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What Does Medicaid Expansion Mean for Cancer Screening & Prevention? Results from a Randomized Trial on the Impacts of Acquiring Medicaid Coverage

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Abstract

Background.—The Oregon Medicaid lottery provided a unique opportunity to assess the causal impacts of health insurance on cancer screening rates within the framework of a randomized controlled trial. Prior studies on the impacts of health insurance have almost always been limited to observational evidence, which cannot be used to make causal inferences.

Methods.—We prospectively followed a representative panel of 16,204 persons from the Oregon Medicaid Lottery Reservation List, collecting data before and after the Medicaid lottery drawings. Our panel was divided into two groups: a *treatment* group who were selected in the Medicaid lottery (n=6,254) and a *control* group who were not (n=9,950). We also created an elevated risk subpanel based on family cancer histories. One year after the lottery drawings, we compared differences in cancer screening rates, preventive behaviors, and health status between our study groups.

Results.—Medicaid coverage resulted in significantly higher rates of several common cancer screenings, especially among women, as well as better primary care connections and self-reported health outcomes. We found little evidence that Medicaid increased the adoption of preventive health behaviors that might reduce cancer risk.

Conclusion.—Medicaid coverage did not directly impact lifestyle choices that might reduce cancer risk, but it did provide access to important care and screenings that could help detect

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cancers earlier. These findings could have long-term population health implications for states considering or pursuing Medicaid expansion.

Precis:

Access to Medicaid significantly increased the use of certain preventive screenings in a low-income population, especially among those with elevated family risk for cancer. Health insurance expansion might be an important strategy for addressing cancer disparities by ensuring earlier detection in underserved or at-risk populations.

Keywords

Health Insurance; Medicaid; Health Behavior; Early Detection of Cancer; Health Status

INTRODUCTION

Research has consistently demonstrated disparities in cancer prevention, with lower screening rates among the poor resulting in later stage diagnoses and lower expected survival rates.[1–10] Lack of health insurance has been identified as a potential reason why: the uninsured often struggle to find a primary care physician and pay the cost of preventive screenings.[2,4,5,8] In light of this evidence, coverage expansions may help increase screening rates among low-income populations, increasing early detection and improving outcomes.

A unique pre-ACA expansion policy environment in Oregon created an unprecedented opportunity to test this idea: a randomized trial assessing the effects of health insurance coverage. In 2008, Oregon opened new slots in its Medicaid expansion program, Oregon Health Plan Standard (OHP Standard), to non-disabled adults age 19-64 with incomes under 100% of the federal poverty level.[11] Demand exceeded available program slots, so Oregon randomly distributed openings from a reservation list – a process referred to as the Oregon Medicaid "lottery." Selected individuals were sent applications for OHP Standard; those not selected were unable to access the otherwise closed program. Oregon's first lottery ended in late 2008, but in 2011 the state re-opened the list and continued randomly selecting new names until 2013.

In response to the Medicaid lottery, a longitudinal study – the *Oregon Health Insurance Experiment* (OHIE) – was launched to assess the impacts of insurance coverage by comparing individuals selected in the lottery to those not selected. OHIE, the first-ever randomized trial on this topic, has provided some of the best evidence available on the impact of Medicaid on general health and health care outcomes.[12–15] OHIE was preceded by many other studies on the impacts of health insurance, including observational[16–28] and quasi-experimental[29–35] designs that demonstrated an association between coverage and outcomes; a few explicitly focused on cancer-specific outcomes.[36–39] However, prior studies were based on observational designs that cannot account for the many confounding differences between people who do and do not have insurance. Only one other study –the RAND experiment in the 1970s – examined health insurance in a randomized framework, but it compared different cost sharing structures without testing the impact of having no coverage at all.[40]

In this paper, we assess the impact of gaining Medicaid coverage on cancer screening rates, as well as preventive behaviors and services, by comparing results between a "treatment" group (those selected in the Oregon Medicaid lottery) and a "control" group (those not selected) 12 months after acquiring coverage.

METHODS

Design:

We employed a prospective longitudinal panel study design that replicates the original OHIE study, but with a specific focus on cancer-related outcomes.

Sample & Inclusion Criteria:

Between February and August of 2011, 48,755 people ages 18–64 were randomly sampled from the Reservation List and received mail surveys about their baseline health and health care experiences. Our study panel consisted of 16,204 persons who returned this baseline survey prior to being selected in Oregon's Medicaid drawings. We excluded another 979 persons who waited until after selection to return their survey, limiting our panel to those for whom we had true baseline (pre-randomization) data.

