

## Missed Work Related to Mid-Week Screening Colonoscopy

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### Abstract

**Background** Most screening colonoscopies require patients to miss work on the day of the procedure. Little is known about whether patients are taking additional time off from work, and the reasons for doing so.

**Aims** The purpose of this study was to assess the patterns and reasons for missed work related to screening colonoscopies.

**Methods** All outpatient screening colonoscopy procedures performed at an academic medical center over 6 months were reviewed. Exclusions included procedures performed for other indications, patients age 65 or older, procedures performed on Monday or Friday, and patients who were not working. Patients were interviewed by telephone regarding missed work time and the reasons for doing so.

**Results** Sixty-eight patients met all inclusion criteria. Thirty-four percent missed work on more than the day of the procedure. Thirty-two percent took the day prior off, 10% took the day after off, and 9% took both days off. The reason for taking the day before the procedure off was uniformly anticipation of the bowel preparation. Of those who took the day after off, 57% did so as a precautionary measure after moderate sedation, while 43% had symptoms.

**Conclusions** One third of working patients who undergo mid-week screening colonoscopies miss work on additional days to the procedure day. Unanticipated time missed from work could increase the indirect costs of screening colonoscopy.

**Keywords** Colonoscopy · Screening · Health care costs · Lost productivity

### Abbreviations

CT	Computer tomography
EGD	Esophagogastroduodenoscopy
GI	Gastroenterology
IBD	Inflammatory bowel disease
IBS	Irritable bowel syndrome

### Introduction

Patients undergoing screening colonoscopy typically miss work on the day of their procedure due to both the procedure itself and to the sedation, but little is known about what the recovery time is after the procedure, whether many patients miss work the day before the procedure, and whether a significant number of friends and family members miss work as a result of a patient's colonoscopy procedure. In a study of subjects undergoing screening or surveillance colonoscopies, Ko et al. [1] interviewed 502 patients aged 40 years and older, and reported that 20% of them lost more than 1 day from normal activities and 25% of friends or family lost at least 1 day. Jonas et al. [2, 3] examined time requirements for screening colonoscopy in 110 subjects and found that the average total time required,

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from initiation of the bowel preparation to return to normal activities, was 39.5 h, with 17% of subjects taking longer than 24 h to achieve full recovery. These studies included patients who had procedures any day of the week, Monday through Friday. Also, they examined time lost from self reported “normal activities,” both work-related and non-work related. It is anticipated that the number of missed days from work would be even higher if procedures were performed mid-week (Tuesday, Wednesday, or Thursday) because no weekend (Saturday/Sunday) days would be missed from work. The main aim of this paper was to determine the frequency of missing work the day before or the day after screening colonoscopy when performed mid-week.

## Methods

This was a retrospective study conducted at the University of California at San Diego Medical Center. All outpatient colonoscopies performed at the UCSD Thornton Hospital GI endoscopy unit, UCSD Moores Cancer Center endoscopy unit, or UCSD University Ambulatory Surgery Center within a 6-month time period (from August 2009 through January 2010) were reviewed for eligibility by examining an electronic endoscopy report database.

As per institutional practice at the time, all patients were instructed to consume a clear liquid diet the day before the procedure, followed by 4 l of polyethylene glycol solution starting at 6 pm the evening before the procedure. All patients were instructed that they needed to have a friend or family member accompany them home after the procedure if they received intravenous sedation.

Inclusion criteria were: (1) adults under the age of 65, (2) colonoscopies performed in asymptomatic individuals for the indications of average risk screening, surveillance in individuals with personal history of adenomatous polyps or colon cancer, screening in individuals with high risk family history, evaluation after other abnormal screening test such as flexible sigmoidoscopy, barium enema, or fecal occult blood test, and for evaluation of iron deficiency without overt GI bleeding, and (3) procedures scheduled for the middle of the week (Tuesday, Wednesday, or Thursday), flanked by working days before and after the procedure.

