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Reducing Racial And Ethnic Disparities In Colorectal Cancer Screening Is Likely To Require More Than Access To Care

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Abstract

Colorectal endoscopy, an effective screening intervention for colorectal cancer, is recommended for people age fifty or older, or earlier for those at higher risk. Rates of colorectal endoscopy are still far below those recommended by the US Preventive Services Task Force. This study examined whether factors such as the supply of gastroenterologists and the proportion of the local population without health insurance coverage were related to the likelihood of having the procedure, and whether these factors explained racial and ethnic differences in colorectal endoscopy. We found evidence that improving access to health care at the county and individual levels through expanded health insurance coverage could improve colorectal endoscopy use but might not be sufficient to reduce racial and ethnic disparities in colorectal cancer screening. Policy action to address these disparities will need to consider other structural and cultural factors that may be inhibiting colorectal cancer screening.

Colorectal endoscopy, an effective screening intervention for colorectal cancer, is recommended for people age fifty or older, or earlier for those at higher risk.^{1–3} However, rates of colorectal endoscopy are still far below those recommended by the US Preventive Services Task Force. Among the nearly 100 million US adults age fifty or older, only about half have ever undergone screening endoscopy.^{3,4} A further concern is that endoscopy utilization rates for racial and ethnic minorities and low-income groups are even lower than for the US adult population as a whole.^{5–11}

Attempts to explain disparities in colorectal screening among racial and ethnic minority populations have focused on the contributions of health insurance coverage and health services use. However, those factors have been deemed insufficient explanations for racial and ethnic disparities in colorectal cancer screening.^{12–15}

More recent studies have begun to look beyond individual-level indicators of access to care and have examined geographic factors in use of the procedure.^{16–18} A better understanding of the role of community and policy barriers in colorectal cancer screening is important in evaluating the relative importance of these barriers and designing policy solutions to increase the use of colorectal endoscopy, particularly among minority populations.

The growing recognition that macro-level forces shape screening has not been matched by sufficient evidence to understand how structural and organizational characteristics influence screening and shape disparities in screening.^{19,20} Numerous studies of the association between area-level socioeconomic status and cancer screening have been conducted, but the results have been mixed, largely as a result of variations in research design or conceptual frameworks.^{21–27}

Recent work in this area has found that although the poverty level of a given community is an important factor contributing to an individual's decision to undergo cancer screening, these aggregate measures of socioeconomic status have been unable to fully explain geographic variation in screening.^{28,29}

A growing trend in the research literature has been the study of policy-modifiable community-level factors. For example, the effects of managed care activity within a defined geographic area could also affect the availability of services and physicians' behavior, in part because screening facilities need to operate at near full capacity to recover their fixed costs.^{30–32} Thus, large uninsured populations in a community could put substantial financial pressure on screening facilities and providers in that community.³³

Another area of inquiry has been whether the supply of primary care physicians, surgeons, and medical oncologists influences the quantity and quality of colorectal cancer care.^{34–37}

This study examined whether policy-modifiable, contextual factors such as the supply of gastroenterologists and the proportion of the local population without health insurance coverage were related to the likelihood of having a colorectal endoscopy. It also examined whether racial and ethnic differences in colorectal endoscopy could be explained by these factors.

Study Data And Methods

DATA SOURCES

We used two sources of data for this study. The National Health Interview Survey is an annual survey of the US non-institutionalized adult population. This survey is widely considered the leading source of information on health behavior and screening in the United States.³⁸ We used survey data for the years 2000 and 2005, when supplemental data on cancer screening and related factors were collected.

Our second source of data, the Area Resource File, provided information about characteristics of the counties in which individual respondents to the National Health Interview Survey resided. The Area Resource File was linked to the National Health Interview Survey data through the National Center for Health Statistics Research Data Center using a code that identifies each county.

We restricted our analysis to people without a personal history of cancer, people age fifty or older, and people age forty or older if there was a family history of colorectal cancer. Further details about the methodology and study results can be found in the online Appendix.³⁹ Institutional Review Board approval was granted for this study by the University of Nebraska Medical Center.