Randomization: Our panel members (and the rest of the Reservation List) were put through 14 random Medicaid lottery drawings between February 2012 (the start of our study) and November 2013 (the date of our one-year follow-up). Selected individuals won the opportunity to apply for Medicaid. Those selected in the lottery (n=6,254) comprise our *treatment* group, while the balance of the panel (n=9,950) was not selected during our study window and comprise our *control* group. We followed both groups prospectively over time, collecting data and comparing results to assess the impacts of gaining coverage on cancer-related outcomes.

Elevated Risk Sub-Panel: Following the lead of several earlier studies,[41–42] we used data from our baseline survey responses to form an *elevated risk* subpanel, which we defined as anyone who reported, either for themselves or a close relative (parent, sibling, or child), a prior breast, ovarian, uterine, colon, or prostate cancer diagnosis. A total of 5,753 panel members qualified for this subpanel.

Data Sources:

All members of our panel submitted baseline (pre-lottery) data; another survey was sent out 12 months later to assess one-year outcomes. The response rate for our 12 month follow-up survey was 44% (n=7,030), a result similar to the original OHIE study and other recent Medicaid survey research.[14,43–45] Response rates did not differ significantly between treatments and controls.

We relied on two additional data sources: administrative records showing the complete Reservation List and associated selection records, and Medicaid program data, which we used to determine whether (and for how long) study members were enrolled during our study period.

Key Measures:

We used a variety of validated self-report measures to collect information on key outcomes, including receipt of breast, cervical, colorectal, and prostate cancer screening in the past year for the appropriate gender and age groups, HPV vaccination history, and health behaviors (e.g. tobacco and alcohol use, BMI, and health status) associated with increased cancer risk.

Statistical Analysis:

Our analysis replicates the approach used in the original OHIE, which has been extensively described elsewhere, to estimate both Intent to Treat (ITT) and Local Average Treatment Effect (LATE) of Medicaid coverage. [13–14] To estimate the ITT effect, we compare outcomes between those randomly selected in the lottery and those who were not. However, take-up into coverage was imperfect, with some who were selected either not applying at all or proving to be ineligible. Therefore, to capture the actual effect of Medicaid coverage (the LATE), we use an instrumental variable (IV) approach[46] in which lottery selection is an instrument for being covered by Medicaid during our study period. We estimate the LATE effect of Medicaid by fitting a two-stage least squares model using selection in the lottery as an instrument for being covered by Medicaid during our study period, with the same adjustments as in our ITT models. This approach does not simply compare those who got insurance to those who didn't – which would be non-random – but rather, relies on the fact that the difference in enrollment rates between our groups is a direct function of random selection in the Medicaid Lottery. With this approach, imperfect take-up of Medicaid reduces statistical power but does not introduce bias, because the instrument that drives the difference in enrollment rates (the lottery) is still random. And because selection was random, it can be used to isolate the unbiased causal effect of insurance on outcomes even if take-up was non-random and not universal.

We estimate linear probability models for each outcome of interest. All analyses adjust for the number of household members on the lottery list, which is necessary because selection in the lottery drawings occurred at the individual level, but Medicaid eligibility was determined at the household level for those selected. Standard errors were clustered at the household level to account for intra-household correlation.

Oregon's Reservation List remained open to new sign-ups throughout our study period. As a result, the probability of treatment varied across lottery draws as the size of the list changed, but was equal for each person within any given lottery draw. Since people who signed up early for the list may look different than those who signed up later, and to account for any seasonal or timing trends in outcomes, we incorporated into each model a series of dummy variables indicating whether a given individual was active on the list for that drawing.

Analysis was performed using SAS Version 9.4.

RESULTS

Participant Demographics:

Table 1 details the respective demographic profiles of our longitudinal study panel. Data are from Oregon's Reservation List and our baseline survey, which occurred prior to randomization and thus should be balanced across groups. There are no statistical differences between groups at baseline, suggesting that the lottery resulted in comparable groups.

Insurance Coverage:

Table 2 details the "first stage" differences in insurance coverage between groups. Being selected in the lottery resulted in 24.5 percentage point increase in the probability of having Medicaid during our study period; this is consistent with the rate found in the original OHIE. Prior papers have determined that this low take-up rate was attributable to high mobility in the target population and a lack of pre-screening for individuals who signed up for the lottery, resulting in persons being selected who were not ultimately income eligible for Medicaid.[12] Critically for our study, the difference in enrollment is attributable to the Medicaid lottery and is used in our analytic framework to estimate the LATE effect, which represents the overall effect of acquiring Medicaid.

