

**THE OREGON HEALTH INSURANCE EXPERIMENT:  
DENTAL CARE**

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**Analysis Plan**  
November 17, 2014

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<sup>+</sup>We are grateful to Innessa Colaiacovo and Christopher Murray for expert research assistance, to the Oregon Association of Hospital and Health Systems and Mark Callan for his invaluable expertise in collecting and processing the emergency department data, to the survey research team at CORE, to numerous Oregon state employees for help acquiring the necessary data and for answering our many questions about the administration of state programs, and to our generous funders.

We gratefully acknowledge funding for the Oregon Health Insurance Experiment from the Assistant Secretary for Planning and Evaluation in the Department of Health and Human Services, the California HealthCare Foundation, the John D. and Catherine T. MacArthur Foundation, the National Institute on Aging (P30AG012810, RC2AGO36631 and R01AG0345151), the Robert Wood Johnson Foundation, the Sloan Foundation, the Smith Richardson Foundation, and the U.S. Social Security Administration (through grant 5 RRC 08098400-03-00 to the National Bureau of Economic Research as part of the SSA Retirement Research Consortium). We also gratefully acknowledge Centers for Medicare and Medicaid Services' matching funds for this evaluation. The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, the National Institute on Aging, the National Institutes of Health, any agency of the Federal Government, any of our funders, or the NBER.

## **Introduction**

In 2008, Oregon held a lottery to allocate a limited number of Medicaid slots to low-income uninsured adults on a waiting list. This lottery provides researchers with the opportunity to evaluate the causal effect of Medicaid coverage on a range of outcomes. The lottery, data collection, and fundamental empirical strategy are described in detail elsewhere (see [nber.org/Oregon](http://nber.org/Oregon) for previous analysis plans). Oregon's lotteried Medicaid program covered emergency dental services but not routine dental care. The goal of the analysis described here is to evaluate the effect of that Medicaid program on the use of dental care.

This document pre-specifies our planned analysis of outcomes related to dental care. It has been created before comparing these particular outcomes for treatment and control groups in order to minimize issues of data mining and specification searching. It was, however, constructed after completion of analyses using the lottery to estimate the effects of insurance on a range of other outcomes, including health care use overall and for specific non-dental health condition<sup>1-4</sup>. The methods proposed here follow those of our prior quantitative analyses very closely; however, the outcome measures are new.

## **Background**

### **Dental Care and Oral Health**

The United States spent an estimated \$105 billion (\$341 per capita) on dental services in 2010.<sup>5</sup> A significant share of this dental care was received in hospital emergency departments. The Agency for Health Research and Quality estimated that there were almost a million ED visits in 2009 where a dental condition was listed as the primary diagnosis.<sup>6</sup> The CDC estimates that the share of ED visits for dental conditions among those aged under 65 has been on the rise, from 1.2% in 1999-2000 to 2.1% in 2009-2010.<sup>7</sup> There remains substantial unmet need for dental care, particularly among low-income populations: in 2007-2010, an estimated 24.7 percent of people living under the Federal Poverty Level in the United States had untreated dental caries.<sup>8</sup>

Oral health is also an important component of overall health, and may affect physical health more broadly. Although the biological mechanisms are not fully understood, oral health has been associated with many chronic conditions including cardiovascular disease, diabetes, cancer, obesity, and preterm birth.<sup>9-13</sup> One study, for example, found that periodontal disease was associated with increased risk for lung, kidney, pancreatic, and hematopoietic cancers after controlling for risk factors.<sup>13,14,i</sup>

Despite the role of dental care in health, the percent of the adult population utilizing dental care has steadily decreased since the early 2000s, especially among low-income adults. Between 2000

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<sup>i</sup> Oral health may also affect labor market outcomes through its effect on appearance (Wall and Vujicic 2013).

