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Should Medicaid Include Adult Coverage for Preventive Dental Procedures? What Evidence is Needed?

Shulamite Huang, PhD

Dr. Huang is an assistant professor in Epidemiology and Health Promotion, College of Dentistry, New York University, 433 First Avenue, New York, NY 10010,

Abstract

Background.—Medicaid programs may have a salient financial incentive to provide adult coverage for cost-effective preventive dental procedures, since they face responsibility for catastrophic costs of dental disease. Whether there is sufficient evidence to support adult Medicaid coverage of preventive dental services is unclear.

Methods.—Using an optimal insurance model by Pauly and Held (1990), I examine what evidence there is to support coverage of cost-effective preventive dental services in Medicaid, and what evidence gaps remain.

Results.—There is insufficient evidence to support adult Medicaid coverage for preventive dental procedures.

Conclusions.—More research is needed to 1) identify preventive dental procedures that are cost-effective from a Medicaid perspective; 2) quantify the impact of dental prevention on dental-related health care costs and overall health care costs; and (3) quantify the impact of patient-side and provider-side financial incentives on take-up of specific preventive dental treatments.

Practical Implications.—Though Medicaid programs may have an interest in preventing catastrophic costs of dental disease (i.e. dental-related emergency room visits), there is currently insufficient evidence for Medicaid programs to provide coverage for preventive dental procedures.

Keywords

Dental Insurance; Insurance; Access to Care

ssh8@nyu.edu.

Dr. Huang procured the data, designed and carried out data analyses, and wrote the manuscript.

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I. Introduction

Recently increasing attention to dental benefits has highlighted that current dental benefits in the United States are not structured to incentivize use of clinically effective caries prevention¹, nor to generally attain optimal oral health². Moreover, dental benefits do not provide insurance in the traditional sense. Rather than providing coverage for low-risk, high-expenditure adverse oral health events, dental benefits are structured instead as pre-payment plans for routine dental procedures perceived as preventive, but with little proven clinical efficacy.^{1, 3} Dental benefits are generally purchased separately from health insurance plans, and offered by insurers only offering dental benefits and not health insurance (called stand-alone dental insurers).

Stand-alone dental insurers may have little financial incentive to include coverage for clinically effective dental prevention because they typically do not face costs from catastrophic oral health events. When catastrophic oral health events occur, health insurers are typically billed instead of dental insurers. Hence, dental insurers face little financial risk from patients' poor oral health and are therefore able to predict and plan for dental services utilization costs⁴, due to predictable routine procedure use, annual caps, and high copayments for restorative procedures.⁵ Moreover, dental insurers' costs do not vary significantly with patients' underlying dental risk or oral health status. Because there is no tie between costs of providing dental benefits and patients' risk and health, dental insurers have little incentive to cover procedures decreasing probability of adverse events or improving patient health. Instead, catastrophic dental costs are turned over to health insurers, emergency rooms, or absorbed by patients⁶. The only salient incentive for dental insurers to provide coverage is if consumers will opt out of plans without coverage of clinically-effective preventive services⁷.

However, Medicaid programs may have greater incentives to integrate adult coverage for cost-effective dental prevention⁶. This is because Medicaid programs do bear costs from catastrophic oral health events, primarily through dental-related emergency department (ED) visits. Moreover, EDs are generally not equipped or trained for treating dental conditions⁸⁻¹⁰ and instead provide palliative care (i.e. antibiotics, analgesics) requiring follow-up treatment at a dental office.¹¹ Hence, dental-related ED expenditures represent both catastrophic costs and costs for services ineffective at addressing cavities.¹¹ Recent work has demonstrated Medicaid programs are the largest payers of dental-related ED visits^{9, 12}. These preventable costs should be an increasingly urgent concern – dental-related ED visits have surged in the last decade⁸⁻¹⁰.

Medicaid programs may have interest in providing coverage for dental prevention to prevent catastrophic costs. However, what dental prevention types should be covered and to what extent is an open question. Currently, Medicaid programs exhibit variation across states and over time in (1) whether any adult dental coverage is provided and (2) reimbursement and coverage levels for dental procedures if dental coverage is available^{13, 14}. Though Medicaid is the primary source of dental coverage for low-income adults, adult dental coverage is often among the first benefits cut in response to Medicaid budgetary constraints¹⁵. Hence, low-income adults can experience large fluctuations in dental coverage access and dental

care affordability^{13, 14}. Even among children, which are federally required to have access to Medicaid coverage comprehensive dental services, there still exists variation in coverage and reimbursement for clinically effective dental prevention¹. The variation and fluctuation in Medicaid dental benefits indicates uncertainty among Medicaid programs in deciding what dental procedures warrant coverage.