Cancer Screening Outcomes:

Table 3 details the impact of insurance on the likelihood of receiving recommended cancer screenings in the year after the lottery. We found that acquiring Medicaid coverage significantly increased the probability of having received several types of common cancer screenings, including Pap tests (19 percentage points higher than controls) and colonoscopies (10 percentage points higher than controls). However, impacts on other screenings, including rectal exams, breast exams, mammograms, and HPV vaccinations, were non-significant.

The impacts of insurance were most evident among women in our *elevated risk* subpanel: Medicaid significantly increased three of the four female-specific screening rates among women in the subpanel, including breast exams (26 percentage points higher than controls), pap tests (21 percentage points higher than controls), and HPV vaccinations (4 percentage points higher than controls). We did not see evidence of a parallel effect of insurance on male-specific screenings.

Access to Care, Health Behaviors & Well Being:

Table 4 details findings around access to care and reductions in health behaviors associated with elevated cancer risk, including smoking, heavy drinking, and obesity. We hypothesized that gaining coverage might result in increased access to care (e.g. having a usual place of care) and contact with physicians who would advise, encourage, and support patients to adopt lifestyle choices that reduce cancer risk.

Acquiring coverage substantially improved connections to primary care doctors, but we found little evidence that those connections resulted in healthier behaviors. Rates of smoking

and heavy drinking were lower in our treatment group, but results were not statistically significant. Likewise, insurance did not affect the likelihood that respondents were overweight (based on self-reported height and weight used to compute BMI), nor did it make those who were overweight more likely to report trying to lose weight. However, it is important to note that our data only followed individuals for one year post-coverage; some lifestyle effects associated with better access to care might take longer to develop as individuals work through their more urgent health issues before turning their attention toward prevention and lifestyle change.

We found strong evidence of an effect on overall self-reported health status. *Elevated risk* subpanel members who gained coverage were significantly more likely to rate their overall health as good, very good, or excellent (19 percentage points higher than controls), and were more likely to classify their health as stable or improving over the last year (14 percentage points higher than controls). These results suggest that, even if coverage does not directly impact healthy *behaviors*, it does provide an improved sense of subjective health and well-being.

DISCUSSION

In this study, we followed a panel of participants through a lottery that randomly assigned access to Medicaid for low-income, non-disabled uninsured adults. Using the Medicaid lottery as a proxy for random assignment to health insurance, we collected self-report data and compared results over time between those who were selected and those who were not. Because the differences in Medicaid coverage between our treatment and control groups are a function of a random lottery, we can estimate the causal impact of Medicaid coverage on outcomes without the influence of confounding variables.

Our findings suggest that, in the first 12 months after acquiring coverage, new Medicaid members are more likely to get certain recommended cancer screenings; this effect is particularly strong among women with an elevated cancer risk. However, we did not find that coverage increased cancer screening rates across the board – some tests improved, but others, particularly male-specific screenings, did not. Still, if Medicaid boosts some screening rates, it could increase early diagnosis, thus helping reduce the burden of treatment and overall risk of mortality among low-income populations.

Acquiring health insurance did not significantly impact health behaviors. Our panel exhibited high rates of self-reported smoking (40%), heavy drinking (37%), and obesity (65%). We hypothesized that insurance would lead to better access to health care (which it did), and that those care connections might help patients modify health behaviors in ways that reduce cancer risk (which they did not). In the end, coverage alone may not be a direct enough intervention to drive widespread behavior change.

Our estimates of the impact of health insurance apply to able-bodied, uninsured adults at or near the poverty line – a population of considerable policy interest given the ACA Medicaid expansion underway in some states. The original OHIE dispelled the notion that Medicaid expansion might “pay for itself” in the short term by reducing emergency department or

hospital use. However, expanding coverage could still lead to long-term reductions in cancer mortality through earlier detection, especially for those with elevated cancer risk profiles. Increasing early detection in high-risk populations could pay longer-term dividends in both population health and cost outcomes.

There are several important limitations to this study. First, Oregon's low-income population differs from other states; it is, for example, less ethnically diverse. Second, our estimates apply to a population *who signed up for the Medicaid lottery,* which implies they were already seeking coverage – the impacts may not be the same for a general expansion population. The Oregon experiment also involved a small Medicaid expansion in one state; a full-scale expansion might introduce access or other systemic challenges that change its impact profile. And finally, our study relies on self-report data, which are potentially subject to recall or non-response bias.

