Insurance Coverage

Coverage and Preventive Screening

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Context. Preventive care has been shown as a high-value health care service. Many employers now offer expanded coverage of preventive care to encourage utilization.

Objective. To determine whether expanding coverage is an effective means to encourage utilization.

Design. Comparison of screening rates before and after introduction of deductible-free coverage.

Setting. People insured through large corporations between 2002 and 2006.

Patients or Other Participants. Preferred Provider Organization (PPO) enrollees from an employer introducing deductible-free coverage, and a control group enrolled in a PPO from a second employer with no policy change.

Main Outcome Measures. Adjusted probability of endoscopy, fecal occult blood test (FOBT), lipid screens, mammography, and Papanicolaou (pap) smears.

Intervention. Introduction of first-dollar coverage (FDC) of preventive services in 2003.

Results. After adjusting for demographics and secular trends, there were between 23 and 78 additional uses per 1,000 eligible patients of covered preventive screens (lipid screens, pap smears, mammograms, and FOBT), with no significant changes in the control group or in a service without FDC (endoscopy).

Conclusions. FDC improves utilization modestly among healthy individuals, particularly those in lower deductible plans. Compliance with guidelines can be encouraged by lowering out-of-pocket costs, but patients' predisposing characteristics merit attention.

Key Words. Health care financing/insurance/premiums, evaluation design research, health care costs

A number of studies have examined the effects of cost sharing on preventive care. One early study found that higher cost sharing was associated with less cholesterol testing, mammography, and prostate examination (McWilliams et al. 2003). Other studies found that increased cost sharing was associated with a lower probability of receiving cancer screening (Friedman et al. 2002; Varghese et al. 2005; Trivedi, Rakowski, and Ayanian 2008). Still other studies found no association between cost sharing and use of preventive care

(Cherkin, Grothaus, and Wagner 1990; Tye et al. 2004; Rowe et al. 2008). Few studies, however, have examined specifically the effects of adding first-dollar preventive care coverage across a range of low- and high-deductible plans, despite the fact that many employers now offer such plans.

Recognizing that cost sharing may reduce utilization of important preventive care, Congress included in the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 a provision that allows firms to incorporate first-dollar coverage (FDC) of preventive care services in tax-preferred health savings account plans. FDC for preventive care means that insurers can provide coverage for preventive services without first requiring enrollees to meet the plan deductible. In 2004, the U.S. Internal Revenue Service clarified which preventive services would qualify under this provision: annual physicals, routine prenatal and well-child care, immunizations, tobacco cessation programs, obesity weight-loss programs, and many screening services (U.S. Department of the Treasury 2004). In theory, coupling FDC of preventive care with a high-deductible plan should give consumers a financial incentive to seek out preventive services before they meet their plan deductible while at the same time preserving the financial incentive to avoid inappropriate nonpreventive care.

A growing number of Americans are enrolled in “consumer-directed” health plans that have high deductibles (Plans 2008). Proponents argue that such plans slow the growth of health expenditures and reduce the use of unnecessary or inappropriate services by making consumers more conscious of the cost of their care (Goodman and Musgrave 1992). Critics, however, assert that such plans primarily benefit healthy people in high income tax brackets (Park and Greenstein 2006). In addition, they worry that increased cost sharing will reduce the use of appropriate care, especially among low-income people with chronic illnesses (Center on Budget and Policy Priorities 2006).

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In this observational study, we used health insurance claims data from two multinational corporations before and after one corporation introduced FDC in 2003 to assess whether such coverage was effective in increasing utilization among healthy individuals. Additionally, we separately analyzed patients selecting high-deductible, zero premium plans from those electing low-deductible plans with higher premiums, to determine whether the impact of expanded coverage differed between these self-segregating groups.

METHODS

We followed 44,106 individuals who were given the choice between a low- or high-deductible Preferred Provider Organization (PPO) plan through a large multinational company between the years of 2001 and 2006. Annual deductibles for these plans ranged from U.S.\$250 to U.S.\$2,500. The high-deductible plans were provided to employees at no cost to them; employees who opted for low-deductible plans had to pay a share of the premium. A comparison group of 60,107 individuals enrolled in a low-deductible PPO (U.S.\$200) plan served as a control.

Each person in our sample had no prior history of chronic disease, was under 65 years old, enrolled from 2 to 6 years of the observation period, and eligible for one or more selected preventive screens according to criteria from the National Committee for Quality Assurance Healthcare Effectiveness Data and Information Set (HEDIS). These included endoscopy (including both flexible sigmoidoscopy and colonoscopy; males and females 50 and older), fecal occult blood tests (FOBTs) (males and females 50 and older), lipid screening (males 35 and older, females 45 and older), Papanicolaou (pap) smear screening (females 18–64), and mammography (females 40–64).

