Health Insurance Is Associated With Preventive Care but Not Personal Health Behaviors

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Background: **Economists posit 2 mechanisms increasing financial risk to insurers after health insurance gain: *ex ante* moral hazard (riskier behavior because of reduced personal costs) and *ex post* moral hazard (increased use of care because of lower care costs). In contrast, the Health Belief Model (HBM), would anticipate no increase in risk behaviors while also predicting increased health care utilization following insurance gain (because of reduced financial barriers to accessing care). Empirical studies examining the association of insurance change with changes in preventive care and health behaviors have been limited and yielded mixed findings. The objective of this study was to examine the association of health insurance change (gain or loss of coverage) with changes in preventive care and health behaviors in a large, nationally representative sample.**

Methods: **We analyzed data from adults ≥18 years old and enrolled for 2 years in the 2000 to 2009 Medical Expenditure Panel Surveys (n = 76,518). Conditional logistic regression analyses modeled year-to-year individual changes in preventive care and health behaviors associated with individual changes in insurance status, adjusting for characteristics varying year to year (income, employment, total health care expenditures, office visits, prescriptions, availability of usual source of care, and health status). Preventive care included adherence to influenza vaccination, colorectal cancer screening, mammography, and Papanicolaou and prostate-specific antigen testing. Health behaviors examined were becoming nonobese, quitting smoking, and adopting consistent use of seatbelts.**

Results: **Insurance gain (loss) was associated with increases (decreases) in preventive care (adjusted odds ratios [95% confidence intervals]: influenza vaccine, 1.27 [1.04–1.56]; colorectal cancer screening, 1.48 [0.96–2.29]; Papanicolaou testing, 1.56 [1.22–2.00]; mammography, 1.70 [1.21–2.38]; prostate-specific antigen, 1.42 [0.98–2.05]). Insurance change was not associated with significant changes in health behaviors.**

Conclusions: **Consistent with both economic theory and the HBM, preventive care increased (decreased) after gaining (losing) coverage. In contrast, health behaviors changed little after insurance change, consistent with the HBM but not with the potential for decreased personal health care costs (*ex ante* moral hazard). (J Am Board Fam Med 2013;26:759–767.)**

Keywords: **Health Behavior, Health Insurance, Health Surveys, Preventive Medicine**

Having health insurance is associated with higher utilization of preventive health care and better health outcomes.[1–4] However, how changes in health insurance coverage are associated with changes in preventive care and health behaviors remains unclear, since few prospective national

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studies have explored this issue, with mixed findings.

Several prospective studies have examined the association of gaining health insurance with changes in preventive health behaviors such as not smoking, being nonobese, and using car seatbelts.[5–11] Some studies found that gaining health insurance was associated with decrements in such behaviors (eg, increases in smoking and obesity, decreases in car seatbelt use).[6,7,10,11] Economists use the term *ex ante moral hazard* (*ex ante* meaning "before the event") to describe such insurance-related behavior changes: the personal cost of unhealthy behavior is reduced, with increased costs to insurers.[12,13] Inconsistent with *ex ante* moral hazard theory but consistent with the Health Belief Model (HBM),[14] other studies found no evidence of riskier behavior following insurance gain.[5,8,9] Methodological differences limit comparisons among these studies; all employed relatively small, selected samples, and most were limited to people gaining Medicare coverage.[5–8]

Economists also identify *ex post* ("after the fact") moral hazard to describe the increase in health care utilization associated with gaining insurance (a price–demand relationship).[13] The HBM would also anticipate that gaining health insurance would be associated with increases in preventive care because of reduced financial barriers to accessing care.[14] Among empirical studies, all limited to people acquiring Medicare, only some found associations between health insurance gain and increased preventive care.[5,15–17]

