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The Impact of the Affordable Care Act's Dependent Coverage Mandate on Use of Dental Treatments and Preventive Services

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Abstract

BACKGROUND—Oral health problems are the leading chronic conditions among children and younger adults. Lack of dental coverage is thought to be an important barrier to care but little empirical evidence exists on the causal effect of private dental coverage on use of dental services. We explore the relationship between dental coverage and dental services utilization with an analysis of a natural experiment of increasing private dental coverage stemming from the Affordable Care Act's (ACA) dependent coverage mandate.

OBJECTIVES—To evaluate whether increased private dental insurance due to the spillover effect of the ACA dependent coverage health insurance mandate affected utilization of dental services among a group of affected young adults.

DATA—2006–2013 Medical Expenditure Panel Surveys

STUDY DESIGN—We employed a difference-in-difference regression approach comparing changes in dental care utilization for 25-year-olds affected by the policy to unaffected 27-year-olds. We evaluate effects on dental treatments and preventive services

RESULTS—Compared to 27-year-olds, 25-year-olds were 8-percentage points more likely to have private dental coverage in the three years following the mandate. We do not find compelling evidence that young adults increased their use of preventive dental services in response to gaining insurance. We do find a nearly 5-percentage point increase in the likelihood of dental treatments among 25-year-olds following the mandate, an effect that appears concentrated among women.

CONCLUSIONS—Increases in private dental coverage due to the ACA's dependent coverage mandate do not appear to be driving significant changes in overall preventive dental services utilization but there is evidence of an increase in restorative care.

Keywords

Affordable Care Act; dental insurance; dental care utilization; dependent coverage mandate

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Introduction

Oral health is a major contributor to overall health and wellbeing^{1–4}. Dental problems such as caries and periodontal disease are the most prevalent chronic conditions among young adults with over 80% living with caries, missing, or filled teeth, including 28% with untreated decay, and an average of six decayed permanent teeth⁵. Poor oral health is a risk factor for subsequent chronic health problems such as diabetes and heart disease in adulthood¹. Access to dental care, though considered key for oral health⁶, declined in the last 10 to 15 years for adults, particularly younger adults⁷. Private dental coverage rates declined from 57% in 2000 to 51% in 2010 for adults aged 19–34⁸, and most of those losing coverage did not gain public coverage⁹. Further, nearly 20% of adults in this age group forego needed dental care because of cost⁷. 2012). Corresponding with these trends is an increase in dental-related emergency room visits¹⁰.

In contrast to the noted declining trends, recent work by Vujcic et al.¹¹ and Shane and Ayyagari¹² showed increases in private dental coverage among young adults in 2011. This increase was a positive spillover effect of the dependent coverage mandate of the Affordable Care Act (ACA) that enabled approximately 1.5 million young adults to gain private dental insurance in addition to medical coverage. The dependent coverage mandate required private medical insurance plans to allow dependents to stay on parental plans until age 26. Stand-alone dental plans were not specified in the dependent coverage mandate policy but companies that offer private plans covering dependents appear to have extended access to other benefits including dental coverage, as evidenced by nearly the same increase in dental coverage as medical coverage¹³. For 19–25 year-olds, the dependent coverage mandate is the only ACA policy that may have affected private dental coverage. The inclusion of dental coverage as an essential health benefit via the ACA is limited to children 18 years or younger¹⁴.

We exploit this ACA-driven gain in dental insurance as a natural experiment for examining the impact of increased private dental coverage on use of dental care among young adults. To increase the validity of the natural experiment, we focus on the closest possible comparison groups: the 25 year-olds that benefitted from the mandate versus 27 year-olds that did not qualify. Our work fills a major gap in the literature on the potential causal effects of policies focused on expanding private dental coverage as prior studies have exclusively focused on policies that expanded public dental coverage. Such studies have generally found increased utilization of dental services with expanded Medicaid coverage for adults^{15–17} and declines in access to care after reductions in public dental benefits^{18–20}.

