



Morbidity and Mortality Weekly Report (MMWR)

Use of Dental Care and Effective Preventive Services in Preventing Tooth Decay Among U.S. Children and Adolescents — Medical Expenditure Panel Survey, United States, 2003–2009 and National Health and Nutrition Examination Survey, United States, 2005–2010

Supplements

September 12, 2014 / 63(02);54-60

Susan O. Griffin, PhD¹

Laurie K. Barker, MSPH¹

Liang Wei, MS²

Chien-Hsun Li, MS,³

Melissa S. Albuquerque¹

Barbara F. Gooch, DMD¹

¹*Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, CDC*

²*DB Consulting Group, Inc., Atlanta, Georgia*

³*Northrop Grumman Information Systems, Burlington, Massachusetts*

Corresponding author: Susan O. Griffin, Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. Telephone: 770-488-6054; E-mail: sig1@cdc.gov.

Introduction

Tooth decay is one of the most common chronic conditions among children. Approximately 23% of children aged 2–11 years have at least one primary tooth with untreated decay and 20% of adolescents aged 12–19 years have at least one permanent tooth with untreated decay (1). Tooth decay, if left untreated, can cause pain and infection, and can lead to problems with eating, speaking, and learning (2). Risk factors for tooth decay include recent history of cavities, low fluoride exposure, and living in a low-income household (3). Prevalence of untreated decay in primary or permanent teeth among children from lower-income households is more than twice that among children from higher-income households (1). Prevalence of untreated tooth decay is also higher among Mexican-American children and non-Hispanic black children than among

white non-Hispanic children (1). By age 15, approximately 60% of all adolescents will have experienced tooth decay (1). An estimated 51.7 million school hours are missed annually by school-aged children because of a dental problem or visit (4).

In 2009, the total dental expenses for U.S. children aged 5–17 years were approximately \$20 billion (5), accounting for 17.7% of all health-care expenses among this age group (6). Approximately 40% of dental costs were paid out of pocket (5), compared with 17% for medical care (6). Approximately one fourth of U.S. children do not have dental insurance (private or public) (7). The types of services covered by dental insurance vary widely by plan, but typically have higher copayments and lower annual limits than services covered by medical insurance (8).

Clinical interventions, including dental sealants and fluoride (e.g., topical gels and varnishes and oral fluoride supplementation) are effective in preventing and controlling tooth decay. Dental sealants are coatings placed on the pits and fissures of posterior teeth where the majority of decay occurs in children (9). A systematic review of randomized controlled trials found that dental sealants reduce decay in permanent molars by 81% approximately 2 years after placement and continue to be effective up to 4.5 years after placement (10). Effectiveness remains strong as long as sealants are retained in the pits and fissures (3). For these reasons, combined with findings that sealant retention rates exceed 70% in the primary teeth after 3 years, the American Dental Association (ADA) Council on Scientific Affairs recommends the placement of dental sealants on primary and permanent molars for children at risk for developing tooth decay (9). Although the recommendation was made on the basis of clinical effectiveness, the ADA Council on Scientific Affairs noted that several economic models demonstrated that delivering sealants to children at-risk for caries also was cost-effective. Two models found that placing sealants on the permanent first molars of children at high-risk for tooth decay strictly dominated not placing sealants (i.e., reduced cavities and saved costs) (11,12). Systematic reviews of randomized controlled trials also have found that professional or professionally supervised application of fluoride gel prevents more than one quarter of decay in permanent teeth (13) and professional application of fluoride varnish prevents one third of decay in primary teeth and almost half of decay in permanent teeth (14). The ADA Council on Scientific Affairs also recommends for at-risk children aged <6 years the professional application of 2.26 percent fluoride varnish at least twice yearly and for at-risk children aged ≥6 years, the professional application of 2.26 percent fluoride varnish or 1.23 percent (APF*) fluoride gel at least twice yearly (15). In addition, the U.S. Preventive Services Task Force (USPSTF) recommends that primary care clinicians apply fluoride varnish to the primary teeth of all infants and young children beginning when their first primary tooth comes in (USPSTF Grade B recommendation, which means USPSTF recommends the service) (16); and that they prescribe oral fluoride supplementation at currently recommended doses to preschool children beginning at age 6 months whose primary water source is deficient in fluoride (USPSTF Grade B recommendation) (16).

Preventing tooth decay is enhanced by early identification of children at high risk for the disease (3) and subsequent delivery of effective interventions. The American Academy of Pediatrics (AAP) (17), ADA, the Academy of General Dentistry, and the American Academy of Pediatric Dentistry (AAPD) encourage families to have accessed a dental home by the time their child is 1 year old to deter the development of tooth decay (18)†. AAPD recommends that after the first dental visit a child should be seen by a dentist every 6 months or, according to a schedule recommended by the dentist, on the basis of the child's individual needs (19). The National

Quality Forum (NQF) has endorsed two oral health performance measures related to dental use. These include the percentage of children and adolescents enrolled in Medicaid with an annual dental visit (NQF #1388) and the percentage of children and adolescents with a preventive dental visit in the past 12 months (NQF #1334) (20).