This uncertainty exists because all insurers face a trade-off when adding coverage for a new service. Though adding coverage for a new service may decrease future costs and costs from using more expensive services, consumers may respond by increasing service utilization overall, thereby increasing insurer costs^{16, 17}. This increase in insurer costs may then cause Medicaid state programs to increase premiums or taxes. Since lower premiums and tax stability may be prioritized for tax-financed public insurance¹⁸, Medicaid programs would then typically prefer covering interventions not requiring premium or tax increases.

The issues in assessing whether Medicaid should add coverage for dental prevention for adults require insights from health economics applied to dental research. Health economics is concerned with the allocation of scarce resources among alternative uses to maximize benefits in health and health care.^{19, 20} Hence, economists study and model optimal resource allocation as a constrained optimization problem. The form of the constrained optimization problem depends on the decisionmakers' perspective and trade-offs.

A published health economics model by Pauly and Held (1990)²¹ encapsulates primary trade-offs faced by health insurers when adding coverage for preventive services, and identifies key factors influencing the optimal coverage level for a specific treatment. The model takes the perspective of a health insurer considering whether to add coverage for a new treatment to an existing plan. The insurer's constrained optimization problem is a premium minimization problem since public and private insurers are constrained from raising premiums¹ on existing plans. Because adding coverage impacts present and future expected costs for both insurers and consumers, the model includes information on 1) whether incurring the cost of the new service now will lower future expected medical costs and 2) consumers' response to increased coverage and the decreased out-of-pocket costs for a specific treatment. This highlights that providing coverage for a cost-effective preventive service (where using the service lowers total expected medical spending) decreases total insurer expenses only under certain conditions. When these conditions are fulfilled, insurers are more likely to offer coverage for cost-effective preventive services. These conditions are as follows:

1. At minimum, use of the preventive service offsets the insurer's future expected medical costs;²¹
2. There is not already a large proportion of people purchasing the preventive service without insurance;²¹
3. Consumers are responsive to price changes for the service;²¹ and

¹Either because of difficulties in raising taxes to fund higher premiums or significant transaction costs from renegotiating higher health insurance premiums.²¹ Pauly MV, Held PJ. Benign moral hazard and the cost-effectiveness analysis of insurance coverage. *Journal of health Economics* 1990;9(4):447-61.

4. Coverage increases take-up of the service²¹

This study's purpose is to examine what evidence exists to support Medicaid coverage of cost-effective preventive services using the Pauly and Held (1990) model, and what evidence gaps remain. I do this first by identifying what dental prevention has been deemed to be cost-effective in the literature and by reviewing the portions of the dental literature pertaining to each Pauly and Held (1990) condition. I draw from systematic literature reviews where possible, and assess whether conclusions from the literature are robust enough to support each condition.

II. What preventive dental interventions have been found to be cost-effective?

Economic evaluations (EEs) characterize the trade-offs involved in including coverage for dental treatments and can be used for decision-making and policymaking. In particular, EEs can quantify trade-offs between increased cost of providing a treatment and improvements in health outcomes. These trade-offs may be particularly relevant for Medicaid, which may be interested in not only health care expenditures, but also social welfare and population health. Because Medicaid programs budget for overall health, EEs can be informative for policymakers and decision-makers as to whether the increased costs from providing coverage for a dental treatment is worth the gain in overall health (i.e. is cost-effective).

Despite a robust evidence base for clinical efficacy of caries prevention such as fluoride, silver diamine fluoride, and sealants²², caries prevention EEs are modest in number and quality, primarily indicating prevention is cost-effective for specific populations and countries²³. Because methods and outcomes used for caries prevention EEs are highly heterogenous,^{24, 25} only 1) water fluoridation and 2) targeted fissure sealing of patients at high caries risk were concluded to be cost-effective among evaluated caries prevention in a recent scoping review²⁶. Moreover, health outcomes and costs included in these EEs tend to exclude outcomes of interest to Medicaid. These are (1) quality-of-life (QoL),^{25, 27, 28} (2) systemic health,^{25, 27, 28} and (3) economic costs.²⁵

Usefulness and applicability of EEs for Medicaid is limited when QoL outcomes are excluded.²⁸ Oral diseases may have drastic impacts on people's QoL in terms of functioning, pain, and self-perception.^{29, 30} Such impacts on QoL may not be captured when examining "naturally occurring" dental outcomes, i.e. caries. Hence, whether an EE assesses QoL outcomes may drastically alter study conclusions. Moreover, Medicaid likely optimizes budgets for providing overall health care coverage, not just dental care coverage. In this case, EEs should include health outcomes comparable across a broad set of medical and dental interventions.