Despite these limitations, this study does provide valuable evidence on the impacts of Medicaid expansion on cancer screening and detection. Our findings generally map to those of the original OHIE, which found that Medicaid generally improved access, utilization of primary and preventive care, and subjective well-being, but did not reduce health risk behaviors such as smoking. Our results agree and also expand those results to include a wider range of cancer-related screening and behavioral outcomes. Using a randomized controlled design ensures that our findings are attributable to the coverage itself, providing important inputs for policymakers and other key health reform stakeholders.

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TABLE 1
CHARACTERISTICS AT BASELINE (PRE-RANDOMIZATION)

	Total Longitudinal Panel (n=16,204)			Elevated Risk Subpanel (n=5,753)		
Baseline Survey Data	**Control n=9,950**	**Treatment n=6,254**	**p-value**	**Control n=3,548**	**Treatment n=2,205**	**p-value**
Female (%)	55.5%	55.0%	0.559	64.3%	64.3%	0.996
Average Age, y	42.0	42.3	0.188	44.4	43.9	0.187
18–30 (%)	25.0%	24.4%	0.526	17.8%	18.6%	0.559
31–49 (%)	40.4%	41.9%	0.139	40.8%	41.7%	0.583
50–64 (%)	33.0%	32.8%	0.805	41.3%	39.8%	0.372
White (%)†	84.0%	83.4%	0.493	89.0%	89.9%	0.381
Black (%)†	3.2%	2.9%	0.360	2.7%	3.2%	0.997
Other Race (%)†	17.0%	17.4%	0.587	14.6%	12.9%	0.143
Hispanic (%)	9.8%	11.0%	0.070	6.3%	7.1%	0.310
Prior Cancer Diagnosis (%)	5.0%	5.1%	0.826	13.9%	14.2%	0.817
Reservation List Data						
Average Age, y	42.13	42.05	0.696	42.71	42.64	0.800
Female (%)	55.3%	55.4%	0.854	55.4%	55.3%	0.986
English Speaking Household (%)	95.3%	94.6%	0.107	98.4%	97.9%	0.178

Notes: Data come from the baseline (pre-randomization) survey or the Reservation List administrative database. P-values were calculated using ordinary least squares regression. All regressions include indicators for household size and eligibility status for each lottery draw.

†More than one race code possible, will not necessarily sum to 100% across categories.

TABLE 2
FIRST STAGE: DIFFERENCES IN MEDICAID COVERAGE

	Total Longitudinal Panel (n=16,204)			Elevated Risk Subpanel (n=5,753)		
Coverage Data	**Control n=9,950**	**Treatment n=6,254**	**p-value**	**Control N=3,548**	**Treatment n=2,205**	**p-value**
Ever on any Medicaid During the Study Period (%)	14.5%	39.0%	<.0001	15.9%	42.1%	<.0001
Ever on OHP Standard During Study Period (%)	2.8%	27.9%	<.0001	3.0%	30.3%	<.0001
Months on Medicaid During Study, No.	1.76	4.71	<.0001	1.87	5.17	<.0001

Notes: Coverage data come from state Medicaid eligibility records. P-values were calculated using ordinary least squares regression. All regressions include indicators for household size and eligibility status for each lottery draw.

TABLE 3

EFFECTS OF MEDICAID ON PREVENTIVE SCREENING RATES (12 MONTH FOLLOW-UP)