Although preventive dental care is effective, for reasons previously noted, the percentage of children using dental care is low (1). The *Healthy People 2020* initiative, recognizing the problem of low use of preventive dental care, especially among those at highest risk, set several oral health objectives (OH) to increase acceptance and adoption of effective preventive interventions (21). These objectives include 1) increasing the proportion of children, adolescents, and adults who used the oral health care system in the past year from its baseline value of 44.5% by 10% (objective OH-7, a leading health indicator); 2) increasing the proportion of low-income children and adolescents who received any preventive dental service during the past year from its baseline value of 30.2% by 10% (objective OH-8); and 3) increasing the proportion of children and adolescents who have received dental sealants on their molar teeth by 10% (objective OH-12).

The reports in this supplement provide the public and stakeholders responsible for infant, child, and adolescent health (including public health practitioners, parents or guardians and their employers, health plans, health professionals, schools, child care facilities, community groups, and voluntary associations) with easily understood and transparent information about the use of selected clinical preventive services that can improve the health of infants, children, and adolescents. The topic in this report is one of 11 topics selected on the basis of existing evidence-based clinical practice recommendations or guidelines for the preventive services and availability of data system(s) for monitoring (22). This report analyzes 2003–2009 data from the Medical Expenditure Panel Survey (MEPS) and 2005–2010 data from the National Health and Nutrition Examination Survey (NHANES) to determine the proportion of children and adolescents who have used dental care and received preventive dental services. Public health agencies play an important role in increasing access to preventive dental services by supporting provision of preventive services in nonclinical settings such as schools. These agencies also can promote policies that increase access to preventive dental services such as increasing Medicaid reimbursements for dental services and increasing public awareness about the importance of oral health and the effectiveness of the use of fluorides and sealants. Public health agencies can use these data to benchmark progress toward the goal of improving regular access to dental care and to preventive services and reducing the prevalence of tooth decay in children and adolescents.

Methods

To estimate the use of dental care and receipt of preventive dental services, specifically professionally applied sealant or topical fluoride gel or varnish within the calendar year, CDC analyzed 2009 data from MEPS§ for 12,143 children and adolescents aged 0–21 years. To evaluate trends, CDC used MEPS data during 2003–2009. MEPS is a set of large-scale surveys of families and persons, their medical providers, and employers across the United States. Dental data are collected during the survey of families and persons who are drawn from a nationally representative subsample of households that participated in the previous year's National Health Interview Survey (conducted by the National Center for Health Statistics). The receipt of dental services measures for 2009 are presented by the following characteristics: child's sex, age, race/ethnicity, health insurance status, dental insurance status (e.g., reported having private dental insurance at some point within the past year), and disability status; family income-poverty

ratio; and head of household education level.

To estimate the prevalence of sealant use for children and adolescents aged 5–19 years, CDC analyzed combined 2005–2010 NHANES data (three cycles). NHANES is a complex, multistage probability sample of the noninstitutionalized U.S. population.[¶] During 2005–2010, an examiner visually assessed each child's teeth using the Basic Screening Examination (BSE) and recorded information including whether the child had at least one tooth with a sealant. During 2005–2010, a total of 8,492 children and adolescents aged 5–19 years received a BSE; of these, 8,481 had valid data for dental sealants. NHANES did not collect data for sealants on children aged <5 years during 2005–2008, nor adolescents aged >19 years during 2009–2010. Sealants remain on teeth for several years after placement (9), and do not need to be replaced every year. For this reason, expected estimates of the percentage of children who have sealants on their teeth at the time of NHANES examination will be higher than estimates of the percentage of children who received sealants in 1 year from the MEPS survey.

Dental insurance status was not available from NHANES during 2005–2010. Otherwise, estimates of sealant prevalence are presented by the same characteristics as the receipt of dental service measures from MEPS. For MEPS estimates, disability was defined as receiving help or supervision in conducting activities of daily living because of impairment, or a physical or mental health problem. For NHANES estimates, disability was defined as reporting a limitation in crawling, walking, running, or playing, having a long-term impairment or health problem, or having received special education or early intervention.

All analyses were conducted using statistical software to account for the complex sample design of MEPS and NHANES data. Estimates from MEPS and NHANES were obtained using the expenditure file person weights and the examination sample weights, respectively. Estimates with relative standard errors >30% are not presented. Confidence intervals (CIs) reported are 95% CIs. To test whether use of dental care, receipt of preventive dental services, or prevalence of dental sealants varied by the characteristic of the child, CDC used a chi-square test of independence for nominal characteristic variables and a chi-square test of linear trend for ordinal characteristic variables. Cochran-Mantel-Haenszel Chi-square tests of linear trend were used to test whether receipt of dental services varied from 2003 to 2009. All findings reported in the text are determined to be significant at $p < 0.05$.