and 2010, the percentage of adults self-reporting a dental visit in the past year decreased from 79.2% to 77.8% among those living at over 400% of the Federal Poverty Line (FPL) and from 46.1% to 38.7% among those living below 100% of the FPL.<sup>15</sup> Reductions in insurance coverage of adult dental benefits may play a role in these patterns.<sup>16</sup> Some studies have suggested that reducing adult dental insurance coverage results in more people seeking dental care in hospitals and emergency departments.<sup>17,18</sup> A recent study found that the majority of these dental-related emergency visits are non-urgent and could be handled more effectively and at a lower cost in dental offices.<sup>16</sup>

## **Medicaid Coverage of Dental Care**

While federal rules require states to provide comprehensive dental coverage to children on Medicaid, adult dental coverage is left to the discretion of the states. In 2007, 16 states provided coverage for all dental services, 13 states (like Oregon) provided coverage only for emergency dental care (providing in the emergency department (ED) or an office setting), and 6 provided no dental coverage (except for care in the ED which is covered in all states).<sup>19</sup> Many states in recent years have changed their Medicaid dental benefits in response to evolving costs. Between 2002 and 2013, 11 states (AK, AR, CO, IA, NC, OH, OR, RI, TX, VA, WY) and the District of Columbia increased their dental benefits provided to Medicaid beneficiaries, while 15 states (CA, IL, IN, MD, MA, MI, MN, MO, MT, NJ, PA, SD, TN, UT, WA) decreased their dental benefits provided to Medicaid beneficiaries.<sup>20</sup> Recent work suggests that Medicaid coverage of dental care results in dentists seeing more Medicaid patients.<sup>21</sup>

## **Oregon Health Insurance Experiment**

For a full description of the Oregon Medicaid Program (OHP Standard), the lottery intervention, and study methods, please refer to previous analysis plans ([nber.org/oregon](http://nber.org/oregon)) and publications.<sup>1</sup> OHP Standard covered dental care only in the case of dental emergencies (not routine office visits) throughout the study period. The lottery provides an opportunity to gauge the causal effects of Medicaid coverage on health outcomes and health care utilization patterns, including the substitution of covered care in one setting for uncovered care in other settings. Previous research found no evidence of the crowding out of private insurance (which might have had more expansive dental coverage) for those newly covered by Medicaid.<sup>1</sup> The expected effect of emergency-only dental coverage on utilization is discussed in more detail below, but is in some cases uncertain because of both the limited coverage and the potential interaction between dental care and use of other (covered) health care services.

## **Methods**

### **Data Sources**

The present analysis uses administrative emergency department (ED) data, as well as mail and in-person survey responses to assess how Oregon's Medicaid program affected dental care. The data sets are described in more detail elsewhere, including collection protocols and coverage.<sup>1,3,4</sup> Here we give only brief descriptions, focusing on the new outcome variables.

### *Mail and In-Person Survey Responses*

In conjunction with the Oregon Health Insurance Experiment, mail surveys (mailed statewide approximately 12 months after the lottery) and an in-person survey (fielded in the greater Portland metro area approximately 2 years after the lottery) were administered to investigate individuals' self-reported health care needs, utilization, and costs. The mail surveys and in-person surveys have been described in detail in <sup>1</sup> and <sup>3</sup>, respectively. Full mail survey text and interview scripts are available via the study website ([www.nber.org/oregon](http://www.nber.org/oregon)). Each mail survey asked respondents: "In the last 6 months, have you needed any dental care?" and, "If you needed dental care in the last 6 months, did you get all the care you needed?" The in-person survey asked individuals whether they had received dental care in the last twelve months, and, if so, to estimate their out-of-pocket spending on that care.

### *Emergency Department Discharge Records*

We analyze ED discharge data obtained from 12 emergency departments in the Portland area from the first lottery notification in March 2008 through September 2009. We probabilistically matched these data to the Oregon Health Insurance Experiment Study population based on information provided at the time of lottery sign-up. These data and their origin have been described in detail elsewhere.<sup>4</sup>

### *Qualitative Data*

In-depth free-form interviews were conducted with approximately 600 lottery participants.<sup>2</sup> These interviews can provide context for the findings of the analysis described here.

## **Statistical Analysis**

For a full description of the Analytic Specifications used, please see analysis plans at [www.nber.org/oregon](http://www.nber.org/oregon).<sup>22,23</sup> We sketch out the key points here.

