

Limited Life Expectancy Among a Subgroup of Medicare Beneficiaries Receiving Screening Colonoscopies

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BACKGROUND & AIMS: Life expectancy is an important consideration when assessing appropriateness of preventive programs for older individuals. Most studies on this subject have used age cutoffs as a proxy for life expectancy. We analyzed patterns of utilization of screening colonoscopy in Medicare enrollees by using estimated life expectancy.

METHODS: We used a 5% random national sample of Medicare claims data to identify average-risk patients who underwent screening colonoscopies from 2008 to 2010. Colonoscopies were considered to be screening colonoscopies in the absence of diagnoses for nonscreening indications, which were based on either colonoscopies or any claims in the preceding 3 months. We estimated life expectancies by using a model that combined age, sex, and comorbidity. Among patients who underwent screening colonoscopies, we calculated the percentage of those with life expectancies <10 years.

RESULTS: Among the 57,597 Medicare beneficiaries 66 years old or older who received at least 1 screening colonoscopy, 24.8% had an estimated life expectancy of <10 years. There was a significant positive association between total Medicare per capita costs in hospital referral regions and the proportion of patients with limited life expectancies (<10 years) at the time of screening colonoscopy ($R = 0.25$; $P < .001$, Pearson correlation test). In a multivariable analysis, men were substantially more likely than women to have limited life expectancy at the time of screening colonoscopy (odds ratio, 2.25; 95% confidence interval, 2.16–2.34).

CONCLUSIONS: Nearly 25% of Medicare beneficiaries, especially men, had life expectancies <10 years at the time of screening colonoscopies. Life expectancy should therefore be incorporated in decision-making for preventive services.

Keywords: Colon Cancer; Colonoscopy; Life Expectancy; Medicare.

It is important to consider overall health and prognosis when considering cancer screening decisions in older patients.^{1,2} For example, screening colonoscopy is the dominant screening modality for colorectal cancer.³ Evidence from observational studies suggests that few polyps will form and progress to cancer in fewer than 10 years.⁴ In addition, complications related to colonoscopy are more common in those with significant comorbidities or advanced age.⁵ Thus, older patients with limited life expectancy are at risk of harm from screening or treatment of a condition that may never manifest in their lifetime.^{6,7} For these reasons, the United States Preventive Services Task Force (USPSTF) has recommended against routine screening for colorectal cancer in those aged 75–84 and against any screening in those older than 85.⁸ The task force reasoned that with the limited life

expectancy of those older than age 75, “the gain in life years associated with extending screening [above age 75] was small in comparison to the risks of screening.” Others and we have reported on potential overuse of screening colonoscopies in those older than age 75 and older than 85.^{9–11}

However, the chronological age of the patient is less relevant than life expectancy, or whether the patient can

Abbreviations used in this paper: CPT, Current Procedural Terminology; HRR, hospital referral region; ICD-9-CM, International Classification of Disease-Ninth Revision-Clinical Modification; MedPAR, Medicare Provider Analysis and Review; OutSAF, Outpatient Standard Analytical File; USPSTF, United States Preventive Services Task Force.

expect to survive long enough after the test to reap benefits that outweigh the risks.¹²⁻¹⁴ Recently, we developed an algorithm estimating life expectancy in older Medicare patients that is substantially more accurate than using age alone.¹⁵

In this study, we estimate life expectancy in Medicare recipients who underwent screening colonoscopy in 2008-2010 in the United States and report on the proportion of patients who had a life expectancy of less than 10 years. We also analyze how this proportion varies by patient and provider characteristics and by geographic location.

Materials and Methods

Data Source

Claims from 2007-2010 for a 5% random sample of Medicare beneficiaries were used, including Medicare beneficiary summary files, Medicare Provider Analysis and Review (MedPAR) files, Outpatient Standard Analytical File (OutSAF), and Medicare Carrier files. Provider information was obtained from the American Medical Association Physician Masterfile.

