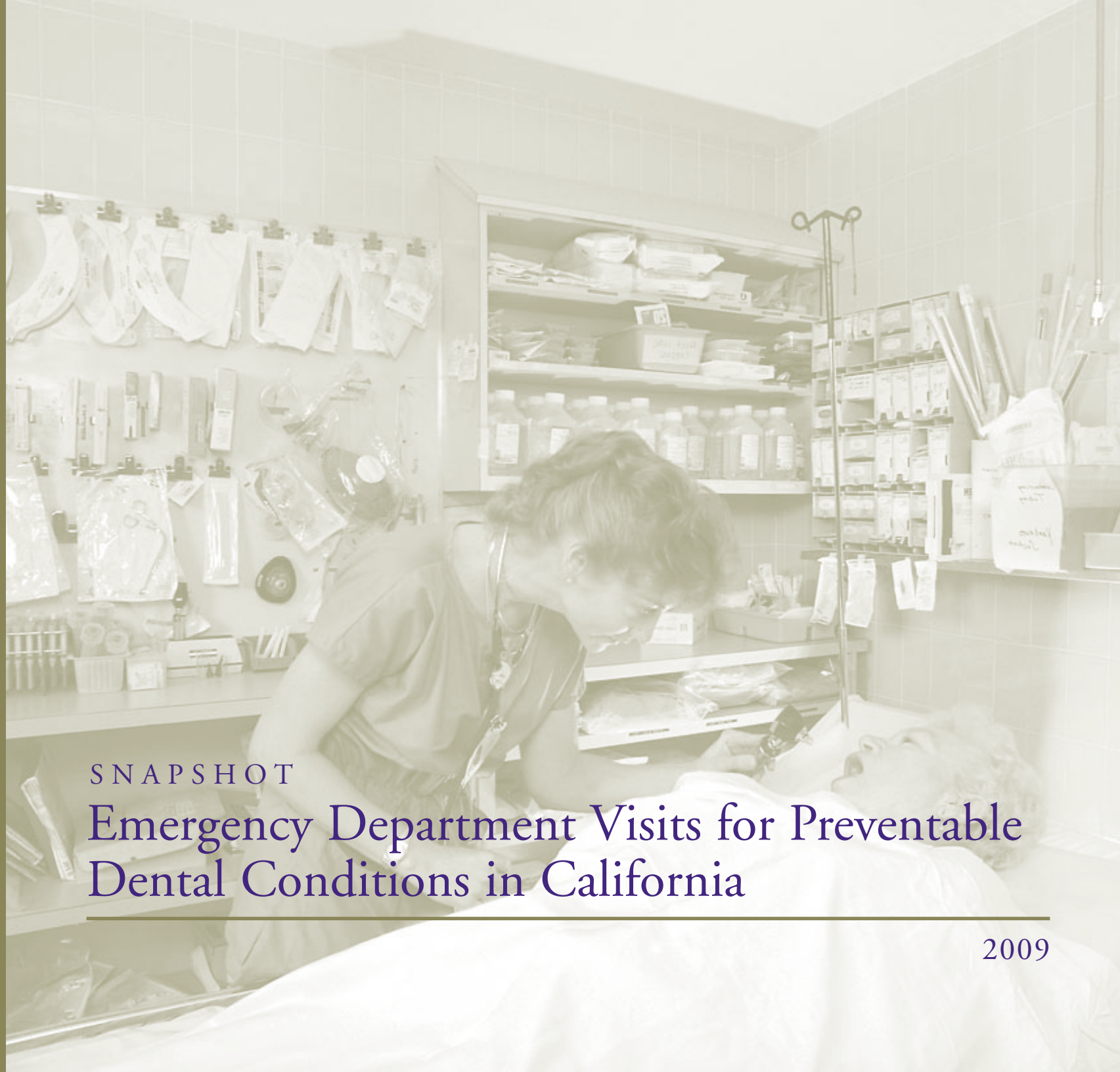


SNAPSHOT

Emergency Department Visits for Preventable Dental Conditions in California

2009

California HealthCare Foundation

Introduction

An estimated quarter of all adults and 28 percent of children in California have untreated dental caries (tooth decay). A growing number—over 83,000 in 2007—seek emergency care only to fall through the dental safety net each year. As the state scales back services to address the current fiscal crisis, these numbers likely will continue to rise. Disadvantaged individuals, affected to a greater extent by oral disease, will feel the impact more than other groups.

