Managed Health Care and Utilization of Fecal Occult Blood Testing for Colorectal Cancer Screening: a National Database Study

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Abbreviations

HMO	Health maintenance organization
USPSTF	United States Preventive Services Task Force

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INTRODUCTION

The United States Preventive Services Task Force (USPSTF) recommends colorectal cancer screening in adults aged 50 to 75 using either fecal occult blood testing (including fecal immunochemical test) or lower endoscopy.¹ However, in 2015, less than two-thirds of eligible adults were compliant with these screening recommendations.²

The influence of health insurance on colorectal cancer screening uptake is unknown. Although certain managed care consortiums such as Kaiser Permanente have successfully implemented programmatic screening using fecal occult blood testing,³ the influence of managed care as an overall category of health insurance has not been examined in relation to colorectal cancer screening. The purpose of this study was to determine if state-level managed care market penetration was associated with increased prevalence of fecal occult blood testing (FOBT).

METHODS

This was a retrospective, national database study. Crude prevalence survey data from the biennial Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System were utilized to obtain state-level trends in the utilization of either FOBT or colonoscopy. State-level health maintenance organization (HMO) market penetration was obtained from the Kaiser Family Foundation. All data were obtained for 2016. Linear regression analysis was used to determine the association between any two particular variables.

RESULTS

During 2016, 67.8% of subjects surveyed nationally reported compliance with USPSTF recommendations for colorectal cancer screening. Overall, 8.7% of subjects reported receipt of FOBT in the past year, and 63.6% reported receipt of a colonoscopy within the past 10 years.

The national mean HMO market penetration was 24.5% (standard deviation = 13.6%), and state-level prevalence was variable (range 0.2–59.2%) (Table 1). HMO market penetration was positively correlated with utilization of FOBT at the state level ($R^2 = 0.36$, $p < 0.001$; see Fig. 1). There was no correlation between HMO market penetration and overall compliance with USPSTF recommendations for colorectal cancer screening ($R^2 = 0.0286$, $p = 0.12$), or between HMO market penetration and receipt of colonoscopy within the past 10 years ($R^2 = 0.0082$, $p = 0.27$).

DISCUSSION

Our analysis of national survey data indicates that despite relatively low utilization of FOBT, receipt of this low-cost screening test was more common in states with higher HMO market penetration. National variation in managed care has previously been associated with increased uptake of breast and cervical cancer screening.⁴ While the influence of HMO prevalence on colorectal cancer screening has been studied at the county-level,⁵ this is the first analysis of state-level data.

The etiology of our findings is unclear. Although one might expect that an increase in FOBT use would be associated with an overall increase in the proportion of screened patients, we found no such correlation. It is thus possible that HMOs are associated with increased enthusiasm for FOBT in lieu of colonoscopy. If this finding is corroborated in other studies, the mechanism for this effect should be explored to determine if this is related to patient or HMO preference, incentives from payers related to cost of care (FOBT is associated with lower clinical costs than colonoscopy⁶), or other factors.

The lack of subject-specific clinical information is the largest limitation of this study given our reliance on survey data. The surveys were also based on patient recollection of screening and modality, rather than objective clinical data. Data

Table 1 State-Level Prevalence of Colonoscopy, Fecal Occult Blood Test, and HMOs in 2016

State	HMO market penetration (%)	Colonoscopy in past 10 years (%)	Fecal occult blood test in past year (%)
Alabama	7.2	33.9	8.9
Alaska	0.2	62.2	7.3
Arizona	32.6	59.3	10.8
Arkansas	14.2	61.3	9.9
California	59.2	60.9	23.8
Colorado	16.6	62.9	9.2
Connecticut	7	73.4	8.9
Delaware	26.9	69.6	5.2
Florida	35.6	62.2	15.2
Georgia	27	58.3	12.8
Hawaii	58.2	63.9	19.9
Idaho	9.2	60	4.9
Illinois	24	61.5	5.2
Indiana	23.4	61	7.8
Iowa	9.3	66.1	5.8
Kansas	19.3	64.3	6.7
Kentucky	36.4	66	10.4
Louisiana	35.3	60.6	8.3
Maine	11.5	73.3	6.7
Maryland	34.2	66.6	9.2
Massachusetts	34.2	73.1	8.6
Michigan	38.9	67.2	8.7
Minnesota	26.1	70.3	6.1
Mississippi	25.7	57.7	8.8
Missouri	15.8	62.8	6.2
Montana	4.4	57.9	8
Nebraska	15.1	63.3	6.9
Nevada	37	58.1	10.2
New Hampshire	21.3	72.7	6.6
New Jersey	25	62.9	7.4
New Mexico	45.2	55.2	7.3
New York	35.6	66.2	7.4
North Carolina	7.6	69.6	9.2
North Dakota	18.5	62.2	5.8
Ohio	31.7	63.6	8.1
Oklahoma	7.1	55	9.2
Oregon	40.2	63.4	13.2
Pennsylvania	31.3	65.3	7.4
Rhode Island	32.6	71.5	7.8
South Carolina	24.3	66.8	7.6
South Dakota	12	63.5	7.3
Tennessee	32.3	62.8	9.6
Texas	24.7	56.1	8.7
Utah	30.3	70.5	2.8
Vermont	2.8	70.1	5.5
Virginia	20.4	67.6	7.8
Washington	31.5	64.2	12
West Virginia	29.8	63.3	10
Wisconsin	34.4	70.2	7.1
Wyoming	0.8	59.4	4.5

Fig 1. State-level HMO Insurance Status and Prevalence of Fecal Occult Blood Testing

regarding the results of FOBT, and whether positive results accounted for a portion of the recorded colonoscopies, were not available. Additionally, as an observational study, there is also the potential for selection bias. However, the use of a large, well-studied survey database is a strength in allowing us to examine national trends.

In conclusion, HMO market penetration at the state level was associated with increased utilization of FOBT for colorectal screening, with no difference in overall compliance with colorectal cancer screening. Our findings should lead to further research on mechanisms accounting for increase utilization of FOBT by HMOs, and relative efficacy and cost-effectiveness of FOBT by HMOs in comparison to other health insurers.

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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