To address existing study limitations, we analyzed data from a nationally representative sample of respondents who entered the 2000 to 2008 Medical Expenditure Panel Survey (MEPS)[18] and continuously enrolled for 2 years (baseline and follow-up). Health behaviors examined were becoming nonobese, quitting smoking, and adopting consistent seatbelt use. Preventive care examined included influenza vaccination, colorectal cancer (CRC) screening, mammography, Papanicolaou testing, and prostate-specific antigen (PSA) testing. We employed conditional logistic regression analyses[19,20] to model within-individual changes in preventive care and health behaviors associated with within-individual changes in health insurance status. One set of models was unadjusted, while a second set was adjusted for factors that may both change year to year and influence preventive care and health behaviors: income level,[21,22] employment status,[23] total health care expenditures,[24] the number of office visits to health care providers,[25,26] the number of medication prescriptions,[24] availability of a usual source of care,[27–30] and health status.[31]

An advantage of conditional logistic regression in this context is that it simultaneously models individual increases or decreases in preventive care and health behaviors associated with individual gain or loss of insurance, providing a more robust estimate of the effects of insurance change (approximately doubling the sample size of those changing insurance status) and yielding an average of the effects of insurance gain and loss. An additional advantage of conditional logistic regression is that characteristics that do not vary within individuals from the baseline to follow-up year do not affect estimated insurance effects. Such characteristics include unmeasured fixed confounders (sex, age, and calendar year at study entry) and concurrent secular influences, including stable prevailing preventive care guidelines.

Given the inconsistent findings of prior studies exploring *ex ante* moral hazard associated with health insurance[5–11] and that the HBM would not anticipate riskier behaviors following insurance gain,[14] we hypothesized that insurance changes would not be associated with becoming nonobese (or obese), quitting (or starting) smoking, or adopting (or abandoning) consistent seatbelt use. In contrast, based on the HBM[14] and prior evidence linking having health insurance with greater use of clinical preventive services,[1–4] we hypothesized that gaining (or losing) insurance would be associated with increased (or decreased) preventive care.

Methods

The MEPS employs an overlapping panel design surveying the health care use and costs of the noninstitutionalized US civilian population.[18] The analytic sample for the current study included people >18 years old entering the MEPS between 2000 and 2008 and maintaining enrollment for 2 years, the maximum length of participation. In both years (baseline and follow-up), the MEPS Household Component collected information regarding sociodemographics and health insurance. In both years, a self-administered questionnaire assessed health behaviors, the availability of a usual source

of care, office visits, and health status. For the 9 panels of 2-year data employed in the study, response rates varied from 66.5% to 70.5%. The local institutional review board exempted the study.

Measures

Within each 2-year MEPS panel, all measures were assessed in both the baseline and follow-up year. Health insurance status was categorized as uninsured (no insurance for the entire year), publicly insured (only public insurance [eg, Medicaid, Medicare] during the year), or privately insured (any private coverage during the year).

Preventive Care

Adherence to influenza vaccination was defined as receipt within the past year (yes/no)[32] and assessed for all respondents. Adherence to CRC screening was assessed for respondents ≥50 years old; they were asked whether they had ever undergone fecal occult blood testing or flexible sigmoidoscopy or colonoscopy and, if so, when. Respondents reporting fecal occult blood testing in the prior 2 years[33] and/or endoscopic testing in the prior 5 years[34] were categorized as adherent to CRC screening. Adherence to Papanicolaou testing was defined as receipt within 3 years (women only)[35]; adherence to mammography as receipt within 2 years (women ≥40 years old)[36]; and adherence to PSA testing as receipt within 2 years (men ≥50 years old).[37]

Health Behaviors

Seatbelt use was assessed by the question, "When you drive or ride in a car, would you say you wear a seat belt…" (always, nearly always, sometimes, seldom, never, or never drive or ride in a car). Respondents answering "always" were categorized as consistent seatbelt users, with all others categorized as inconsistent users, excluding those reporting never driving or riding in a car. Smoking was assessed by the question, "Do you currently smoke?" (yes/no). Self-reported height and weight were used to construct body mass index (BMI; weight in kilograms divided by height in meters squared); respondents were categorized as obese (BMI ≥30) or not.