We chose these five screens because they are widely regarded as effective and because they can be identified based on *International Classification of Diseases, Ninth Revision, Clinical Modification, Current Procedural Terminology*, and *Health Care Financing Agency Common Procedure Coding System* codes, which are available in health insurance claims data.

In some cases, the HEDIS guidelines indicate that a screen should be administered less frequently than once a year. In those cases, utilization rates in our study, which are based on annual use, are lower than would be the case if we used multiyear utilization rates. Because we calculated utilization rates consistently across plan types and over time, this discrepancy does not bias our results.

Table 1: Out-of-Pocket Expenditures on Preventive Screens

	<i>Year</i>	<i>FOBT</i>	<i>Lipid Screen</i>	<i>Mammography</i>	<i>Pap Smears</i>	<i>Endoscopy</i>	<i>Deductible</i>
Control (no coverage change)	2001	\$1.52	\$5.13	\$2.80	\$5.46	\$37.06	\$200.00
	2002	\$1.31	\$5.31	\$2.99	\$1.82	\$42.00	\$200.00
	2003	\$1.11	\$5.01	\$2.78	\$1.07	\$43.50	\$200.00
	2004	\$1.02	\$5.16	\$2.31	\$1.11	\$39.47	\$200.00
	2005	\$0.92	\$4.34	\$2.72	\$1.50	\$39.68	\$200.00
High deductible	2002	\$8.58	\$33.79	\$70.68	\$30.66	\$540.77	\$1,000.00
	2003	\$3.45	\$17.79	\$36.27	\$10.53	\$427.18	\$2,000.00
	2004	\$4.18	\$19.90	\$31.78	\$14.09	\$435.82	\$2,000.00
	2005	\$3.42	\$15.21	\$23.26	\$12.21	\$364.34	\$2,500.00
	2006	\$4.59	\$12.40	\$15.02	\$10.85	\$174.25	\$2,500.00
Low deductible	2001	\$4.02	\$14.39	\$40.41	\$14.06	\$251.54	\$200.00
	2002	\$4.47	\$16.60	\$40.43	\$16.17	\$254.77	\$250.00
	2003	\$2.40	\$12.69	\$22.72	\$7.95	\$202.38	\$510.00
	2004	\$2.78	\$12.68	\$21.74	\$9.24	\$206.73	\$510.00
	2005	\$3.31	\$14.35	\$26.26	\$11.95	\$326.10	\$510.00
	2006	\$3.53	\$9.84	\$14.05	\$8.62	\$108.02	\$510.00

FOBT, fecal occult blood test; pap, Papanicolaou.

Literature provided to us by the employer states that beginning January 1, 2003, the plan would offer zero-deductible coverage (or “FDC”) of “preventive medical tests and routine physical examinations.” This reduced the cost of preventive services to their postdeductible levels; coinsurance rates ranged from 20 to 30 percent of total costs for the affected PPOs, varying by plan, year, and network. The plan literature directly cites pap smears and mammograms. Where coverage of preventive services was not explicitly stated in the plan descriptions, we determined coverage empirically by comparing PPO enrollees’ mean out-of-pocket expenses before and after the introduction of FDC (Table 1).

In this study, we exploited three types of variation—changes in coverage of preventive services over time (within a plan); coverage of different preventive services, that is, endoscopy versus other preventive services; and differences among individuals’ enrollment choices—to test two hypotheses:

- First, we hypothesized that FDC would be associated with increased utilization of covered preventive services, because FDC lowers the effective price to consumers.
- Second, we hypothesized that after controlling for demographics and secular trends, the expanded coverage would be more effective in

increasing utilization among healthy low-deductible enrollees than high-deductible enrollees, because the value of preventive care to high-deductible enrollees remains lower than actual or perceived dollar costs.

To test the first hypothesis, we used multivariate logistic regression (clustering error by individuals) to calculate the adjusted utilization rates with and without FDC for the five screens. The dependent variables were (1) lipid screens, (2) mammograms, (3) pap smears, (4) FOBTs, and (5) endoscopy (not subject to FDC). Each dependent variable was coded as 1 if the service was used in a particular year, 0 otherwise, a dummy variable for FDC (0 before 2003; 1 otherwise). As control variables we included the enrollment year, gender, and year of birth. We were not able to control for other important variables, such as socioeconomic status, education, and occupation, because they were not in our dataset. To test the second hypothesis, we repeated the regressions separately for low- and high-deductible enrollees.

