

Population-based prevalence estimates of history of colonoscopy or sigmoidoscopy: review and analysis of recent trends

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Background: Lower GI endoscopy, such as colonoscopy or sigmoidoscopy, is thought to have a substantial impact on colorectal cancer incidence and mortality through detection and removal of precancerous lesions and early cancers. We aimed to review prevalence estimates of history of colonoscopy or sigmoidoscopy in the general population and to analyze recent trends.

Methods: A systematic review of the medical literature, including MEDLINE (1966 to August 2008) and EMBASE (1980 to August 2008), was undertaken, supplemented by searches of the European Health Interview & Health Examination Surveys database and bibliographies. Detailed age-specific and sex-specific prevalence estimates from the United States were obtained from the Behavioral Risk Factor Surveillance System surveys 2002, 2004, and 2006.

Results: The search yielded 55 studies that met our inclusion criteria. The majority of the reports (43) originated from the United States. Other countries of origin included Australia (2), Austria (2), Canada (5), France (1), Germany (1), and Greece (1). Estimates from the United States were generally increasing over time up to 56% (2006) for lifetime use of colonoscopy or sigmoidoscopy in people aged 50 years and older. Analysis of national survey data showed higher prevalences among men aged 55 years and older than for women of the same age. Prevalences were highest for people aged 70 to 79 years.

Conclusion: Data from outside the United States were extremely limited. Prevalence estimates from the United States indicate that a considerable and increasing proportion of the population at risk has had at least 1 colonoscopy or sigmoidoscopy in their lives, although differences between age and sex groups persist. Prevalences of previous colonoscopy or sigmoidoscopy need to be taken into account in the interpretation of time trends in, and variation across, populations of colorectal cancer incidence and mortality. (*Gastrointest Endosc* 2010;71:366-381.)

Colorectal cancer (CRC) ranks fourth in men and third in women for cancer incidence worldwide, with the highest incidence rates being reported from North America, Australia/New Zealand, Western Europe, and Japan.¹ The risk of developing CRC rises exponentially for people over the age of 50 years; however, the development from premalignant adenoma to invasive cancer is a long-term, multiple-step process, which makes the disease pre-

ventable. Moreover, if the disease is detected in an early stage, curative treatment is possible.

There is increasing evidence, although mostly restricted to observational studies, that lower GI endoscopy has the potential to prevent a large proportion of incident cases and deaths from CRC through detection and removal of precancerous lesions and early cancers.²⁻⁷ Since the mid 1990s, several expert panels have recommended both colonoscopy and sigmoidoscopy as a primary CRC screening test every 10 years or every 5 years, respectively, for people aged 50 years and older.⁸⁻¹⁰

Besides being used as primary screening interventions, colonoscopies are used in the work-up of positive alternative CRC screening tests as well as in the diagnostics and surveillance of other bowel diseases. Thus, as numerous colonoscopies that lead to detection and removal of precancerous lesions are performed outside of screening programs, the prevalence of the history of colonoscopy in the general population is an important measure of the degree of CRC prevention and informs

Abbreviations: BRFSS, Behavioral Risk Factor Surveillance System; CRC, colorectal cancer; HINTS, Health Information National Trends Survey; HIS/HES, European Health Interview & Health Examination Survey; NHIS, National Health Interview Survey.

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implementation as well as evaluation of screening programs in public health policy. In contrast to population-based prevalences of previous endoscopy, attendance rates of endoscopy-based CRC screening programs, which are often reported to be low, do not reflect the full level of protection from CRC in a population. They omit tests which have been performed primarily for diagnostic purposes (ie, not in the context of a screening program).

Our aim was to review reports of prevalence estimates for lifetime and recent use of lower GI endoscopy in the general population with a focus on colonoscopy. Moreover, data from the United States Behavioral Risk Factor Surveillance System (BRFSS) surveys were analyzed, which allowed us to estimate detailed and comparable nationally representative prevalences of such use in the years 2002, 2004, and 2006.