Results

Less than half of children aged ≤ 21 years (43.8%) used dental care in 2009 and only 14.2% of children aged ≤ 21 years received a preventive dental service (i.e., topical fluoride, sealants, or both) (Table 1). Children aged 6–10 years and 11–15 years were more likely to use dental care (55.0% and 57.8%, respectively) than children aged 0–2 years (7.6%), 3–5 years (43.7%), and 16–21 years (41.8%). Lower likelihood of dental care use and receipt of preventive care was associated with being a non-Hispanic black or Hispanic child, having lower family income, head of household having lower educational attainment, and not having medical insurance. Children with private dental insurance were more likely to receive preventive care than were children without private dental insurance.

The percentage of children and adolescents using dental care or receiving a preventive dental service annually did not vary during 2003–2009 (Figure). Among children who used dental care,

approximately one third received topical fluoride or a sealant. However, among children who used dental care, those with private health insurance or from families with higher income or education were more likely to receive these preventive services.

Approximately 31% of children aged 5–19 years had at least one dental sealant during 2005–2010 (Table 2). Lower sealant prevalence was associated with being non-Hispanic black or Mexican American, having lower family income, head of household having lower educational attainment, or not having private health insurance. Neither dental sealant prevalence nor dental use varied by disability status.

Discussion

In 2009, less than half of children and adolescents had a dental visit in the past year, and approximately 15% of children received sealants or topical fluoride. These low levels of dental use have persisted throughout the preceding decade. Sealant prevalence was also low; among children with teeth likely to be eligible for sealant placement, less than one third had sealants.

Socioeconomic groups with low levels of dental use—non-Hispanic blacks, Hispanics, those with low family income, and low educational attainment by head of household—also have been documented to have higher prevalence of untreated decay than the general population (1). The low use of dental care and preventive dental services among children at high-risk for dental problems is likely associated with financial barriers and low oral health literacy. The findings in this report indicate that children with private dental insurance were more likely to have had a dental visit during the past year and to have received preventive dental services than were children without private dental insurance. A recent Institute of Medicine (IOM) report found that low oral health literacy in the United States created obstacles to recognizing the risk for oral diseases as well as seeking and receiving needed oral health care (8).

This report also found that very young children (aged <3 years) were even less likely than older children to use dental care. Among these very young children at risk for tooth decay, early establishment of a dental home might reduce dental treatment costs. An analysis of North Carolina Medicaid claims data during 1992–1997 found that children who received a preventive dental service before age 1 year had lower dental costs over 5 years than did children receiving their first preventive service at age 2–5 years (23). However, a later analysis of North Carolina Medicaid claims during 1999–2006 found no difference in subsequent dental decay related treatment outcomes between children receiving their first preventive dental visit by age 18 months compared with children at age 18–42 months. Children with existing dental decay receiving their first tertiary preventive visit before age 18 months did have lower rates of subsequent treatment and dental treatment costs than similar children aged 18–42 months (24).

This report only included sealants and topical fluoride as preventive services on the basis of their strong evidence of effectiveness (10,13,14). Dental prophylaxis (e.g., tooth cleaning and polishing), a commonly received service, was not included because insufficient evidence exists that it prevents tooth decay (25). As a result, the percentage of children receiving preventive dental services in this report is lower than values reported in other studies (7,26).

Ongoing changes in the U.S. health-care system offer opportunities to improve the use of clinical preventive services among infants, children, and adolescents. The Patient Protection and Affordable Care Act of 2010 (as amended by the Health Care and Education Reconciliation Act of

2010 and referred to collectively as the Affordable Care Act [ACA]) expands insurance coverage, consumer protections, and access to care and places a greater emphasis on prevention (27). As of September 23, 2010, ACA § 1001 requires nongrandfathered private health plans to cover, with no cost-sharing, a collection of four types of clinical preventive services, including 1) recommended services of USPSTF graded A (strongly recommended) or B (recommended) (28); 2) vaccinations recommended by the Advisory Committee on Immunization Practices (29); 3) services adopted for infants, children, and adolescents under the Bright Futures guidelines supported by the Health Resources and Services Administration (HRSA) and AAP (18) and those developed by the Discretionary Advisory Committee on Heritable Disorders in Newborns and Children (30); and 4) women's preventive services as provided in comprehensive guidelines supported by HRSA (31). USPSTF recommends application of fluoride varnish to the primary teeth of preschool children beginning when the first tooth comes in as a Grade B service and oral fluoride supplementation as a Grade B service for preschool children beginning at age 6 months and whose primary water source is deficient in fluoride (16). Bright Futures guidelines recommend certain oral health services for children and adolescents including pediatric oral health risk assessments beginning at age 6 months (18). State Medicaid programs cover oral health services as part of the Early and Periodic Screening, Diagnostic and Treatment benefit.

