Journal of Health Care and Research
(ISSN: 2582-8967)
Original Article
DOI: https://doi.org/10.36502/2025/hcr.6246

Streamlining Financial Clearance to Reduce Imaging Appointment Delays and Enhance Patient Experience

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Received date: 19 May 2025; **Accepted date**: 07 July 2025; **Published date**: 15 July 2025

Citation: Kalambo M, Dido A, Tannir H, Ninan G. Streamlining Financial Clearance to Reduce Imaging Appointment Delays and Enhance Patient Experience. J Health Care and Research. 2025 Jul 15;6(2):40-47.

Abstract

Background and Purpose: Lengthy wait times for diagnostic imaging often stem from unresolved financial clearance at check-in, undermining patient experience and operational efficiency. This quality improvement study evaluated a three-part intervention—securing authorization before arrival, proactively flagging accounts lacking authorization, and resolving flagged accounts within one hour of check-in—to reduce lobby delays and improve patient satisfaction.

Methods: We retrospectively analyzed 4,585 patient records from January 2016 through May 2022. Pre-intervention data (February 2016–December 2019) were compared with post-intervention data (January 2020–May 2022). Interventions included: (1) obtaining financial authorization before patients arrived for their appointments, (2) flagging any account lacking authorization so that front-desk staff could immediately engage the Financial Clearance Center (FCC), and (3) targeting same-day clearance within one hour for flagged accounts. Patient Service Coordinators at 11 front desks recorded lobby wait intervals. Statistical analyses and visualizations were conducted using Excel, Minitab, and Tableau; significance was assessed via two-sample t-tests.

Results: Despite a 56 percent rise in imaging volume during the post-intervention period, the average lobby wait time for financial clearance decreased from 61.1 ± 76.3 minutes to 44.1 ± 61.1 minutes ($p < 0.0001$). The percentage of patients cleared before arrival improved modestly, remaining above 99 percent even amid COVID-19–related FCC staffing shortages. Patients waiting less than 30 minutes for clearance rose from 48.1 percent pre-intervention to 58.2 percent post-intervention, while those waiting over one hour declined by 9.5 percentage points. The number of accounts flagged tripled—from an annual average of ~330 before 2020 to ~1,000 afterward—demonstrating consistent capture of unresolved authorizations without increasing long-wait cases.

Conclusion: Proactive coordination between front-desk staff and the FCC—focused on pre-arrival authorization, systematic flagging, and rapid same-day clearance—significantly reduced lobby wait times, even with increased patient volume and pandemic pressures. Institutions should continue investing in real-time financial clearance workflows to sustain and expand upon these improvements.

Keywords

Patient Wait Times, Financial Clearance, Diagnostic Imaging, Pre-Authorization, Workflow Improvement

Introduction

Waiting times are a key determinant of patient-perceived quality in healthcare delivery [1-3]. In a 2016 public opinion survey by AlRowaili et al., 75% of respondents identified reducing waiting time as a top priority for improving healthcare services [4]. Delays in diagnostic imaging are multifactorial, stemming from procedural durations, equipment availability, and administrative processes such as preauthorization and financial clearance by insurance providers [5]. Among these, financial clearance has emerged as a significant bottleneck, hindering timely access to imaging services and contributing to inefficiencies in care delivery. Moreover, delays related to financial processing influence not only whether patients proceed with scheduled imaging but also the types of services they ultimately receive and their perceptions of healthcare quality. Alrasheedi et al. further emphasized that extended wait times may detrimentally impact both care quality and patients' willingness to pursue medical evaluation [6].

The association between waiting times and patient satisfaction has been well documented. Mathews et al. categorized five broad contributors to delays in cancer care settings—patient-related, treatment-related, system-related, and others—with financial clearance, though not explicitly cited, falling within systemic contributors to operational inefficiencies [7]. To address prolonged waiting times, numerous interventions have been proposed, including the deployment of artificial intelligence, health information technologies, and efforts to reduce administrative waste and fraud [8–11].

In this quality improvement initiative, we sought to reduce waiting times for diagnostic imaging by standardizing and streamlining the financial clearance process. This effort focused on optimizing workflow design, service standards, scheduling practices, and interdepartmental coordination, particularly between the front-desk scheduling team and the financial clearance unit.

Methods

The leadership team in the Division of Diagnostic Imaging at our institution reviewed and approved this study. All data collection adhered to institutional guidelines for research involving human participants. Because this analysis used only historical, de-identified data (no protected health information), patient consent was not required. The study complied with applicable federal and institutional regulations, including the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule. To ensure confidentiality, only authorized medical professionals captured, recorded, and shared data, following strict institutional protocols for data security and PHI protection.

