

# Hidden Cost of Sedation for Screening and Surveillance by Optical Colonoscopy

Cynthia W. Ko, MD, MS

## Abstract

The majority of colonoscopies are performed under sedation. Patient recovery time and activity restrictions have social and economic costs. A shortage of facilities, trained personnel, and equipment limits physicians' ability to perform colonoscopy. In one study, patients spent a median of 37.2 hours from bowel preparation until resumption of routine activities. If there were no sedation used, patients could save as much as 18 hours. In one study, examining non-adherence to screening colonoscopy, 14% of patients reported transportation difficulties as a significant barrier. Further research might describe the effect of sedation-free colonoscopy on access, economic costs, and social costs as they relate to patients and their caregivers.

## Introduction

In the United States, roughly 14 million colonoscopies were performed in 2003.<sup>1</sup> Colonoscopy is recommended for early polyps and for follow-up of other abnormal screening tests, such as fecal occult blood. Endoscopic screening programs may reduce the risk of colorectal cancer mortality by 90%.<sup>2-5</sup> In addition, colonoscopy is useful for investigation of gastrointestinal tract symptoms. Most colonoscopies are performed under moderate or deep sedation, the latter usually managed by an anesthesiologist or certified nurse-anesthetist.

Although sedation improves patient comfort, the associated side effects of sedation may prevent patients from having the procedure. Sedation increases recovery time in the endoscopy unit and later at home. Sedated patients usually require transportation home and are advised not to return to work until the following day. These time constraints may cause poorer patients to forego screening or a therapeutic intervention. This

paper reviews the opportunity cost of colonoscopy as it relates to colorectal cancer screening and posits that sedation-free colonoscopy may decrease these costs.

## Opportunity Cost

Preparation and recovery require far more time than colonoscopy itself. At an academic medical center,<sup>6</sup> 110 patients undergoing screening or surveillance colonoscopy completed a time diary from the beginning of bowel preparation until the resumption of normal activities. Jonas et al. found that these patients spent a median of 37.2 hours for colonoscopy from commencing bowel preparation until the resumption of routine activities. Polyethylene glycol-based bowel preparation required a median 16.7 hours. The average time spent traveling from home to the endoscopy suite and returning home was 3.7 hours. At home, recovery required a median of 15.8 hours until normal activities were resumed. These patients required an average of 1.8 additional hours to achieve self-reported normalcy.

This study also examined time lost from other activities because of the colonoscopy. Forty-three percent of patients gave up work although 42% of the patients were retired or disabled. Twenty-four percent of patients lost only one day from work; approximately 10% lost more. Forty-seven percent lost leisure time and time for household chores. Twenty-nine percent lost time normally used for the care of others.

Similar to flexible sigmoidoscopy, colonoscopy without sedation minimizes time spent in the recovery unit of the endoscopy facility. Furthermore, patients usually do not require an escort home and may even return to work the day of the procedure. Based on the above data, patients could save up to 17.6 hours in recovery time.

## Need for Escort Home

Sedated patients usually require transportation home after colonoscopy. Indeed, in one study examining reasons for non-adherence to screening colonoscopy, 14% of patients reported transportation difficulties as a significant barrier.<sup>7</sup> Few studies address the opportunity cost for caregivers of patients undergoing colonoscopy. In a study of 502 patients undergoing screening or surveillance colonoscopy, 75% of caregivers did not report losing any days from work, 22.7% reported losing one day of work, and 1.9% lost more than one day of work. To our knowledge, no study has addressed the issue of caregiver time for patients who undergo colonoscopy without sedation.

