

Late-Stage Oral Cancer Detection After California and Illinois Restored Medicaid Dental Benefits

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Abstract

Objective. Previous research found an association between California's Medicaid dental coverage and oral cancer detection. However, this relationship has yet to be explored in other states or by subgroup populations.

Study Design. In addition to controlling for sociodemographic and tumor characteristics, this study implemented a traditional difference-in-differences design to compare distant-stage diagnosis trends in states restoring Medicaid dental benefits (California [CA] and Illinois [IL]) with trends in states with constant Medicaid dental benefits.

Setting. This retrospective, observational study analyzed oral cavity and pharynx cancer case data from The Surveillance, Epidemiology, and End Results program (2004-2017).

Methods. The outcome was a binary variable indicating whether a patient was diagnosed at a distant stage. Subgroup analyses were conducted by state, race/ethnic group, sex, age, and county-level household income.

Results. The sample included 109,997 adults diagnosed with cancer of the oral cavity and pharynx. Restoring Medicaid dental benefits was associated with a statistically significant 2.7%-point decline in the probability of a distant-stage oral cancer diagnosis. This estimate represented a 14% relative change from baseline rates. Results were consistent for CA and IL and by county-level median income. Estimates were significantly larger for adults under age 65, males, and adults identifying as Hispanic; non-Hispanic Black; American Indian; or Asian American or Pacific Islander.

Conclusion. Restoring Medicaid dental coverage improved early detection in both CA and IL, with the greatest reductions in distant-stage diagnoses occurring in younger adults, males, and minoritized racial/ethnic groups. Future research should investigate whether earlier detection reduces oral cancer mortality disparities.

Keywords

dental, detection, disparities, equity, Medicaid, oral cancer, policy

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Policies ensuring that low-income adults have adequate access to preventive dental services are essential for early detection of oral cancer.^{1,2} Yet, many low-income adults face significant financial barriers to visiting a dentist: the healthcare professional is most likely to screen for oral cancer.³⁻⁶ The primary government health insurance for low-income adults, Medicaid, does not always cover dental benefits.⁷ So, state policy decisions regarding Medicaid dental benefits have the potential to improve oral cancer detection for adults most vulnerable to the disease.

Previous research has shown a clear link between increasing Medicaid dental coverage and higher rates of early-stage oral cancer diagnoses.^{1,2} For instance, when California (CA) eliminated its Medicaid dental benefits in 2009, early-stage diagnoses declined.¹ Then, when CA restored its Medicaid dental benefits in CA in 2014, the trend reversed, at least for nonoropharyngeal oral cancers and oral cancers not associated with human papillomavirus.^{2,8} Note, that this conclusion, increasing early-stage diagnoses, was not found for states that didn't increase Medicaid dental benefits at the time of Medicaid expansion.² In fact, Medicaid expansion was not significantly associated with greater Medicaid enrollment for patients with oral cancer not associated with human papillomavirus after expansion in CA; suggesting that the increase in early-stage diagnoses was related to dental benefits, not insurance coverage.² However, it is important to note that the applicability of these findings to other states and diverse populations remains uncertain. Further research is necessary to evaluate the impact of Medicaid dental policy changes on oral cancer detection within different state jurisdictions, communities, and populations.

This study aims to further investigate the potential impact of Medicaid dental policy changes on late-stage oral cancer. In 2014, CA and Illinois (IL), 2 large and

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diverse states, restored their Medicaid dental benefits. To date, no Medicaid dental policy research has analyzed IL's new cancer registry data.⁹ By understanding the extent of Medicaid dental coverage's impact on oral cancer detection, these findings could offer valuable insights to public policy and resource allocation decision-makers striving to improve access to dental services for low-income adults.

Methodology

Data and Sample

Publicly available cancer case data was obtained from the Surveillance, Epidemiology, and End Results (SEER) program.⁹ The inclusion criteria consisted of patients diagnosed with cancer of the oral cavity and pharynx, aged 30 years or older, with a known stage at diagnosis derived from the SEER Summary Staging (2004-2017).¹⁰ Cases from 13 state-based registries included: CA, Connecticut, Georgia, Hawaii, Idaho, IL, Iowa, Kentucky, Louisiana, New Jersey, New Mexico, Texas, and Utah.