In contrast, studies of private dental coverage have been largely descriptive and limited to association estimates. Recent work describing a large sample of adults with private dental insurance finds that a large fraction of those with coverage do not file a claim in a given year and potentially calls into question the overall value of private dental coverage for nearly 70% of the group²¹. A handful of observational studies employed statistical techniques to attempt to deal with the problem of self-selection into coverage including panel data methods²², instrumental variables, and conditional maximum likelihood models^{23,24}. These studies overall point to an increase in use of services with coverage. No previous study has

examined a national natural experiment resulting from a specific policy change that actually increased private dental insurance to study the impact on use of dental services. Similarly, no prior work has focused on young adults.

Methods

Beginning in September 2010, the dependent coverage mandate allowed young adults up to age 26 to remain on private parental health insurance plans. Around that time, no other significant policy changes affected private dental coverage at a national level. Moreover, other than the dependent coverage mandate, no other aspects of the ACA affecting health insurance markets took effect until 2014. We leverage the resulting large spillover increase in private dental insurance as a natural experiment to assess the effects of the resulting expansion in dental coverage on use of dental services among young adults through 2013; three years after the policy took effect. We use a difference-in-difference (DD) design comparing the pre-post ACA change in dental services use among 25 year-olds to the change among 27 year-olds who were not eligible under the dependent coverage mandate to account for other events unrelated to the ACA policy that may have influenced dental services utilization. The choice of such a narrow age comparison greatly reduces the possibility of any event other than the mandate differentially affecting one group during the same period.

Data

We use data from the Medical Expenditure Panel Survey (MEPS). The MEPS, a nationally representative survey, contains information on dental insurance and services use as well as demographic and socioeconomic factors. To evaluate annual changes in private dental coverage and dental care use due to the dependent coverage mandate, we include MEPS participants from 2006 through 2009 as the pre-ACA period and from 2011 through 2013 as the post-ACA period. As of September 2010, renewable private health insurance plans were required to accept young adults up to age 26, making 2011 the first full year for the dependent coverage mandate to take effect. Since our analysis is based on annual changes in coverage and the policy was in effect only for the last few months of 2010, we do not include data from 2010. This avoids any confusion on whether to classify 2010 as a pre-ACA mandate year or a post-ACA mandate year. We also exclude 2014 as the ACA Medicaid expansions may affect dental care use in both age groups.

Sample

We restrict the sample to individuals aged 25 to 27 years. We also exclude individuals who were 26 years old at the time of the survey since we cannot confirm age at the time of the parent's insurance renewal and therefore cannot determine whether the mandate would apply. Using the MEPS insurance plan files, we identify individuals that have private dental insurance. To ensure we are comparing private dental coverage to no coverage, we exclude individuals with public insurance. However, we also evaluate results including those with public insurance as part of evaluating the sensitivity of our main estimates. The main analysis sample consists of 5,447 observations including 2,727 in the "treatment group" of 25 year-olds and 2,720 in the "control" group of 27 year-olds.

Dental Utilization Measures

MEPS collects detailed, individual, visit-level information on utilization of all dental services. Using these visit-level dental files, we separate services into dental treatments and preventive dental services to evaluate potential changes in utilization stemming from increased coverage. We construct aggregate, annual binary indicators for both types of care. Included in preventive services are cleanings, fluoride treatments, and dental exams (outcome equals one if any of these services occurred during the year). We note that teeth cleanings may have independent appeal to individuals beyond their preventive value, notably for their cosmetic value, an issue we return to in the discussion. Under dental treatments, we include cavity fillings, tooth extractions, crowns, and root canals. Unfortunately, we cannot distinguish whether dental exams are strictly comprehensive exams that would typically be associated with preventive care. Therefore, it is possible that an exam occurred as part of a subsequent dental treatment. For our outcomes, we would consider that person as having had both preventive services and dental treatments during that year. Despite this shortcoming, we feel separating services into these categories is useful in understanding the potential effects of gains in private dental insurance, particularly given the large differences in cost between these categories. Using the MEPS dental files from 2013, we obtained the average charges prior to any insurance subsidies for the key services we are evaluating to provide context in terms of what an uninsured patient may face. For teeth cleaning services with an exam, the average charge was just over \$170. For extractions, the average charge was nearly \$600, while the average charges for crowns and root canals were \$800 and \$900, respectively.