These underserved groups more often end up in emergency departments (and sometimes the hospital), only to receive cursory treatment for urgent care conditions—the dental equivalent of putting out fires instead of taking measures to prevent them. While this approach usually resolves the immediate medical problem, it overlooks the underlying reasons for the visit. So the cycle of neglect continues, possibly triggering or exacerbating other health conditions, often adding avoidable health care costs, and putting even more pressure on the already overburdened resources of emergency departments (EDs) and hospitals throughout the state.

This report estimates for the first time the extent to which Californians must rely on ED care for certain ambulatory care sensitive (ACS), largely preventable, dental conditions. It also identifies those who are at greatest risk for ending up in the ED to have their urgent dental issues resolved.

AMONG THE FINDINGS:

- People without private insurance are at least seven times more likely to visit the ED, controlling for other demographic characteristics.
- People living in rural areas are more likely to visit the ED.
- Statewide, the ED visit rate, without hospitalization, for ACS dental conditions runs higher than that for diabetes.
- People ages 18 to 34 are significantly more likely than other age groups under age 65 to visit the ED.
- Women are at a slightly higher risk than men to visit the ED.

The report ends with recommendations for developing a more comprehensive dental safety net, improving insurance coverage, raising reimbursement rates, and promoting good oral health practices.

CONTENTS

Prevalence

California

- Six percent of Californians, or about 1.8 million people, miss work or school each year due to dental problems.[1]
- Fifty-five percent of children ages six to eight years have untreated tooth decay, more than twice the national average for this age group.[2]

United States[3]

- Tooth decay remains the most common, though largely preventable, chronic disease of children ages 5 to 17 years—five times more common than asthma (59 versus 11 percent).
- Twenty-seven percent of those 35 to 44 years old and 30 percent of those 65 years and older have untreated tooth decay.

Sources:

1. *California Health Interview Survey,* 2003.
2. Oral Health Access Council (www.oralhealthaccess.org). Accessed September 18, 2008.
3. *Preventing Dental Caries.* U.S. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion, 2005 (www.cdc.gov/nccdphp/publications/factsheets/prevention/oh.htm).

Importance of Oral Health and Its Effect on General Health

Oral and general health are intertwined. Poor oral health makes it difficult to eat, speak, get a job—and for kids especially—to learn, due to pain, discomfort, or social stigma. Accordingly, oral health affects a person's self-esteem, psychological and social well-being, income level, interpersonal relations, and quality of life.

Although oral disease can be episodic and is generally not life threatening, if left untreated it can often become chronic. But the effects of oral disease run even deeper.

In 2000, the Surgeon General's first report and fact sheet on oral health documented how dental problems and infections wreak havoc elsewhere in the body, linking oral diseases with ear/sinus infections, weakened immune systems, heart and lung diseases, and other serious health conditions.

Specifically, bacteria from oral infections can enter the blood stream, travel to major organs, and start new infections. Research suggests this may:

- Contribute to the development of heart disease, the nation's leading cause of death.
- Increase the risk of stroke.
- Increase a woman's risk of having a preterm, low birth weight baby.
- Pose a serious threat to people whose health is already compromised by diabetes, respiratory diseases, HIV/AIDS, or osteoporosis.

While more research needs to be done to say definitively that people with oral disease are at higher risk for developing these conditions, oral disease is a bacterial infection, and all infections are serious and require proper treatment.

Providers

- The majority of dental care is provided by small teams of professionals (dentists, dental hygienists, and dental assistants) in private practices and clinics. Although most dental treatment focuses on preventing or managing tooth decay and gum disease, observant providers can identify oral cancer and auto-immune or systemic diseases during exams.
- California's dental safety net serves as the other primary source of care. The two largest providers are community health centers and public health clinics. Other providers include dental hygiene and dental schools and other settings, such as mobile van programs for persons who would otherwise have little or no access to dental services.
- Emergency departments and hospitals sometimes become the provider of last resort.

Source: *Improving Oral Health Care Systems in California.* Report of the California Dental Access Project at the Center for the Health Professions, University of California, San Francisco, funded by the California HealthCare Foundation, December 2000.

Financing

Two-tiered system for dental care:

- Individuals with private insurance or those who can afford to pay for services out-of-pocket usually choose private practice to get dental care.
- Individuals without private insurance and who cannot afford to pay out-of-pocket receive dental care via safety-net providers (largely community health centers or clinics sponsored by local health departments).