Outcome and Control Variables

The primary outcome of interest was a binary variable indicating whether a patient was diagnosed at a distant stage of oral cancer. This variable was derived from the SEER Summary Stage data, which categorizes cancer cases into localized, regional, and distant stages based on the extent of tumor spread at the time of diagnosis.¹⁰ At the group level, this variable measured the average probability of being diagnosed at a distant stage.

All models included control variables to account for potential confounding factors associated with a distant-stage oral cancer diagnosis. Demographic controls included binary variables indicating if the patient self-reported as male, non-Hispanic white race/ethnicity, and married. Age at diagnosis was dichotomized as a set of binary variables for 5-year age groups (30-34 to 95-99). Regarding tumor data, controls included binary variables indicating if the oral cancer was classified as squamous cell carcinoma and if the cancer was the patient's first malignant tumor, as well as a set of binary variables indicating the tumor site (Lip, Floor of Mouth, Gum and Other Mouth, Tongue, Other Oral Cavity & Pharynx, Hypopharynx, Nasopharynx, Oropharynx, Salivary Gland, Tonsil). Patient residence and geography were controlled for by a SEER-derived Rural-Urban Continuum Code indicating if the patient lived in a metro county and a set of binary variables based on categories of county-level median household income (<35k, 35k-39k, 40k-44k, 45k-49k, 50k-54k, 55k-59k, 60k-64k, 65k-69k, 70k-75k, >75k).

Finally, to account for unobserved confounding across states, all models included state-level fixed-effect variables.¹¹ To account for temporal trends in oral cancer

staging, all models also included year fixed-effect binary variables.

Exposure

The key exposure was a state-level change in Medicaid dental benefits. In 2014, both CA and IL restored their generous Medicaid dental benefits (which included access to a comprehensive dental exam—the exam most likely to include a visual screening for oral cancer).^{1,2,5-7} All other state Medicaid dental benefits remained constant during the study period. Exposure to the change was modeled as a binary variable, indicating if the patient was diagnosed in CA or IL, between 2015 and 2017 and zero otherwise. This time-variant, exposure variable estimated the association between restoring Medicaid dental benefits and the probability of a distant-stage diagnosis.

Research Design

This study implemented a traditional difference-in-differences design to compare distant-stage diagnosis trends in states restoring Medicaid dental benefits with the trend in states with constant Medicaid dental benefits, before and after the policy change in 2014.^{12,13} The year 2014 is excluded as a “wash-out” period.¹⁴ The state and year fixed-effect variables controlled for unobserved, time-invariant state-level differences affecting distant stage trends and secular trends in oral cancer staging outcomes. In addition to the standard difference-in-differences model, this study also implemented an event-history design.¹⁵ The event-history design served 2 purposes. By estimating year-by-year differential trends in distant-stage diagnoses by exposure to the policy change, this design first assessed the policy's impact over time. Second, this design also enabled assessing the validity of the common-trends assumption by testing if distant-stage trends differed by state prior to the policy change.¹⁶

Subgroup Analyses

In addition to the primary design described above, analyses were conducted to estimate the effect of CA's and ILs' state policy change separately. To further assess the generalizability of these findings, subgroup analyses tested for differential effects by binary population groups: (1) male and female, (2) non-Hispanic white and (all grouped together due to limited sample size) Hispanic; Asian American or Pacific Islander; American Indian or Alaska Native; non-Hispanic Black, (3) age < 65 and age ≥ 65, and (4) median county household income < 65k and ≥ 65k).