Study Design and Data Collection:

We conducted a retrospective study comparing two cohorts of cancer patients scheduled for diagnostic imaging: (1) an "unauthorized" group (accounts flagged for missing financial clearance at check-in), and (2) a "cleared" control group (accounts with pre-arrival authorization). Data were collected manually by Patient Service Coordinators (PSCs) at 11 front-desk locations within the Diagnostic Imaging Division, in collaboration with the institution's Financial Clearance Center (FCC). Each PSC recorded, in a standardized Excel spreadsheet, the following for every patient encounter: financial clearance status at arrival, time stamps marking each step of the clearance process, and total lobby wait time.

- Pre-intervention period: February 1, 2016, to December 31, 2019
- Post-intervention period: January 1, 2020, to May 9, 2022

The primary investigator and the institutional Office of Performance Improvement reviewed the spreadsheet entries for accuracy. Records were flagged for review if they: (a) were missing critical elements (e.g., arrival time, clearance status), (b) recorded lobby wait times exceeding 9 hours, or (c) captured events outside standard business hours. Less than 10 percent of the initial dataset required correction or removal based on these criteria; such records were either amended when

possible (e.g., updating obvious time-stamp errors) or excluded from final analysis.

Intervention Overview:

Beginning January 1, 2020, we implemented a three-part intervention aimed at reducing lobby delays caused by financial clearance issues:

1. Pre-arrival Authorization: PSCs and FCC staff coordinated daily to obtain insurance preauthorization before patient arrival.
2. Account Flagging: Any patient without completed authorization received an electronic "flag" in the scheduling system, alerting front-desk staff upon check-in.
3. Rapid Same-Day Clearance: When a flagged patient arrived, front-desk personnel immediately contacted two dedicated FCC representatives to resolve outstanding clearance—targeting completion within one hour of check-in.

Data Validation and Cleaning:

After the intervention launch, all entries underwent a second review. Trained staff cross-checked flagged accounts against FCC logs to confirm whether clearance was achieved within the one-hour goal. Records with inconsistent or missing FCC notes were audited; if unresolved, they were excluded. Overall, fewer than 10 percent of records were omitted due to data quality issues.

Data Analysis:

Final, cleaned data (N = 4,585 encounters) were imported into Excel, Minitab, and Tableau for descriptive and inferential analysis. We calculated mean lobby wait times (in minutes) and stratified patients into five wait-time intervals (< 30 min, 30–60 min, 1–2 hr, 2–3 hr, > 3 hr). Two-sample t-tests ($\alpha = 0.05$, two-tailed) compared pre- and post-intervention mean wait times. In addition, we tracked annual counts of pre-authorized versus flagged accounts, breaking these down by imaging modality, insurance payer, and referring home clinic.

Descriptive statistics (means, standard deviations, and frequency distributions) characterized changes over time. Data visualizations—bar charts, Pareto charts, and trend lines—were used to highlight shifts in wait-time intervals attributable to the intervention. Subgroup analyses identified the most common reasons for missing preauthorization (e.g., need for prior authorization, incomplete insurance information, self-pay status) and examined their distribution across payer types, imaging studies, and home clinics. We also recorded patient geographic origin (including international and out-of-state status) to assess the impact of travel restrictions during COVID-19 on clearance delays.

Results

We analyzed data for 4,585 patients who attended imaging appointments between January 1, 2016, and May 9, 2022, to assess the impact of a three-part intervention designed to reduce lobby wait times caused by missing financial clearance ("flags"). The intervention included:

1. Obtaining preauthorization/financial clearance before patients arrived for their imaging appointments.
2. Flagging accounts lacking authorization to prevent unbilled scans.
3. Collaborating with the Financial Clearance Center (FCC) to clear flagged accounts within one hour.

Financial Clearance Before Imaging Appointments:

After implementing the intervention in January 2020, the percentage of patients who arrived with financial clearance increased, despite COVID-19–related staffing shortages within the FCC. **Table-1** summarizes annual counts of patients with and without clearance.

Notably, flagged accounts (patients arriving without clearance) nearly tripled after the intervention—from an annual average of ~330 during 2016–2019 to ~1,000 in each of 2020 and 2021, and 1,163 through May 2022—indicating more consistent capture of unresolved authorizations. In fact, the first four months of 2022 saw a higher percentage of flagged accounts than any previous year; if this trend continued, over 3,000 patients would receive advance notification of financial clearance issues in 2022.