OUTCOME MEASURES

The main outcome measure in this study was that a respondent reported a colorectal endoscopy exam (1 = affirmative report of ever having a colorectal endoscopy exam, 0 = report of never having a colorectal endoscopy exam). Current guidelines of the US

Preventive Services Task Force recommend that people age fifty or older who do not have a family history of colorectal cancer or other risk factors get an endoscopy exam every ten years. People with a family history of colorectal cancer are recommended to start endoscopy screening at age forty.^{3,38} This outcome measure is regularly used by authorities, including the Centers for Disease Control and Prevention and the American Cancer Society, to provide official estimates of colorectal endoscopy screening in the United States.^{3,4}

OTHER VARIABLES

Race or ethnicity was measured using the following categories: white (reference group), African American, Hispanic/Latino, and other race or ethnicity (which includes Asian Americans and American Indian/Alaska Natives). We also measured age, sex, marital status, education, income levels relative to poverty, family history of colorectal cancer, health insurance coverage, access to a usual source of care, and the existence of any transportation barriers to seeing a doctor.

It was important to select contextual variables that have the potential to be modifiable by health policy. Thus, this study used two such factors that could directly affect providers' or patients' behavior.

The first was the number of gastroenterologists in a county per 100,000 people living in the county, measured continuously and in categories (0, 1–2, 3 or more). The second measured the proportion of the local population without health insurance coverage, measured continuously and in categories (low: 0–9.9 percent, mid: 10–19.9 percent, high: 20 percent or more).

LIMITATIONS

We used county-level factors to measure the community context. Contextual analysis is challenging because the best unit of analysis may vary according to the focus of the study. For example, smaller units such as census blocks are better for measuring aspects of social organization (such as social norms), while larger units are better for measuring the supply of medical resources.²⁴

The county level was chosen because counties can best capture the diversity of factors that influence health in a given area, and counties have government entities that drive policy on the organization of social and health services. However, one limitation of the study is that the market for endoscopy screening services is not necessarily structured around counties, but instead may be structured around health service areas, which are not available in the current linked data. Another limitation of the contextual data was that they did not include a measure for the supply of colorectal surgeons, surgical specialists who perform colorectal endoscopy exams.

The findings should be interpreted with the understanding that survey responses regarding colorectal endoscopy are subject to reporting bias. Individuals may not accurately report the mode of colorectal endoscopy exam or the specific date that the exam was administered. Furthermore, this survey did not differentiate between colorectal endoscopies conducted for screening versus diagnostic purposes. Despite these limitations, government agencies and other organizations regularly use the outcome measures and data used in this study to report on progress in colorectal screening adherence in the United States.^{3,4}

Study Results

The distribution of respondents reporting colorectal endoscopy exams between 2000 and 2005 by racial and ethnic groups is shown in Exhibit 1. Overall, only 42 percent of the

population of people age fifty or older without a personal history of cancer, or those age forty or older with a family history of colorectal cancer, on average, reported ever getting a colorectal endoscopy exam during the study period.

We found that there were differences by racial and ethnic groups. Whites were the largest group reporting a colorectal endoscopy exam (44 percent of those in the categories described above), followed by African Americans (36 percent) and Hispanics (28 percent). Hispanics were much more likely to live in counties with the highest levels of uninsurance (47 percent), in stark contrast to whites (6 percent).

Whites had the highest percentage of people living in an area without a gastroenterologist (22 percent) and the lowest percentage of people living in an area with a high supply of gastroenterologists (55 percent). In further analyses (not shown), this finding was largely due to differences in the racial and ethnic distribution by rural and urban location.

The main findings from the multivariate analyses are shown in Exhibit 2. Racial and ethnic disparities were apparent in initial models that accounted for age, sex, family history of colorectal cancer, and marital status. African American, Hispanic, and other racial and ethnic groups were less likely than whites ever to have undergone a colorectal endoscopy (see the Appendix).³⁹ However, after we added an adjustment for socioeconomic status, the disparity in colorectal endoscopy use disappeared between African Americans and whites.