Statistical Analysis

All models were specified as linear probability regressions, estimating the average association between restoring Medicaid dental benefits and the probability of being diagnosed with a distant-stage oral cancer. For inference,

robust standard errors were clustered at the state level.¹⁷ As a sensitivity check, given the low number of state clusters, alternative models infer statistical significance based on cluster bootstrap procedures.^{18,19} All analyses were conducted in STATA v. 17.²⁰

Exploratory Analysis

As a secondary, exploratory analysis, the above methodology was repeated for 2 secondary staging variables (SEER Combined Summary Stage). The first is a binary variable indicating if the patient was diagnosed at a localized stage or a regional stage without lymph node involvement. The second is a binary variable indicating if the patient was diagnosed at a regional stage with lymph node involvement. Taken together, the primary (distant) and 2 secondary outcomes create a set of mutually exclusive staging categories. The purpose of the exploratory analysis

was to assess how the policy to restore Medicaid dental benefits was associated with changing staging patterns in patients with oral cavity and pharyngeal cancer.

Results

Primary Results

The analytic sample included a total of 109,997 adults diagnosed with cancer of the oral cavity and pharynx. In the preperiod (2010-2013), 19% of the sample were diagnosed at distant stages. Most of the sample self-reported as non-Hispanic white (71%-78%) and male (70%-72%). Only 33% to 37% of the sample were married. In the control states, 80% of the sample was in metro counties, compared to 93% of the sample in the treated states. The sample summary statistics are reported in **Table I**. **Figure 1** visualizes the year-by-year trends in

Table I. Mean Summary Statistics

| Variable | 2010-2013 | | 2015-2017 | |
|--------------------------------|----------------|-----------|----------------|-----------|
| | Control states | CA and IL | Control states | CA and IL |
| Primary outcome | | | | |
| Distant stage diagnosis | 0.197 | 0.189 | 0.174 | 0.134 |
| Secondary outcomes | | | | |
| Localized or regional w/out LN | 0.435 | 0.433 | 0.410 | 0.408 |
| Regional w/LN | 0.368 | 0.378 | 0.416 | 0.458 |
| Individual variables | | | | |
| Age | 62.3 | 62.8 | 63.1 | 63.7 |
| Non-Hispanic white | 0.784 | 0.714 | 0.773 | 0.710 |
| Male | 0.708 | 0.710 | 0.716 | 0.708 |
| Married | 0.340 | 0.361 | 0.335 | 0.374 |
| County variables | | | | |
| Metro | 0.800 | 0.927 | 0.806 | 0.927 |
| Median household income ≥ 65k | 0.315 | 0.395 | 0.390 | 0.530 |
| Tumor variables | | | | |
| First malignant tumor | 0.797 | 0.797 | 0.796 | 0.793 |
| Squamous cell carcinoma | 0.790 | 0.788 | 0.804 | 0.800 |
| The floor of the mouth | 0.048 | 0.045 | 0.040 | 0.037 |
| Gum and other mouth | 0.135 | 0.127 | 0.134 | 0.123 |
| Hypopharynx | 0.057 | 0.053 | 0.050 | 0.047 |
| Lip | 0.052 | 0.060 | 0.046 | 0.058 |
| Nasopharynx | 0.044 | 0.066 | 0.041 | 0.056 |
| Oropharynx | 0.044 | 0.042 | 0.051 | 0.041 |
| Other oral cavity and pharynx | 0.028 | 0.018 | 0.034 | 0.016 |
| Salivary gland | 0.109 | 0.113 | 0.108 | 0.110 |
| Tongue | 0.298 | 0.300 | 0.312 | 0.324 |
| Tonsil | 0.185 | 0.177 | 0.186 | 0.189 |
| N sample | 29,834 | 22,158 | 34,221 | 23,784 |
| m states | 11 | 2 | 11 | 2 |

The mean summary statistics of the sample, by treatment state group and treatment period. Except for age, which is reported here as a continuous variable's mean, all variables are reported as mean proportions of a binary variable. Total sample = 109,997. Control states = Connecticut, Georgia, Hawaii, Idaho, Iowa, Kentucky, Louisiana, New Jersey, New Mexico, Texas, and Utah. Stage outcomes are based on the SEER Summary Stage (2000-2017). Except for age, which reports the average age within each column group, all variables are reported on a binary scale to show the mean proportion.