RESULTS

This empirical analysis shows declines in out-of-pocket spending for all screens except one following the introduction of FDC in January 2003. For endoscopy (not shown), out-of-pocket costs showed a change of <30 percent between 2002 and 2003. We conclude that endoscopy was not among the services covered under the deductible-free preventive service coverage package. It also shows the lower average costs in the control plan that did not experience an intervention, where small copays were charged for all preventive services during the entire study period.

Table 2A provides descriptive statistics for the sample and by type of plan (low-deductible PPO or high-deductible PPO) and utilization rates before or after the introduction of FDC for preventive services) for each of the five screens. Although we selected only healthy individuals, the enrollees in the low-deductible plans were slightly older.

Table 2B shows unadjusted annual utilization rates for eligible enrollees. In the control group, utilization changed little in the pre-post intervention period. When combined, enrollees in the PPOs affected by the intervention increased average utilization in lipid screens, pap smears, and endoscopy.

Table 2: Summary Statistics

	<i>High- and Low-Deductible PPOs</i>	<i>Control Group</i>	<i>p-Value of Difference between Groups</i>
(A) Sample mean (standard deviation)			
Sample size	44,106	60,007	
Age in 2002	56.10 (12.0784)	53.1345 (11.0107)	< .001
Male	45.99%	39.04%	< .001
(B) Fraction screened			
Lipid			
Pre-FDC	19.43%	28.42%	< .001
Post-FDC	23.04%	25.98%	< .001
Mammography (pre/post)			
Pre-FDC	39.27%	45.00%	< .001
Post-FDC	37.21%	45.49%	< .001
Pap smear (pre/post)			
Pre-FDC	25.87%	35.89%	< .001
Post-FDC	28.21%	33.43%	< .001
Endoscopy (pre/post)			
Pre-FDC	6.39%	8.61%	< .0015
Post-FDC	7.11%	7.22%	< .001
FOBT (pre/post)			
Pre-FDC	10.45%	13.47%	< .001
Post-FDC	9.99%	15.38%	< .001

FDC, first-dollar coverage; FOBT, fecal occult blood test; pap, Papanicolaou; PPO, Preferred Provider Organization.

For each of the five screens, Table 3 shows the adjusted utilization rates among enrollees before and after FDC coverage was introduced to the “treatment” PPOs. The first two columns compare the control plan enrollees (column 1) to all the enrollees whose policy changed to include FDC (column 2). Columns 3 and 4 analyze changes in preventive service use separately for the high- and low-deductible PPOs.

As expected, there is little change in the control group before and after the coverage policy was changed in the other PPOs. The exception to this pattern is in pap smear utilization, which shows a small but significant increase in the control group, which we attribute in part to a corresponding lowering in patient costs (see Table 1). By contrast, utilization rates in the plans introducing FDC increase among all services that were subject to the policy change. The exception, endoscopy, which was not covered by the policy, had decreased utilization rates. Among the covered services, significant increases in adjusted utilization rates were observed: between 23 (mammography) and 78 (pap smears) more patients per 1,000 enrollees receiving screens after the policy change than before.

Table 3: Changes in Use of Preventive Services after the Introduction of First-Dollar Coverage (FDC)

	<i>Control PPO (FDC Unchanged) (1)</i>	<i>PPOs (FDC Introduced) (2)</i>	<i>PPO High- Deductible Only (3)</i>	<i>PPO Low- Deductible Only (4)</i>
Lipid screens				
With FDC	0.305	0.224	0.176	0.277
Without FDC	0.306	0.171	0.124	0.16
Difference	− 0.001	0.053***	0.052***	0.117***
D in D		0.054*		0.065*
Mammograms				
With FDC	0.476	0.392	0.294	0.473
Without FDC	0.48	0.369	0.308	0.35
Difference	− 0.004	0.023*	− 0.014	0.123***
D in D		0.027		0.137*
pap smears				
With FDC	0.365	0.256	0.177	0.333
Without FDC	0.337	0.178	0.148	0.169
Difference	0.028*	0.078***	0.029*	0.164***
D in D		0.05*		0.135*
Endoscopy (no policy change)				
With FDC	0.086	0.069	0.046	0.095
Without FDC	0.084	0.073	0.058	0.068
Difference	0.002	− 0.004	− 0.012	0.027***
D in D		− 0.0060		0.039*
Fecal occult blood test				
With FDC	0.137	0.105	0.081	0.128
Without FDC	0.139	0.064	0.045	0.064
Difference	− 0.002	0.041***	0.036***	0.064***
D in D		0.043*		0.028

* $p < .05$.