At the same time, even after individual-level access to a usual source of care and having health insurance were accounted for, the disparities in endoscopy use persisted between whites and Hispanics or people of other race or ethnicity.

Next, we added adjustments for contextual indicators that describe cancer-relevant health services in the community, including the supply of gastroenterologists and the local health insurance market. These contextual variables slightly reduced but did not eliminate the disparities in endoscopy exams for Hispanics (odds ratio: 0.80) and people of other race or ethnicity (odds ratio: 0.62; Exhibit 2).

However, both of these contextual measures of local health services were associated with the likelihood of undergoing a colorectal endoscopy exam. Respondents living in areas characterized by moderate (odds ratio: 0.87) and high levels of uninsurance (odds ratio: 0.70) were less likely than others to report a colorectal exam, net of other contributing factors. People living in areas with a high supply of gastroenterologists, defined here as three or more per 100,000, were more likely to report a colorectal endoscopy exam (odds ratio: 1.15) than people living in areas with a lower concentration of gastroenterologists.

Discussion

Colorectal screening and diagnostic procedures at present generally must be performed by a specialized physician. Our study was able to identify a target for the number of gastroenterologists to improve the uptake of colorectal endoscopy exams. We found that at least three gastroenterologists per 100,000 people could yield significantly higher colorectal exam rates.

Our finding that the supply of gastroenterologists can positively influence the overall rate of colorectal endoscopy screening is consistent with prior work. There appears to be growing evidence that increasing the supply of professionals qualified to conduct colonoscopies is a modifiable factor that can improve colorectal cancer screening.^{34–37}

We also found that the health insurance market was important in shaping endoscopy screening for colorectal cancer. Areas characterized by high levels of uninsurance are unlikely to be attractive locations for screening and diagnostic services because facilities need a relatively large number of patients to recover costs.^{32,33} By extension, it is possible that the negative impact of uninsurance could extend to everyone in the community, regardless of individual health insurance status.³³

Thus, health insurance seems to be related to colorectal cancer screening by increasing the likelihood that a local community will be able to sustain an appropriate level of colorectal cancer screening facilities. Therefore, the health insurance market of a community may be a modifiable factor to use in focusing public policy efforts on improving colorectal cancer screening, and perhaps other forms of preventive screening for the general population.

Our study also attempted to explain racial and ethnic disparities in colorectal endoscopy use. We discovered that various factors, including access to care as measured by individual-level health insurance coverage, access to a usual source of care, and transportation barriers, along with county-level indicators of access such as the supply of gastroenterologists and the health insurance market, were unable to fully explain disparities. This finding is also consistent with conclusions from recent studies.^{12–15,28–36}

Specifically, our finding that the supply of gastroenterologists was unable to substantially explain racial and ethnic disparities was similar to conclusions reached in prior research studies.^{35,36} However, a recent study using Texas Medicare claims data found that increased supply of colonoscopists and primary care physicians was associated with higher screening colonoscopy uptake among whites and lower uptake among racial and ethnic minorities.³⁷

The strength of this study, compared to other studies, was its ability to clearly differentiate screening colonoscopies versus colonoscopies for diagnostic purposes and other colorectal screening and diagnostic modalities. However, the study population was restricted to people age sixty-five or older living in Texas, which is not generalizable to the population group that is recommended for screening (people age fifty or older, or people age forty or older with a family history of colorectal cancer).

Therefore, there is still a need for analysis of generalizable data on the recommended screening population using measures that can differentiate colonoscopies for screening versus diagnostic purposes.

Despite our ability to measure and account for numerous factors that may influence the likelihood of undergoing a colorectal exam, we found persistent disparities that need further research. The only factor that was able to account to any great degree for racial disparities was individual-level socioeconomic status. Accounting for this factor substantially reduced the disparity for Hispanics and other racial and ethnic groups (Asian Americans and American Indian/Alaska Natives) and eliminated the disparity for African Americans.

