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Changes in State Policies Related to Oral Health in the United States, 2002–2009

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Abstract

Objectives—Examining state policies in oral health, including changes over time, helps inform the degree to which states fulfill public health dentistry functions and deliver essential services. This study examines changes in state policies affecting oral health in the United States between 2002 and 2009.

Methods—We reviewed 43 oral health policies in three domains (public dental insurance; workforce capacity; and infrastructure, programs and surveillance). Data sources included federal and private foundation reports and databases. Fifteen of 43 policies had data available for both time points and were analyzed. We examined national and regional changes over time using McNemar's test and Wilcoxon matched pairs signed ranks test.

Results—Between 2002 and 2009, the number of states offering Medicaid reimbursement to non dental professionals increased, more states had 12-month continuous coverage in CHIP, income eligibility for children on Medicaid expanded, and the number of licensed dentists per state increased. However, the percent of public and private state health expenditures going toward dental services declined. Though nationally no other state policies significantly changed, the proportion of population on public water system with fluoridated water increased in Western states and administration of needs assessments or oral health surveys decreased in the Northeast.

Conclusion—Efforts are needed to systematically track the status of state policies to promote the public's oral health. Further research can determine if changes in state policies have led to improvements in the provision of oral health services and oral health status, as well as reductions in disparities.

Keywords

oral health; public policy; prevention and control

Introduction

Effective health policies can mitigate oral diseases and negative conditions and improve dental public health in the United States. As one of the functions of public health (1), adopting policies to address essential public health services can advance oral health by: assessing the public's oral health status and implementing oral health surveillance systems; analyzing determinants of oral health and responding to health hazards; assessing public perceptions about oral health and educating the public; mobilizing community partners to advocate on oral health issues; supporting state and community efforts in oral health; reducing barriers to care and increasing utilization of services; training an oral health workforce; evaluating oral health promotion activities and services; and conducting research for innovative solutions to oral health problems (2). The oral health objectives of Healthy People 2020, which include reducing the proportion of adults with untreated dental decay, increasing access to preventive dental services for low income children and adolescents, and improving oral health interventions and public health infrastructure (3), underscore the need to develop and implement sound oral health policies in the United States.

The Patient Protection and Affordable Care Act (ACA), signed into law on March 23, 2010 (4), and largely upheld by the U.S. Supreme Court in June 2012 (5), authorizes several major changes in policy and funding related to oral health. The legislation includes provisions to substantially improve access to dental services to children through increased dental insurance coverage, enhanced training and expansion of dental health care providers, expanded safety net capacity, and improved surveillance (6). It further establishes oral health prevention campaigns and programs, and supports the improvement of oral health infrastructure through the leadership and guidance of the Centers for Disease Control and Prevention (CDC) (4).

In addition to federal policies, state health agencies support oral health through developing and implementing policies related to fluoride mouth-rinsing, water fluoridation, and maternal and child health programs for oral disease prevention (7). Examining geographic variability, as well as recent changes in state policies related to oral health, helps inform the degree to which states fulfill their public health dentistry functions and deliver essential services. To gain a comprehensive understanding of state policies related to oral health, it is necessary to examine policies for both children and adults; some policies impact only children directly (e.g. dental screening for school-age children), some only adults (e.g. adult Medicaid benefits), and some both (e.g. licensure reciprocity across states). These examinations are also critical to understanding how implementation of the ACA can build on prior state efforts. While assessment of the current status of selected oral health policies in the U.S. has been reported elsewhere (8), there has been no comprehensive assessment or examination of changes of such policies over time. The objectives of this study were to: (1) describe state oral health policies for which data is routinely collected; and 2) examine changes in oral health state policies from 2002 to 2009.

Methods

Selection of State Policies

We identified 43 oral health policies in three domains (13 related to public dental insurance; 19 to workforce capacity; and 11 to infrastructure, programs and surveillance, see Table 1). Domains and variables were selected based on their relation to oral health and dental care, as well as their relevance to Healthy People 2020 goals and indicators (3), and expert opinion of the authors and consultants. Of the 43, fifteen variables had sufficient data and were used in the analysis (see Table 2). Twenty eight variables were excluded because they had missing data for one or both time points, or were not uniformly operationalized at both time points. We used the earliest year within 2002/4 and the latest year within 2008/9 for which there were complete data.