## The Fiscal Cost of Sedation

Using questionnaires, Heitman et al. compared the time lost and economic costs for 604 patients undergoing screening fecal occult blood tests and 723 patients undergoing screening colonoscopy in Canada.<sup>8</sup> For colonoscopy, the time was measured from the departure to the endoscopy facility until the patient arrived home after the procedure. Time spent on bowel preparation and post-procedural recovery was not surveyed. Patients spent a median of 4.0 hours for colonoscopy compared to a median of 0.9 hours for fecal occult blood testing. Caregivers spent a median of 3.7 hours for colonoscopy patients, while no patients undergoing fecal occult blood testing reported caregivers giving time. Patients undergoing colonoscopy also reported a median of 4.1 hours off work, with caregivers reporting 1.8 hours (IQR 0-4.7). Total patient costs, including time for travel, time receiving care, and any other additional time, were \$36 Canadian for fecal occult blood testing, compared to \$308 Canadian for colonoscopy. Importantly, colonoscopy patients reported median lost wages of \$76.4 (IQR \$63.7-95.5) for travel and clinic time and \$78.60 (IQR \$52.5-108.2) for additional time, including time off work for recovery. Caregivers for colonoscopy patients reported total costs, including lost wages, of \$70.0 (IQR \$46.1-85.6) for travel and clinic time, and \$86.4 (IQR \$56.3-\$124.0) for additional time caring for the patient.

Time devoted to colonoscopy may have significant impact on the cost-effectiveness of screening. Jonas, et al. used data on patient time requirements discussed earlier to estimate total costs from lost time associated with colonoscopy.<sup>9</sup> They found a median of \$1,341 (IQR \$596-\$6,405) of lost wages from the beginning of bowel preparation until the return to normal activities. The estimated lost wages for caregivers was \$73 (IQR \$23-258) for the time spent accompanying the patient to and from colonoscopy. These costs, in addition to the QALY published in a previous analysis,<sup>10</sup> increased the cost per life-year saved for screening colonoscopy from \$24,500 to \$36,000. The incremental cost per life-year saved compared with no screening increased from \$13,100 to \$22,400.

## Summary and Conclusion

The process of colonoscopy requires time, with preparation and recovery at home accounting for the majority. Sedation increased costs by prolonging the recovery process, which delays the return to normal activity. These costs may impede colonoscopy adherence. Colonoscopy without sedation may decrease economic and social costs to patients and their caregivers.

*Cynthia W. Ko, MD MS, is Associate Professor of Medicine, Division of Gastroenterology, University of Washington, Seattle.*

*Potential Financial Conflicts of Interest: By AJCM® policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article that might create any potential conflict of interest. The author has stated that no such relationships exist.*

## References

1. Seeff LC, Richards TB, Shapiro JA, et al. How many endoscopies are performed for colorectal cancer screening? Results from CDC's survey of endoscopic capacity. *Gastroenterology*. 2004;127(6):1670-7.
2. Baxter NN, Goldwasser MA, Paszat LF, et al. Association of colonoscopy and death from colorectal cancer. *Ann Intern Med*. 2009;150(1):1-8.
3. Winawer SJ, Zauber AG, Ho MN, et al. Prevention of colorectal cancer by colonoscopic polypectomy. *N Engl J Med*. 1993;329(27):1933-1981.
4. Muller AD, Sonnenberg A. Prevention of colorectal cancer by flexible endoscopy and polypectomy: a case-control study of 32,702 veterans. *Ann Intern Med*. 1995;123(12):904-910.
5. Muller AD, Sonnenberg A. Protection by endoscopy against death from colorectal cancer: a case-control study among veterans. *Arch Intern Med*. 1995;155(16):1741-1748.
6. Jonas DE, Russell LB, Sandler RS, et al. Patient time requirements for screening colonoscopy. *Am J Gastroenterol*. 2007;102(11):2401-10.
7. Denberg TD, Melhado TV, Coombes JM, et al. Predictors of nonadherence to screening colonoscopy. *J Gen Intern Med*. 2005;20(11):989-95.
8. Heitman SJ, Au F, Manns BJ, et al. Nonmedical costs of colorectal cancer screening with the fecal occult blood test and colonoscopy. *Clin Gastroenterol Hepatol*. 2008;6(8):912-917.
9. Jonas DE, Russell LB, Sandler RS, et al. Value of patient time invested in the colonoscopy screening process: time requirements for colonoscopy study. *Med Decis Making*. 2008;28(1):56-65.
10. Sonnenberg A, Delco F, Bauerfeind P. Is virtual colonoscopy a cost-effective option to screen for colorectal cancer? *Am J Gastroenterol*. 1999;94(8):2268-74.