Other Characteristics

MEPS participants report detailed information by year regarding the number of office visits to health care providers, drug prescriptions, and all other aspects of health care utilization (eg, emergency department visits, hospitalizations). This information was used to generate standardized expenditures for each item of utilization, which were summed to yield total health care expenditures in US dollars. The availability of a usual source of health care was assessed by a yes/no question asking whether there was a particular doctor's office, clinic, health center, or other place the respondent usually went if they were sick or needed advice about their health. Health status was measured both years with the 12-item Short Form Physical and Mental Component Summary scores (range, 0–100; higher scores indicate better health).[38]

Household income level was categorized as a percentage of the federal poverty level (<100%, 100% to 124%, 125% to 199%, 200% to 399%, or ≥400%) for the survey calendar year. Employment status was categorized as employed (having employment at any time during the year) versus not. Other sociodemographic variables measured included age; sex; race/ethnicity (Hispanic [any race], non-Hispanic white, non-Hispanic black, or non-Hispanic other); US Census region of residence (West, Midwest, Northeast, South); urbanicity (living in a metropolitan statistical area or not); and education level (0–8 years [less than high school]; 9–11 years [some high school]; 12 years [high school graduate]; 13–15 years [some college[; ≥16 years [college graduate]).

Data Analysis

Data were analyzed using Stata software version 12.1 (StataCorp, LP, College Station, Texas); all analyses were adjusted for the complex MEPS survey design. The MEPS oversamples certain vulnerable sociodemographic groups; the percentages presented are population-weighted (adjusting for the sampling strategy and nonresponse). Conditional logistic regression analyses modeled changed from the baseline year to the follow-up year in individual preventive care and health behaviors (the dependent variables) associated with year-to-year changes in health insurance status (the key independent variable of interest).[19,20] In the conditional logistic regression, uninsured is the reference group for insurance status. Hence the odds ratio can be interpreted as the within-individual relative odds of the outcome associated with gaining insurance, and the reciprocal of the odds ratio as the within-indi-

vidual relative odds of the outcome associated with losing insurance.

The base conditional logistic regression analysis models were unadjusted. A second set of models adjusted for characteristics with the potential to both vary from year to year and influence preventive care and behaviors: household income (<100% [reference], 100% to 124%, 125% to 199%, 200% to 399%, or ≥400%); employment status (employed vs. not employed); total health care expenditures (in US dollars); the number of office visits to health care providers; the number of drug prescriptions; usual source of care available (yes vs. no); physical (12-item Short Form Physical Component Summary) and mental (12-item Short Form Mental Component Summary) health status; Census region; and urbanicity. All adjusted models also included terms for MEPS calendar year at entry (baseline year data) and entry year plus 1 (follow-up year data) to capture secular influences. We also examined the significance of interaction terms (effect modification) between insurance change and age, sex, race/ethnicity, and education. To facilitate study interpretation, in addition to reporting the adjusted odds ratios associated with change in insurance status, we also report the adjusted marginal changes (percentage increase [positive number] or decrease [negative number]) relative to no insurance change.[39]

Results

There were 96,021 adults aged 18 and older who entered a MEPS panel between 2000 and 2008 and participated in both panel years (baseline and follow-up); excluded were 4778 people (5.0%) who participated in 1 year only. Table 1 summarizes the characteristics of the sample at the baseline year by study insurance status group. While those gaining and losing insurance were similar, differences across the 3 groups were statistically significant for all variables except for the percentage who were not obese.

Table 2 summarizes the unadjusted and adjusted odds ratios for and average marginal individual changes in preventive care and health behaviors among respondents who changed (gained or lost) insurance relative to those with no insurance change. Gain (loss) of insurance was associated with increases (decreases) in the likelihood of adherence to preventive care during the follow-up year. In contrast, change in insurance status was not associated with significant changes in health behaviors in the follow-up year. The findings of the unadjusted models differed little from the findings of models additionally adjusted for income, employment, total expenditures, office visits, prescriptions, availability of a usual source of care, health status, region, and calendar year. There were no significant modifications of insurance change effects by age, sex, race/ethnicity, or education.