Data Sources

Several sources informed these analyses. Data on policies came from the Association of State and Territorial Dental Directors (9, 10); Centers for Medicare and Medicaid Services (11); The Henry J. Kaiser Family Foundation's Kaiser Commission on Medicaid and the Uninsured (12, 13); American Academy of Pediatrics (14); American Dental Association (P O'Connor, ADA, oral communication, November 2012); Centers for Disease Control (15, 16); and Children's Dental Health Project (17).

Statistical Analysis

The unit of analysis was the state, and the sample size was 51, including the 50 states and District of Columbia. Wilcoxon matched pairs signed ranks tests and McNemar's tests, both non-parametric statistical tools, were used to assess the extent and significance of changes in oral health policies from 2002 to 2009. Wilcoxon matched pairs signed ranks test assess if the distribution of the differences between values within paired data is symmetrical. McNemar's test determines whether there is a significant change in nominal data for matched pairs. Analyses were conducted nationally, and also stratified by US Census region (Northeast, South, Midwest, and West).

Results

Four of the fifteen oral health policies significantly improved in the United States from 2002/4 to 2008/9 (see Table 3). The percentage of states offering Medicaid reimbursement to non dental health professionals for application of fluoride varnish increased from 7.8% to 66.7% ($p<0.001$), and states allowing 12-month continuous coverage in CHIP for children increased from 47.1% to 58.8% ($p<0.05$). Eligibility for Medicaid, based on percent federal poverty level (% FPL), expanded for children of all age groups. While the median eligibility for children <12 months old and 1–5 years old remained at 185% FPL and 140% FPL, respectively, and for 6–19 year olds decreased from 140% FPL to 133% FPL, the sum of ranks within each age category, as tested by Wilcoxon matched pairs signed ranks test, increased from 2004 to 2008 (all $p<0.05$). Income eligibility for Medicaid among all children expanded in three states (Hawaii, Maryland, and Wisconsin) and the District of Columbia. Additionally, Indiana and Georgia expanded income eligibility for children <12

months olds; North Carolina expanded it for 0–5 year olds; Alaska and Missouri expanded income eligibility for 1–19 year olds; and Idaho expanded it for 6–19 year olds.

Finally, the median number of dentists licensed per 10,000 state population increased from 5.7 to 7.1 ($p<0.001$). In contrast, the median proportion of public and private state health care expenditures allocated for dental services significantly worsened from 2002 to 2009, though by only 0.3 percentage points ($p<0.001$).

There was regional variability in policy improvements (see Table 4). The Midwest improved most in percentage of states providing reimbursement to non-dental providers from Medicaid, starting at 7.7% in 2002 and rising to 92.3% in 2009 ($p<0.001$). The South improved most in percentage of states providing 12-month continuous coverage for CHIP, from 35.3% to 64.7% ($p<0.05$). Western states improved most in median number of licensed dentists per 10,000 population (6.1 to 8.9, $p<0.05$), and declined most in median proportion of state health care funds going towards dental services (6.4% to 5.8%, $p<0.05$).

Two additional state level variables did not significantly change in the U.S. as a whole, but did change by region. The median percent of people on public water systems receiving fluoridated water increased in Western states from 36.7% to 54.3% ($p<0.05$). Additionally, the percent of states implementing a needs assessment/oral health survey in the Northeast region started at 74.5% in 2002 and fell to 62.8% in 2009 ($p<0.05$).

Discussion

Four out of fifteen measurable oral health policies significantly improved from 2002/4 to 2008/9, and there was considerable variation in policy improvements. Reasons for variation may be numerous, including state policies passed in response to recognized crises, an invested state policy-maker, or a state champion for oral health (4, 18). For example, after acknowledging that only 16 percent of North Carolinian dentists actively participated in Medicaid at the end of the 1990s, the state initiated a program in 2000 enabling physicians to provide preventive oral health services for young children enrolled in Medicaid. The program, Into the Mouth of Babies, reimburses providers for up to six visits for preventive oral health services in primary care medical settings for children ages 0–3 years. Implementation of the program has led to a substantial increase in dental services provided in medical offices, and a net statewide increase in the provision of preventive oral health services to young Medicaid-enrolled children (19).