This finding suggests that something beyond structural features of access to care, or socioeconomic status, may be responsible for disparities in colorectal cancer screening. It also is consistent with conclusions from other studies.^{35,36}

Some recent studies provide excellent insight into this problem. A recent qualitative study provided some explanation about how context may shape colorectal cancer disparities. In particular, the perception of risk for developing cancer may be shaped by the specific geographic context in which people live, which in turn influences health behaviors that include the likelihood of seeking appropriate colorectal cancer screening.⁴⁰ In such a case, even if an individual had health insurance coverage, that person might not seek out

colorectal cancer screening because of other structural or cultural barriers such as fear of medical encounters, stigma of colorectal endoscopy, low levels of health literacy, or lack of paid leave from work.

The findings from another recent study that examined the persistent disparity in colorectal cancer screening for Hispanics suggested that high levels of fatalism and low levels of health literacy might be responsible for low levels of colorectal cancer screening, at least among low-income Hispanics.⁴¹ Future research in this area may benefit from exploring how perceptions of risk and health literacy among racial and ethnic groups contribute to the likelihood of one's being screened for colorectal cancer.

Policy Implications

The major focus of recent health reform efforts, including the Affordable Care Act, is to reduce the number of uninsured people. Our results demonstrated a stark problem related to the county distribution of the uninsured by racial and ethnic groups: Hispanics are disproportionately more likely than others to live in areas with the highest levels of uninsurance. If the structure of the local health insurance market is a factor that may affect individuals within the market, as our study and the previous literature suggests, then this finding could be further justification for policy attention to reducing disparities in the geographic distribution of health insurance coverage.

In addition to efforts that would increase the size of the primary care workforce, the supply of specialized physicians or others qualified to perform colorectal endoscopies should receive further attention from policy makers. Policy actions could include the identification of incentives for health care providers to perform endoscopies in underserved areas, especially for markets where it might not be feasible to locate a specialized physician practice. Incentives could be designed to facilitate screening of populations either by transporting the patients to clinics; by reimbursing physicians more to perform procedures within underserved areas; or by using other arrangements. Another possibility is training other health care providers who could conduct colorectal endoscopy exams under the supervision of a gastroenterologist via telemedicine or other means.

An analysis of the supply of gastroenterologists concluded that increased demand for colorectal endoscopies created by the aging population and improved colorectal screening efforts will result in a shortfall of more than 1,500 gastroenterologists by 2020.⁴² Even if emerging technologies take hold that reduce the need for colorectal endoscopies as a screening method, such as computed tomographic colonography, DNA testing, and wireless capsules, there will still be a need for specialized physicians or others trained to perform colonoscopies as a follow-up procedure for positive test results and to remove polyps.

There have been numerous policy attempts to reduce health disparities among minority and underserved populations. These include better data collection on these subgroups, improved access to preventive care, improved cultural competency of health care providers, increased supply of providers in underserved communities, and increased attention to ending insurance discrimination. The combination of these policy efforts should be monitored for its effect on reducing cancer incidence among racial and ethnic groups by increasing the use of evidence-based cancer prevention interventions such as colorectal endoscopies.

Conclusion

Colorectal endoscopy exams save lives and are effective screening interventions for early detection and treatment of colorectal cancer.^{1,2} However, the overall rate of endoscopy

screening is still very low, with less than half the eligible population ever having undergone an exam.^{3,4}

We found evidence that improving access to health care at the county and individual levels through expanding health insurance coverage could be a policy mechanism for improving colorectal endoscopy use. However, improving access to care might not be sufficient to reduce racial and ethnic disparities in colorectal cancer screening, because other cultural and structural factors may be inhibiting screening, such as the stigma of colorectal endoscopy, fear of medical encounters, low levels of health literacy, or lack of paid leave from work. Additional measures are likely to be needed, including improved cultural competency of providers, patient navigators, and granting workers paid leave to obtain screening and diagnostic testing.

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Biographies



Jim P. Stimpson is an associate professor in the Department of Health Services Research and Administration, University of Nebraska Medical Center.

