

Understanding Why Patients No-Show: Observations of 2.9 Million Outpatient Imaging Visits Over 16 Years

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Abstract

Purpose: To understand why patients “no-show” for imaging appointments, and to provide new insights for improving resource utilization.

Materials and Methods: We conducted a retrospective analysis of nearly 2.9 million outpatient examinations in our radiology information system from 2000 to 2015 at our multihospital academic institution. No-show visits were identified by the “reason code” entry “NOSHOW” in our radiology information system. We restricted data to radiography, CT, mammography, MRI, ultrasound, and nuclear medicine examinations that included all studied variables. These variables included modality, patient age, appointment time, day of week, and scheduling lead time. Multivariate logistic regression was used to identify factors associated with no-show visits.

Results: Out of 2,893,626 patient visits that met our inclusion criteria, there were 94,096 no-shows during the 16-year period. Rates of no-show visits varied from 3.36% in 2000 to 2.26% in 2015. The effect size for no-shows was strongest for modality and scheduling lead time. Mammography had the highest modality no-show visit rate of 6.99% (odds ratio [OR] 5.38, $P < .001$) compared with the lowest modality rate of 1.25% in radiography. Scheduling lead time greater than 6 months was associated with more no-show visits than scheduling within 1 week (OR 3.18, $P < .001$). Patients 60 years and older were less likely to miss imaging appointments than patients under 40 (OR 0.70, $P < .001$). Mondays and Saturdays had significantly higher rates of no-show than Sundays (OR 1.52 and 1.51, $P < .001$).

Conclusion: Modality type and scheduling lead time were the most predictive factors of no-show. This may be used to guide new interventions such as targeted reminders and flexible scheduling.

Key Words: Scheduling, no-show, quality improvement, missed appointment, informatics

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INTRODUCTION

No-show visits (NSVs) are missed health care opportunities that negatively impact overall patient health and reduce departmental operational efficiency [1,2]. Delays in diagnosis and treatment can lead to increased

morbidity and mortality [3]. NSVs also confer a negative impact on other patients because a different patient could have been imaged during the unutilized time slot. Besides the more obvious lack of revenue generation that is associated with an unused appointment, there is also sunk cost from the utilization of human resources for scheduling, determining examination protocol, and financial pre-authorization. Understanding and improving appointment compliance is essential for radiology practices that strive to provide timely and high-quality care.

Many previous publications describing NSV occurrence have studied primary care, internal medicine, and more recently radiology [4-6]. Published rates of NSVs in the literature vary widely from 2% to over 50% depending

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on the specialty, clinical setting, patient demographic, and scheduling resources [7-12]. Investigations have shown that the day of week, time of day, and the previous attendance rate correlate with appointment behavior [1,13-16]. However, the common reasons identified for no-shows in other medical specialties likely differ from those in radiology because of differences in the reasons for visits, costs of care, patient anxiety, or misunderstanding about the nature of tests and required patient preparation [17,18]. Some prior research in radiology has focused on the effects of team-building exercises [19], psychosocial factors, such as posttraumatic stress disorder [20,21], or individual service lines, such as breast imaging [22]. More recent studies have analyzed smaller data sets of

electronic medical record data or demographic factors, such as race and socioeconomic status [4-6]. Our study is, to date, the largest data set to examine multiple modalities and quantitative variables related to patient no-show behavior in radiology.

In this article, we investigate multiyear, multiservice trends across a four-hospital radiology system to determine the strongest correlations between administrative factors and NSV rates to ultimately improve patient care and operational efficiency.

METHODS

Our retrospective study was HIPAA-compliant and designated Institutional Review Board–exempt as an

Table 1. Multivariate analysis of predictors of NSVs

Variable	No. (%) NSV	Multivariate Model		
		OR	95% CI	P Value
Modality				
CR	12,147/976,677 (1.24%)			
CT	20,078/599,282 (3.35%)	2.58	2.51-2.65	<.001
MG	21,280/304,284 (6.99%)	5.38	5.24-5.52	<.001
MR	12,685/342,484 (3.7%)	2.77	2.69-2.85	<.001
NM	7637/215,539 (3.54%)	2.80	2.69-2.92	<.001
US	20,269/455,360 (4.45%)	3.48	3.39-3.56	<.001
Scheduling lead time (wk)				
≤1	60,403/2,227,350 (2.71%)			
1-2	10,563/220,305 (4.79%)	1.23	1.20-1.26	<.001
2-3	5958/116,018 (5.14%)	1.27	1.23-1.32	<.001
3-4	4567/86,778 (5.26%)	1.28	1.23-1.33	<.001
4-6	5238/100,036 (5.24%)	1.32	1.28-1.37	<.001
6-8	2484/50,512 (4.92%)	1.31	1.25-1.38	<.001
8-12	2050/47,695 (4.3%)	1.22	1.15-1.29	<.001
12-26	2263/38,909 (5.82%)	1.81	1.71-1.90	<.001
>26	570/6023 (9.46%)	3.18	2.88-3.51	<.001
Patient age (y)				
<40	23,657/758,343 (3.12%)			
40-59	47,490/1,245,573 (3.81%)	1.04	1.02-1.06	<.001
≥60	22,949/889,710 (2.58%)	0.71	0.70-0.73	<.001
Time of day				
Working hours	86,676/2,625,789 (2.77%)			
Off-hours	7420/267,837 (3.3%)	1.13	1.10-1.16	<.001
Day of week				
Sunday	743/38,946 (1.91%)			
Monday	19,617/534,179 (3.67%)	1.52	1.39-1.66	<.001
Tuesday	19,668/608,358 (3.23%)	1.38	1.26-1.50	<.001
Wednesday	18,881/600,795 (3.14%)	1.31	1.20-1.43	<.001
Thursday	17,697/562,712 (3.14%)	1.28	1.17-1.40	<.001
Friday	15,444/490,156 (3.15%)	1.25	1.14-1.36	<.001
Saturday	2046/58,480 (3.50%)	1.51	1.37-1.66	<.001

OR = odds ratio; CR = computed radiography; CI = confidence interval; NSV = no-show visit; MG = mammography; NM = nuclear medicine; US = ultrasound.

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