

## Short Communication

# Does Health Insurance Coverage of Office Visits Influence Colorectal Cancer Testing?

Reuben K. Varghese,<sup>1</sup> Carol Friedman,<sup>3</sup> Faruque Ahmed,<sup>3</sup> Adele L. Franks,<sup>2</sup> Marsha Manning,<sup>4</sup> and Laura C. Seeff<sup>3</sup>

<sup>1</sup>Epidemic Intelligence Service Program, <sup>2</sup>Epidemiology Program Office, and <sup>3</sup>Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; and <sup>4</sup>Health Care Initiatives Unit, General Motors Corporation, Detroit, Michigan

### Abstract

**Objective:** To assess the effect of differing health insurance coverage of physician office visits on the use of colorectal cancer (CRC) tests among an employed and insured population.

**Method:** Cohort study of persons ages 50 to 64 years enrolled in fee-for-service (FFS) or preferred provider organization (PPO) health plans, where FFS plan enrollees bear disproportionate share of office visit coverage, for the period 1995 through 1999.

**Results:** Compared with FFS plans, enrollees in PPO plans were significantly more likely to obtain CRC tests [adjusted

relative risk (RR<sub>a</sub>), 1.27; 95% confidence intervals (CI), 1.21-1.24]. The association was more pronounced among hourly individuals (RR<sub>a</sub>, 1.43; 95% CI, 1.41-1.45) than among salaried individuals (RR<sub>a</sub>, 1.09; 95% CI, 1.05-1.10), consistent with a greater differential in office visit coverage among the hourly group.

**Conclusions:** Disproportionate cost-sharing seems to have a negative effect on the use of CRC tests most likely by discouraging nonacute care physician office visits. (Cancer Epidemiol Biomarkers Prev 2005;14(3):744-7)

### Introduction

Colorectal cancer (CRC) is the second leading cause of cancer-related death in the United States. The American Cancer Society estimates that 146,940 new CRC cases will be diagnosed and 56,730 CRC deaths will occur in 2004 (1). The economic cost of CRC is significant, totaling > \$6.5 billion/year (2). Fecal occult blood testing (FOBT), sigmoidoscopy, colonoscopy, and/or double-contrast barium enema (DCBE) have each been recommended as effective screening for persons ages >50 years at average CRC risk (3-5). Despite an increasing body of evidence that screening of asymptomatic persons significantly reduces incidence and mortality (6-9), the percentage of individuals who have been screened remains low (10-12).

One factor associated with decreased use of preventive services is disproportionate cost-sharing borne by health insurance enrollees, using mechanisms such as deductibles, copayments or coinsurance payments (13-16). It is estimated that >90% of persons with employer-sponsored fee-for-service (FFS) or preferred provider organization (PPO) insurance were subject to cost-sharing (14).

However, the impact of cost-sharing on CRC screening is not well-established. In this study, we evaluated the use of CRC testing among an employed population at General Motors Corporation (GM), with cost-sharing mechanisms that vary by pay and plan type.

### Materials and Methods

**Study Population.** The study population consists of persons who received health insurance through GM. GM is a large private purchaser of health insurance in the United States with >1 million covered lives. GM contracts with >120 HMOs and is self-insured through traditional (or FFS) and PPO health plans. Employees, retirees, and their dependents can enroll in HMO, PPO, or traditional health plans. The traditional plans are identified as "traditional" for hourly enrollees, and as the basic medical plan or enhanced medical plan for salaried enrollees. Traditional basic medical plan and enhanced medical plan plans differ in the degree of enrollee cost-sharing provisions with basic medical plans requiring the greatest out-of-pocket expenses for services used. Fifty percent of the workforce is enrolled in FFS, 31% in HMO, and 19% in PPO health insurance plans.

We did not include employees enrolled in HMO plans in the analysis because HMO encounter data are not maintained in the company's data warehouse. We also excluded enrollees in the basic medical plan because this coverage is only offered to salaried workers and accounts for <1% of the total enrollment. Additionally, we excluded employees aged  $\geq 65$  years from the analysis, as Medicare is the primary payer and most claims for these enrollees are not captured in the GM data warehouse.