Exclusion criteria were: (1) subjects who were 65 years of age and older based on the United States Social Security Office established standard retirement age, (2) those who had procedures performed for evaluation of overt GI bleeding, abdominal pain or bloating, change in bowel habits, as a follow-up procedure to remove a known lesion, or for evaluation of abnormal imaging findings (excluding imaging studies performed for the purposes of colon cancer screening), (3) procedures performed in subjects with

inflammatory bowel disease (IBD), and (4) procedures performed on Mondays, Fridays, and immediately adjacent to national holidays as subjects would normally be expected to have either the day before or after the procedure off.

Those that met inclusion criteria were contacted by telephone, and those who agreed to participate were asked a series of questions regarding whether they had missed work before or after their procedure, the reasons for missing work, and whether any friends or family took time off of work for their procedure. Work was self-defined by the patient as having a conventional job, being self employed, working from home, or being contracted. Subjects who had colonoscopies scheduled during vacation days, or subjects in the latter three groups who did not have active work-related tasks on the days surrounding their procedure were classified as working but not requiring time off. Subjects were also asked to estimate the number of sick days they took within the past year (excluding days taken for the colonoscopy procedure) and whether they had a known diagnosis of irritable bowel syndrome (IBS). Ethnicity was self-reported. All telephone calls were made by a single investigator (MHD). Subjects who could not be reached on three separate days (at least one call was made on a weekday evening between 7 and 9 pm, and another on a weekend afternoon between 1 and 4 pm) were excluded from the study. For those that reported not working during the month of their colonoscopy procedure, information was collected regarding whether friends or family members missed work.

Chart reviews were conducted to obtain the following information: patient age, sex, exam indication, endoscopist, procedure time (morning vs. afternoon), sedative medication regimens and dosages, endoscopic interventions performed, whether or not the exam was completed to the cecum, and whether any other concomitant endoscopic procedures were performed that day (i.e., EGD).

This study was approved by the Human Research Patient Protection Institutional Review Board of the University of California, San Diego. No external funding sources were utilized.

## Results

### Subject Characteristics

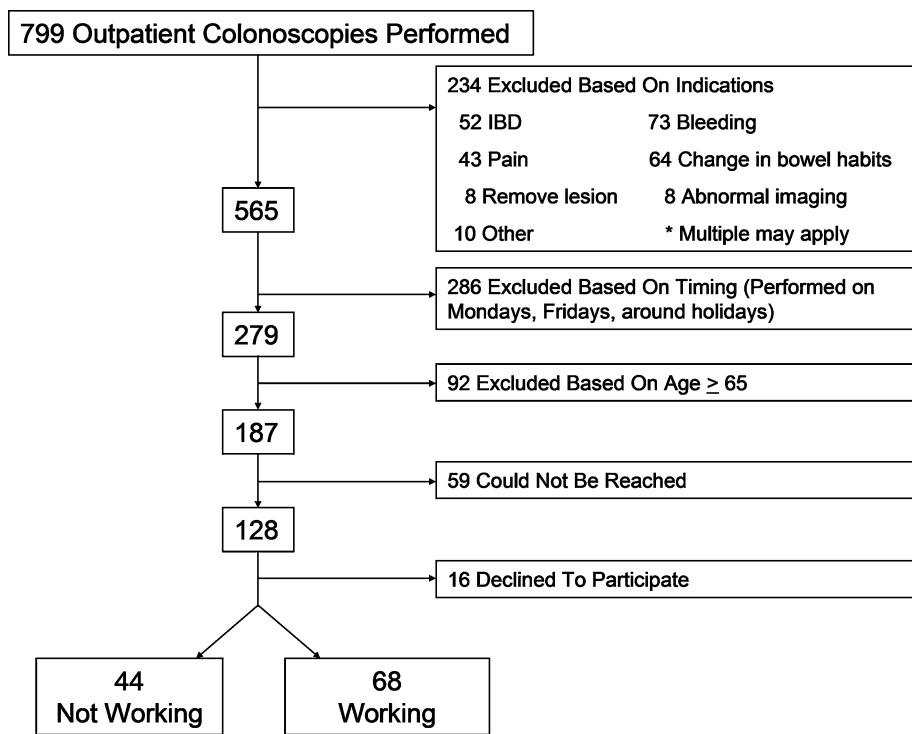
A total of 799 outpatient colonoscopies were performed from August 2009 through January 2010. The reasons for excluding 687 were: 234 were performed for purposes other than screening or surveillance, 286 were performed on Mondays, Fridays, or immediately adjacent to national holidays, 92 were performed in subjects age 65 or older, 16