Abbreviations: CA, California; IL, Illinois; LN, lymph nodes; regional w/LN, regional lymph nodes involved and direct extension; regional w/out LN, regional by direct extension only; SEER, Surveillance, Epidemiology, and End Result.

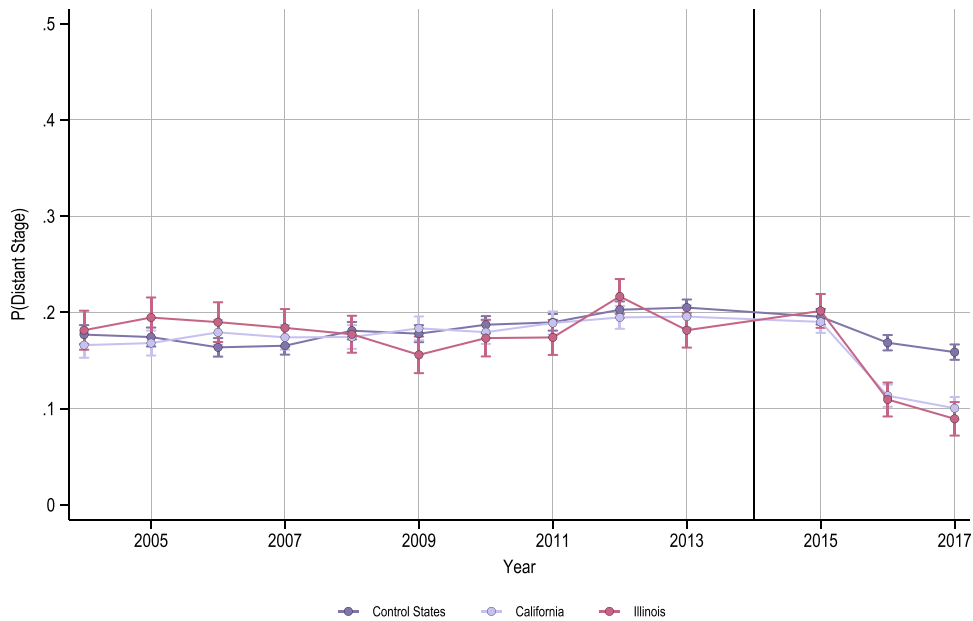


Figure 1. Year-by-year trends in distant stage diagnoses, by state group. The figure visualizes the year-by-year trends in the proportion of oral cancer cases diagnosed at a distant stage, by state. the vertical black line represents 2014, the year California and Illinois restored Medicaid dental benefits.

distant-stage diagnoses for the full sample of patients with oral cavity and pharynx cancer. **Figure 2** visualizes the trends by age, race/ethnicity, sex, and community household income level.

Overall, restoring Medicaid dental benefits was associated with a 2.7%-point decline in the probability of a distant-stage oral cancer diagnosis (**Table 2**; $P < .05$). This estimate represented a 14% relative change from baseline rates. This result held when estimating CA and IL separately. We fail to reject the null hypothesis that estimates differed between CA and IL (CA: estimate = -0.026 , $P < .01$; IL: estimate = -0.027 , $P < .05$; t test $P = .5071$). However, the association between restoring Medicaid dental benefits and distant stage diagnoses did vary across age, sex, and race/ethnicity. Estimates were larger and statistically significant for adults under age 65 (estimate = -0.033 , $P < .05$, t test $P = .01$), males (estimate = -0.030 , $P < .05$, t test $P = .001$), and adults not self-reporting as non-Hispanic white (estimate = -0.051 , $P < .01$, t test $P = .001$). Estimates for adults older than 64, females, and non-Hispanic white adults were not statistically significantly different than zero. Although only the estimates for lower-income counties were statistically significant (estimate = -0.028 , $P < .05$) when stratifying by median county household income, we failed to reject the null hypothesis that the estimates differed from each other (t test $P = .440$).