Additionally, the Centers for Medicare & Medicaid Services 416 form, which collects basic information on participation in the Medicaid program, in 2010 began requiring states to provide the number of children who receive an oral health service from a non-dental provider. This prompted a number of states to start engaging physicians to provide fluoride varnish on children's teeth (20).

The proportion of dentists in the population may have increased partially due to a rise in the number of dental school graduates, which was aided by a larger proportion of students accessing government educational loans. In 2002, 4,349 students graduated from dental school, and that figure rose to 4,873 in 2009, a 12% increase in student enrollment. In the

same time period, the percentage of dental students who received a Health Professions Student Loan administered by the Health Resources and Services Administration (HRSA) increased from 28.8% to 35.0% (22% increase in student loans). The proportion of dental students who had Perkins and Stafford Loans also increased from 2002 to 2009 (21). Simultaneously, retirement wealth lost in the Great Recession of 2007–2009 may have prompted some older workers, including retirement-age dentists, to remain in the labor force (22).

The decline in proportion of public and private state health care expenditures allocated for dental services started in the mid-2000s, and has not increased since the end of the Great Recession. Dental spending also began to slow in the early 2000s (23). The decline in utilization of adult dental care is a significant contributor to the decrease in dental expenditures, though the percent of children in the United States who received care from a dentist in this time period increased (24).

The increase in the proportion of the population on public water system receiving fluoridated water in Western states was driven largely by California and Utah. While fluoridation programs have been long standing in certain Californian cities, including San Francisco and Oakland, in 1992 only 16% of the state's population received fluoridated water. A 2000 report from California's Children's Dental Health Initiative Advisory Committee stressed the benefits of water fluoridation and recommended that access be expanded throughout the state (25). In February 2003, the board of the Metropolitan Water District of Southern California (MWD), the state's largest water supplier, adopted a policy to add fluoride to the greater Los Angeles district's treatment processes. In September that year, the California Dental Association Foundation, in conjunction with the California Fluoridation 2010 Work Group, provided MWD \$5.5 million in grants to design and construct fluoridation facilities at each of its five treatment facilities. The California Department of Public Health approved the change in MWD's treatment process, and implementation of the policy began (26).

Finally, a cascade of policy changes is sometimes initiated in response to one significant event. In Maryland, the 2007 death of a 12-year old boy from an untreated dental infection attracted national attention and prompted a congressional investigation (8). As a result, the Dental Action Committee (DAC), convened by Maryland's Department of Health and Mental Hygiene, was charged with making recommendations to reform children's access to oral health care in the state. DAC made seven recommendations, including increasing Medicaid payment levels for dental services and establishing authority for public health level dental hygienists to provide certain services without a dentist present or having to see the patient first. All recommendations were supported by the state Secretary of Health and Governor, and are now in various stages of implementation (18). Similarly, federal legislation introduced by Senator Bingaman (D-NM) and Senator Snowe (R-ME) assured inclusion of dental provisions in ACA, while regional, state, and local oral health champions have promoted meaningful improvements throughout the nation.

Subsequent to the close of the study period, there has been momentum in many U.S. states promoting oral health policies, although systematic data are not available for additional

analysis. In 2012, 44 states (compared to 34 in 2009) had policies for Medicaid reimbursement to non-dental professionals to provide preventive dental care (27). There have also been efforts to decrease the population living in a dental health professional shortage area, and increase the percentage of the population receiving fluoridated water through community efforts or state mandates. Additionally, workforce activities have increased through federal and state funding of grants to support oral health workforce activities (28). In 2010, 34 states received \$17 M (compared to 25 states that received \$10 M in 2009) for expansion of loan repayment programs, recruitment and retention of dentists in underserved areas, grants and loans to expand existing practices in underserved areas, dental residency expansions, community-based educational and prevention services, and strengthening state oral health departments (BL Edelstein, DDS, MPH, written communication, Analysis of Federal Grants to States to Support Oral Health Workforce, January 2013).