### *Intent-to-Treat Effect of the Lottery (ITT)*

Our analytic approach begins with an intent-to-treat (ITT) model comparing outcomes for all those who were selected in the lottery (the study treatment group) to all those who were on the list but not selected (the study control group), or the effect of winning the lottery. We estimate the ITT by fitting the following OLS equation:

$$y_{ih} = \beta_0 + \beta_1 LOTTERY_h + X_{ih}\beta_2 + V_{ih}\beta_3 + \varepsilon_{ih} \quad (1)$$

Here  $i$  denotes an individual and  $h$  denotes a household. LOTTERY is an indicator variable for whether or not household  $h$  was selected by the lottery. The coefficient on LOTTERY ( $\beta_1$ ) is the main coefficient of interest, and gives the average difference in (adjusted) means between the treatment group (the lottery winners) and the control group (those not selected by the lottery), or the effect of being able to apply for OHP Standard through the Oregon lottery.

We denote by  $X_{ih}$  the set of covariates that are correlated with treatment probability (and potentially with the outcome) and therefore must be controlled for so that estimates of  $\beta_1$  give an unbiased estimate of the relationship between winning the lottery and the outcome. In all of our analyses,  $X_{ih}$  includes indicator variables for the number of individuals in the household listed on

the lottery sign-up form (hereafter “household size”); although the state randomly sampled from individuals on the list, the entire household of any selected individual was considered selected and eligible to apply for insurance. As a result, selected (treatment) individuals are disproportionately drawn from households of larger household size.

We denote by  $V_{ih}$  a second set of covariates that can be included to potentially improve power by accounting for chance differences between treatment and control groups in variables that may be important determinants of outcomes. These covariates are not needed for  $\beta_1$  to give an unbiased estimate of the relationship between winning the lottery and the outcome, however, as they are not related to treatment status. Following our previous work, our primary specification includes the pre-randomization version of ED use for the ED outcomes, and no variables for the survey response outcomes.

We explore the sensitivity of our results to an alternate specification using logistic regression and calculating average marginal effects for all binary outcomes and using negative binomial regression and calculating average marginal effects for all continuous outcomes.

*Local Average Treatment Effect of Medicaid (LATE)*

The intent-to-treat estimates from equation (1) provide an estimate of the causal effect of winning the lottery (i.e. winning the opportunity to apply for OHP Standard). We are also interested in the impact of insurance coverage itself. We model this as follows:

$$y_{ih} = \pi_0 + \pi_1 INSURANCE_{ih} + X_{ih}\pi_2 + V_{ih}\pi_3 + v_{ih} \tag{2}$$

Here INSURANCE is a measure of insurance coverage and all other variables are as defined in equation (1).

We estimate equation (2) by two stage least squares (2SLS), using the following first stage equation:

$$INSURANCE_{ih} = \delta_0 + \delta_1 LOTTERY_{ih} + X_{ih}\delta_2 + V_{ih}\delta_3 + \mu_{ih} \tag{3}$$

Here the excluded instrument is the variable LOTTERY.

We interpret the coefficient on insurance from instrumental variable estimation of equation (2) as the local average treatment effect of insurance, or LATE.<sup>1</sup> In other words, our estimate of  $\pi_1$  identifies the causal impact of insurance among the subset of individuals who obtain insurance upon winning the lottery but who would not obtain insurance without winning the lottery (if the main avenue through which the lottery affects outcomes is Medicaid enrollment).

In all analyses we cluster the standard errors on the household identifier since the treatment is at the household level. All analyses of outcomes from the survey data are weighted using survey weights to account for the sample releases into the field and intensive follow-up of initial non-responders.

## **Analysis**

### **Study Population**

This analysis focuses on the characteristics of three different samples: those included in the emergency department (ED) sample, participants in the 12-month mail survey, and participants in the in-person survey. Table 1 summarizes the demographic characteristics for these three sample groups, including the treatment group selected in the lottery and the control group not selected. While we have information on age and gender for all study subjects, we only have self-reported race from in-person and mail survey responders. There are no statistically significant differences in these characteristics between the treatment and control groups, consistent with prior analyses.