Estimation

We employ a DD regression approach that compares the change in dental service use outcomes among 25 year-olds pre-post ACA to the change for 27 year-olds (through 2013). We estimate the following regression:

$$DENTAL_{it} = \alpha + \beta_1 YOUNGADULT_{it} \times POSTACA_t + \beta_2 YOUNGADULT_{it} + \beta_3 POSTACA_t + \mathbf{X}'_{it} \beta_4 + \varepsilon_{it}.$$

(1)

The dependent variable in equation (1) $DENTAL_{it}$ is one of the two outcomes described above. The group indicator $YOUNGADULT_{it}$ is a binary variable that takes the value 1 if individual i is 25 and takes the value 0 if individual i is 27. The variable $POSTACA_t$ is a binary indicator for observations in 2011–2013, the post-ACA implementation years. The coefficient β_2 captures the mean difference in dental outcomes between 25 year olds and 27 year olds, while β_3 captures secular trends in dental measures between 2006–2009 (pre-ACA) and 2011–2013 (post-ACA). The main parameter of interest is the coefficient on the interaction term (β_1) which represents the change over time in dental care use for 25 year-olds compared to 27 year-olds. This coefficient captures the dependent coverage mandate effect on dental services use. We also estimate this regression for dental coverage to update previous estimates based on data through 2011.

To control for observable differences that may affect dental outcomes ($\mathbf{X}$), we include gender, race, and a set of dummy variables for census region. Table 1 provides a descriptive summary of these variables across groups. We do not adjust our primary model for potentially endogenous variables such as employment status, marital status, and personal income as the mandate may affect these variables directly and thus including them may result in a partial effect estimate. Instead, we evaluate whether including these variables changes our estimates in a sensitivity analysis. We also include means for these variables in Table 1. All estimations include survey weights that account for the complex nature of the survey design and cluster sampling using survey-analysis commands in STATA²⁵. We discuss alternative options for clustering the standard errors below.

Testing Pre-Trends

As noted above, the identifying assumption of the DD model is that any events relevant to the outcomes over the study period other than the dependent coverage mandate are shared between the two groups. To evaluate this assumption, we examine whether the pre-ACA trends in dental coverage and service use are similar between the two groups by examining interactions between year fixed effects and the group indicator (25 versus 27) for the years prior to the ACA mandate (controlling for group and year fixed effects and the same demographic covariates in equation (1) above). We find no evidence of differential pre-trends, including tests of the joint significance of the pre-ACA year interaction terms between groups (Supplementary Table S1).

Results

Descriptive Findings

Figure 1 illustrates unadjusted trends for dental services use from 2006 to 2013. Overall, patterns of dental services utilization are close between 25 and 27 year-olds both before and after the mandate. Changes in both dental treatments and preventive services utilization appear flat to negative between 2006 and 2013, consistent with previous evidence⁷ on declining utilization for young adults in the previous decade. A possible difference between groups in use of dental treatments does emerge, however, following implementation of the mandate. In 2011, the likelihood of treatments increases for 25 year-olds while continuing to decline for 27 year-olds. In subsequent post-mandate years, the likelihood of having a dental treatment remains higher for 25 year-olds, albeit following a downward trend after the initial increase.

Effects on Dental Coverage and Dental Services Use

Table 2 presents results for the DD estimates of the dependent coverage mandate impact on dental insurance coverage and the measures of dental service use. Private dental coverage is 8 percentage-points higher among 25 year-olds following the mandate. We did not find evidence of a significant effect on preventive dental services use. Taking into consideration the high end of the 95% confidence interval in terms of our estimates, we can rule out increases in the likelihood of preventive visits of more than 4 percentage-points (about 10% of the use rate pre-ACA). In contrast to preventive services, the likelihood of dental treatments increased among 25 year-olds by 4.8 percentage points (0.0, 9.6) compared to 27

year-olds following the mandate. For context, this post-mandate increase in the rate of dental treatments is nearly 40% of the pre-ACA average rate of dental treatments among 25 year-olds.

Effects on Dental Services Use by Sex

Given the overall findings that the policy-driven expansion in private dental coverage increased use of dental treatments but did not have a significant effect on preventive services use, we evaluate potential differences between men and women. We re-estimated equation 1 for dental treatments and preventive dental services separately for men and women with the results shown in Table 3. We find that the likelihood of dental treatments increased by 10 percentage points (2.2, 17.8) among women. Among men, the increase was only 0.5 percentage points (-5.3, 6.4) and not significant at traditional levels. We did not find evidence that either men or women increased use of preventive services following the mandate though there were differences as the estimated effect was positive for women and negative for men.