declined to participate, and 59 could not be reached by telephone. A total of 112 subjects participated in the study. Of those, 44 reported not working during the month of their colonoscopy procedure, while 68 were working (Fig. 1).

Characteristics of the 68 working subjects are shown in Table 1. The mean age was 53.9 years (range

40–64 years), 56% were women, and the majority of the group was Caucasian (79%). Very few reported having a formal diagnosis of IBS (4%). For the patients who were not working, the mean age was 56.8 years (range 43–64 years), 66% were women, 82% were Caucasian, and 2% reported a diagnosis of IBS (Table 1). Procedure

**Fig. 1** Patient recruitment



**Table 1** Patient characteristics

Characteristics	Working group ( <i>N</i> = 68)	Non-working group ( <i>N</i> = 44)
Mean age, y (range)	53.9 (40–64)	56.8 (43–64)
Women	38 (56%)	29 (66%)
Previous diagnosis of IBS	3 (4%)	1 (2%)
Caucasian ethnicity	54 (79%)	36 (82%)
Morning procedures	41 (60%)	26 (59%)
Had concomitant endoscopic procedures	4 (6%)	7 (16%)
Indication for procedure		
Average risk screening	45 (66%)	32 (73%)
High risk family history	10 (15%)	4 (9%)
History of polyps or colon cancer	11 (16%)	8 (18%)
Iron deficiency anemia	2 (3%)	0 (0%)
Procedure sedation		
Mean midazolam dose, mg (range)	4.0 (0–8)	4.0 (0–6)
Mean meperidine dose, mg (range)	90 (0–150)	85 (0–150)
Mean fentanyl dose, mcg (range)	50 (0–100)	72 (0–100)
Procedure interventions		
None	35 (52%)	25 (57%)
Biopsy forceps	23 (34%)	17 (39%)
Snare polypectomy	10 (15%)	4 (9%)

IBS irritable bowel syndrome

**Table 2** Missed work related to colonoscopy procedures

Missed work	Working group (N = 68)	Non-working group (N = 44)
Patients who took days off from work	23 (34%)	NA
Took the day prior off	22 (32%)	NA
In anticipation of the prep	22 (100%)	NA
Took the day after off	7 (10%)	NA
Abdominal pain	1 (14%)	NA
Altered hearing	1 (14%)	NA
Sore throat	1 (14%)	NA
Anticipatory	4 (57%)	NA
Took both the day before and the day after off	6 (9%)	NA
Friends or family who took days off from work	33 (49%)	18 (41%)
Half to one day	32 (47%)	18 (41%)
Two days	1 (2%)	0
Average number of sick days taken in the prior year <sup>a</sup>	2.1 (range 0–10)	NA

NA not applicable

<sup>a</sup> Excluding two outliers who took 150 and 23 days off for major illness

indications, sedative medications used, and procedure interventions are shown in Table 1.