### **Insurance Coverage**

Table 2 reports the effect of being selected in the lottery on insurance coverage for our three samples. In our analysis, we define Medicaid coverage as being covered at any point between March 10, 2008 (the date of the first lottery notifications) and the sampling date. This definition of Medicaid includes both the lotteried Medicaid program (OHP Standard) and other non-lotteried Medicaid programs. The results indicate that winning the lottery increased the probability of being covered by Medicaid among those selected relative to the control group by 25.6 percentage points for the Portland-area ED sample at any point over the 18-month window of the ED data; by 29.0 percentage points among mail survey responders at any point over the previous year; and by 24.1 percentage points among in-person survey responders at any point over the previous 2 years. The lottery affected coverage through increasing enrollment in OHP Standard.

### **Self-Reported Dental Care Need and Utilization**

Table 3 reports the effect of Medicaid coverage on needing dental care, receiving needed dental care, and out-of-pocket costs. Of the control group, 73.9% reported needing dental care in the 12-month mail survey, while 39.4% reported getting all of the care they needed.<sup>ii</sup> Among those surveyed in-person roughly 2 years after the lottery, 31.7% of the control group reported receiving any dental care, with average out-of-pocket dental spending among the control group of \$120. The distribution of out-of-pocket costs is described in Table A3. Among those with positive spending on dental care in the control group, the median of out-of-pocket costs of dental care was \$250, and those in the top 10% of spenders had more than \$1200 in out-of-pocket costs.

The effect of Medicaid on these responses is ambiguous a priori. Theory suggests that Medicaid might increase the use of dental care broadly both by lowering the price of emergency dental care and by providing individuals with additional financial resources that may be devoted in part to obtaining dental care (the income effect of gaining Medicaid).<sup>iii</sup> This is consistent with

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<sup>ii</sup> Respondents who said they did not need any care were coded as having received all of the care they needed.

<sup>iii</sup> If dental health were to improve substantially through these channels, in the long run the consumption of dental care could in theory decline.

evidence suggesting that Medicaid coverage increased use of primary care, prescriptions, hospital care, and ED visits.<sup>1,3,4</sup> Increased use of emergency dental services would not generate out-of-pocket spending for enrollees, and coverage would lower out-of-pocket costs for those who would otherwise have gone to the ED and paid for that care themselves. The use of additional uncovered services enabled by the additional income or prompted by the detection of problems through covered primary care, however, could increase out-of-pocket costs.

To the extent that Medicaid increases access to and use of care, one might expect individuals to be more likely to respond that they received all needed care, but this is also potentially ambiguous: additional health care encounters generated by insurance coverage may give individuals information that they would not otherwise have had about needed (non-emergency) dental care that they cannot afford to obtain, prompting them to report that they have greater unmet need.<sup>1,2</sup>

### **Emergency Department Utilization**

We consider ED visits where the primary diagnosis was a dental condition. Using Clinical Classification Software (CCS) published by the Healthcare Cost and Utilization Project (HCUP), we group ED visits by primary diagnosis (ICD-9 code), and examine the category “Disorders of the Teeth and Jaw” – hereafter “dental ED visits.” As shown in Table A1, this category is the fourth most prevalent CCS category, accounting for 4.6% of the control group’s ED visits. Table A2 provides a list of the ICD-9 codes included in this category. Nearly a third of these admissions were for dental caries (or cavities), which can largely be prevented with regular dental care.<sup>1</sup>

Table 4 reports the effect of Medicaid coverage on ED visits for teeth and jaw disorders. Both the percent of participants with any visits and the mean number of visits are analyzed. Of the control group, 2.7% had at least one dental ED visit in this period (the intensive margin), with an average of 0.05 dental ED visits over the 18 months (the total margin, including those who had 0). This rate of ED use for dental conditions is comparable to estimates of the national rate: Seu estimated an average of .03 dental visits per capita in 2009.<sup>iv</sup>