Discussion

As hypothesized, we found that individual change in health insurance status was associated with changes in preventive care but not with changes in health behaviors. Parameter estimates of the associations were similar in unadjusted and adjusted analyses, the latter including some possibly endogenous variables, underscoring the robustness of our findings.

Gaining (losing) health insurance from the baseline to follow-up year was associated with increased (decreased) adherence to influenza vaccination, CRC screening, Papanicolaou testing, mammography, and PSA testing. These associations, consistent with the HBM prediction that reducing barriers (in this case financial impediments to accessing care) should increase care utilization, likely simply reflect price–demand relationships, albeit modified by factors not addressed by health insurance (eg, lack of awareness of services, opportunity costs, copayments). Economists assert that such associations represent *ex post* moral hazard, given that they entail increased financial risk to insurers.[4,40] However, the findings also are consistent with an intended purpose of health insurance: to facilitate receipt of preventive care.[41] Indeed, this purpose of health insurance sets it apart from other types of insurance (eg, fire, automobile), which are intended to lessen the financial burden of a catastrophic event after it happens. In this context, the connotation of the term *moral hazard* (implying something undesirable) is unfortunate. Further ambiguity in the moral hazard concept arises when one considers that *ex ante* moral hazard theory suggests the potential for decreased preventive care following insurance gain due to reduced personal costs of nonadherence to preventive care, possibly offsetting any *ex post* moral hazard effects.

One might have anticipated a priori larger changes in preventive care with more frequent re-

Table 1. Baseline Sociodemographics, Healthcare Utilization, Health Characteristics, Preventive Care, and Health Behaviors by Study Insurance Status Group

	No Insurance Change* (n = 89,616; 94.2%)	Gained Insurance in Follow-up Year (n = 3212; 2.9%)	Lost Insurance in Follow-up Year (n = 3193; 2.9%)	*P* Value†
Mean age, years	46.2	36.5	34.8	<.001
Female sex	51.9	50.1	49.6	.03
Race/ethnicity				<.001
Hispanic (any race)	11.1	14.9	13	
Non-Hispanic white	69.8	56.5	61.2	
Non-Hispanic black	12.4	21.8	19.1	
Non-Hispanic other	6.7	6.8	6.6	
Education level				<.001
Less than high school	6.4	7.5	5.9	
Some high school	12	17.8	19.6	
High school graduate	32	37	37	
Some college	23	22.3	24.1	
College graduate	26.6	15.5	13.4	
Household income (% of FPL)				<.001
<100	10.3	20	20	
100–124	4	6.8	7.3	
125–199	12.9	22.7	19.9	
200–399	31.1	31.3	32.3	
>400	41.7	19.2	20.6	
Employed	72.5	81.3	83.9	<.001
U.S. Census region				<.001
Northeast	19.2	16.1	14.9	
Midwest	22.3	20.5	19.9	
South	35.9	39.6	39.6	
West	22.6	23.9	25.5	
Urban residence‡	82.9	83.3	79.8	.01
Insurance status				<.001
Private	73.5	—§	76.9	
Public	14.6	—§	23.1	
None	11.9	—§	—	
Utilization and health characteristics				
Mean healthcare expenditures, $	3961.2	1283.1	2327.0	<.001
Office visits (mean)	3.9	1.7	2.5	<.001
Prescription drugs (mean)	13.2	5.7	6.6	<.001
Report having a USOC	78.4	52.1	63.9	<.001
Health status				
Physical (PCS-12) (mean)	49.5	51.1	51.2	<.001
Mental (MCS-12) (mean)	50.9	49.1	48.9	<.001
Preventive care				
Influenza vaccine	31.2	13.3	13.0	<.001
CRC screening	39.8	17.7	28.6	<.001
Pap testing	81.1	77.0	82.7	<.001
Mammography	62.4	40.5	66.0	<.001
PSA testing	51.7	25.9	28.8	<.001
Health behaviors				
Always using seatbelts	81.7	77.1	76.9	<.001
Not smoking	79.1	68.6	65.4	<.001
Not obese	74.4	74.0	74.5	.64

Data are percentages unless otherwise indicated. All percentages are population-weighted.
*Includes both continuously insured and continuously uninsured participants.
†χ^2 Test for categorical variables, linear regression for continuous variables.
‡Defined as residence in a metropolitan statistical area.
§Of patients, 69.7% gained private insurance and 30.3% gained public insurance in the follow-up year.
CRC, colorectal cancer screening; FPL, Federal Poverty Level; MCS-12, 12-item Short Form mental component summary score; Pap, Papanicolaou; PCS-12, 12-item Short Form physical component summary score; PSA, prostate-specific antigen; USOC, usual source of healthcare.