The Health Insurance Marketplace (or Health Insurance Exchange) began providing access to private health insurance for small employers and to persons and families interested in exploring their options for coverage, with policies taking effect as early as January 2014.¶ Insurance plans sold on the Marketplace must cover the four types of recommended clinical preventive services without cost-sharing. These services delivered by primary care providers include oral fluoride supplementation for preschool children beginning at age 6 months whose primary water source is deficient in fluoride, fluoride varnish for children aged <6 years, and certain oral health services for children (e.g., pediatric oral health risk assessments) beginning at age 6 months. The Affordable Care Act also includes provisions addressing the supply of dental providers. Specifically, the Act authorizes the Secretary of the U.S. Department of Health and Human Services to make grants to fund the training of general, pediatric, and public-health dentists, and establish a loan repayment program for dental faculty in institutions (ACA § 5303). The U.S. Department of Health and Human Services also has developed a multiagency national action plan to improve health literacy, of which oral health was a component (32). One of the plan's goals is to promote changes in the health-care delivery system that improve health information, communication, informed decision-making, and access to health services.

The receipt of preventive dental services should increase over time because of the provisions in the Affordable Care Act that address oral health, including the insurance reforms that require that certain oral health services be covered and the training grants designed to increase the supply of dental health providers. A recent IOM report emphasized the importance of the U.S. Department of Health and Human Services promoting the use of preventive dental services because of the strong evidence for their effectiveness, which could potentially reduce overall treatment need and costs (33). Increased dental insurance coverage and other measures should increase the likelihood that very young children have a dental home.

Public health agencies and organizations, dental providers and their professional societies, and private and public insurers are key stakeholders in increasing receipt of preventive dental services. Public health surveillance can identify population subgroups that might require

additional strategies to access clinical services needed to prevent dental decay. Recently, CDC's Division of Oral Health, the Association of State and Territorial Dental Director, and the Council of State and Territorial Epidemiologists, added indicators of Medicaid and Children's Health Insurance Program (CHIP) beneficiaries' use of clinical dental preventive services to the National Oral Health Surveillance System (34).

Dental providers and insurers play a key role in ensuring that children receive timely and effective dental care. ADA, the Centers for Medicare and Medicaid Services (CMS), private insurers, and federal public health agencies participate in the Dental Quality Alliance, which was formed to develop and test quality measures for oral health. The Association of State and Territorial Dental Directors and the Medicaid/CHIP State Dental Association also recently formed the Partnership for Alignment Project to assess and facilitate collaboration between state public health and medical assistance departments. Collaboration might include increased use of Medicaid/CHIP enrollment and claims data for public health program planning, and use of public health strategies to increase access to care for Medicaid/CHIP enrolled children through the CMS-sponsored voluntary state pediatric oral health action plan.

CDC's Division of Oral Health, through cooperative agreements with state grantees, funds school-based sealant programs (SBSP) and state infrastructure to increase effectiveness, reach, and efficiency of these programs. SBSP typically target schools with students likely to have high levels of untreated decay and low use of clinical services (i.e., where >50% of children are eligible for the reduced and free meal program) and provide children with referrals for clinical dental care. Strong evidence supports the effectiveness of SBSP in preventing decay (10) and increasing the number of high risk children (e.g., Medicaid enrolled) who receive sealants (35). Evidence also demonstrates that sealants are cost-effective when provided to children from low-income families. An analysis of Alabama Medicaid claims data during 1985–1992 found that total dental costs (including the cost of sealants) were lower among children receiving sealants (36). An analysis of North Carolina Medicaid claims data found that among high-risk children (i.e., who had received caries related procedures on at least two chewing surfaces), providing sealants was associated with lower dental costs over a 5- year period (37). Finally, an analysis of total dental costs among children from low-income families found that average total dental costs were lower for children who participated in a school-based sealant program than children who attended a school without such a program (38).

Limitations








The findings in this report are subject to at least two limitations. First, MEPS data used to generate measures of use are self-reported or reported by parents and caregivers. Although MEPS collects information from medical providers and insurers, in addition to that from patients, on use of medical services, it does not do so for dental care. Because MEPS interviews patients several times (i.e., approximately every 6 months over 2 years), it might be less subject to recall and social desirability bias than self-reported dental care use in other national surveys, which asks respondents once about the time since they last received dental care (39). Second, the dental data collection protocol for NHANES changed between 2005–2008 and 2009–2010. The type of examiner changed from health technicians in 2005–2008 to dental hygienists in 2009–2010. However, in all cycles of NHANES during 2005–2010 examiners were trained by the U.S. standard reference examiner, and interexaminer reliability for presence of dental sealants ranged from substantial to almost perfect (40).