**Benefit Structure of Health Plans.** From 1995 through 1999, the benefit structure of health plans for GM's active and retired hourly employees were determined through negotiations with the United Auto Workers and GM (Table 1). Active or retired hourly workers and their dependents enrolled in the FFS health insurance option had complete coverage, with no deductibles or coinsurance, for procedures, laboratory tests, and hospitalizations. However, they are responsible for paying the entire cost of an office visit regardless of the reason for the scheduled appointment. Active or retired hourly workers and

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**Requests for reprints:** Carol Friedman, Surveillance Research Section, Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Highway, MS K-53, Atlanta, GA 30341. Phone: 770-488-3180; Fax: 770-488-4759. E-mail: cxf7@cdc.gov

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**Table 1. Benefit structure of FFS and PPO plans by pay type**

	Hourly		Salaried	
	FFS	PPO	FFS	PPO
Deductible	None	None	*\$300-*\$600*	None
Coinsurance	None	None <sup>†</sup>	20%	10%
Office visit	0% coverage	50-70% coverage <sup>‡</sup>	80% coverage	90% coverage <sup>§</sup>
FOBT <sup>  </sup>	100% coverage	100% coverage	100% coverage	100% coverage
Sigmoidoscopy <sup>¶</sup>	0% coverage	0% coverage	0% coverage	0% coverage
Colonoscopy <sup>¶</sup>	0% coverage	0% coverage	0% coverage	0% coverage
DCBE <sup>¶</sup>	0% coverage	0% coverage	0% coverage	0% coverage

\*\*\$300 for individual coverage and \*\$600 for family coverage.

<sup>†</sup>80% coverage if enrollee goes out of approved network unless referred by network physician.

<sup>‡</sup>Plan-specific.

<sup>§</sup>70% coverage if out-of-network physicians used; enrollee pays the balance.

<sup>||</sup>Deductible and coinsurance provisions waived.

<sup>¶</sup>From 1995 through 1999, 100% covered if ordered for diagnostic purposes.

their dependents enrolled in PPO plans have no annual deductibles and coinsurance if they stay within the approved PPO network. If the enrollee goes out of the approved network, the plan pays 80% for out-of-network services and 50% to 70% of the cost of an office visit.

Salaried workers (active or retired) and their dependents enrolled in FFS plans have an annual deductible of \*\$300 to \*\$600 (individual versus family). Once the deductible is met, the FFS health plan pays 80% of the cost of each physician office visit. Salaried workers and their dependents enrolled in PPO health plans have no annual deductible and the plan pays 90% of the cost of each physician office visit if the enrollee stays within the approved network. If the enrollee goes out of the approved network, the plan pays 70% of the lesser charge or the PPO's fee schedule.

FOBT is a covered benefit for all enrollees regardless of plan enrollment or pay type and not subject to cost-sharing. From 1995 through 1999, flexible sigmoidoscopy, colonoscopy, and DCBE were covered health plan benefits if ordered for diagnostic purposes only (Table 1).

**Data Source.** We examined health claims data for individuals enrolled in the FFS and PPO health plans and their use of CRC testing services. Health claims data were linked with deidentified administrative files to provide information on enrollee age, marital status, race, ethnicity, education, plan type (PPO versus FFS), pay type (salary versus hourly), work status (active versus retired), employee status (employee versus dependent), and state of residence. Claims submission and payment mechanisms are similar for all PPO and FFS plans. Determination of type of CRC test use was based on a Health Plan Employer Data and Information Set performance measure designed to measure the use of CRC screening services (17). The Health Plan Employer Data and Information Set measure does not distinguish among the different CRC tests. FOBT use was defined as at least one claim for a home kit FOBT during the past year. Flexible sigmoidoscopy, colonoscopy, or DCBE use was defined as at least one claim for any one of these procedures in the past 5 years. The denominator (or eligible population) was comprised of all individuals ages 50 to 64 years as of December 31, 1999 who were enrolled in a FFS or PPO health plan during 1995 to 1999. The numerator was derived from the number of members in the denominator who had at least one colonoscopy, DCBE, flexible sigmoidoscopy claim during the past 5 years or one FOBT claim during the past year.