The results of the sensitivity check were reported in Supplemental Exhibit 1, available online. In general, estimating the difference-in-differences model by bootstrap does not change effect estimates or inference. Estimates for adults over age 64 and median county household income above 65k were now statistically significant, but those

sensitivity estimates are not meaningfully or statistically different than our primary estimates. For females, the bootstrap estimates are higher than the estimates for males, and the difference between these 2 subgroups is no longer statistically different.

When examining the estimates across years, restoring Medicaid dental benefits was not associated with reduced distant stage diagnoses until 2016 and 2017 (**Table 3**). Generally, the estimates were not subject to threats from pretreatment differential trends. (**Table 3**). Estimates for Illinois were significant and positive for both 2012 and 2015. The coefficient for 2011 for adults not reporting as non-Hispanic white adults was also significant.

Exploratory Results

There is no evidence that restoring Medicaid dental benefits was associated with an increased probability of being diagnosed at a localized stage or regional stage without lymph node involvement (Supplemental Exhibit 2, available online). Conversely, there is consistent evidence that restoring Medicaid dental benefits was associated with a higher probability of being diagnosed at a regional stage with lymph node involvement. In the full sample, there is a near identical shift from distant stage to regional with lymph node involvement (regional w/LN estimate = 0.026 , $P < .01$; distant estimate = -0.027 , $P < .05$). The estimate is positive and statistically significant for both CA (regional w/LN estimate = 0.025 , $P < .01$) and IL (Regional w/LN estimate = 0.027 , $P < .01$). When examining the association between restoring Medicaid dental benefits and the probability of a regional stage diagnosis with lymph node involvement, we also find heterogeneity by subgroups. Supplemental