Conclusion


Dental decay is one of the most common health conditions among children and adolescents. Although clinical interventions are effective in preventing and controlling tooth decay, only 44% of children and adolescents visited a dentist in 2009, and 14% received a dental sealant or topical fluoride application. These low levels of use persisted during 2003–2009. During 2005–2010, less than one third of children had a dental sealant. Provisions in the Affordable Care Act likely will increase the number of children and adolescents with regular access to dental care and to preventive services that have the potential to substantially reduce tooth decay. This might ultimately lead to improved quality of life and school performance.

References

1. Dye BA, Tan S, Smith V, et al. Trends in oral health status: United States, 1988–1984 and 1999–2004. *Vital Health Stat* 11;2007:1–92.
2. US Department of Health and Human Services. Oral health in America: a report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
3. National Institutes of Health Consensus Development Conference Statement. Diagnosis and management of dental caries throughout life. *J Dental Educ* 2001;65:1162–8.
4. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. *Am J Public Health* 1992;82:1663–8.
5. Agency for Healthcare Research and Quality. Dental services-mean and median expenses per person with expense and distribution of expenses by source of payment: United States, 2009. Medical Expenditure Panel Survey Household Component Data. Generated interactively. September 2012. Rockville, MD: US Department of Health and Human Services; 2013. Available at http://meps.ahrq.gov/mepsweb/data_stats/quick_tables.jsp.
6. Agency for Healthcare Research and Quality. Total health services-mean and median expenses per person with expense and distribution of expenses by source of payment: United States, 2009. Medical Expenditure Panel Survey Household Component Data. Rockville, MD: US Department of Health and Human Services; 2012. Available at http://meps.ahrq.gov/mepsweb/data_stats/quick_tables.jsp.
7. Lewis C, Mouradian W, Slayton R, Williams A. Dental insurance and its impact on preventive dental care visits for US children. *J Am Dent Assoc* 2007;138:369–80.
8. Institute of Medicine; National Research Council. Improving access to oral health care for vulnerable and underserved populations. Washington, DC: The National Academies Press; 2011.
9. Beauchamp J, Caufield PW, Crall JJ, et al. Evidence-based clinical recommendations for the use of pit-and-fissure sealants. A report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc* 2008;139:257–68.
10. Guide to community preventive services. Preventing dental caries: school-based dental sealant delivery programs (abbreviated). Available at www.thecommunityguide.org/oral/schoolsealants.html.
11. Griffin SO, Griffin PM, Gooch BF, Barker LK. Comparing the costs of three sealant delivery strategies. *J Dent Res* 2002;81:641–5.
12. Quiñonez RB, Downs SM, Shugars D, Christensen J, Vann WF. Assessing cost-effectiveness of sealant placement in children. *J Public Health Dent* 2005;65:82–9.
13. Marinho VC, Higgins JP, Logan S, Sheiham A. Systematic review of controlled trials on the effectiveness of fluoride gels for the prevention of dental caries in children. *J Dent Educ* 2003;67:448–58.