**Statistical Analyses.** Characteristics of enrollees in FFS and PPO plans were compared statistically using the  $\chi^2$  test. Previous research was used to guide the selection of variables for the analysis (3, 13, 16, 18). Factors associated with CRC test use were assessed using univariate and bivariate techniques. Multivariable logistic regression was done to adjust for

potential confounding. Because race and education information were missing for 14% and 23% of the records, respectively, we excluded these variables from the main multivariable models.

Effect modification was assessed by using interaction terms in multivariable logistic regression. To facilitate interpretation, adjusted odds ratios were converted to adjusted relative risk ratios (RR<sub>a</sub>; ref. 19). Two-tailed *P* values and 95% confidence intervals (CI) were calculated for all ratio measures. Regression analyses were done using SAS software (20).

## Results

Among 264,504 enrollees eligible for CRC tests, 177,683 (67%) were enrolled in FFS plans. Comparison of FFS and the PPO plans revealed that older age, being male, salaried pay type, and being retired were all significantly associated with enrollment in FFS plans. Geographic variation was also observed (Table 2).

Among 177,683 FFS enrollees eligible for CRC tests, 53% were male, 82% were married, 78% were hourly workers, and 63% were retired. Among 86,821 PPO enrollees eligible for CRC tests, 45% were male, 84% were married, 84% were hourly workers, and 42% were retired (Table 2).

CRC test receipt was significantly higher among persons enrolled in PPO plans compared with those enrolled in FFS plans (Table 3). Overall, the unadjusted CRC test use rate for persons enrolled in FFS plans was 29% compared with 37% for persons enrolled in PPO plans. Stratification by pay type showed that hourly enrollees in FFS plans had the lowest CRC test use rate (26%).

Simultaneous adjustment in multivariate models for characteristics unequally distributed between FFS and PPO plans showed that use of CRC tests by enrollees in PPO plans was 27% (RR<sub>a</sub>, 1.27; 95% CI, 1.25-1.28) higher compared with FFS plans (Table 3). The association between plan type and the use of CRC tests was modified by pay type. Among hourly enrollees, CRC test use was 43% higher in PPO plans compared with FFS plans (RR<sub>a</sub>, 1.43; 95% CI, 1.41-1.45); the association was significant but less pronounced among salaried workers (RR<sub>a</sub>, 1.09; 95% CI, 1.05-1.10).

## Discussion

Our findings indicate that in this employed and insured population, CRC test use was lower than expected based on previously reported national data, and that enrollment in plans with more generous coverage for office visits (PPO) was significantly associated with greater CRC test use when compared with plans with less generous coverage (FFS). This

finding is consistent with a prior study which showed that the use of cancer screening services among women in this same population was lower due to differences in health insurance coverage for office visits (16).

Potential barriers to CRC screening may include low consumer acceptance and beliefs, low provider recommendations, poor provider reimbursement, and lack of provider skill (3, 21, 22). Our study suggests another barrier to CRC screening: office visit cost-sharing.

One possible explanation for the low rates of CRC test use is that our study population may be less likely to be screened for cancer because of other comorbid conditions and/or receiving more care from specialists who may focus less on screening (18, 23, 24). However, this possibility could not be assessed. Another explanation could be that because our data is at least 5 years old, CRC tests may have increased.

Another potential barrier is that screening tests for CRC, with the exception of FOBT, were not covered benefits from 1995 through 1999 for GM enrollees. Low CRC screening test coverage is not unusual. However, evidence exists that physicians often manipulate reimbursement rules to help patients obtain coverage for screening not explicitly covered by health insurance (25), raising the possibility that CRC tests in our population were conducted for screening as well as for diagnostic purposes.