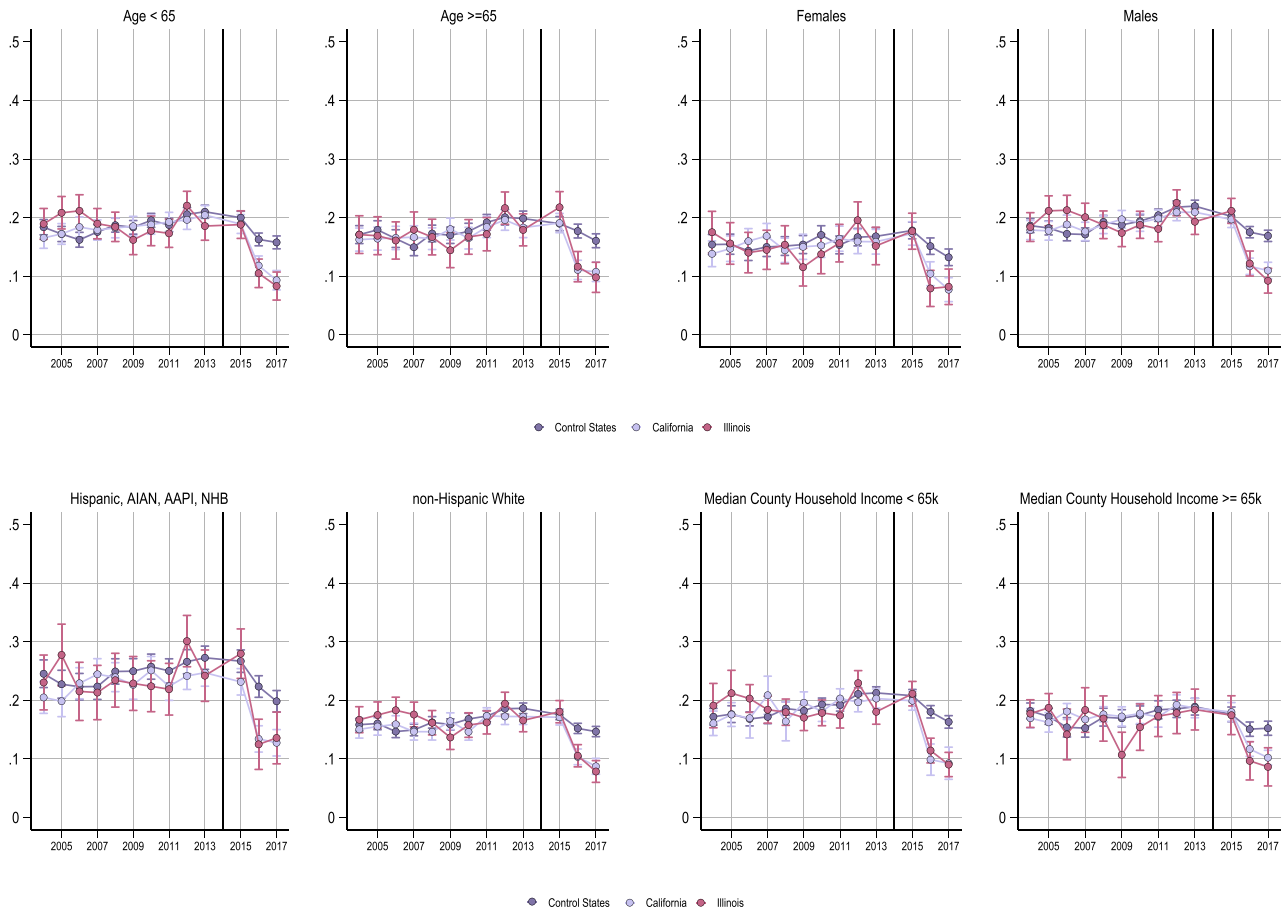


Figure 2. Year-by-year trends in distant stage diagnoses, by state and subgroup. The figure visualizes the year-by-year trends in the proportion of oral cancer cases diagnosed at a distant stage, by state and subgroup population. The vertical black line represents 2014, the year California and Illinois restored Medicaid dental benefits. AAPI, Asian American Pacific Islander; AIAN, American-Indians/Alaska-Native; NHB, non-Hispanic black.

Exhibit 2, available online shows that restoring Medicaid dental benefits increased the probability of a regional diagnosis with lymph node involvement for adults above and below age 65, and adults living in high- and low-income communities. However, similar to the primary results which showed only male patients were found to have a lower probability of a distant stage diagnosis after restoring Medicaid dental benefits, the exploratory results show that only males had a higher probability of a regional diagnosis with lymph node involvement (estimate = 0.033, $p < .001$). The estimate for females was smaller and not statistically significant. Finally, when examining the heterogeneity by race/ethnicity, there appears to be more nuance. For non-Hispanic white adults, the policy change was not associated with a statistically significant decline in the probability of distant-stage diagnoses. However, there does appear to be an associated increase in the probability of a regional stage with lymph node involvement diagnosis in this non-Hispanic white population (estimate = 0.027, $P < .05$). Also, there was a statistically significant negative association between the policy change and the probability of being diagnosed at a localized or regional stage without lymph node involvement

(estimate = -0.016 , $P < .05$). Despite observing a statistically significant, negative association between the policy change and distant stage diagnoses in the patient population of Hispanic, American-Indians/Alaska-Native, Asian American Pacific Islander, and non-Hispanic black adults, there was no observed change in either localized and regional stages without lymph node involvement or regional stage with lymph node involvement.

Discussion

The restoration of Medicaid dental benefits in CA and IL improved early oral cancer detection. In both states, there was a statistically significant decrease in the probability of being diagnosed at a late stage. However, the pretreatment differential trends in IL should invoke caution for interpreting the association as causal. There were no such issues when interpreting the CA estimate or subgroups. The estimated association between restoring Medicaid dental benefits was most pronounced among younger adults, males, and minoritized racial/ethnic groups. These findings reaffirm the evidence that access