While developing state policies to promote oral health is a necessary step, policy adoption is not sufficient to improve oral health status and dental care. Moving from policy development to implementation is a multi-step process that involves numerous stakeholders, including those at the federal and state levels. For example, between 2002 and 2011, 40 states had developed and released one or more state oral health plans, while Congress enacted laws, including the Children's Health Insurance Program Reauthorization Act of 2009 and the Patient Protection and Affordable Care Act of 2010, which directly affect states' capacity to implement the plans (29). Federal agencies continue to develop regulations and program guidance for the new laws. Policy action at the state level is also required to implement state plans. State-level stakeholders must prioritize their objectives, negotiate the policymaking process, and develop an approach to implementing selected actions. This process includes assessing the difficulty of implementing selected actions in light of associated costs, effectiveness, complexity, feasibility, and timing, as well as assessing the strengths and vulnerabilities of alternative strategies (29).

Several limitations are noted. First, due to lack of data we could not examine all policy domains and variables of interest. For example, we did not have systematic information regarding the reimbursement amount dental providers receive from Medicaid, an important policy that may affect access to dental services (30). Second, the elapsed time between the baseline and endline of our study may not be sufficiently long to assess meaningful change. Moreover, there may be state policies that were enacted within this time period, but for which implementation was slow or not initiated. Relatedly, the passage of policies does not indicate how implementation varies at the local or regional level.

Despite these limitations, this study is the first to systematically review a broad array of oral health policies at the state level and examine changes over time. Ongoing efforts are needed to systematically track a wide range of policies around oral health services, programs and systems in order to assess the magnitude of policy changes that has taken place over time. Accurate assessment of whether and how oral health policies have evolved can assist oral health practitioners, state champions and policy makers to advocate for enacting and implementing policies to improve access to dental services, oral health interventions, and public health infrastructure. Furthermore, there is considerable room for improvement in the

passage and implementation of additional state policies to promote oral health. Finally, further research is needed to determine if changes in state policies have led to improvements in the provision of oral health services and status of oral health, as well as reductions in disparities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

State policies influencing oral health service delivery in the United States

Policy Domain and Variable	Description
Public Dental Insurance	
Reimbursement of non-dental health professionals for preventive dental care for Medicaid and CHIP	Medicaid/CHIP pays for procedures such as oral exam; fluoride varnish; anticipatory guidance; risk assessment
12-month continuous eligibility in Medicaid and CHIP	State covers Medicaid/CHIP recipients for 12 continuous months, regardless of fluctuations in family income during that period
Medicaid eligibility	Income eligibility for Medicaid as a percent of the federal poverty level
Medicaid payment level	Comparison of state pediatric Medicaid reimbursement amount to dentists' billed charges
State Medicaid authority promotes public-private contracting	State sanctions and facilitates contracting private dentists with federally qualified health centers to care for Medicaid patients.
Adult Medicaid benefits	Extent of adult benefits coverage (e.g. none, emergency, limited, full)
CHIP eligibility	Income eligibility for CHIP as a percent of the federal poverty level
CHIP annual expenditure cap	Maximum dollar amount covered by CHIP per year
CHIP copayment	Copayment patient must pay for preventive visit
Number of annual exams allowed in CHIP	Maximum number of annual exams patient allowed to receive per year
State elects supplementary dental coverage in CHIP	State CHIP plan allows child-only supplemental dental coverage for families who have private/employer-sponsored health insurance with limited or no dental coverage
Presumptive eligibility in Medicaid and CHIP	Provision of temporary coverage for qualifying families assuming that application will be completed and family and income information supplied will be confirmed
Prior authorization requirements for Medicaid and CHIP	State requires dentist to obtain prior approval from Medicaid/CHIP to provide a covered service or prescribe a covered medication
Workforce Capacity	
Dentists licensed by the state	Number of dentists licensed by each state, per 10,000 population
Dentists participating in Medicaid and CHIP	Number of dentists participating in Medicaid/CHIP out of total number of dentists in state
Counties without a dentist to total counties	Percent of the total state population with no dentist to total counties in that state, by year
State dental director is a dentist, registered dental hygienist, or has a Bachelor of Dental Surgery	State dental director has a DMD, DDS, RDH, or BDS
Dental director position requires public health experience	Position requires education or professional experience in public health
Dental hygienists allowed to place sealants without prior dentist's exam	State does not require a prior dentist's exam before a hygienist sees a child in a school sealant program
Fluoride varnish allowed by non-dental professionals	State allows physicians, nurses, and medical staff to apply fluoride varnish
Loan forgiveness program	State provides scholarship assistance or loan forgiveness for dental students and practicing dentists