Lobby Wait Times:

We compared lobby wait times for financial clearance before (February 2016–December 2019) and after (January 2020–May 2022) the intervention, stratifying patients into five intervals: < 30 minutes, 30–60 minutes, 1–2 hours, 2–3 hours, and > 3 hours.

During the pre-intervention period, the average wait time was 61.1 ± 76.3 minutes; post-intervention, it dropped to 44.1 ± 61.1 minutes—a significant 17-minute reduction ($p < 0.0001$, two-sample t-test). **Table-2** shows the distribution across time intervals.

After the intervention, the percentage of patients cleared in under 30 minutes increased from 48.1 percent to 58.2 percent, while those waiting over one hour decreased by 9.5 percentage points.

Table-1: Diagnostic imaging patients with financial clearance before imaging appointment vs those without clearance, by year

	Preintervention				Postintervention		
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2022***
No. of patients with clearance	86,608	109,284	114,089	120,192	103,098	117,175	60,427
No. of patients without clearance	382	356	317	315	998	1054	1163
Percentage without clearance	0.44%	0.33%	0.28%	0.26%	0.97%	0.90%	1.9%

**YTD through May 9, 2022*

Table-2: Distribution of patients by lobby wait-time intervals before and after the intervention (N = 4,585)

Time Interval	Preintervention (n = 1,370)	Pre %	Postintervention (n = 3,215)	Post %
0–30 Minutes	659	48.10%	1,872	58.23%
31–60 Minutes	235	17.15%	601	18.69%
1–2 Hours	245	17.88%	459	14.28%
2–3 Hours	114	8.32%	143	4.45%
> 3 Hours	117	8.54%	140	4.35%
Total	1,370	100%	3,215	100%

Proportion of Flagged Patients and Clearance Turnaround:

Across 2016–2019, annual counts of flagged accounts remained stable (382, 356, 317, 315). Post-intervention, flagged accounts rose to 998 (2020), 1,054 (2021), and 1,163 (2022 YTD), demonstrating consistent capture of patients needing clearance. Assigning two dedicated FCC staff members to collaborate directly with front-desk teams was instrumental: when flagged patients arrived, front-desk staff immediately contacted these FCC representatives, initiating same-day clearance workflows. As a result, the number of patients undergoing scans and then being billed because of missing insurance clearance decreased significantly.

Factors Contributing to Delays:

To understand remaining clearance delays, we analyzed reasons why flagged patients still waited beyond the one-hour goal. Appendices 1 and 2 summarize these factors, including their frequencies. The most common cause was "need for preauthorization" (n = 1,790), followed by "cost estimate needed" for self-pay patients. Other major contributors included "outdated insurance information" (n = 514), "missing authorization notes in the electronic health record" (n = 413), "deductible payment required" (n = 163), and "referral missing from primary care provider" (n = 136). A Pareto analysis (**Fig-1**) showed that patients referred from the breast clinic were most affected (n = 562) by clearance flags, underscoring specific workflow bottlenecks in that unit.

International and Out-of-State Patients:

During the peak of the COVID-19 pandemic beginning in April 2020, travel restrictions significantly reduced in-person visits from international and out-of-state patients. To maintain access to care, the institution implemented a virtual-visit workflow for these patients. They were advised to obtain imaging locally and transmit their studies to MD Anderson via electronic

image exchange platforms (e.g., lifeIMAGE, PowerShare) or CD submission. The Image Library team actively monitored incoming outside studies to ensure timely processing for interpretation. This enabled radiologists to review the images ahead of scheduled telehealth follow-up visits. Continuous oversight of this remote workflow ensured consistent financial clearance and imaging turnaround times, despite the decline in on-site imaging volume. **Fig-2** showed the geographic distribution of imaging patients.