14. Marinho VC, Higgins JP, Logan S, Sheiham A. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev* 2002;CD002279.
15. Weyant RJ, Tracy SL, Anselmo T, et al. Topical fluoride for caries prevention: executive summary of the updated clinical recommendations and supporting systematic review. *J Am Dent Assoc* 2013;144:1279–91.
16. US Preventive Services Task Force. Prevention of dental caries in children from birth through age 5 years. Rockville, MD: U.S. Preventive Services Task Force; 2014. Available at <http://www.uspreventiveservicestaskforce.org/uspstf/uspsdnch.htm> .
17. Casamassimo P, Holt K, editors: guidelines for health supervision of infants, children, adolescents, third edition. Elk Grove Village, IL: American Academy of Pediatrics; 2008. Bright futures in practice: oral health—pocket guide. Washington, DC: National Maternal and Child Oral Health Resource Center; 2004.
18. Hagan JF, Shaw JS, Duncan PM, editors. Bright futures: guidelines for health supervision of infants, children, and adolescents, third edition. Elk Grove Village, IL: American Academy of Pediatrics; 2008.
19. American Academy of Pediatric Dentistry. Policy on the dental home. Chicago, IL: American Academy of Pediatric Dentistry; 2004. Available at http://www.aapd.org/media/Policies_Guidelines/P_DentalHome.pdf  .
20. National Quality Forum. Oral health performance measurement: environmental scan, gap analysis and measure topics prioritization—technical report. Washington, DC: National Quality Forum; 2012.
21. US Department of Health and Human Services. Healthy people 2020. Topics and objectives. Oral health. Washington, DC; US Department of Health and Human Services; 2013. Available at <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=32> .
22. Yeung LF, Shapira SK, Coates RJ, et al. Rationale for periodic reporting on the use of selected clinical preventive services to improve the health of infants, children, and adolescents—United States. In: Use of selected clinical preventive services to improve the health of infants, children, and adolescents — United States, 1999–2011. *MMWR* 2014; 63(No. Suppl 2).
23. Savage MF, Lee JY, Kotch JB, Vann WF Jr. Early preventive dental visits: effects on subsequent utilization and costs. *Pediatrics* 2004;114:e418–23.
24. Beil H, Rozier RG, Preisser JS, Stearns SC, Lee JY. Effect of early preventive dental visits on subsequent dental treatment and expenditures. *Med Care* 2012;50:749–56.
25. Azarpazhooh A, Main PA. Efficacy of dental prophylaxis (rubber cup) for the prevention of caries and gingivitis: a systematic review of literature. *Br Dent J* 2009;207:E14.
26. Manski RJ, Brown E. Dental procedures, United States, 1999 and 2009. Statistical brief #368. April 2012. Rockville, MD: Agency for Healthcare Research and Quality; 2012. Available at http://meps.ahrq.gov/mepsweb/data_files/publications/st368/stat368.shtml .
27. US Department of Health and Human Services. Patient Protection and Affordable Care Act of 2010. Pub. L. No. 114–148 (March 23, 2010), as amended through May 1, 2010. Washington, DC: US Department of Health and Human Services; 2010. Available at <http://www.healthcare.gov/law/full/index.html> .
28. US Preventive Services Task Force. USPSTF A and B recommendations. Rockville, MD: USPSTF; 2014. Available at <http://www.uspreventiveservicestaskforce.org/uspstf/uspsabrecs.htm> .
29. CDC. Vaccine recommendations of the Advisory Committee on Immunization Practices. Atlanta, GA: US Department of Health and Human Services. Available at <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>.
30. US Department of Health and Human Services. Discretionary Advisory Committee on

Heritable Disorders in Newborns and Children. About the committee. Rockville, MD: US Department of Health and Human Services; 2014. Available at <http://www.hrsa.gov/advisorycommittees/mchbadvisory/heritabledisorders/about/index.html> .

31. US Department of Health and Human Services. Women's preventive services guidelines. Rockville, MD: US Department of Health and Human Services; 2012. Available at <http://www.hrsa.gov/womensguidelines/> .
32. US Department of Health and Human Services. National action plan to improve health literacy. Washington, DC: US Department of Health and Human Services; 2010.
33. Institute of Medicine. Advancing oral health in America: The role of HHS. Washington, DC: The National Academies Press; 2011.
34. Malvitz DM, Barker LK, Phipps KR. Development and status of the National Oral Health Surveillance System. *Prev Chronic Dis* 2009;6:A66.
35. Siegal MD, Miller DL, Moffat D, Kim S, Goodman P. Impact of targeted, school-based dental sealant programs in reducing racial and economic disparities in sealant prevalence among schoolchildren—Ohio, 1998–1999. *MMWR* 2001;50:736–8.
36. Dasanayake AP, Li Y, Kirk K, Bronstein J, Childers NK. Restorative cost savings related to dental sealants in Alabama Medicaid children. *Pediatr Dent* 2003;25:572–6.
37. Weintraub JA, Stearns SC, Rozier RG, Huang CC. Treatment outcomes and costs of dental sealants among children enrolled in Medicaid. *Am J Public Health* 2001;91:1877–81.
38. Zalos GP, Glied SA, Tobin JN, et al. Cost-effectiveness analysis of a school-based dental sealant program for low-socioeconomic-status children: a practice-based report. *J Health Care Poor Underserved* 2002;13:38–48.
39. Macek MD, Manski RJ, Vargas CM, Moeller J. Comparing oral health care utilization estimates in the United States across three nationally representative surveys. *Health Serv Res* 2002;37:499–521.
40. Dye BA, Barker LK, Li X, Lewis BG, Beltrán-Aguilar ED. Overview and quality assurance for the oral health component of the National Health and Nutrition Examination Survey (NHANES), 2005–08. *J Public Health Dent* 2011;71:54–61.

* Acidulated Phosphate Fluoride.