Table 2. Difference-in-Differences Estimates

| | Estimate | (SE) | t test (P) |
|---------------------------|----------|---------|------------|
| Full sample | −0.027* | (0.011) | |
| Treated states | | | |
| CA | −0.026* | (0.011) | .5071 |
| IL | −0.027* | (0.011) | |
| Age | | | |
| <65 | −0.033* | (0.011) | .010 |
| ≥65 | −0.020 | (0.012) | |
| Sex | | | |
| Female | −0.019 | (0.010) | .001 |
| Male | −0.030* | (0.012) | |
| Race/ethnicity | | | |
| Hispanic, AIAN, AAPI, NHB | −0.051** | (0.013) | .001 |
| NHW | −0.018 | (0.011) | |
| County, median HH Income | | | |
| <65k | −0.028* | (0.010) | .440 |
| ≥65k | −0.026 | (0.012) | |

The table reports the primary estimates measuring the association between restoring Medicaid dental benefits and the probability of a distant-stage oral cancer diagnosis. All models were specified as linear probability regressions, with standard errors clustered at the state level. The *t* test column reports the *P* value of a 2-group hypothesis test, testing if the estimates were equal between the 2 subgroup populations. Total sample = 109,997. Control states = Connecticut, Georgia, Hawaii, Idaho, Iowa, Kentucky, Louisiana, New Jersey, New Mexico, Texas, and Utah.

Abbreviations: AAPI, Asian American Pacific Islander; AIAN, American-Indians/Alaska-Native; CA, California; HH, household; IL, Illinois; NHB, non-Hispanic black; NHW, non-Hispanic white.

P* < .05, *P* < .01.

to dental care is critical for systems of oral cancer prevention and control.^{1,2,21–24} The current study, however, contributes new evidence by analyzing (1) more recent data, (2) an additional treatment state, and (3) a large enough sample to conduct valid subgroup analyses by sociodemographic factors.

When people are able to see a dentist regularly, they are more likely to have any oral abnormalities identified during a visual examination or screening.²⁵ This is especially important for low-income adults who face concurrent risks of poor oral health and delayed dental care.^{26–28} These findings also highlight the importance of expanding access to dental care.²⁹ Medicaid is the largest source of dental insurance for low-income Americans, yet many lack access to generous dental benefits or available dental professionals.^{30–32} Even in states with generous coverage, most states place limits or other financial and administrative barriers to receiving dental care.^{30,33,34} Conversely, that older adults (presumably eligible for Medicare) were not found to improve early detection following the restoration of Medicaid dental benefits is concerning given that traditional Medicare does not cover comprehensive dental services.^{35,36} If dentists remain among the only providers recommended to screen for oral cancers, oral cancer control efforts will continue to rely on policies facilitating access to dental services.^{37–40}

Future research should investigate how policies effectively remove barriers to dental care and their long-term impact on early detection of oral cancer.

Oral cancer disproportionately affects men, who have incidence rates 2–3× that of women.^{41,42} Men also have a higher likelihood of being diagnosed at later stages compared to women, presumably because men are less likely to utilize preventive health care.^{43–45} Similarly, while incidence rates are higher in non-Hispanic white adults, other racial/ethnic groups are diagnosed at later stages.^{46,47} By disproportionately lowering the probability of late-stage diagnoses for these 2 at-risk populations (men and minoritized racial/ethnic groups), restoring Medicaid dental benefits served as a tool for health equity. This finding is highly consistent with previous work showing that expanding access to Medicaid dental coverage reduced or eliminated disparities.⁴⁸ However, whether reducing gaps in staging leads to reduced mortality gaps remains unknown.^{49,50}

Limitations

The study has several limitations. The sample sizes limited the ability to disaggregate estimates by race, ethnicity, age, and other individual or community characteristics. However, the work presented here is among the first to explore how Medicaid dental policy changes impacted oral cancer detection outcomes outside of CA and how such a policy change differentially impacted subgroup populations. The study's findings should only be generalized to patients diagnosed with oral cancer in CA and IL, so the findings may not be applicable to patients diagnosed with oral cancer in other states. Moreover, both states have disproportionately larger metro populations compared to other states, which again limits external validity to only oral cancer patients in metro and urban communities. Next, the latest release of SEER which adds the new states and spans the time period of interest only includes summary staging variables. This limits our ability to further contextualize the results and define more clinically relevant or nuanced staging outcomes. Unfortunately, this data limitation cannot be overcome until more detailed data is released. Finally, the study was an observational study, which means that it was not possible to control for all the unobserved factors that could have affected the staging of oral cancer. However, by following best practices and traditional quasi-experimental methods, this study was still able to provide valuable insights into the association between restoring Medicaid dental benefits and the staging of oral cancer.

