



Factors Associated With Missed and Cancelled Colonoscopy Appointments at Veterans Health Administration Facilities

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BACKGROUND & AIMS:

Cancelled and missed colonoscopy appointments waste resources, increase colonoscopy delays, and can adversely affect patient outcomes. We examined individual and organizational factors associated with missed and cancelled colonoscopy appointments in Veteran Health Administration facilities.

METHODS:

From 69 facilities meeting inclusion criteria, we identified 27,994 patients with colonoscopy appointments scheduled for follow-up, on the basis of positive fecal occult blood test results, between August 16, 2009 and September 30, 2011. We identified factors associated with colonoscopy appointment status (completed, cancelled, or missed) by using hierarchical multinomial regression. Individual factors examined included age, race, sex, marital status, residence, drive time to nearest specialty care facility, limited life expectancy, comorbidities, colonoscopy in the past decade, referring facility type, referral month, and appointment lead time. Organizational factors included facility region, complexity, appointment reminders, scheduling, and prep education practices.

RESULTS:

Missed appointments were associated with limited life expectancy (odds ratio [OR], 2.74; $P = .0004$), no personal history of polyps (OR, 2.74; $P < .0001$), high facility complexity (OR, 2.69; $P = .007$), dual diagnosis of psychiatric disorders and substance abuse (OR, 1.82; $P < .0001$), and opt-out scheduling (OR, 1.57; $P = .02$). Cancelled appointments were associated with age (OR, 1.61; $P = .0005$ for 85 years or older and OR, 1.44; $P < .0001$ for 65–84 years old), no history of polyps (OR, 1.51; $P < .0001$), and opt-out scheduling (OR, 1.26; $P = .04$). Additional predictors of both outcomes included race, marital status, and lead time.

CONCLUSIONS:

Several factors within Veterans Health Administration clinic control can be targeted to reduce missed and cancelled colonoscopy appointments. Specifically, developing systems to minimize referrals for patients with limited life expectancy could reduce missed appointments, and use of opt-in scheduling and reductions in appointment lead time could improve both outcomes.

Keywords: Colonoscopy; Health Services Accessibility; Veterans Health; Appointments and Schedules; Organizational Efficiency; Observational Study.

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Missed and cancelled medical appointments not only delay important health care for individuals, they also pose a number of challenges for health care

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Abbreviations used in this paper: CDW, Corporate Data Warehouse; FOBT+, positive fecal occult blood test; ICD-9, International Classification of Diseases, 9th Revision; OR, odds ratio; VHA, Veterans Health Administration.

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systems, including wasted resources,¹⁻⁴ longer wait times,³ and concomitant threats to future patient satisfaction.³ Missed and cancelled appointments are particularly problematic for colonoscopy clinics because they are expensive (resulting in an estimated net loss of \$725 per day for the average facility),² limited colonoscopy capacity in most settings creates pressure to be efficient with colonoscopy resources,^{5,6} and increases in diagnostic colonoscopy waiting times as short as 30 days have been found to be associated with modest but significantly elevated odds of detecting neoplasia on exam.⁷ Because of these potential adverse impacts on clinic productivity and patient outcomes, identifying and mitigating the effects of modifiable drivers of missed and cancelled colonoscopy appointments are a high priority for most outpatient endoscopy clinics.

Prior studies examining factors associated with missed and cancelled appointments in outpatient endoscopy clinics have identified a number of predictors, including patient age⁸⁻¹² and gender,¹³ appointment lead time (ie, number of days between the scheduling date and appointment date),^{8,10,12} season of referral,¹⁴ and organizational-level improvement strategies such as appointment reminders,^{8,15-17} opt-in scheduling (ie, requiring patients to call to initiate scheduling),¹⁸ and peer coaching.¹¹ To our knowledge, no prior studies examining outpatient endoscopy clinic appointments have distinguished between cancelled and missed appointments. Because cancelled and missed appointments represent behaviorally distinct choices with potentially different causes and consequences, separately examining their levels and predictors may provide useful information for future efforts to improve productivity and efficiency in endoscopy clinics. Finally, most prior studies examining predictors of missed and cancelled endoscopy appointments were conducted in a single setting, limiting the ability to examine the influence of contextual factors such as facility region, type (ie, specialty care hospital, community-based outpatient clinic), and complexity found to be associated with the guideline-consistent colorectal cancer screening and diagnostic follow-up in prior studies.^{19,20}

To address these gaps in the literature, we conducted a study with the aim of assessing the contribution of both individual and organizational-level factors to cancelled and missed colonoscopy appointment rates in a nationally representative sample of medical facilities and patients.

Materials and Methods

Setting and Participants

We identified patients and facilities from a larger study designed primarily to estimate levels and determinants of diagnostic colonoscopy after positive fecal occult blood test (FOBT+) results.²¹ This study identified

104,894 patients with FOBT+ results from a Veterans Health Administration (VHA) facility between August 2009 and March 2011 and followed them until September 2011 for completion of colonoscopy. Patients were excluded if they did not receive their FOBT+ results from 1 of 125 VHA facilities conducting at least 1400 FOBTs in 2009; were <18 or >100 years old at the time of the FOBT+ result; had a prior diagnosis of colorectal cancer; or received their FOBT+ from a VHA community-based outpatient clinic referring <70% of colonoscopies to 1 of the 125 VHA facilities included in the sampling frame, leaving 86,926 eligible FOBT+ patients. For the present analysis, we considered the subsample of 64,176 patients from this cohort who had an appointment scheduled in a colonoscopy-performing clinic on or before September 30, 2011 (the date determined by the larger study to ensure eligible patients had a minimum 6-month follow-up). We linked this sample to organizational-level data on reminders, scheduling, and colonoscopy preparation instruction approaches obtained from a Web-based survey of Gastroenterology Chiefs described previously,^{21,22} yielding 51,944 patients from 89 facilities with Gastroenterology Chief survey data. After excluding cases with incomplete or implausible appointment data, 27,994 patients from 69 facilities were available for analysis (Figure 1).

Data Sources and Measures

The dependent measure for our analysis was colonoscopy appointment status (completed, cancelled, or missed), which was identified from the appointment data domain of the VHA Corporate Data Warehouse (CDW). To generate this measure we identified clinics performing colonoscopies at the facilities included in our sample. Then, for each patient in our sample, we extracted the following information for all appointments in these clinics during the follow-up interval: (1) date the appointment was entered into the Appointment Management application (scheduling date), (2) date the appointment was scheduled to be completed (appointment date), and (3) appointment status (completed, cancelled, or missed). We defined a scheduled appointment as completed if the patient attended the appointment, as cancelled if the appointment was cancelled by the patient or clinic at any time between the scheduling date and the appointment date, and as missed if the patient did not show up for a scheduled appointment and did not cancel. If a patient had more than 1 appointment in a clinic performing colonoscopies during the follow-up interval, we selected the first appointment for analysis. Any appointments rescheduled to a later date would be included in the cancelled category. We combined early (>7 days prior) and late (0-7 days prior) cancellations because preliminary analyses suggested their predictors were similar. The vast majority of cancellations (76%) were made more than 1 day before the appointment.

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