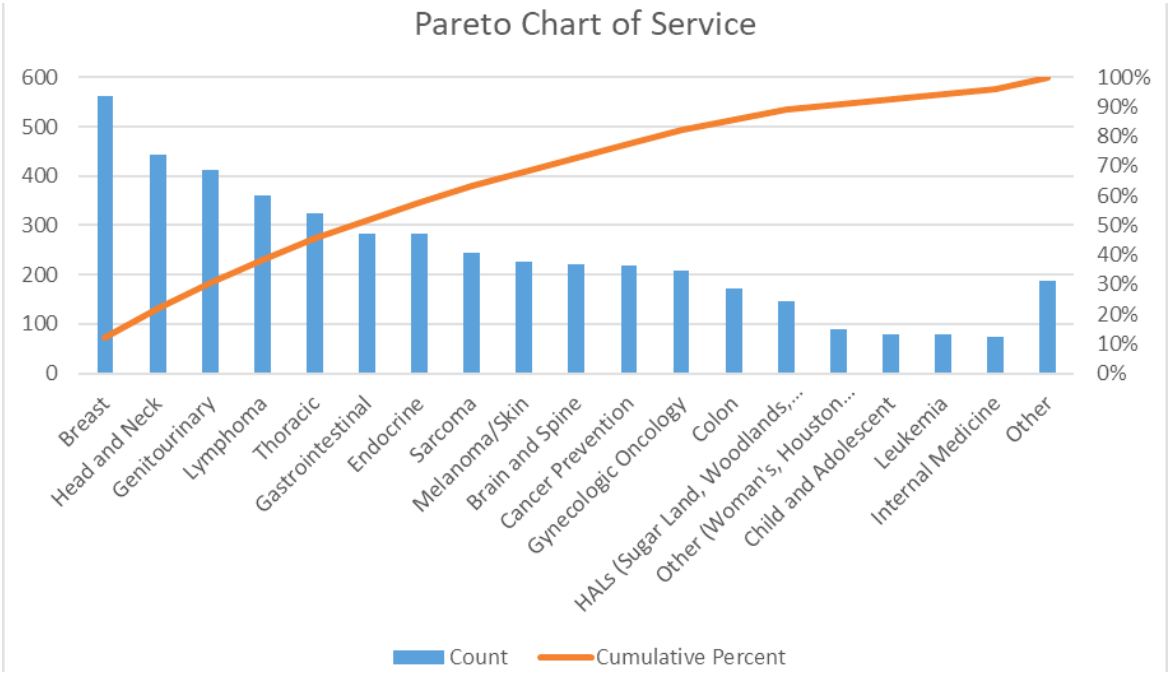

Fig-1:

Pareto chart showing the number of patients with flagged accounts by referring clinic. "Other" category includes Mohs/Dermasurgery, Clinical Center for Targeted Therapy, Plastic Surgery, Employee Health, EC, Surgical Oncology, Pain Management, Women's Hospital, and Screening