Robustness Checks and Additional Estimations

Though we found no differences in terms of “pre-trends” between 25 year-olds and 27 year-olds, we further explore the sensitivity of our model to other factors that may influence the likelihood of having private dental coverage and dental services utilization. Such factors include marital status, labor supply participation, and personal income. We add variables that capture these factors to our base model. Specifically, we include binary indicators for whether the person is married, whether a person is currently employed, self-employed, works for an employer with more than 250 employees, or works for an employer with 10 or fewer employees. We also include annual wage income. If these variables changed differentially between 25 and 27 year-olds during the same time period as the dependent coverage mandate, and these changes are responsible for the differences in dental utilization, then we would expect our estimated effects to change appreciably once variables that capture these other changes are added to the model. Table 4 shows a series of regression that adds the factors noted above incrementally to gauge the effects on our main estimates. The results clearly show that adding these variables does not result in meaningful changes to our estimates. The DD coefficient for preventive services declines slightly and remains insignificant, while the coefficient for dental treatments declines slightly to 4.6 percentage points (0.0, 9.4) and remains significant. Though the dependent coverage mandate affected only private plans, we also re-estimated models including individuals with public health insurance to test the sensitivity of results to that sample restriction. Estimates of the changes in both coverage and dental treatments and preventive services utilization were nearly unchanged from the main model.

As Cameron and Miller²⁶ summarize, the issue of clustering standard errors in DD models is important to address. We tested whether our results are sensitive to the type of clustering arrangement by estimating models clustered at the person-level, the household-level, and by year in addition to using the survey commands to adjust for the complex survey design. We used the wild cluster bootstrap method²⁷ to compute adjusted p-values in cases where there are few clusters as there is a tendency to over-reject in those cases. We found no differences

in inference across the various methods (additional details and resulting p-values available upon request).

5. Discussion

We examine the effects of a policy-driven expansion of private dental coverage among young adults on dental services utilization. Our finding of an 8 percentage point increase in private dental coverage is consistent with prior evidence documenting the spillover effect from the dependent coverage mandate^{11,12}. Our primary analysis aims at identifying the causal effect of this expansion on dental services by comparing 25 year-olds affected by the mandate to 27 year-olds who were ineligible. We find evidence of an increase in use of dental treatments following the coverage gain but do not find a significant change in use of preventive dental services. We also find differences in the effects of the policy-driven coverage expansion between men and women. For 25 year-old women, we find a post-mandate increase in dental treatments of 10 percentage points compared to 27 year-olds over the same period. We did not find a significant increase in dental treatments among men, however. This evidence suggests that having coverage made young adults, particularly women, slightly more responsive to treating dental problems but not necessarily more proactive in terms of seeking services like cleanings and oral exams to prevent future issues. This differential effect by type of service and the relatively large impact on dental treatment use (nearly 40% compared to the rate before the mandate) may be driven by the much larger cost of treatments relative to preventive services and a possible pent-up demand for dental treatments. As previously noted, average charges for dental treatment such as crowns, root canals, and extractions range from \$600–\$900 while charges for teeth cleaning and an exam are \$170. An additional important detail is that services provided as part of preventive dental services that have a cosmetic appeal such as plaque removal and teeth whitening can be done at home, perhaps decreasing the responsiveness for such services from a dental insurance perspective. Furthermore, demand for dental preventive care was relatively low to begin with (~30%), suggesting a penchant in this age group for seeking dental services only when absolutely necessary, such as due to a pain flare, consistent with an increase in dental treatments after gaining insurance. Apart from patient-level explanations, differences in the way dentists respond to patients that have insurance may also play a role in the increase in dental treatments compared to preventive services.

Despite the relatively high prevalence of oral health problems among young adults, the demand for preventive dental services in this group appears relatively insensitive to coverage, consistent with evidence on the dependent coverage mandate's effect on use of medical services such as primary care doctor visits^{28,29}. Additional work can make use of the details of dental plans to gauge whether plan design affects use of preventive services.