*** $p < .001$ (based on model estimates).

pap, Papanicolaou; PPO, Preferred Provider Organization.

The third and fourth columns split the “treatment” group into low- and high-deductible enrollees, the third column showing adjusted utilization rates in low-deductible enrollees and the fourth in high-deductible enrollees. These two columns show the difference in utilization rates between enrollees that selected high-deductible plans and those that did not. We see that the bulk of the increase in utilization can be attributed to affected enrollees in low-deductible plans, where significant increases in adjusted utilization rates were observed for all services. However, even in the high-deductible plans, modest but significant increases in utilization rates were observe for three of the four

covered services. Among high-deductible enrollees, adjusted rates of utilization decreased. In the low-deductible plan, there was also a significant increase in rates of colorectal cancer screens. Overall, the low-deductible enrollees had significantly higher rates of update of the preventive services than did the high-deductible enrollees. For most of these screens, low-deductible enrollees achieve utilization rates comparable to those in the control group after FDC.

DISCUSSION

Preventive screenings for cardiac risk factors and breast, colorectal, and cervical cancer have been recommended for healthy adults meeting age and gender criteria (U.S. Preventive Services Task Force [USPSTF] 2008; American Cancer Society 2008; Centers for Disease Control and Prevention 2008). In an attempt to encourage greater use of such services, a growing number of employers have begun offering health plans that exclude preventive services from the deductible. Patients in our study population appear to respond to these incentives with significant increases in lipid screening, pap smears, mammograms, and FOBTs. A smaller increase was observed for mammography, primarily due to a small decrease in utilization among high-deductible enrollees, the only covered service to display this pattern. A possible explanation is the relatively high baseline utilization of mammography in all plans. Although these analyses used guidelines in place at the time of the study, recent changes in policy recommendations indicate that decreases in screening frequency among younger patients may be justified (USPSTF 2008).

When separately considering the low-deductible enrollees, all individual screens showed increased utilization (endoscopy, FOBT, mammography, lipid screens, and pap smears). The increase in use of endoscopy occurred despite evidence that endoscopy was not included in the FDC package.

However, our results suggest that introducing FDC for preventive services may have only a limited effect on use among high-deductible enrollees, despite the reduction in patient costs. In the five screens tracked in our study, utilization among high-deductible PPO enrollees did not increase significantly for mammography following the introduction of deductible-free preventive service coverage. There was a significant decrease in endoscopy rates, a service not covered by the policy change. This may indicate that there was a

substitution with lower-cost FOBT. The small but significant increases in cervical cancer screens are comparable in both the control group and the high-deductible PPOs, potentially indicative of a trend unrelated to the coverage.

What accounts for the differential response between low- and high-deductible enrollees to the reduction in cost sharing for preventive care? A likely explanation is that people who enroll in high-deductible plans differ from those who enroll in low-deductible plans in ways that cannot be observed and therefore cannot be controlled for statistically. For example, high-deductible enrollees may be less risk-averse and/or tend to place less value on health, on average, than their low-deductible counterparts. These characteristics presumably would result in lower demand for both health insurance and preventive screens. Such traits may also account for high-deductible enrollees' relatively inelastic demand for screens. Another possibility is that high-deductible enrollees are less predisposed to interact with the health care system than low-deductible enrollees and therefore may be less aware of the need or availability of preventive screens. Whatever the source of the differences, the reduced rate of early detection among high-deductible enrollees suggests that screening incentives beyond FDC could improve health outcomes.

A number of limitations common to all retrospective studies based on claims data apply here—for example, the possibility that enrollees paid for some preventive services themselves rather than through their insurance plan. We would not be able to identify utilization outside of the health plan. We are also unable to observe factors such as patients' income, awareness of benefits, or exposure to promotional campaigns. A final set of limitations relate to the generalizability of our results. We examined data from one large employer. Further research is needed to validate these results among people enrolled in individual, small group, and public health plans such as Medicare and Medicaid.

Our study suggests that reducing cost sharing for preventive services encourages screening among PPO enrollees, across several categories, but this effect is significantly attenuated among individuals that opt for high-deductible plans. Other techniques, such as patient and physician reminders and patient and physician education, have showed at least modest success in some populations (McPhee et al. 1991; Dietrich et al. 1992; Fletcher et al. 1993; Margolis and Menart 1996; Chaudhry et al. 2007; Dexheimer et al. 2008). Future research should investigate the efficacy of such approaches with respect to people that select high-deductible plans.

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