Total Longitudinal Panel (n=7,030 respondents)					
	Control Mean (1)	**ITT (2)**	**LATE (3)**	**p-value (4)**	**Valid n**
PANEL A: GENERAL SCREENINGS					
Blood stool test in last year (age>=50)	0.099 (0.008)	-0.001 (0.015)	-0.004 (0.047)	0.937	2539
Colonoscopy in the last year (age>=50)	0.068 (0.006)	0.033 (0.015)	0.102 (0.043)	0.018	2608
PANEL B: FEMALE SCREENINGS					
Breast exam in the last year (age>=18)	0.401 (0.010)	0.034 (0.012)	0.127 (0.076)	0.094	4022
Mammogram in the last year (age>=40)	0.315 (0.012)	0.040 (0.026)	0.144 (0.091)	0.113	2427
Pap test in the last year (age>=18)	0.378 (0.010)	0.050 (0.021)	0.187 (0.077)	0.015	3924
Ever had HPV vaccination (age<=31)	0.289 (0.019)	0.022 (0.040)	0.094 (0.171)	0.580	887
PANEL C: MALE SCREENINGS					
Rectal exam in the last year (age>=50)	0.197 (0.015)	0.044 (0.033)	0.109 (0.079)	0.170	1086
Elevated Risk Subpanel (n=2,705 respondents)					
	Control Mean (1)	ITT (2)	LATE (3)	p-value (4)	Valid n
PANEL A: GENERAL SCREENINGS					
Blood stool test in last year (age>=50)	0.121 (0.012)	-0.002 (0.025)	-0.008 (0.081)	0.926	1127
Colonoscopy in the last year (age>=50)	0.086 (0.010)	0.013 (0.022)	0.041 (0.072)	0.567	1158
PANEL B: FEMALE SCREENINGS					
Breast exam in the last year (all ages)	0.407 (0.015)	0.078 (0.030)	0.255 (0.100)	0.011	1809
Mammogram in the last year (age>=40)	0.341 (0.017)	0.035 (0.035)	0.123 (0.125)	0.322	1225
Pap test in the last year (age>=18)	0.368 (0.015)	0.063 (0.031)	0.211 (0.102)	0.039	1753
Ever had HPV vaccination (age<=31)	0.272 (0.033)	0.168 (0.073)	0.502 (0.245)	0.004	291
PANEL C: MALE SCREENINGS					
Rectal exam in the last year (age>=50)	0.254 (0.029)	0.037 (0.058)	0.090 (0.135)	0.517	381

Notes: The per-comparison p value for the LATE analysis is reported in Column 4. All regressions include indicators for household size and eligibility status for each lottery draw. All standard errors are clustered on household and the eligibility status across the lottery selections that occurred during our study period.

TABLE 4

EFFECTS OF MEDICAID ON ACCESS TO CARE, HEALTH BEHAVIORS, & HEALTH STATUS (12 MONTH FOLLOW-UP)

Total Longitudinal Panel (n=7,030 respondents)					
	Control Mean (1)	**ITT (2)**	**LATE (3)**	**p-value (4)**	**Valid n**
Percent with a “usual place of care”	0.609 (0.488)	0.071 (0.015)	0.229 (0.048)	<.0001	6904
Current Smoker (at 12 months)	0.398 (0.007)	-0.015 (0.015)	-0.048 (0.050)	0.336	7030
Heavy Drinker (at 12 months)†	0.370 (0.008)	-0.004 (0.016)	-0.014 (0.047)	0.783	6192
BMI of 25 or higher (at 12 months)	0.649 (0.007)	0.011 (0.015)	0.034 (0.049)	0.494	6729
Trying to Lose Weight (at 12 months)	0.571 (0.008)	0.028 (0.016)	0.091 (0.050)	0.073	6966
Overall Health is Good, Very Good, or Excellent (vs Fair or Poor)	0.554 (0.008)	0.040 (0.016)	0.130 (0.051)	0.011	6868
Health is Stable or Improving Over Last Year (vs Declining)	0.686 (0.007)	0.046 (0.014)	0.149 (0.047)	0.002	6956
Elevated Risk Subpanel (n=2,705 respondents)‡					
	Control Mean (1)	ITT (2)	LATE (3)	p-value (4)	Valid n
Percent with a “usual place of care”	0.662 (0.012)	0.076 (0.023)	0.228 (0.069)	0.001	2659
Current Smoker (as 12 months)	0.422 (0.012)	-0.016 (0.025)	-0.048 (0.073)	0.511	2705
Heavy Drinker (at 12 months)†	0.373 (0.012)	-0.014 (0.025)	-0.041 (0.075)	0.588	2415
BMI of 25 or higher (at 12 months)	0.662 (0.012)	0.026 (0.024)	0.076 (0.070)	0.279	2617
Trying to Lose Weight (at 12 months)	0.592 (0.012)	0.048 (0.024)	0.141 (0.073)	0.055	2686
Overall Health is Good, Very Good, or Excellent (vs Fair or Poor)	0.497 (0.012)	0.064 (0.025)	0.190 (0.076)	0.013	2647
Health is Stable or Improving Over Last Year (vs Declining)	0.617 (0.012)	0.046 (0.024)	0.139 (0.073)	0.056	2684

Notes: The per-comparison p value for the LATE analysis is reported in Column 4. All regressions include indicators for household size and eligibility status for each lottery draw. All standard errors are clustered on household and the eligibility status across the lottery selections that occurred during our study period.

† Heavy drinking is defined as >=1 drink for women or >=2 drinks for men per day on average for those whose gender information is available