Because OHP Standard provides coverage for emergency dental services, one might expect it to result in an increase in ED visits for dental conditions by lowering the out-of-pocket price of emergency dental care. However, although OHP does not cover non-emergency dental services, there are still avenues through which it might increase non-emergency dental care that could potentially generate an offsetting reduction in ED dental visits: it could increase the use of non-emergency dental care through an income effect (with enrollees devoting some of the extra resources generated by insurance to dental care) or through earlier detection (with insurance increasing encounters with health care providers who detect dental problems that prompt some enrollees to obtain uncovered services). Previous analysis demonstrated that Medicaid coverage increased both ED use overall and primary care.<sup>1</sup>

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<sup>iv</sup> Seu (2012) defines dental conditions as admissions with an ICD9 diagnosis code 520-523.9. The CCS Classification of “Disorders of the Teeth and Jaw” used in the present analysis includes ICD9 codes 520-526.9 as well as V523, V534, V585, and V722.

## **Robustness**

In Table A4 we explore the sensitivity of the results in Tables 3 and 4 to alternate specifications. First, we estimate negative binomial regressions for the continuous outcomes and logistic regressions for the binary outcomes and calculate average marginal effects. Second, we assess sensitivity to covariates. We include controls for characteristics provided by participants when they signed up for the lottery, including year of birth; sex; whether English is the preferred language for receiving materials; whether the individuals signed themselves up for the lottery or were signed up by a household member; whether they provided a phone number on sign-up; whether the individuals gave their address as a PO box; whether they signed up the first day the lottery list was open; and the median household income in the 2000 census from their ZIP code. For ED visits we also assess sensitivity to excluding the control for pre-period ED visits.



## **References**

1. Finkelstein A, Taubman S, Wright B, et al. The Oregon Health Insurance Experiment: Evidence from the First Year. *Quarterly Journal of Economics* 2012;127:1057-106.
2. Allen H, Wright BJ, Baicker K. New medicaid enrollees in Oregon report health care successes and challenges. *Health affairs (Project Hope)* 2014;33:292-9.
3. Baicker K, Taubman SL, Allen HL, et al. The Oregon Experiment -- Effects of Medicaid on Clinical Outcomes. *New England Journal of Medicine* 2013;368:1713-22.
4. Taubman SL, Allen HL, Wright BJ, Baicker K, Finkelstein AN. Medicaid increases emergency-department use: evidence from Oregon's Health Insurance Experiment. *Science* 2014;343:263-8.
5. Center for Disease Control and Prevention. National Health Expenditure Tables. 2014.
6. Seu K, Hall KK, Moy E. Emergency Department Visits for Dental-Related Conditions, 2009: Healthcare Cost and Utilization Project; 2012.
7. Centers for Disease Control and Prevention. QuickStats: Percentage of Emergency Department (ED) Visits That Were Dental-Related Among Persons Aged <65 Years,. 2013.
8. Centers for Disease Control and Prevention. Health, United States, 2013.
9. Lockhart PB, Bolger AF, Papapanou PN, et al. Periodontal disease and atherosclerotic vascular disease: does the evidence support an independent association?: a scientific statement from the American Heart Association. *Circulation* 2012;125:2520-44.
10. Azarpazhooh A, Tenenbaum HC. Separating fact from fiction: use of high-level evidence from research syntheses to identify diseases and disorders associated with periodontal disease. *Journal* 2012;78:c25.
11. Hwang SS, Smith VC, McCormick MC, Barfield WD. The association between maternal oral health experiences and risk of preterm birth in 10 states, Pregnancy Risk Assessment Monitoring System, 2004-2006. *Maternal and child health journal* 2012;16:1688-95.
12. Torres LH, da Silva DD, Neri AL, Hilgert JB, Hugo FN, Sousa ML. Association between underweight and overweight/obesity with oral health among independently living Brazilian elderly. *Nutrition* 2013;29:152-7.
13. Michaud DS, Liu Y, Meyer M, Giovannucci E, Joshipura K. Periodontal disease, tooth loss, and cancer risk in male health professionals: a prospective cohort study. *Lancet Oncol* 2008;9:550-8.
14. Neidell M, Herzog K, Glied S. The association between community water fluoridation and adult tooth loss. *American journal of public health* 2010;100:1980-5.