Policy Domain and Variable	Description
Population living in dental health professional shortage area	Percent of the total population living in a dental health professional shortage area, as defined by Health Resources and Services Administration (HRSA)
Limited allowance/license of foreign dentists	State provides for limited licensure for non-Commission on Dental Accreditation (CODA) graduate to practice, typically in academic or safety net environment
Limited allowance/license dentist formal safety net	State provides for limited licensure for dentist who otherwise does not meet all state licensure requirements to practice in a safety net facility
Limited allowance/license volunteer dentists free care	State provides temporary authority for a dentist licensed in another state to provide direct care in a recognized free-care program
Liability protection for volunteer	State provides limited liability or immunity from liability for voluntary care
Expanded function of oral health care providers	State allows non-dentists (e.g. dental hygienists, dental assistants, dental technicians) to provide expanded services
Expanded dental practice ownership allowance	State provides for ownership of a dental practice or facility by a non-dentist
Mobile or portable dentistry	State provides specific authorization for dental practice in a mobile or portable facility or program.
Expanded hygiene practice in safety net	State provides either a broader range of authorized services or a lesser-level of dentist supervision for dental hygienists practicing in safety-net facilities or programs.
Licensure reciprocity	State licenses dentist based on having license in another state
Creation of new oral health provider types	State licenses new provider types (e.g. advanced dental hygiene practitioners, dental therapists, community dental health coordinators)
Infrastructure, Programs and Surveillance	
State health Care expenditures allocated for dental services	Amount of health care expenditures for dental services out of total health care expenditures for all services by state
Population on public water system receiving fluoridated water	Percent population on public water system receiving fluoridated water
Mandatory dental screening for school age children	State requires students to provide officials with certification that the required examination was conducted or the dental examination is conducted by the school system
Early childhood caries (ECC) program	Programs vary widely among states, e.g. education from WIC nutritionists to WIC recipients; topical fluoride varnish; education of medical providers
Needs assessment/oral health survey	State implements survey to assess oral health needs of children
Oral health education program	State implements school-based, facility-based, community-based, and/or web-based education
Fluoride supplement program	States assesses and provides services in areas where water supply is low in fluoride
Dental sealant program	State has school-based and school linked dental sealant program
Capacity of community based low income dental clinics	Number of hours and/or days all community based low income dental clinics are open
Submission of basic screening data	State submits data on untreated tooth decay and number of sealants to National Oral Health Surveillance System
Number of staff functions fulfilled for state oral health program	Number of staff function (out of 7) state has fulfilled based on CDC requirements for state oral health programs

State policies and data sources (included in present analysis) related to oral health in the United States