Our study had certain potential limitations. First, because we excluded race and education from the multivariate

**Table 2. Comparison of FFS and PFO plans for selected characteristics, 1995 to 1999**

Characteristic	FFS enrollees eligible for CRC tests* (n = 177,683)	PPO enrollees eligible for CRC tests (n = 86,821)
Age (years)		
50-54	32	45
55-59	35	37
60-64	34	18
Sex		
Male	53	45
Female	47	55
Marital Status		
Single	18	16
Married	82	84
Pay Type		
Hourly	78	84
Salaried	22	16
Employee Status		
Dependent	37	42
Employee	63	58
Work Status		
Active Enrollee	37	58
Retired Enrollee	63	42
Race		
White	67	78
Black	14	11
Other <sup>†</sup>	3	2
Unknown <sup>‡</sup>	16	9
Education		
<High School	19	11
High School	47	61
College	9	8
Unknown <sup>§</sup>	25	20
State of Residence		
Indiana	7	22
Michigan	43	33
Ohio	13	20
Other states (44)	37	25

NOTE: Numbers represent percent unless otherwise indicated.

\*P < 0.001 for PPO versus FFS comparison for all variables listed in the table.

<sup>†</sup>Other includes Hispanic, Native American/Alaskan Native, Pacific Islander, or Asian.

<sup>‡</sup>35,726 records with missing race information.

<sup>§</sup>61,495 records with missing education information.

**Table 3. Association between health plan type and CRC test use, overall and by pay type\***

Type of Health Plan	CRC Test Use	
	Percentage (No./total no.)	Adjusted RR <sub>a</sub> (95% CI) <sup>†</sup>
Overall		
FFS	29 (51,899/177,683)	1.00 (referent)
PPO	37 (32,081/86,821)	1.27 (1.25, 1.28)
By Pay Type		
Hourly		
FFS	26 (35,890/137,924)	1.00 (referent)
PPO	36 (26,194/73,009)	1.43 (1.41, 1.45)
Salary		
FFS	40 (16,009/39,759)	1.00 (referent)
PPO	43 (5,887/13,812)	1.09 (1.05, 1.10)

\*CRC test use = use of any one of the following: FOBT (past year), sigmoidoscopy (past 5 years), colonoscopy (past 5 years), or DCBE (past 5 years).

<sup>†</sup>Adjusted for age, sex, marital status, plan type, and state of residence. Adjusted odds ratios from logistic regression models were converted to RR<sub>a,s</sub> based on the method by Flanders and Rhodes (19).

models, we were concerned this could bias the association between plan type and CRC test use. However, when we included missing race and education variables as a separate category coded as unknown, the findings were similar to those displayed in Table 3 (results available upon request). Furthermore, for the subset of records with complete race and education information, logistic regression models for CRC test use indicated similar point estimates for the association with plan type, both with and without race and education. Second, claims data might underestimate preventive service use, such as home kit FOBT, if these services were not separately reimbursed. However, as a routine, reimbursable test, it is unlikely that GM enrollees and their clinicians would regularly fail to submit FOBT claims. Also, procedure claims are generally considered accurate compared with physician evaluation and management services claims (26). However, we cannot rule out the possibility that a procedure was done but no claim submitted. Third, underestimation could also occur if enrollees with dual insurance coverage submitted claims elsewhere; excluding Medicare-eligible enrollees should have minimized this source of bias. Fourth, CRC test use could be underestimated in persons ages 55 to 59 and 60 to 64 years for the time period studied because colonoscopy and DCBE have recommended screening intervals up to 10 years starting at age 50 years. However, CRC test receipt among persons aged 50 to 54 years was also low. It should be noted that the association between CRC test use and plan type would not be biased because the potential underreporting is expected to be similar between the plan types. Finally, an observational study such as ours cannot rule out the possibility that unmeasured factors could partially explain the results. However, it is unlikely that the stronger association between plan type and CRC test use among hourly workers than among salaried workers could be explained by unmeasured differences between FFS and PPO enrollees.

The benefits of CRC screening are well established, yet screening remains low at least in part due to the effects of cost-sharing in this study despite rich health insurance benefits. Public health officials should engage policy makers and employers about the low proportion receiving CRC screening and potential interventions to increase screening. Furthermore, policy makers and employers reviewing health care benefits should consider reducing or eliminating cost-sharing for office visits for preventive services, and encourage employees to select high-quality health plans providing coverage for these services, as a means to encourage preventive service use.

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