15. Wall TP, Vujicic M, Nasseh K. Recent trends in the utilization of dental care in the United States. *J Dent Educ* 2012;76:1020-7.
16. Vujicic M, Nasseh K. A decade in dental care utilization among adults and children (2001-2010). *Health services research* 2014;49:460-80.
17. Cohen LA, Manski RJ, Magder LS, Mullins CD. A Medicaid population's use of physician offices for dental problems. *American journal of public health* 2003;93:1297-301.
18. Neely M, Jones JA, Rick S, Gutierrez L. Effects of Cuts in Medicaid on Dental-Related Visits and Costs at a Safety-Net Hospital. *American journal of public health* 2014.
19. McGinn-Shapiro M. Medicaid Coverage of Adult Dental Services. *State Health Policy Monitor* 2008.
20. Wall TN, K; Vujicic, M. Financial Barriers to Dental Care Declining after a Decade of Steady Increase. *Health Policy Institute Research Brief* 2013.
21. Buchmueller T, Miller S, Vujicic M. How Do Providers Respond to Public Health Insurance Expansions? Evidence from Adult Medicaid Dental Benefits. *NBER Working Paper No 20053* 2014.
22. Baicker K, Taubman S, Allen H, et al. The Oregon Health Insurance Experiment: Evidence from the In-Person Interviews. *Analysis Plan*; Archived on April 16, 2012; Available at <http://www.nber.org/oregon>.
23. Finkelstein A, Taubman S, Allen H, et al. The short-run impact of extending public health insurance to low income adults: evidence from the first year of The Oregon Medicaid Experiment. *Analysis Plan*; Archived on December 1, 2010; Available at <http://www.nber.org/oregon>.

**Table 1: Sample Characteristics**

	12-Month Mail Survey Sample			In-Person Survey Sample			Emergency Department Sample		
	Controls (1)	Lottery Winners (2)	P-Value (3)	Controls (4)	Lottery Winners (5)	P-Value (6)	Controls (7)	Lottery Winners (8)	P-Value (9)
N	11,966	11,811		5,842	6,387		15,020	9,626	
Age (Years)	41.5	41.5	0.79	39.1	39.3	0.37	39.4	39.3	0.59
Female (%)	59.1	58.7	0.58	56.9	56.4	0.60	55.4	54.4	0.09
White (%)	82.0	81.7	0.58	68.8	69.2	0.68			
Any Pre-Lottery ED Visits (%)							32.0	32.5	0.47
<i>F-Statistic for Above Variables</i>	0.236			0.542			1.074		
<i>P-Value</i>	0.871			0.654			0.359		

**Notes:** Table shows characteristics of different samples analyzed. For each sample, the first column shows the weighted mean value for control individuals who entered the lottery but were not selected, the second column reports the regression-adjusted weighted mean value for those randomly selected by the lottery to be able to apply for Medicaid coverage, and the third column shows the p-value of difference between the means. Information on age and gender was measured at the time of lottery sign up; data on race was collected in the 12-month mail and in-person surveys. Survey samples are all weighted with corresponding survey weights. The final rows report the pooled F statistics and p-values from testing treatment-control balance on the above variables jointly.

**Table 2: Insurance Coverage (First Stage Estimates)**

	12-Month Mail Survey Sample		In-Person Survey Sample		Emergency Department Sample	
	Control Mean (1)	Estimated FS (2)	Control Mean (3)	Estimated FS (4)	Control Mean (5)	Estimated FS (6)
Ever on Medicaid	13.50	28.96 (0.67)	18.46	24.14 (0.90)	14.58	24.65 (0.61)
Ever on OHP Standard	2.63	30.14 (0.55)	3.34	26.49 (0.70)	3.34	25.21 (0.50)
Number of Months on Medicaid	1.51	3.94 (0.09)	2.56	4.16 (0.16)	2.56	3.25 (0.08)
On Medicaid at the End of the Period	10.45	18.83 (0.61)	13.34	11.35 (0.79)	13.34	14.31 (0.54)