The current evidence base is not robust enough to assess whether dental prevention would be cost-effective to Medicaid, which necessitates QoL outcomes. A recent systematic review found only 23 EEs in dental research directly addressing oral health interventions' impact on QoL outcomes³⁰. Among these 23 EEs, only three evaluated dental prevention³¹⁻³³, and

only one evaluated a non-public oral health intervention³¹. Hence, future work assessing whether dental prevention is cost-effective should include QoL.

Current oral health intervention EEs exclude other outcomes of interest to Medicaid, such as economic and systematic health outcomes. For instance, economic outcomes (i.e. education, school attendance, income, days missed at work) may impact whether dental interventions are cost-effective to Medicaid. Excluding medical outcomes (i.e. ED, primary care visits averted for dental-related conditions) may impact this as well. Future dental intervention EEs should incorporate all outcomes of interest to Medicaid.

III. Would providing coverage for dental prevention offset future costs to Medicaid among adults?

Most Medicaid programs do not face most dental costs for adult enrollees, due to fluctuations in Medicaid adult dental benefits. However, unmet dental need among Medicaid enrollees does directly impact Medicaid costs through dental-related ED admissions. There has been an increase in dental-related ED admissions over time, which has recently outstripped the increase in overall ED visits.⁸⁻¹⁰ Providing dental prevention coverage to address unmet dental need may prevent Medicaid dental-related ED costs.

Recent work has suggested Medicaid dental coverage directly impacts dental-related ED admissions. A study examining the Oregon Health Insurance Experiment (HIE) found recently Medicaid expansions not including adult dental coverage lead to sizable increases in the share of Medicaid enrollees visiting the ED for dental care³⁴. Another study examining the Affordable Care Act (ACA) found Medicaid expansions including adult dental coverage decreased dental ED visits.^{35, 36} Both are consistent with prior studies suggesting reducing Medicaid adult coverage leads to more people seeking dental care in EDs³⁷⁻⁴². With ongoing public and private health insurance expansions through the ACA, this may indicate dental-related ED visits may continue increasing if expansions do not include increased dental coverage and timely dental care access. This suggests a financial interest for Medicaid in identifying what dental treatments can offset dental-related medical costs.

However, which dental treatments prevent future dental-related ED costs is unclear, though most dental-related ED admissions are preventable^{9, 43} and could be treated at lower cost by dentists.⁹ Regular preventive dental visits have also been suggested to decrease restorative dental services use⁴⁴, which may be a substitute for dental-related ED visits. However, a recent scoping review of dental-related ED visit determinants found no papers examining the impact of specific dental prevention on dental-related ED visits⁴⁵. Instead, this literature focused only on macro-level factors and is primarily associational⁴⁵. Examining the causal impact would require longitudinal retrospective data on medical and dental claims data, as well as causal inference methods⁴⁶⁻⁴⁹ if randomized controlled trials (RCTs) with claims data follow-up is not possible.

Improving oral health has been posited to improve overall health and decrease future overall health expenditures especially from chronic disease. A recent systematic review found this literature is primarily correlational and limited in scope⁴. Hence, there is limited evidence

for dental interventions' impact on health care costs for chronic conditions³⁶ and insufficient evidence for the directionality and magnitude of the dental interventions' impact on health care costs. Future work should (1) leverage linkages between dental and medical claims data and (2) apply robust causal inference methods in lieu of clinical trials mimicking real-world conditions.⁴⁶⁻⁴⁹

IV. Would adult consumers currently purchase preventive dental services without Medicaid coverage?

The primary function and definition of “insurance” is to provide protection from financial risk. Hence, dental insurance is a misnomer. Instead, “dental insurance” in the majority of cases is a pre-payment plan². Hence, consumers *do* currently purchase dental prevention without true insurance, but whether (1) dental prevention purchased is cost-effective (i.e. cleanings), and (2) consumers purchase cost-effective dental prevention are unknown. The second point cannot be discussed without a more methodologically robust literature to identify what dental prevention is cost-effective (see Section II).

However, questions of dentists' financial incentives precede these questions of consumer behavior. To examine whether consumers would purchase dental prevention without insurance, dental prevention needs to be available for purchase. This excludes publicly provided dental interventions and public health goods (i.e. tap water fluoridation). Because most non-publicly provided dental prevention is not available outside dentists' offices,² consumers can purchase some types of dental prevention only if offered by dentists. Yet, prior literature demonstrates dentists have little financial incentive to offer preventive treatments likely to be cost-effective.¹ Rather, interventions likely to be cost-effective are under-reimbursed relative to other common treatments under current dental benefits¹. Simultaneously, existing literature documents dentists' treatment behavior responds to financial incentives.^{50, 51} Hence, consumers may not know about available and possibly cost-effective interventions (i.e. sealants, silver diamine fluoride) in dental offices. Whether consumers would purchase dental prevention in dental offices without insurance cannot be determined without (1) further work understanding dentists' financial incentives to provide different interventions and (2) accounting analytically for how financial incentives impact what preventive options are offered.