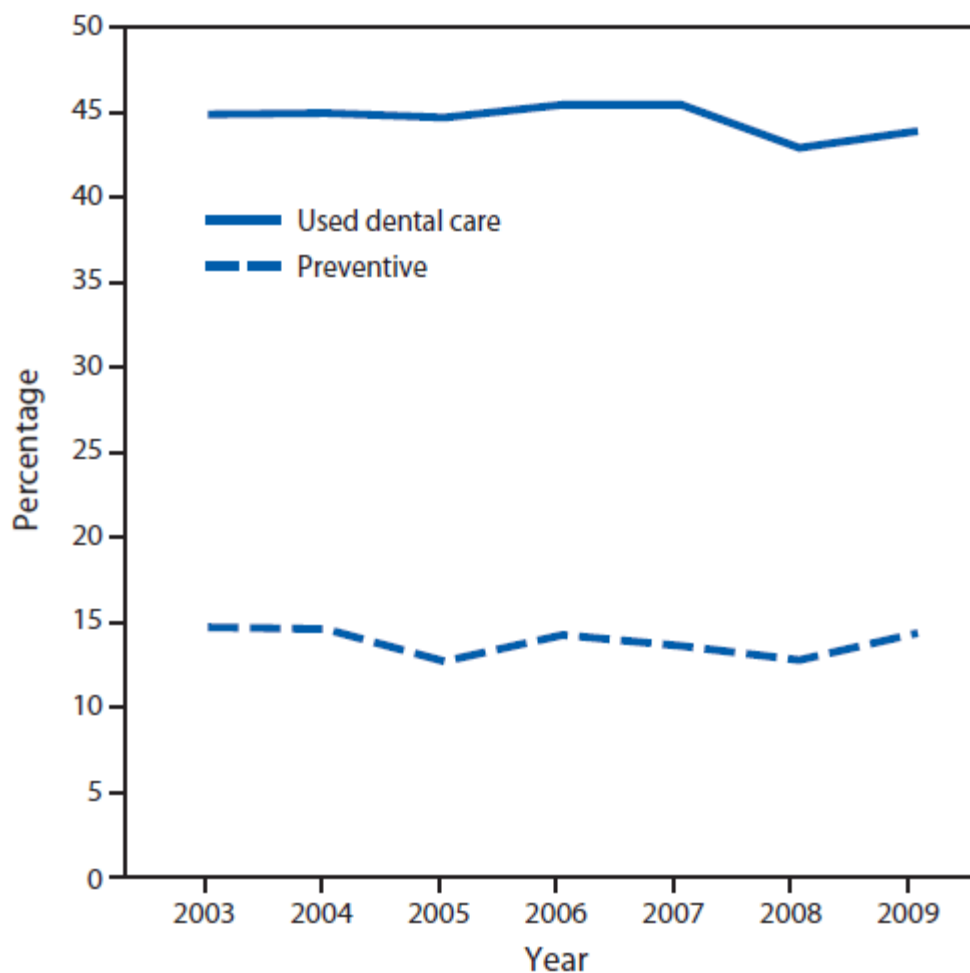
† Dental care is provided in a comprehensive, continuously accessible, coordinated, and family centered way.

§ Additional information is available at <http://meps.ahrq.gov/mepsweb/> .

¶ Additional information is available at <http://www.cdc.gov/nchs/nhanes.htm>.

¶ The Health Insurance Marketplace was set up to provide a state-based competitive insurance marketplace. The Marketplace allows eligible persons and small businesses with up to 50 employees (and increasing to 100 employees by 2016) to purchase health insurance plans that meet criteria outlined in ACA (ACA § 1311). If a state did not create a Marketplace, the federal government operates it.

FIGURE. Percentage of children and adolescents aged 0–21 years who used dental care or received preventive dental services (topical fluoride, or sealant, or both) in a calendar year — Medical Expenditure Panel Survey, United States, 2003–2009



Alternate Text: This figure is a line graph that presents the percentage of children receiving at least one service within the past year in two categories: 1) preventive, and 2) any during 2003-2009.

TABLE 1. Prevalence of dental visit and receipt of preventive services (topical fluoride, sealant, or both) among children and adolescents, aged 0–21 years — Medical Expenditure Panel Survey, United States, 2009

Characteristic	Dental visit			Preventive services	
	No.	%	(95% CI)	%	(95% CI)
Sex					
Male	6,240	42.5*	(40.4–44.5)	14.3	(12.8–15.9)
Female	5,903	45.1	(43.0–47.2)	14.2	(12.7–15.8)
Age group (years)					
0–10	6,128	38.7*	(36.7–40.7)	15.9*	(14.4–17.6)