**Notes:** For each of the three categories of analysis (ED data, 12-month mail survey data, and in-person survey data), the first column reports the control mean for alternate definitions of “MEDICAID,” and the second column reports the coefficient (with standard error in parentheses) on LOTTERY from estimating the first-stage (equation 3 in text) using the specified definition of “MEDICAID.” All regressions adjust standard errors for household clusters. Regressions of insurance variables used in the analyses of in-person survey data and ED data (columns 4 and 6) include indicators for the number of household members on the lottery list. Regressions of insurance variables used in the analysis of the 12-month survey data (column 2) also include indicators for survey wave and survey wave interacted with number of household members on the lottery list. Columns 1-4 include sampling weights. In all our analyses of the local-average-treatment effect of Medicaid in the paper, we use the definition in the first row: “On Medicaid at any point in the study period.” N=23,777 for 12-month mail sample, N=12,229 for in-person sample, and N=24,646 for ED sample.

**Table 3: Survey Data**

	Mean Value in Control Group	Effect of Lottery Selection	Effect of Medicaid Coverage	P-Value
	(1)	(2)	(3)	(4)
<i>12-Month Mail Survey Sample</i>				
Needed Dental Care (Past 6 Months)	73.9			
Got All Needed Dental Care (Past 6 Months)	39.4			
<i>In-Person Survey Sample</i>				
Recieved Dental Care (Past 12 Months)	31.7			
Out of Pocket Costs of Dental Care (Past 12 Months)	120.06			

**Notes:** All regressions include indicators for the number of household members on the lottery list and cluster standard errors by household. Analyses of the 12-month mail survey also contain indicator variables for survey wave and for the interaction between survey wave and number of household members on the lottery list. The 12-month mail survey and in-person survey analyses include sampling weights. Sample sizes are N=23,777 for the 12-month mail survey and N=12,229 for the in-person survey.

**Table 4: Emergency Department Data**

	Percent with any visits				Number of visits			
	Mean Value in Control Group	Effect of Lottery Selection	Effect of Medicaid Coverage	p-value	Mean Value in Control Group	Effect of Lottery Selection	Effect of Medicaid Coverage	p-value
	(1)	(2)	(3)	(4)	(6)	(7)	(8)	(9)
ED visit for disorders of teeth and jaw	2.72 (16.28)				0.049 (0.437)			

**Notes:** All regressions include indicators for the number of household members on the lottery list, control for pre-period versions of the outcomes (1 January 2007 - March 9, 2008), and cluster standard errors by household. Sample size N=24,646 individuals.

**Table A1: ED Admissions, Primary Diagnosis (Control Group)**

Primary Diagnosis	Frequency	Percent
Sprains and Strains	1390	8.68
Skin and Subcutaneous Tissue Infections	884	5.52
Abdominal Pain	782	4.88
<b>Disorders of Teeth and Jaw</b>	<b>741</b>	<b>4.63</b>
Spondylosis; Intervertebral Disc Disorders; Other Back Problems	683	4.26
Superficial Injury; Contusion	575	3.59
Nonspecific Chest Pain	550	3.43
Headache; Including Migraine	501	3.13
Mood Disorders	491	3.07
Other Nervous System Disorders	409	2.55
Other Upper Respiratory Infections	351	2.19
Other Connective Tissue Disease	309	1.93
Other Aftercare	304	1.90
Open Wounds of Extremities	300	1.87
Alcohol-Related Disorders	295	1.84
Urinary Tract Infections	291	1.82
Other Non-Traumatic Joint Disorders	246	1.54
Asthma	240	1.50
Anxiety Disorders	236	1.47
Other Lower Respiratory Disease	209	1.30
Nausea and Vomiting	204	1.27
Other Injuries and Conditions Due to External Causes	200	1.25
Substance-Related Disorders	194	1.21
Acute Bronchitis	186	1.16
Chronic Obstructive Pulmonary Disease and Bronchiectasis	184	1.15

**Notes:** Table shows the most frequent primary diagnoses from the control sample's 16,016 ED admissions from 10 March 2008 - 30 September 2009. Diagnosis categories shown are aggregated IDC-9 codes grouped into categories by Clinical Classification Software (see Analysis Plan for details).