Conclusions

Restoring Medicaid dental coverage improved early detection in both CA and IL. The probability of being diagnosed at a distant stage declined by 2.7% points, which corresponded to a 14% relative decline from

Table 3. Event History Estimates

| | Pretreatment | | | Posttreatment | | |
|---------------------------|--------------|---------|----------|---------------|-----------|----------|
| | 2010 | 2011 | 2012 | 2015 | 2016 | 2017 |
| Full sample | 0.000 | 0.010 | 0.014 | 0.016* | −0.037** | −0.042* |
| Treated states | | | | | | |
| CA | 0.001 | 0.014 | 0.005 | 0.011 | −0.036** | −0.041* |
| IL | −0.001 | 0.003 | 0.033*** | 0.027*** | −0.038** | −0.044* |
| Age | | | | | | |
| <65 | −0.001 | 0.013 | 0.012 | 0.005 | −0.030* | −0.049** |
| ≥65 | −0.003 | 0.022 | 0.022 | 0.027* | −0.019 | −0.019 |
| Sex | | | | | | |
| Female | −0.009 | 0.024 | 0.024 | 0.015 | −0.037** | −0.035 |
| Male | −0.015 | 0.009 | 0.016 | −0.003 | −0.060*** | −0.055** |
| Race/ethnicity | | | | | | |
| Hispanic, AIAN, AAPI, NHB | −0.004 | −0.015* | 0.001 | −0.006 | −0.074** | −0.054 |
| Non-Hispanic white | −0.008 | 0.017 | 0.014 | 0.010 | −0.019 | −0.014 |
| County, median HH Income | | | | | | |
| <65k | −0.001 | 0.013 | 0.012 | 0.005 | −0.030* | −0.049** |
| ≥65k | −0.003 | 0.022 | 0.022 | 0.027* | −0.019 | −0.019 |

The table reports the event-history estimates measuring the association between restoring Medicaid dental benefits and the probability of a distant-stage oral cancer diagnosis. All models were specified as linear probability regressions, with standard errors clustered at the state level. Pretreatment estimates test for violations of the noncomment trend assumption. Total sample = 109,997. Control states = Connecticut, Georgia, Hawaii, Idaho, Iowa, Kentucky, Louisiana, New Jersey, New Mexico, Texas, and Utah.

Abbreviations: AAPI, Asian American Pacific Islander; AIAN, American-Indians/Alaska-Native; CA, California; HH, household; IL, Illinois; NHB, non-Hispanic black.

* $P < .05$,

** $P < .01$,

*** $P < .001$.

baseline rates. This study was among the first to study how increasing the generosity of Medicaid dental coverage impacted oral cancer detection outside of CA and found that early diagnoses likely improved similarly in IL (another large and diverse state). The greatest reductions in distant-stage diagnoses were found in younger adults, males, and minoritized racial/ethnic groups. Exploratory results suggest that the decision to restore Medicaid dental benefits shifted the staging patterns from distant to regional with lymph node involvement. There is no evidence that the policy change increased the localized or regional stage diagnoses without lymph node involvement. Future research should investigate whether earlier detection reduces oral cancer mortality disparities.

Author Contributions

Jason T. Semprini, is the sole author and is responsible for all aspects of the research.

Disclosures

Competing interests: None to report.

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Data Availability Statement

Data sharing is limited by third-party restrictions.

Supplemental Material

Additional supporting information is available in the online version of the article.

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