### Missed Work

A total of 23 patients (34%) reported taking more than the day of the procedure off from work. Twenty two (32%) reported taking part of or the full day before the procedure off for the bowel preparation. All patients reported that the time taken off of work prior to the procedure was in anticipation of the prep rather than actually feeling ill from the prep itself. Seven patients (10%) took the day after the colonoscopy procedure off. Of these, the reason for taking the day off was reported as follows: one had abdominal pain, one patient who had a history of partial hearing loss reported a prolonged sense of altered hearing, one patient who had a concomitant EGD procedure that day reported a sore throat, the remaining four patients reported feeling well but either were wary of driving the day after receiving sedation (two patients) or stayed home in anticipation of the possibility of feeling ill (two patients). Six patients (9%) out of the seven that had taken the day after the procedure off also took the day before the procedure off. No patients took off more than 1 day after the procedure. Excluding two patients who had taken a significant amount of time off from work in the past year due to surgery or major illness, the average number of sick days taken in the past year for this cohort was 2.1 (range 0–10) (Table 2). Comparison of those who took extra time off from work versus those who did not yielded similar patient and procedure characteristics (Table 3).

In the working group, 33 (49%) reported that a friend or family member also had to take off part of or a full day from work on the day of the colonoscopy. The majority of these (32 of 33) were due to the requirement to have

someone drive or accompany the patient to their home after sedation. One family member took 2 days off work because the patient had a slow recovery after colonoscopy. In the non-working group, 18 (41%) reported that a friend or family member took time off of work. All were the designated drivers for the procedure. Combining the two groups, 46% of patients (51 of 112) had friends or family members who had to miss work as a result of the colonoscopy procedure (Table 2).

### Discussion

This study found that among asymptomatic, working individuals who had screening or surveillance colonoscopies performed on a Tuesday, Wednesday, or Thursday, 34% missed work on more than the day of the procedure. Thirty-two percent took the day prior off, 10% took the day after off, and 9% took both days off. Forty-six percent of individuals had friends or family members who also took time off work for the procedure. These figures are somewhat higher than the 20% incidence of two or more patient days lost and 25% incidence of one or more family days lost from normal activities previously reported by Ko et al. [1]. However, their study population included all patients undergoing screening and surveillance colonoscopies and reported time lost from normal activities, whereas ours included only those who were working at the time of the procedure, had procedures performed mid-week, and specifically examined lost work time.

In our study population, a high proportion of patients (32%) took the day prior to the procedure off in anticipation of the bowel preparation, even though the instructions they were given did not require them to start consuming the polyethylene glycol solution until the evening before the

**Table 3** Comparison of those who missed work versus those who did not ( $N = 68$ )

Characteristic	Missed any work ( $N = 23$ )	Missed the day before ( $N = 22$ )	Missed the day after ( $N = 7$ )	Did not miss work ( $N = 45$ )
Mean age, y (range)	52.7 (40–64)	52.6 (40–64)	53.1 (51–56)	54.5 (44–64)
Women	12 (52%)	12 (55%)	3 (43%)	26 (58%)
Previous diagnosis of IBS	1 (4%)	1 (5%)	0 (0%)	2 (4%)
Caucasian ethnicity	19 (83%)	18 (82%)	4 (57%)	35 (78%)
Morning procedures	12 (52%)	12 (55%)	4 (57%)	29 (64%)
Had concomitant endoscopic procedures	2 (9%)	2 (9%)	2 (29%)	2 (4%)
Indication for procedure				
Average risk screening	15 (65%)	14 (64%)	7 (100%)	30 (67%)
High risk family history	3 (13%)	3 (14%)	0 (0%)	7 (16%)
History of polyps or colon cancer	4 (17%)	4 (18%)	0 (0%)	7 (16%)
Iron deficiency anemia	1 (4%)	1 (5%)	0 (0%)	1 (2%)
Procedure sedation				
Mean midazolam dose, mg (range)	3.9 (0–8)	4.0 (0–8)	3.4 (3–4)	4.1 (0–7)
Mean meperidine dose, mg (range)	82 (0–100)	81 (0–100)	86 (75–100)	93 (0–150)
Procedure interventions				
None	16 (70%)	16 (73%)	4 (57%)	19 (42%)
Biopsy forceps	6 (26%)	5 (23%)	2 (29%)	23 (51%)
Snare polypectomy	3 (13%)	2 (9%)	2 (29%)	7 (16%)