Table 2. Odds of and Marginal Changes in Preventive Care and Health Behaviors Associated With Changes in Health Insurance Status*

	Patients (n)†	Base Unadjusted Models		Adjusted Models‡	
		OR (95% CI)	Marginal Change§ (95% CI)	Adjusted OR (95% CI)	Adjusted Marginal Change§ (95% CI)
Preventive care					
Influenza vaccine	28,686	1.28 (1.08–1.52)	6.1 (1.9–10.2)	1.27 (1.04–1.56)	3.6 (0.5–6.7)
CRC screening	12,636	1.51 (0.99–2.30)	9.9 (0.6–19.2)	1.48 (0.96–2.29)	2.5 (0.0–4.9)
Pap testing	11,436	1.72 (1.37–2.15)	12.7 (8.1–17.4)	1.56 (1.22–2.00)	8.5 (3.7–13.3)
Mammography	8,586	1.66 (1.21–2.29)	12.0 (5.3–18.8)	1.70 (1.21–2.38)	10.4 (3.6–17.1)
PSA testing	9,206	1.42 (1.01–2.00)	8.5 (0.6–16.4)	1.42 (0.98–2.05)	3.4 (−0.1 to 6.9)
Health behaviors					
Always using seatbelts	22,112	0.91 (0.78–1.07)	−2.3 (−6.3 to 1.7)	0.96 (0.81–1.14)	−0.6 (−3.4 to 2.1)
Not smoking	9,550	1.04 (0.82–1.31)	0.9 (−4.9 to 6.8)	0.96 (0.75–1.24)	−0.5 (−3.6 to 2.7)
Not obese	17,992	1.00 (0.81–1.22)	−0.1 (−5.2 to 5.0)	0.94 (0.74–1.19)	−1.5 (−7.0 to 4.1)

*The reference group in all analyses is "no insurance." Hence, the odds ratios (ORs) presented for each outcome pertain to an individual gaining insurance form baseline to follow-up, and the reciprocal of the ORs pertain to an individual losing insurance. The marginal changes presented pertain to an individual gaining insurance, whereas the negatives of the marginal changes pertain to an individual losing insurance.

†Sample size of people who reported a change in the status of the preventive care or health behavior from their baseline year to their follow-up year.

‡Adjusted for income, employment, total healthcare expenditures, number of office visits to healthcare providers, number of drug prescriptions, availability of a usual source of care, and the 12-item Short Form physical and mental component summary scores, Census region, urbanicity, and Medical Expenditure Panel Survey calendar year.

§Marginal change is the percentage of increase (if positive) or decrease (if negative) in the preventive care or health behavior associated with changing insurance status (ie, gaining or losing insurance).

CI, confidence interval; CRC, colorectal cancer; Pap, Papanicolaou; PSA, prostate specific antigen.

ceipt intervals than for preventive care with longer intervals. However, our findings suggest a more complex picture. For example, insurance gain was associated with a smaller increase in influenza vaccination, which is recommended annually, than in cancer screening tests, including CRC screening, which is generally performed in the United States using colonoscopy at 5- to 10-year intervals. Although our study was not designed to examine the reasons for these findings, we hypothesize that use of the relatively low-cost, ubiquitous influenza vaccine may be less affected by health insurance change than use of relatively more expensive and more difficult to access cancer screening tests. These findings may be useful in forecasting changes in various aspects of preventive care due to evolving health insurance expansion.