From a policy perspective, these results offer some contrast to previous findings of an increase in use of dental services following expansions of enrollment of adults in Medicaid^{14–16}. In addition to the public versus private coverage distinction, an additional difference between our work and the noted work on public dental benefits is that we split utilization into dental treatments and preventive services while the other studies focus on overall utilization (whether there were any visits to a dentist) or focus strictly on preventive

services. In any case, the differences in results indicate that we should be cautious in extrapolating Medicaid expansion effects on dental care use to individuals gaining private dental coverage, particularly for preventive services. Differences may be attributable to the socioeconomic and demographic characteristics of Medicaid recipients and the prevalence of untreated dental health problems between the groups affected by the dependent coverage mandate and Medicaid expansions. The estimates from the studies on Medicaid expansions apply to low income adults who are generally older than the group affected by dependent coverage mandate. Moreover, coverage of dental services in Medicaid can be more generous than that in private plans. There is also a potential difference in the role of selection as it relates to who signs up for public or private coverage and subsequent changes in utilization of services. Individuals must take the positive step of enrolling in coverage in most circumstances for Medicaid while it is the parent, not the ultimate beneficiary, who must take the positive step of enrolling the young adult in their employer benefits as part of the dependent coverage mandate.

In conclusion, our study suggests that policies that extend access to private dental coverage may increase the use of dental treatments but may not meaningfully change preventive services utilization among young adults. Questions stimulated by our findings that merit future research include how private dental coverage affects an individual's use of dental services over a longer period, how changes in dental coverage generosity and benefits can affect use of both dental treatments and preventive services, and how plan design may create incentives for seeking preventive care.

Limitations

In terms of the available data on dental visits, we lacked the ability to differentiate comprehensive exams from consultative exams and thus to truly separate exams into preventive versus treatment-related. We also lacked both longitudinal data and any information on oral health that would be necessary to evaluate the connection at the person level between an increase in dental insurance coverage and changes in dental services utilization. Unfortunately, we also did not have information on the dental plan benefits or restrictions for this sample, leaving the effects of plan generosity on utilization for future work. We were also unable to differentiate between changes in patient behavior following an increase in dental coverage versus changes in provider behavior as both could have an impact. We can only highlight the overall effect and point to future research evaluating both supply-side and demand-side effects.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Dental Service Utilization Trends: 2006–2013

Table 1Pre-ACA (2006–2009) Descriptive Characteristics of Affected ACA Group and Older Control Cohort[&]

Variable	Definition	n=1,414 25 Means	n=1,453 27 Means
<i>Demographic/Socioeconomic</i>			
Female	1 if Female	46%	49%
Black	1 if Black	13%	11%
Hispanic	1 if Hispanic	18%	19%
White	1 if White	63%	63%
Other	1 if Other Race	7%	7%
Married	1 if Married	22%	36%
Wage Income (\$2011)	Annual wage income (000's)	26.9	33.1
Employed	1 if Employed	84%	86%
Small Firm	1 if Firm has 250 or more employees	33%	35%
Large Firm	1 if Firm has 10 or fewer employees	27%	26%
Self-Employed	1 if Self-Employed	3%	4%
<i>Region**</i>			
Northeast	1 if live in Northeast Region	17%	16%
Midwest	1 if live in Midwest Region	24%	21%
South	1 if live in South Region	38%	36%
West	1 if live in West Region	21%	26%
<i>Coverage/Utilization</i>			
Dental Coverage	1 if has Private Dental Coverage [#]	45%	47%
Any Preventive Services	1 if Any Preventive Dental Services During Year	30%	29%
Any Treatments	1 if Any Dental Treatments During Year	13%	14%

[&] Calculated using MEPS person weights^{**} There are 136 individuals with missing values for region, thus percentages do not sum to 100%[#] Individual denoted private dental coverage as part of establishment insurance coverage

Table 2

Difference in Difference Regression Results Comparing Changes in Dental Outcomes Pre/Post Dependent Coverage Mandate for 25 Year-Olds versus 27 Year-Olds