In this month's *Health Affairs*, Jim Stimpson and coauthors probe why rates of colorectal endoscopy for colon cancer screening purposes are still far below those recommended by the US Preventive Services Task Force, and what explained racial and ethnic differences in screening. They found evidence that improving access to health care at the county and individual levels through expanded health insurance coverage could improve colorectal endoscopy use. However, this intervention might not reduce racial and ethnic disparities because other cultural and structural factors may be inhibiting screening. The authors assert that other policy interventions may be needed, such as improved cultural competency of providers, patient navigators, increasing the supply of providers in underserved areas who can perform colorectal endoscopy exams, and granting workers paid leave to obtain screening and diagnostic testing.

Stimpson is an associate professor in the Department of Health Services Research and Administration and director of the Center for Health Policy at the University of Nebraska Medical Center. His research focuses on the social determinants of health outcomes and use

of health services, and he is principal investigator of a National Cancer Institute grant examining the community context of disparities in colorectal cancer screening.

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Pagán was a Robert Wood Johnson Foundation Health and Society Scholar at the University of Pennsylvania and received a 2006 Robert Wood Johnson Foundation Investigator Award in Health Policy Research. He is the principal investigator of a Health Care Innovation Award from the Centers for Medicare and Medicaid Services to improve transitional care. He received a doctorate in economics from the University of New Mexico.



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Chen's research interests include cost and use of health care, public health services and systems research, and comparative effectiveness research. He is the co-principal investigator of the Nebraska Public Health Practice-Based Research Network funded by the Robert Wood Johnson Foundation. Chen received a doctorate in health policy and administration from Pennsylvania State University and a master's degree in health services administration from the University of Michigan.

Exhibit 1
 Distribution Of Colorectal Endoscopies, By Race And Ethnicity And Contextual Factors, Unadjusted, 2000–05

Race/ethnicity	County level without health insurance					Gastroenterologists			
	Had colorectal endoscopy (%)	Percent			Mean no. per 100,000	Percent			
		Mean	Low	Mid		High	0	1–2	3+
Overall	42	13.76	22	67	11	3.91	19	23	58
White	44	12.92	26	68	6	3.81	22	23	55
African American	36	15.68	7	77	16	4.43	14	19	67
Hispanic/Latino	28	19.37	3	50	47	3.99	8	21	71
Other race or ethnicity	31	15.18	11	72	17	4.52	6	20	74

SOURCES National Health Interview Survey and Area Resource File. **NOTES** Analyses were adjusted for sample weights and clustering effects and were restricted to people age fifty or older without a personal history of cancer or those age forty or older with a family history of colorectal cancer. County level without health insurance: low = 0–9.9 percent, mid = 10–19.9 percent, high = 20+ percent. Statistically significant differences compared to white using Rao-Scott chi-square test.

** $p < 0.05$

**** $p < 0.001$

Exhibit 2**Regression Results: Effects Of Race And Ethnicity And Contextual Factors On Colorectal Endoscopies, 2000–05**

	Odds ratio	
	Model 1	Model 2
Race/ethnicity		
White (reference)	1.00	1.00
African American	0.93	0.95
Hispanic/Latino	0.74***	0.80**
Other race or ethnicity	0.61***	0.62****
PROPORTION OF COUNTY RESIDENTS WITHOUT HEALTH INSURANCE		
0–9.9% (reference)	— ^a	1.00
10–19.9%	— ^a	0.87**
20% or more	— ^a	0.70****
NUMBER OF GASTROENTEROLOGISTS IN A COUNTY PER 100,000 RESIDENTS		
0 (reference)	— ^a	1.00
1–2	— ^a	1.02
3 or more	— ^a	1.15**

SOURCES National Health Interview Survey and Area Resource File. **NOTES** Analyses were adjusted for sample weights and clustering effects and were restricted to people age fifty or older without a personal history of cancer or those age forty or older with a family history of colorectal cancer. Odds ratios were adjusted for sample weights, clustering effects, survey year, age, sex, family history of colorectal cancer, marital status, education, income-to-poverty ratio, usual source of care, transportation barrier, and health insurance. Model 1 is reduced model without all variables; model 2 is full model with all variables included.

^a Not applicable.

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 $p < 0:05$

 $p < 0:001$