In contrast to our findings related to preventive care, we found that individual health insurance change was not associated with significant changes in health behaviors (becoming nonobese, quitting smoking, and adopting consistent seatbelt use). Stated in economic terms, we found no evidence of *ex ante* moral hazard resulting from insurance gain. Previous studies examining such behaviors, again involving restricted samples—mostly those eligible for Medicare—and considering only insurance gain, had inconsistent findings.[5–11] In this context, our findings, stemming from large and nationally representative samples, question the notion of *ex ante* moral hazard as an outcome of gaining health insurance, at least as it pertains to the health behaviors we examined. Our study cannot determine why we found no evidence of *ex ante* moral hazard, but, in the context of health behaviors, such hazard presumably has little influence.

Other explanations, also grounded in the HBM, may further help to account for the contrasting findings with regard to preventive care versus health behaviors. As noted previously, insurance gain (loss) increases (decreases) access to clinicians, whose actions are likely to be influenced by perceptions of accountability for various aspects of care. It seems plausible that clinicians may tend to feel more accountable for preventive care than for patient health behaviors. Indeed, empirical evidence suggests clinicians counsel more about preventive care than about health behaviors.[42] Furthermore, while the health behaviors we studied can be favorably influenced by access to health care,

in general they seem to be less influenced by health care access than preventive care and relatively more influenced by other barriers, such as the requirement of sustained patient motivation and effort. Research indicates that most people who quit smoking do so without help from a health care provider[43]; that provider counseling regarding use of seatbelts has uncertain influence on actual use[44]; and that routinely employed approaches to encouraging weight loss in the clinical setting are largely ineffective.[45,46] In the context of these observations, it would be of interest to examine the proportions of people who report adopting the health behaviors we studied with and without provider involvement. We hypothesize that, at a population level, improvements in such behaviors are largely independent of provider involvement.

Our study had some limitations. The analyses were observational, so caution is needed in deriving a causal interpretation of the findings. We examined a range of preventive care and health behaviors, which were chosen primarily based on their availability in the MEPS. It is uncertain whether similar findings would be observed for other care and behaviors. Although we detected significant individual changes in preventive care associated with changes in health insurance status, follow-up intervals longer than the 1-year period possible in the MEPS would likely be required to more fully capture such effects.

The summary estimates of the effects of changing insurance yielded by our conditional logistic regression models do not capture possible differences in the effects of gaining insurance (eg, pent-up demand) versus losing insurance (eg, catching up on care immediately before coverage lapses) but average out these unmeasured differences. Nonetheless, we believe it is reasonable to assume comparable insurance gain and loss effects, given prior research using the MEPS that indicates that the health care expenditures of people gaining insurance closely mirror the expenditures of those losing insurance.[4] We also did not separately examine the effects of changing insurance stratified by insurance type (private vs. public), in part because of concerns about relatively smaller sample sizes, reducing the power to examine effects on preventive care and health behaviors. These issues may be worthy of examination in future studies.

While our analyses adjusted for numerous factors that may influence preventive care and behaviors, we could not adjust for other behavioral influences (eg, state seatbelt laws, local smoking ordinances). However, in a multiyear study such as ours, the average effects of gaining (or losing) insurance will be captured before, during, and after changes in such factors. All the study measures were subject to self-report errors, increasing the possibility of misreporting insurance status, preventive care, and health behaviors. Future studies should examine the degree to which health insurance gain or loss determined via other methods (eg, review of administrative records) is associated with self-reported and, when feasible, objectively measure preventive care and health behavior change (eg, change in BMI based on measured height and weight). Finally, nonresponse to the MEPS may produce bias, so generalizability to nonresponders is uncertain. Still, MEPS data are likely the most representative data available to examine the study research questions.

Conclusion

In a large, nationally representative sample, individual gain (loss) of health insurance was associated with increased (decreased) adherence to preventive care. This finding, consistent with the HBM as well as economic *ex post* moral hazard theory, reflects that one intended purpose of health insurance is to reduce financial barriers to accessing preventive care. In contrast, individual change in health insurance status was not associated with significant changes in health behaviors. The latter finding, again consistent with the HBM, does not support the notion of *ex ante* moral hazard.

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