Variable	Dental Coverage	Any Preventive Services	Any Dental Treatments
Age 25 × 2011–2013	0.080 ** [0.010, 0.152]	–0.024 [–0.088, 0.041]	0.048 ** [0.000, 0.096]
	(0.0364)	(0.0329)	(0.0244)
Age 25	–0.023	0.015	–0.010
	(0.0245)	(0.0224)	(0.0170)
2011–2013	–0.024	–0.013	–0.047 ***
	(0.0256)	(0.0231)	(0.0166)
Female	0.064 ***	0.166 ***	0.054 ***
	(0.0182)	(0.0166)	(0.0126)
Black	–0.076 ***	–0.108 ***	–0.017
	(0.0252)	(0.0226)	(0.0170)
Hispanic	–0.209 ***	–0.163 ***	–0.069 ***
	(0.0210)	(0.0176)	(0.0125)
Other Race	–0.006	–0.092 ***	–0.016
	(0.0301)	(0.0263)	(0.0202)
Midwest	0.039	0.097 ***	0.0385 **
	(0.0245)	(0.0226)	(0.0173)
Northeast	–0.022	0.061 **	0.013
	(0.0292)	(0.0274)	(0.0193)
West	0.012	0.036	0.035 **
	(0.0236)	(0.0207)	(0.0157)

Standard errors in parentheses, 95 percent confidence interval in brackets

***, **, * Significant at $p < .01$, and $.05$, respectively

Table 3

Difference in Difference Regression Results Comparing Changes in Dental Outcomes Pre/Post Dependent Coverage Mandate for 25 Year-Olds versus 27 Year-Olds by Sex

Variable	Women		Men	
	Any Preventive Services	Any Dental Treatments	Any Preventive Services	Any Dental Treatments
Age 25 × 2011–2013	0.040 [–0.060, 0.142]	0.100 ** [0.022, 0.178]	–0.076 [–0.148, 0.115]	0.005 [–0.053, 0.064]
	(0.0520)	(0.0397)	(0.0519)	(0.0299)
Age 25	–.035	–0.033	0.058 **	0.010
	(0.0350)	(0.0264)	(0.0282)	(0.0219)
2011–2013	–0.057	–0.067 **	–0.013	–0.030
	(0.0364)	(0.0264)	(0.0289)	(0.0206)
Black	–0.153 ***	–0.018	–0.067 **	–0.015
	(0.0356)	(0.0264)	(0.0287)	(0.0220)
Hispanic	–0.197 ***	–0.066 ***	–0.135 ***	–0.070 ***
	(0.0293)	(0.0215)	(0.0215)	(0.0146)
Other Race	–0.160 ***	–0.022	–0.026	–0.012
	(0.0392)	(0.0326)	(0.0346)	(0.0242)
Midwest	0.136 ***	0.064 **	0.062 **	0.017
	(0.0385)	(0.0268)	(0.0293)	(0.0222)
Northeast	0.077	0.033	0.047	–0.004
	(0.0426)	(0.0319)	(0.0353)	(0.0232)
West	0.073 **	0.063 **	0.003	0.011
	(0.0332)	(0.0259)	(0.0254)	(0.0186)

Standard errors in parentheses, 95 percent confidence interval in brackets

***, **, * Significant at p < .01, and .05, respectively

Table 4
Difference in Difference Results Comparing Changes in Dental Outcomes Pre/Post Dependent Coverage Mandate for 25 Year-olds versus 27 Year-Olds Under Different Specifications

	(1)	(2)	(3)	(4)
	<i>Any Preventive Services</i>			
Age 25 × Post Years	-0.024	-0.026	-0.024	-0.030
	(-0.088, 0.041)	(-0.091, 0.038)	(-0.088, 0.040)	(-0.094, 0.033)
	<i>Any Dental Treatments</i>			
Age 25 × Post Years	0.048**	0.048**	0.049**	0.046**
	(0.000, 0.096)	(0.000, 0.096)	(0.001, 0.096)	(-0.001, 0.094)
Baseline Covariates (see Table 2)	X	X	X	X
Marital Status		X	X	X
Labor Market Characteristics			X	X
Wage Income				X

95% Confidence intervals in parentheses

Notes: Abbreviated regression results -- full results available upon request; all regressions include survey weights; standard errors clustered to account for complex survey design using STATA survey commands