IBS irritable bowel syndrome

procedure. It is possible that better pre-procedure instructions and reassurance would have avoided the patients taking the day prior to colonoscopy off work. Ten percent of patients took the day after the procedure off, and more than half of those did so as a precautionary measure rather than in response to true symptoms. Only three patients (4%) developed symptoms after colonoscopy, and two of those were likely unrelated to the procedure (sore throat and altered hearing). Thus, less than 2% of patients had symptoms after the colonoscopy procedure, attributable to the procedure itself, which were severe enough to necessitate missing a day of work. In those who had no symptoms but took the day off, anxiety related to the potential after-effects of sedation appears to be the main factor.

Colonoscopy procedures required a significant amount of time investment from friends and family members, with 46% of patients in our cohort reporting that a friend or relative took time off of work for the procedure. In all but one case, the reason for missing work was due to the requirement that patients not drive themselves home after receiving moderate sedation.

Our patient population was fairly uniform, consisting of mostly middle to upper class Caucasians living in San Diego, California, and may not be generalizable to other geographic or ethnic cohorts. On average, this cohort took only 2.1 sick days off of work in the prior year, suggesting that this is an otherwise fairly healthy and motivated working group. Due to the retrospective nature of the

study, subjects may be influenced by recall bias. Also, our study cohort consisted of individuals who had chosen to undergo colonoscopy procedure, and may not represent all individuals eligible for screening or surveillance exams.

In order to assess missed work the day before and after the procedure, only mid-week cases were analyzed. Cases done at the beginning (Mondays) or end (Fridays) of the week would have less impact on patients missing work. From an employer's perspective, this might suggest that more screening colonoscopies should be done on Mondays or Fridays in order to minimize lost work time. This might also be the preference of patients, who might be self-employed or who might need to use medical or vacation leave for missed work related to the procedures. From a societal perspective, as a rough estimate, if there are 42 million US adults age 50–65 (US Census 2000), with 64.6% participating in the labor force (US Bureau of Labor Statistics July 2010), an average weekly wage of \$843 (US Bureau of Labor Statistics, third quarter 2009 for those age 55–65), and 50% utilization of screening colonoscopy [4], if 34% of those undergoing screening colonoscopy take one additional day off from work, that would amount to \$778 million in lost wages. Intervention with patient education about bowel prep techniques and what to expect before and after the procedure might reduce the amount of missed work.

In conclusion, a high percentage of previously asymptomatic patients take more time off of work than the actual

procedure day for colonoscopies, which is mostly related to anxiety about the procedure process. A significant number of patients also have friends or family members who must take time off of work as a result of the procedure. The indirect financial costs to society related to missed work for screening and surveillance colonoscopies should be taken into account, and efforts should be made to minimize those costs when possible through patient education and reassurance. Further studies are needed to assess missed work related to colonoscopy procedures in different demographic populations, in those with varying work responsibilities, in patients receiving conscious sedation versus propofol, and in those who receive conventional versus split-dose bowel preparations.

**Conflict of interest** The authors have no conflict of interest or financial disclosures.

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## References

1. Ko CW, Riffle S, Shapiro JA, et al. Incidence of minor complications and time lost from normal activities after screening or surveillance colonoscopy. *Gastrointest Endosc.* 2007;65: 648–656.
2. Jonas DE, Russell LB, Sandler RS, Chou J, Pignone M. Patient time requirements for screening colonoscopy. *Am J Gastroenterol.* 2007;102:2401–2410.
3. Jonas DE, Russell LB, Sandler RS, Chou J, Pignone M. Value of patient time invested in the colonoscopy screening process: time requirements for colonoscopy study. *Med Decis Mak.* 2008;28: 56–65.
4. CDC (Center for Disease Control). Vital signs: colorectal cancer screening among adults aged 50–75 years—United States, 2008. *MMWR* 2010; 59:808–812.