Study Cohort

Colonoscopy claims were identified from 2008-2010 Carrier and OutSAF data by using Current Procedural Terminology (CPT) codes 45378, 45380, 45382, 45383, 45384, and 45385 and Health Care Procedure Coding System codes G0105 and G0121. For OutSAF data, the following International Classification of Disease-Ninth Revision-Clinical Modification (ICD-9-CM) codes were also used: 45.23, 45.25, 45.27, 45.41, 45.42, and 45.43. We linked the colonoscopy claims from the Carrier files to the admission records in the MedPAR files to identify and remove inpatient colonoscopies. We identified 435,452 outpatient colonoscopies but used only the first colonoscopy for each beneficiary in 2008-2010, resulting in 392,985 colonoscopies. From these, we excluded beneficiaries aged 65 and younger ($N = 79,625$), those without complete Parts A and B enrollment, and those with any health maintenance organization enrollment during the 12 months before colonoscopy ($N = 30,274$), leaving 283,086 colonoscopies performed in as many patients. We then identified colonoscopies performed for the purpose of colon cancer screening, which was defined as outpatient colonoscopies without a possible indication. A colonoscopy was excluded when the patient had anemia, gastrointestinal bleeding, abdominal pain, constipation, change in bowel habits, or other relevant diagnoses on the colonoscopy claim; a barium enema or abdominal computed tomographic scan; or a diagnosis of diverticulitis, anemia, gastrointestinal bleeding, change in bowel habits, or other relevant diagnosis during the 3 months before the colonoscopy (see [Supplementary](#)

[Appendix](#) for full list).¹⁰ Of the 283,086 colonoscopies analyzed, 57,597 were identified as screening colonoscopies. As we previously discussed,^{10,11} the sensitivity of this estimate of screening colonoscopy is conservative compared with estimates that use chart review¹⁶ but should have excellent specificity.

Measures

Beneficiary characteristics. We captured age, sex, and ethnicity by using Medicare beneficiary summary files. We used the Medicaid indicator as a proxy of low socioeconomic status. Rural or urban residence was based on the 2003 Rural-Urban Continuum Codes developed by the U.S. Department of Agriculture. The education level at the zip code of residence was obtained from the 2011 American Community Survey estimates of the U.S. Census. Residential hospital referral region (HRR) was identified by the zip code-HRR crosswalk obtained from the Dartmouth Atlas of Health Care.¹⁷

Colonoscopist characteristics. We identified colonoscopist gender, years in practice, and U.S.-trained vs foreign-trained by using the American Medical Association files. Provider specialty was based on Part B claims in the Medicare Carrier files. Our data source is a 5% national sample of Medicare beneficiaries, so we defined the volume as the number of outpatient colonoscopies performed by the colonoscopist in the year of the patient's colonoscopy, multiplied by 20.

Hospital referral region characteristics. The Medicare standardized per capita cost by HRR in 2009 was obtained from the Institute of Medicine.¹⁸ For colonoscopist availability in an HRR, we first identified providers with any colonoscopy billing from the Carrier and OutSAF data ($N = 24,160$) and then removed any duplicate billings for the same beneficiary on the same date to determine the number of colonoscopy billings in 2008-2010 for each provider. To exclude providers who rarely performed colonoscopies, we selected those with at least 4 billings (equivalent to >80 colonoscopies in the 100% Medicare data) during the 3 years of the study period, resulting in 18,179 colonoscopists. A colonoscopist was considered to be available in all HRRs with which he or she billed. Availability was presented as the number of colonoscopists per 10,000 beneficiaries aged 65+ years in the HRR for 2009. The percentages of female and older residents (age 75 years or older) in the HRR were computed from the 2009 population estimates from the Dartmouth Institute.¹⁷

Study Outcomes

We estimated life expectancy by using a sex-specific model developed by Tan et al¹⁵ combining age and Elixhauser comorbidity. For each patient, the claims in the year before colonoscopy were examined for the 31 conditions comprising the Elixhauser comorbidity index

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