Fig-2: Geographic Distribution of Imaging Patients

Number of patients from each highlighted country (in blue) between 2016 and 2022

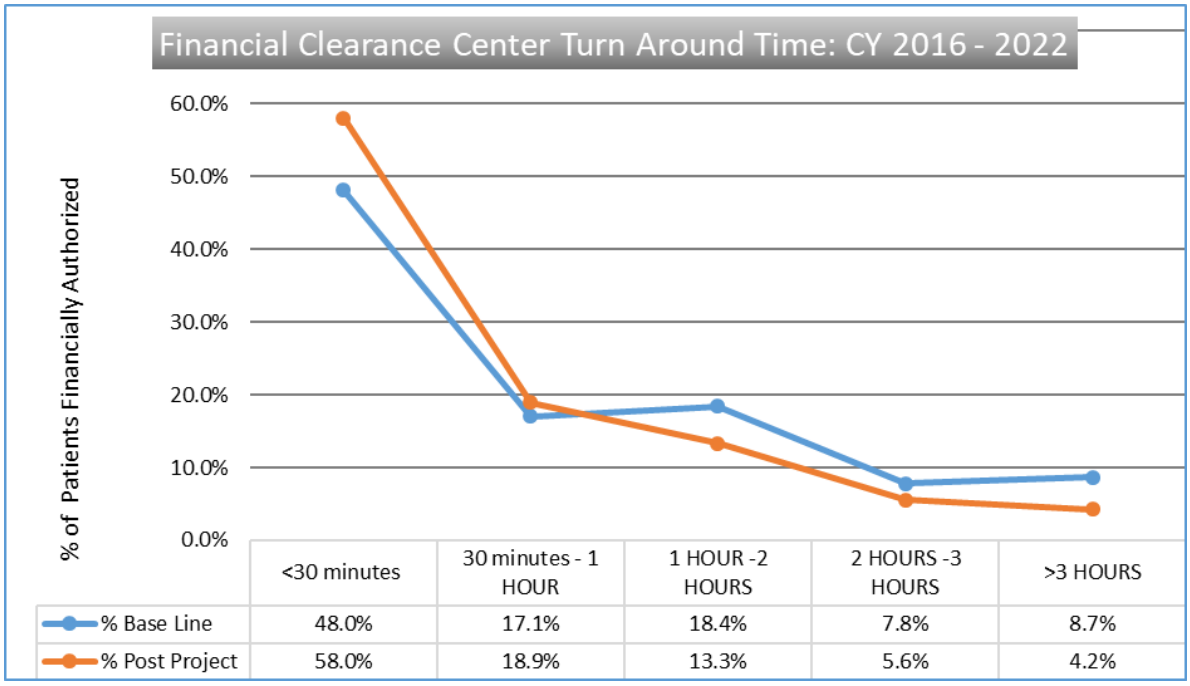

Fig-3: Financial Clearance Turnaround Time for Calendar Years 2016-2022

Discussion

Delays caused by unresolved financial clearance at check-in for diagnostic imaging represent a significant barrier to patient flow and satisfaction. Previous studies, such as that of Jessome [11], demonstrate that improving patient flow often hinges on identifying and addressing operational inefficiencies. In our study, we evaluated three targeted interventions designed to streamline financial clearance and reduce lobby wait times: (1) obtaining pre-arrival authorization, (2) flagging accounts lacking authorization to prevent unbilled scans, and (3) resolving flagged accounts within one hour of arrival. **Fig-3** shows the positive impacts of the first two interventions. Even though patient volume increased during the intervention period, more patients were financially authorized, demonstrating the effectiveness of the first two interventions.

Bleustein et al. have previously shown that longer wait times correlate with lower patient satisfaction scores [1]. By testing account flagging as a means to identify and address outstanding authorizations, we built on these findings and demonstrated comparable gains in turnaround time. After implementation, the percentage of patients receiving financial authorization within 30 minutes improved by approximately 10 percent, while the proportion waiting more than three hours decreased by 4.5 percent. These shifts align with Bleustein et al.'s observation that reducing billing-related grievances can improve overall patient perceptions of care [1].

Our statistical analyses confirmed that flagging accounts before appointments significantly increased the rate of pre-arrival authorization. Consequently, fewer patients required in-person billing resolution, which in turn reduced overall lobby congestion. In light of COVID-19–related staffing challenges, maintaining clearance rates above 99 percent further validates the resilience of our workflows. Taken together, these results indicate that coordinated front-desk/FCC collaboration—emphasizing pre-arrival authorization, systematic flagging, and rapid same-day clearance—can meaningfully shrink wait times and enhance the patient experience, even under high-volume and crisis conditions.

Limitations and Future Directions

A key limitation of this study was our inability to directly correlate financial clearance status, lobby delay, and patient satisfaction, due to constraints in data granularity within our electronic health record and FCC systems. While we measured clearance turnaround and overall wait times, we lacked standardized, quantitative patient satisfaction metrics tied to each encounter.

Future research should integrate validated satisfaction surveys and link them to clearance and wait-time data to quantify how delay reduction translates into measurable improvements in patient-reported experience.

Finally, walk-in and same-day scheduling patterns—especially those that spiked during COVID-19—introduced variability in demand that our intervention did not fully address. Future quality-improvement efforts could explore demand forecasting and dynamic staffing models to better align FCC resources with unpredictable walk-in volumes. By incorporating advanced analytics and perhaps machine-learning algorithms to predict clearance needs, institutions can target interventions more precisely and further reduce financial-clearance–associated delays in diagnostic imaging.

Conclusion

This study demonstrates that a focused three-part intervention—securing pre-arrival authorization, flagging accounts without clearance, and resolving flagged accounts within one hour—significantly reduced lobby wait times for diagnostic imaging. Despite a 56 percent increase in patient volume and pandemic-related staffing challenges, average wait time fell by 17 minutes, and more patients were cleared before arrival. Assigning dedicated Financial Clearance Center (FCC) representatives to work closely with front-desk staff proved essential; this collaboration prevented unbilled scans, reduced billing grievances, and allowed patients to proceed directly to their imaging appointments.

By addressing financial-clearance issues proactively, we improved both operational efficiency and patient experience. Shorter waits and clearer billing expectations minimized stress for patients and freed staff to focus on clinical care. Although a small percentage of patients still waited over three hours' post-intervention, our results suggest that real-time eligibility checks, expanded FCC coverage, and automated alerts could further shorten delays.

In summary, systematic coordination between front-desk teams and the FCC can streamline workflows, safeguard revenue, and enhance patient satisfaction. Adapting these methods in other imaging areas or outpatient settings could yield similar benefits. Future research should link clearance metrics to patient-reported outcomes and extend this model to broader healthcare contexts.

Funding Statement

This study was not funded by any department.

Ethical Compliance

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest Declaration

The authors declare that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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