a series of skip logic-based questioning, that when answered appropriately, released options for SM appointment selection. This tool also allowed for self-reschedule and self-cancellation of appointments.

Results

The baseline measure to compare performance was online self-scheduling platform utilization between October to December 2019 at 1% (57/5762) of total

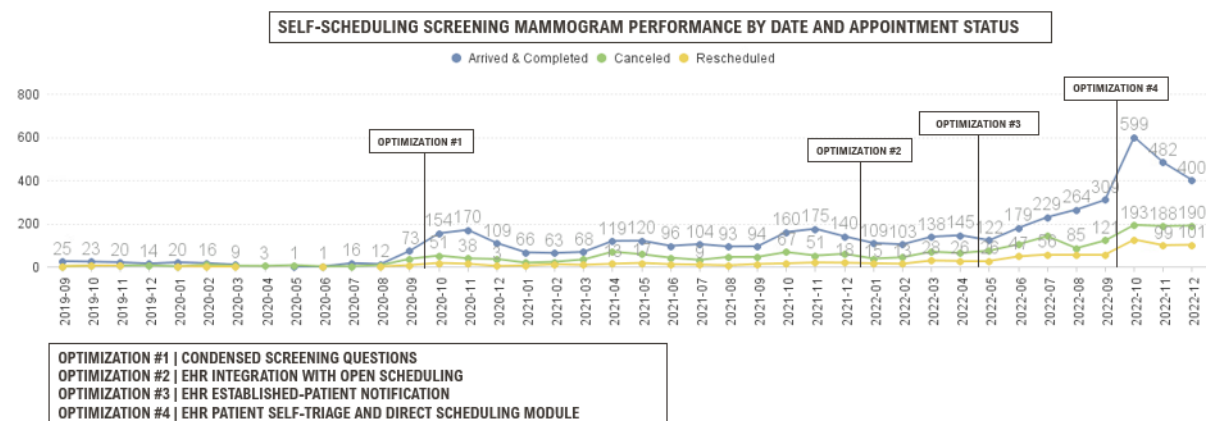


Fig-1: Online Screening Mammogram Scheduling Performance by Appointment Date and Status

screening mammograms performed during that time frame. The associated rate of self-scheduled cancellations and reschedules was also benchmarked at 22% (10/57) and 17% (8/57), respectively. Additionally, at baseline, 100% of online scheduling appointment requests were processed and completed by a dedicated patient access specialist team.

5762 SMs were obtained during the October 1 to December 31, 2019 timeframe and 1% (57/5762) of patients scheduled via the self-scheduling tool. During this timeframe, 18% (10/57) of self-scheduled SMs were cancelled and 14% (8/57) were rescheduled to an alternate time (Table-1).

Comparatively, 7658 SMs were obtained between October 1 to December 31, 2022, and 19% (1481/7658) of patients were scheduled via the optimized self-scheduling tool. During this timeframe, 38% 570/1481 of self-scheduled SMs were cancelled and 22% 326/1481 were rescheduled to an alternate time

(Table-1). October to December online SM scheduling activity rose from 57 to 1481 when comparing 2019 and 2022 performance, representing a 26-fold increase in online platform utilization after EHR-tethered scheduling integration (p=0.013) (Table-2). Concurrently, SM scheduling automation resulted in increases in appointment rescheduling and cancellation rates, from 14% to 22% (p=0.005) and 18% to 38% (p=0.000), respectively.

Conclusion

Leveraging the utility of the COVID-19 self-triage EHR module [4-6], our study suggests that SM eligible patients can be appropriately routed to a desired appointment slot via a self-triage model, resulting in improved patient access and EHR scheduling automation. Implementation of the SM tool has several limitations. In current state, the self-triage scheduling portal requires a baseline knowledge of the EHR [4]. Utilization of the platform may impose unintended barriers to patients not familiar with its navigation

Table-1: 4th Quarter 2019 and 2022 Screening Mammogram Performance

	Month-Year	Total Screening Mammograms	Self-Scheduled (SS) Screening Mammograms (%)	Cancelled SS (%)	Rescheduled SS (%)
(Pre-Optimization) 2019 Q4 Performance	Oct-19	1766	23 (1%)	5 (22%)	4 (17%)
	Nov-19	2394	20 (1%)	5 (25%)	4 (20%)
	Dec-19	1602	14 (1%)	6 (43%)	0 (0%)
	TOTALS	5762	57 (1%)	10 (18%)	8 (14%)
(Post-Optimization) 2022 Q4 Performance	Oct-22	2777	599 (22%)	193 (32%)	125 (21%)
	Nov-22	2553	482 (19%)	188 (39%)	99 (21%)
	Dec-22	2328	400 (17%)	189 (47%)	102 (26%)
	TOTALS	7658	1481 (19%)	570 (38%)	326 (22%)

Table-2: Sample T Test Comparing Q4 2019 and Q4 2022 Screening Mammogram Performance

		Paired Differences – Sample T Test					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	2019 Q4 Self-Scheduled – 2022 Q4 Self Scheduled	-474.67	95.631	55.213	-712.228	-237.106	-8.597	2	0.013
Pair 2	2019 Q4 Rescheduled – 2022 Q4 Rescheduled	-106	13.454	7.767	-139.421	-72.579	-13.647	2	0.005
Pair 3	2019 Q4 Cancelled – 2022 Q4 Cancelled	-184.68	2.887	1.667	-191.838	-177.496	-110.8	2	0

[4,7,8]. Additionally, though our SM scheduling tool was optimized during the COVID-19 pandemic, it did not actively screen patients for COVID-19 symptoms, which may account for a subset of patient appointment cancellations and rescheduling after initial self-scheduled appointment creation.

Though EHR platform development may require operational time and resource allocation for tailored engineering, measurable improvements in patient access, scheduling compliance and overall patient satisfaction justify continued health system integration [5,7]. With improved platform specificity, the operational benefits and 24-hour patient access afforded by EHR directed scheduling can be scaled for utility across additional appointment platforms. Additional studies are warranted to further evaluate the downstream impact on personnel resource allocation, appointment coordination and scheduling workflow.

Conflict of Interest

The authors have read and approved the final version of the manuscript. The authors have no conflicts of interest to declare.

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