Policy Domain and Variable	Operational Definition	Source of Data
Public Dental Insurance		
Reimbursement of non-dental health professionals for preventive dental care for Medicaid	Yes/No	American Academy of Pediatrics. Survey of State Medicaid Payment for Caries Prevention Services by Non-Dental Professionals. 2012.
12-month continuous eligibility in Medicaid and CHIP for children	Yes/No	Ross DC, Cox L. Enrolling children and families in health coverage: The promise of doing more. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2002:47. http://www.kff.org/medicaid/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=14125 Ross DC, Marks C. Challenges of providing health coverage for children and parents in a recession: A 50 state update on eligibility rules, enrollment and renewal procedures, and cost-sharing practices in Medicaid and SCHIP in 2009. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2009:64. http://www.kff.org/medicaid/upload/7855.pdf
Medicaid eligibility	(Income eligibility threshold/federal poverty level threshold) * 100	Ross DC, Cox L. Enrolling children and families in health coverage: The promise of doing more. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2002:47. http://www.kff.org/medicaid/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=14125 Ross DC, Marks C. Challenges of providing health coverage for children and parents in a recession: A 50 state update on eligibility rules, enrollment and renewal procedures, and cost-sharing practices in Medicaid and SCHIP in 2009. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2009:64. http://www.kff.org/medicaid/upload/7855.pdf Substance Abuse and Mental Health Services Administration. Mental Health and Substance Abuse Services in Medicaid and CHIP; 2003. http://store.samhsa.gov/shin/content/NMHH05-0202/NMHH05-0202-AK.pdf http://store.samhsa.gov/shin/content/NMHH05-0202/NMHH05-0202-MO.pdf http://store.samhsa.gov/shin/content/NMHH05-0202/NMHH05-0202-NY.pdf http://store.samhsa.gov/shin/content/NMHH05-0202/NMHH05-0202-ID.pdf
Presumptive eligibility in Medicaid and CHIP for children	Yes/No	Ross DC, Cox L. Enrolling children and families in health coverage: The promise of doing more. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2002:47. http://www.kff.org/medicaid/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=14125 Ross DC, Marks C. Challenges of providing health coverage for children and parents in a recession: A 50 state update on eligibility rules, enrollment and renewal procedures, and cost-sharing practices in Medicaid and SCHIP in 2009. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2009:64. http://www.kff.org/medicaid/upload/7855.pdf
Adult Medicaid benefits for oral health services	None/Emergency or Limited/Full	O'Connor P; American Dental Association, oral communication, November 2012
Workforce Capacity		
Dentists licensed by state	# dentists licensed by state/10,000 population in state	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs. http://apps.nccd.cdc.gov/synopses/
State dental director is a dentist, registered dental hygienist, or has a Bachelor of Dental Surgery	Yes/No	Association of State and Territorial Dental Directors. Synopsis of State and Territorial Dental Public Health Programs, Data for FY 2002–2003. April 2004 Association of State and Territorial Dental Directors. Synopsis of State and Territorial Dental Public Health Programs, Data for FY 2008–2009. July 2010
Infrastructure and Programs		

Policy Domain and Variable	Operational Definition	Source of Data
State health care expenditures allocated for dental services	(Private and public healthcare expenditures for dental services by state/total healthcare expenditures for all services by state)*100	Centers for Medicare and Medicaid Services, Health Expenditure by State of Residence, https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsStateHealthAccountsResidence.html
Population on public water system receiving fluoridated water	(State population served by PWS/total state population) *100	Centers for Disease Control, Reference Statistics for Water Fluoridation, http://www.cdc.gov/fluoridation/statistics/reference_stats.htm
Mandatory dental screening for school age children	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/ Association of State and Territorial Dental Directors and Children's Dental Health Project. Emerging Issues in Oral Health: State Laws on Dental "Screening" for School-Aged Children. Oct 2008, http://www.astdd.org/docs/FinalSchoolScreeningpaper10-14-08.pdf
Early childhood caries (ECC) program	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/
Needs assessment/oral health survey	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/
Oral health education program	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/
Fluoride supplement program	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/
Dental sealant program	Yes/No	Centers for Disease Control, Synopsis of State and Territorial Dental Public Health Programs, http://apps.nccd.cdc.gov/synopses/

Table 3

Changes in state policies related to oral health in the United States from 2002/4 to 2008/9 (n=51)