MATERIALS AND METHODS

Review

An electronic literature search was conducted via MEDLINE, MEDLINE Daily Update, and EMBASE (all from inception to August 30, 2008) to identify reports of lower GI endoscopy prevalences in the general population. The following search strategy was applied: (“colonoscopy” OR “sigmoidoscopy” OR (“colon” OR “colorectal”) AND (“endoscop\$” or “examinat\$”))) AND (((“population” OR “community”) AND “based”) OR “cross sectional” OR (“surveillance” AND (“scheme” or “system”)) OR (“health” AND “survey”) OR “regist\$” OR “prevalence” OR “utilisation” OR “utilization”). Keywords as well as medical subject headings were used to search for population-based studies of the general average-risk population, which were eligible for inclusion if they reported prevalence estimates of lifetime or recent lower GI endoscopy. Moreover, the European Health Interview & Health Examination Surveys (HIS/HES) database was searched on October 23, 2008, for survey questions concerning lower GI endoscopy utilization in European health surveys. This database presents an inventory of national or multiple-country health surveys implemented in European countries, the United States, Canada, and Australia. When relevant questions could be identified, survey Web sites were checked, or the survey office was contacted in order to obtain relevant data. Further, reference lists of all included reports were checked for additional relevant studies.

Estimates of sigmoidoscopy use were included if the outcome was reported as a composite with colonoscopy (ie, “colonoscopy or sigmoidoscopy”). Accordingly, estimates of proctoscopy use were included if the outcome was reported as a composite with colonoscopy and sigmoidoscopy (ie, “colonoscopy or sigmoidoscopy or proctoscopy”). Because we aimed to focus on colonoscopy, reports of merely sigmoidoscopy or proctoscopy estimates alone were not included. We further excluded study populations that mainly comprised high-risk participants with regard to CRC, such

as patients with inflammatory bowel diseases or familial cancer histories. Furthermore, we limited the inclusion to studies with a sample size of at least 150. Language restrictions were not applied. Study eligibility was assessed independently by 2 observers, and disagreements were resolved through discussion or by a third observer. When unweighted/unadjusted and weighted/adjusted outcome data were reported in an article, only weighted/adjusted estimates are reported here. Accordingly, when state-based and national outcome data were reported, only the national data are reported here.

Analysis of recent trends in the United States

In order to explore the time trend in prevalences and to obtain more detailed information on differences in estimates by age and sex, recent data from the BRFSS were analyzed. The BRFSS is an annual, population-based, random-digit-dialed telephone survey of the noninstitutionalized, U.S. civilian population aged 18 years and older. It is conducted by the Centers for Disease Control and Prevention. In the years 2002, 2004, and 2006, nationwide survey data on colorectal cancer screening were available including the 50 U.S. states, the District of Columbia, and U.S. territories Puerto Rico, Guam, and U.S. Virgin Islands (except Hawaii in 2004, and Guam in 2004 and 2006).¹¹ The median state response rate, according to the Council of American Survey and Research Organizations guidelines, was 58.3% in 2002, 52.7% in 2004, and 51.4% in 2006. Respondents aged 50 years and older were asked the following questions, which are analyzed in this study: “Sigmoidoscopy and colonoscopy are exams in which a tube is inserted in the rectum to view the colon (2002)/bowel (2004, 2006) for signs of cancer or other health problems. Have you ever had either of these exams?” and “How long has it been since you had your last sigmoidoscopy or colonoscopy?” The response options were identical in each year (“Yes,” “No,” “Don’t know/Not sure,” “Refused;” “Within the past year (anytime less than 12 months ago),” “Within the past 2 years (1 year but less than 2 years ago),” “Within the past 5 years (2 years but less than 5 years ago),” “Within the past 10 years (5 years but less than 10 years ago),” “10 or more years ago,” “Don’t know/Not sure,” “Refused”). Data were weighted to the sex, racial/ethnic, and age distribution of each state’s adult population. The weights adjust for differences in probability of selection and non-response. Prevalence estimates of lifetime use and use within the past 10 or 5 years of lower GI endoscopy were calculated by using SAS 9.2 (SAS Institute Inc, Cary, NC) and accounting for the complex survey design.

The precision of the various point estimates of prevalence was considered outside the scope of this study, because describing the estimated prevalence of GI endoscopy was the main goal of this report, without trying to ascribe any prevalence levels to any populations other than those described by the individual primary data sources.

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