**Table A2: ED Admissions for "Disorders of Teeth and Jaw" (Control Group)**

Diagnosis	Frequency	Percent
Nonspecified Dental Disorder	248	33.47
Periapical Abscess	175	23.62
Dental Caries (Nonspecified)	174	23.48
Acute Apical Periodontitis	42	5.67
Dental Caries	36	4.86
Tempromandibular Joint Disorders, Nonspecified	11	1.48
Cracked Tooth	7	0.94
Jaw Disease, Nonspecified	6	0.81
Chronic Periodontitis, Nonspecified	6	0.81
Acq Absence of Teeth, Nonspecified	5	0.67
Aggressive Periodontitis, Nonspecified	5	0.67
Chronic Gingivitis, Plaque	4	0.54
Inflammation of Jaw	4	0.54
Arthralgia TMJ (Temporomandibular Joint)	3	0.40
Acute Periodontitis	2	0.27
Other Specific TMJ Disorders	2	0.27
Aggressive Periodontitis, Localized	2	0.27
Periapical Abscess with Sinus	2	0.27
Tooth Eruption Disturb	1	0.13
Unspecified Gingival and Periodontal Disease	1	0.13
Alveolitis of Jaw	1	0.13
Acute Gingivitis, Plaque	1	0.13
Contour Restore Tooth	1	0.13
Loss of Teeth Due to Trauma	1	0.13
Pulpitis	1	0.13
<b>Total ED Admissions for "Disorders of the Teeth and Jaw"</b>	<b>741</b>	<b>100.00</b>

**Notes:** Table shows the primary diagnoses ICD-9 codes for all control group ED admissions classified by Clinical Classification Software as "Disorders of the Teeth and Jaw."



**Table A3: Distribution of Out-of-Pocket Costs of  
Dental Care (Control Group)**

	Out-of-Pocket Costs of Dental Care (Last 12 Months), in Dollars	Out-of-Pocket Costs of Dental Care (Last 12 Months) for Those with Positive Spending, in Dollars
N	5812	1230
Mean	120	569
SD	569	1130
Q1	0	100
Median	0	250
Q3	0	550
90%	250	1225
95%	600	2200
99%	2500	5600
Min	0	1
Max	16000	16000

**Notes:** The out-of-pocket costs described above are those reported in the in-person survey.

**Table A4: Robustness Analysis**

	Mean Value in Control Group	Effect of Lottery Selection: Primary Spec	P-Value	Effect of Lottery Selection: Alternate Spec	P-Value	Adding Lottery List Variables to Primary Spec	P-Value	Removing Pre-Period ED Outcome Control from Primary Spec	P-Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>12-Month Mail Survey Sample</i>									
Needed dental care (Past 6 Months) <sup>1</sup>	73.9								
Got all needed dental care (Past 6 Months) <sup>1</sup>	39.4								
<i>In-Person Survey Sample</i>									
Received Dental Care (Past 12 Months) <sup>1</sup>	31.7								
<i>Emergency Department Sample</i>									
Any ED Visits for Disorders of Teeth and Jaw <sup>1</sup>	2.72								
Number of ED Visits for Disorders of Teeth and Jaw <sup>2</sup>	0.049								

**Notes:** All regressions include indicators for the number of household members on the lottery list and cluster standard errors by household. Analyses of the 12-month mail survey also contain indicator variables for survey wave and for the interaction between survey wave and number of household members on the lottery list. The 12-month mail survey and in-person survey analyses include weights that account for the probability of being sampled in the new lottery. Lottery list variables include year of birth, sex, whether English is the preferred language; whether the individuals signed themselves up for the lottery; whether they provided a phone number on sign-up; whether the individuals gave their address as a PO box; whether they signed up the first day the lottery list was open; and the median household income of residents in their ZIP code in the 2000 census. Sample sizes are N=24,646 for the emergency department data, N=23,777 for the twelve month mail survey, and N=12,229 for the in-person survey. Alternative Specification is: <sup>1</sup>logistic, <sup>2</sup>negative binomial