	2002/4 [‡]	2008/9 [‡]
Public Dental Insurance		
Medicaid reimbursement of non-dental health professionals for fluoride varnish, % ***	7.8 ^a	66.7 ^e
12-month continuous coverage for children		
in Medicaid, %	35.3 ^a	35.3 ^e
in CHIP, % *	47.1 ^a	58.8 ^e
Medicaid eligibility, % FPL, median [range]		
<12 months old *	185 [133, 300] ^b	185 [133, 300] ^d
1–5 years olds **	140 [133, 300] ^b	140 [133, 300] ^d
6–19 years old **	140 [100, 300] ^b	133 [100, 300] ^d
Presumptive eligibility for children,		
in Medicaid, %	17.7 ^a	27.5 ^e
in CHIP, %	9.8 ^a	19.6 ^e
Extent of adult Medicaid benefits, %		
None	13.7 ^a	21.6 ^e
Limited or emergency	58.8 ^a	60.8 ^e
Full	27.5 ^a	17.6 ^e
Workforce Capacity		
Number of dentists licensed per 10,000 population, median [range] ***	5.7 [3.8, 20.2] ^a	7.1 [0.0, 22.0] ^e
State dental director has a DMD, DDS, RDH or BDS %	84.3 ^a	74.5 ^e
Infrastructure and Programs		
State health care expenditures allocated for dental services, median % [range] ***	5.1 [3.6, 8.4] ^a	4.8 [3.4, 7.5] ^e
Population on public water system receiving fluoridated water, median % [range]	75.3 [8.3, 100.0] ^a	77.0 [10.8, 100.0] ^d
Mandatory dental screening for school age children, %	74.5 ^c	72.6 ^d
Early childhood caries (ECC) program, %	60.8 ^c	68.6 ^d
Needs assessment/oral health survey, %	74.5 ^c	62.8 ^d
Oral health education program, %	86.3 ^c	86.3 ^d
Fluoride supplement program, %	19.6 ^c	19.6 ^d

	2002/4 [‡]	2008/9 [‡]
Dental sealant program, %	29.4 ^c	25.5 ^d

Note: McNemar's test used to compare proportions for binary policies. Wilcoxon matched pairs signed ranks test used to compare distributions of ordinal policies.

[‡]Used earliest year within 2002–2004 and latest year within 2008–2009 for which complete data are available.

*
p<0.05;

**
p<0.01;

p<0.001.

^a2002 data,

^b2003 data,

^c2004 data,

^d2008 data,

^e2009 data.

Table 4

Regional variations in state policies related to oral health in the United States from 2002/4 to 2008/9 (n=51)

	2002/3	2008/9	Difference (2008/9–2002/4)
Public Insurance			
Medicaid reimbursement to non-dental provider for application of fluoride varnish, % ***	7.8 ^a	66.7 ^e	58.9
Midwest ***	7.7	92.3	84.6
Northeast *	0.0	66.7	66.7
South *	6.3	43.8	37.5
West *	15.4	69.2	53.8
12-month continuous coverage in CHIP for children, % *	47.1 ^a	58.8 ^e	11.7
Midwest	50.0	41.7	8.3
Northeast	33.3	44.4	11.1
South *	35.3	64.7	29.4
West	61.5	76.9	15.4
Workforce Capacity			
Number of dentists licensed per 10,000 population, median ***	5.7 ^a	7.1 ^e	1.1
Midwest **	5.4	7.1	1.7
Northeast *	7.0	8.9	1.9
South	5.4	5.5	0.1
West *	6.1	8.9	2.8
Infrastructure and Programs			
State health care expenditures allocated for dental services, % ***	5.1 ^a	4.8 ^e	–0.3
Midwest	4.7	4.7	0
Northeast *	5.1	4.8	–0.3
South *	4.7	4.5	–0.2
West *	6.4	5.8	–0.6
Population on public water system with fluoridated water, median %	75.3 ^a	77.0 ^d	1.7
Midwest	88.7	90.8	2.1
Northeast	61.0	65.4	4.4
South	84.6	85.6	1.0
West *	36.7	54.3	17.6
States with needs assessment/oral health survey, %	74.5 ^c	62.8 ^d	–11.7
Midwest	75.0	75.0	0
Northeast *	88.9	44.4	–44.5

	2002/3	2008/9	Difference (2008/9–2002/4)
South	70.6	64.7	–5.9
West	69.2	61.5	–7.7

Note: Only policies with statistically significant changes are shown. McNemar's test used to compare proportions for binary policies. Wilcoxon matched pairs signed ranks test used to compare distributions of ordinal policies.

*
p<0.05;

**
p<0.01;

p<0.001.

^a2002 data,

^b2003 data,

^c2004 data,

^d2008 data,

^e2009 data.