Even the impact of financial incentives for dentists treating uninsured patients on treatment decisions is unclear. Providing dental prevention that is cost-effective from a Medicaid perspective may prevent dentists from reaping future profit from restorative procedures.¹ However, if providing cost-effective dental prevention increases likelihood of future and repeat visits or decreases likelihood of seeking other dentists, decreases in future profit from restorative procedures may be offset by increases in future profit from future visits. Which effect dominates is an empirical question, requiring data on solely out-of-pocket dental costs which is likely only available directly from dental clinics.

²A notable exception being toothpaste with added fluoride.

V. Are adult consumers responsive to price changes for dental prevention?

Assuming dentists offer preventive services, how responsive consumers are to prices for dental prevention is still an open question. In recent years, literature examining out-of-pocket prices' impact on dental procedures has found demand for preventive procedures is not influenced by out-of-pocket prices⁵²⁻⁵⁵. However, the definition of "preventive procedures" in this literature conflates procedures with and without proven clinical efficacy (i.e. sealants vs. exams or cleanings) in preventing cavities. Though the literature suggests dental prevention use is not responsive to out-of-pocket price changes,⁵²⁻⁵⁵ more work is warranted to examine out-of-pocket prices' impact on demand for specific procedures.

VI. Would Medicaid coverage increase dental prevention take-up among adults?

As discussed, though changes in out-of-pocket prices may not influence demand for preventive services, whether dental coverage is available may influence whether preventive services are taken up. However, the literature is constrained by the definition of what is categorized to be "preventive". Moreover, whether coverage increases take-up of cost-effective prevention depends on whether providers have sufficient financial incentive to offer these services to their patients, and whether patients would opt into care.

VII. Discussion

The existing dental research literature cannot be used to assess whether Medicaid should incorporate adult coverage for dental prevention, due to lack of methodologically robust studies examining (1) what dental prevention is cost-effective from a Medicaid perspective; (2) the causal impact of dental prevention on dental-related and overall health care costs; and (3) the causal impact of patient-side and provider-side financial incentives on dental prevention take-up. Though prior literature has established a need to improve the robustness and breadth of EEs examining dental prevention, increased EEs alone are not sufficient to establish whether Medicaid or private insurers should reimburse for dental care. Instead, increased work to quantify how dental prevention impacts broader health care costs, and how financial incentives impact adoption and take-up of prevention is necessary as well.

The broader health economics literature provides analytic strategies to address these questions. For example, the question of how to estimate consumers' price sensitivity, impacting whether they will 1) take-up dental prevention and 2) to what extent is well-studied in health economics. Prior economic studies have leveraged changes in out-of-pocket prices, absent changes in insurance plan selection and provider reimbursement. Other studies implement discrete choice experiments to directly elicit willingness-to-pay among patients for treatments with specific characteristics. Extending the RAND and Oregon HIEs to random assignment to out-of-pocket prices for specific dental prevention types can also be a potential option.

VIII. Limitations

The Pauly and Held (1990) model is ambiguous to the degree to which each of these conditions need to be met for any dental prevention coverage to take place, and the degree of coverage. However, the more the literature is able to demonstrate dental prevention is cost-effective to Medicaid and fulfill the Pauly and Held (1990) conditions, the more likely Medicaid state programs will have an interest in offering and increasing dental prevention coverage.

IX. Conclusion

There has been an increase in dental-related ED visits in the last decade⁸⁻¹⁰, borne primarily by Medicaid programs. Though dental-related ED visits are largely preventable, and substantial progress has been made in the oral disease prevention, government investment in dental care remains low. Direct health care on dental care in the U.S. only amounted to 3.7% of total national health care expenditure in 2015⁵⁶, and only 12% of this was government funded. The lack of and fluctuations in access to dental care through Medicaid has been hypothesized to be a major factor in oral health disparities in the United States⁵⁷.

Though oral health is key to maintaining and improving systemic health, there is a paucity of research quantifying the impact of how oral health interventions can impact overall government health care expenditures, as well as overall health and QoL outcomes. This makes it difficult to communicate to policymakers why investments in oral health should be made and why Medicaid should include coverage for dental prevention. There is therefore an urgent need to expand health economics and health services research in dentistry.

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