0–2	1,599	7.6	(6.0–9.7)	1.7	(1.1–2.5)
3–5	1,768	43.7	(40.2–47.1)	17.5	(15.0–20.3)
6–10	2,761	55.0	(52.3–57.6)	23.9	(21.5–26.6)
11–21	6,015	48.8*	(46.6–51.2)	12.5*	(11.1–14.1)
11–15	2,807	57.8	(54.8–60.8)	20.8	(18.4–23.4)
16–21	3,208	41.8	(39.1–44.7)	6.2	(5.0–7.7)
Race/Ethnicity[†]					
Hispanic	3,102	34.7*	(32.3–37.1)	9.8*	(8.1–11.7)
Black, non-Hispanic	2,690	33.6	(30.8–36.5)	9.8	(7.8–12.3)
White, non-Hispanic	3,968	50.0	(47.3–52.8)	16.7	(14.9–18.8)
Other	2,383	38.9	(35.9–42.4)	13.5	(11.3–16.1)
Family income-poverty ratio					
<100	3,837	32.6§	(29.8–35.4)	8.9§	(7.3–10.9)
100–199	3,150	33.9	(31.2–36.6)	10.7	(9.0–12.6)
200–499	3,888	48.7	(46.4–51.1)	16.3	(14.4–18.3)
≥500	1,268	57.2	(52.8–61.4)	20.0	(16.5–24.0)
Education, head of household					
Less than high school	2,159	31.7§	(28.3–35.2)	7.0§	(5.2–9.3)
High school or equivalent	5,363	38.2	(36.1–40.4)	12.2	(10.8–13.9)
Some college	993	48.1	(43.5–52.8)	15.0	(11.8–18.9)
College graduate	2,922	55.3	(52.1–58.4)	19.8	(17.1–22.8)
Health Insurance					
Any private	5,604	51.4*	(49.1–53.7)	17.4*	(15.6–19.4)
Medicaid/Children's Health Insurance Program	5,274	36.1	(33.4–38.9)	11.0	(9.5–12.8)
Other public	48	45.4	(25.3–67.1)	—¶	

Uninsured	1,217	18.6	(15.3–22.5)	3.9	(2.5–6.1)
Private dental insurance					
Yes	4,277	52.1*	(49.5–54.8)	18.4*	(16.1–20.9)
No	7,866	36.5	(34.8–39.0)	10.8	(9.5–12.4)
Disabilities					
Yes	237	42.8	(34.6–50.7)	12.1	(6.9–20.4)
No	11,906	43.8	(42.0–45.6)	14.3	(12.9–15.7)
Total	12,143	43.8	(42.0–45.6)	14.2	(12.9–15.6)

* Chi-square test of independence significant at $p < 0.05$.

† Persons of Hispanic ethnicity might be of any race or combination of races.

§ Chi-square test of linear trend significant at $p < 0.05$.

¶ Relative standard error $> 30\%$.

TABLE 2. Prevalence of dental sealants among children and adolescents aged 5–19 years — Medical Expenditure Panel Survey, United States, 2009, and National Health and Nutrition Examination Survey, United States, 2005–2010

Characteristic	No.	%	(95% CI)
Sex			
Male	4,326	29.8*	(27.5–32.2)
Female	4,155	32.9	(30.3–35.5)
Age group (yrs)			
5–19	8,481	31.3*	(29.3–33.3)
5–10	3,451	24.3	(22.2–26.4)
11–19	5,030	35.8	(33.4–38.3)
11–15	2,825	39.4	(36.4–42.5)
16–19	2,205	31.1	(27.9–34.5)
Race/Ethnicity			

Mexican-American	2,470	26.7*	(24.1–29.5)
Black, non-Hispanic	2,284	21.0	(18.4–23.9)
White, non-Hispanic	2,527	34.4	(31.4–37.5)
Other	1200	33.3	(29.8–37.0)
Family income-poverty ratio			
<100	2,487	24.2†	(21.4–27.2)
100–199	2,165	25.8	(22.7–29.3)
200–499	2,464	35.0	(32.2–38.0)
≥500	815	38.5	(33.8–43.5)
Education of head of household			
Less than high school	2,208	24.2†	(21.0–27.7)
High school graduate or equivalent	1,781	26.7	(23.6–30.1)
Some college	2,503	29.8	(27.1–32.6)
College graduate	1,789	39.5	(36.6–42.4)
Health insurance			
Private or military	3,938	35.0*	(33.0–37.1)
Medicaid/ Children's Health Insurance Program	2,049	25.2	(21.7–29.1)
Not insured	2,364	21.8	(18.2–25.9)
Disability			
Yes	1,009	29.1	(26.2–32.1)
No	7,471	31.6	(29.5–33.7)
Total	8,481	31.3	(29.3–33.3)

* Chi-square test of independence significant at $p < 0.05$.

† Chi-square test of linear trend significant at $p < 0.05$.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of pages found at these sites. URL addresses listed in *MMWR* were current as of the date of publication.

All *MMWR* HTML versions of articles are electronic conversions from typeset documents. This conversion might result in character translation or format errors in the HTML version. Users are referred to the electronic PDF version (<http://www.cdc.gov/mmwr>) and/or the original *MMWR* paper copy for printable versions of official text, figures, and tables. An original paper copy of this issue can be obtained from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402-9371; telephone: (202) 512-1800. Contact GPO for current prices.

****Questions or messages regarding errors in formatting should be addressed to mmwrq@cdc.gov.**

Page last reviewed: September 12, 2014

Page last updated: September 12, 2014

Content source: [Centers for Disease Control and Prevention](#)

Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA
30329-4027, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - [Contact CDC-INFO](#)