Nationally, dental care is financed primarily through insurance, both private and public, as well as out-of-pocket payments. Since dental care is an ongoing need, with significant risk of minimal harm (i.e., a cavity) and minimal risk of significant harm (i.e., death), the insurance model used in medical care is not quite applicable. Consequently, most dental insurance plans require large individual contributions, often as much as 50 percent. Dental care fees are usually charged by procedure and are performed on a fee-for-service basis.

Source: *Improving Oral Health Care Systems in California.* Report of the California Dental Access Project at the Center for the Health Professions, University of California, San Francisco, funded by the California HealthCare Foundation, December 2000.

Factors That Affect Oral Health

Many factors, in addition to genetics, influence oral health and access to dental care. Dental insurance alone does not guarantee good oral health. Other factors include:

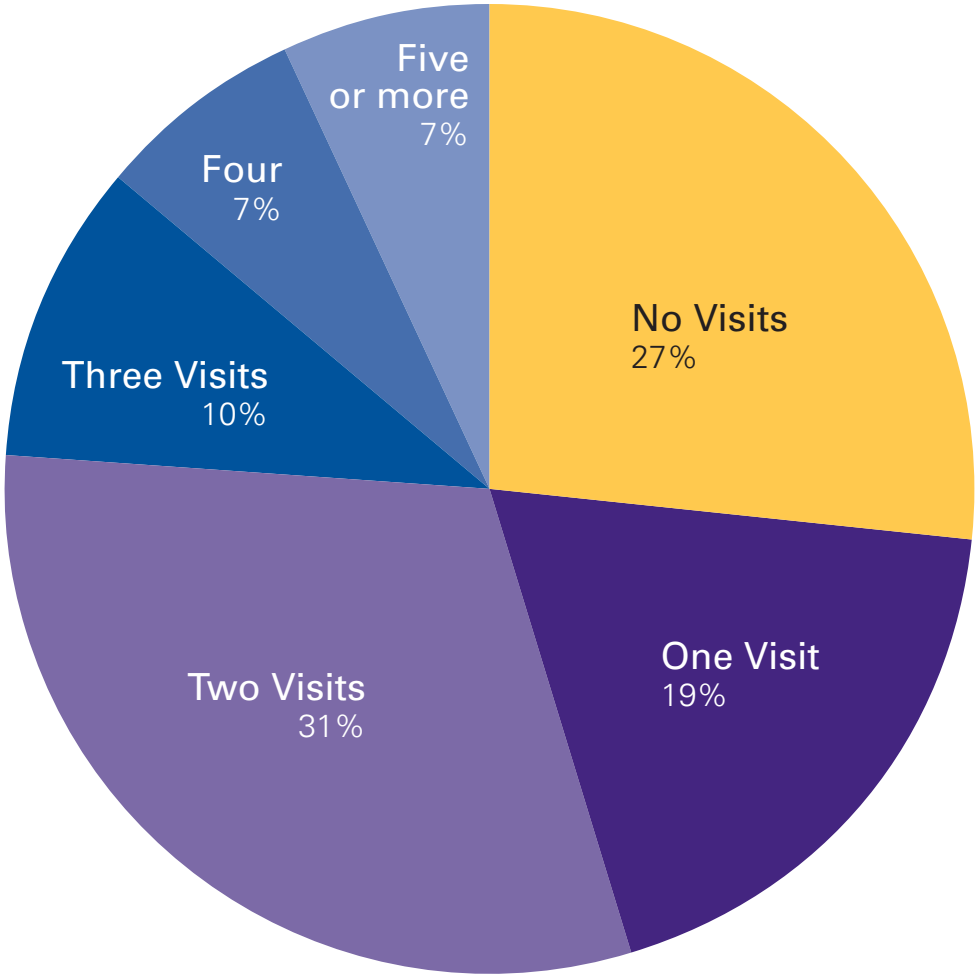
- Access to public or private dental care providers
- Resources for copayments
- Access to fluoridated water
- Nutrition
- Personal oral hygiene practices
- Tobacco use

Cost and Knowledge Barriers

- Nearly two-thirds of those who could not afford needed dental care and didn't get it were uninsured. However, publicly (14 percent) and privately (22 percent) insured respondents also reported the same difficulty.
- Nearly 60 percent of those who failed to get the dental care they needed last year said that they couldn't afford it. An additional 17 percent cited lack of dental insurance as the reason.
- Since 2001, several surveys have shown that more than half of all individuals covered by Medi-Cal may not know they have full dental benefits through Denti-Cal.

Source: *Drilling Down: Access, Affordability, and Consumer Perceptions in Adult Dental Health,* report for the California HealthCare Foundation, November 2008.

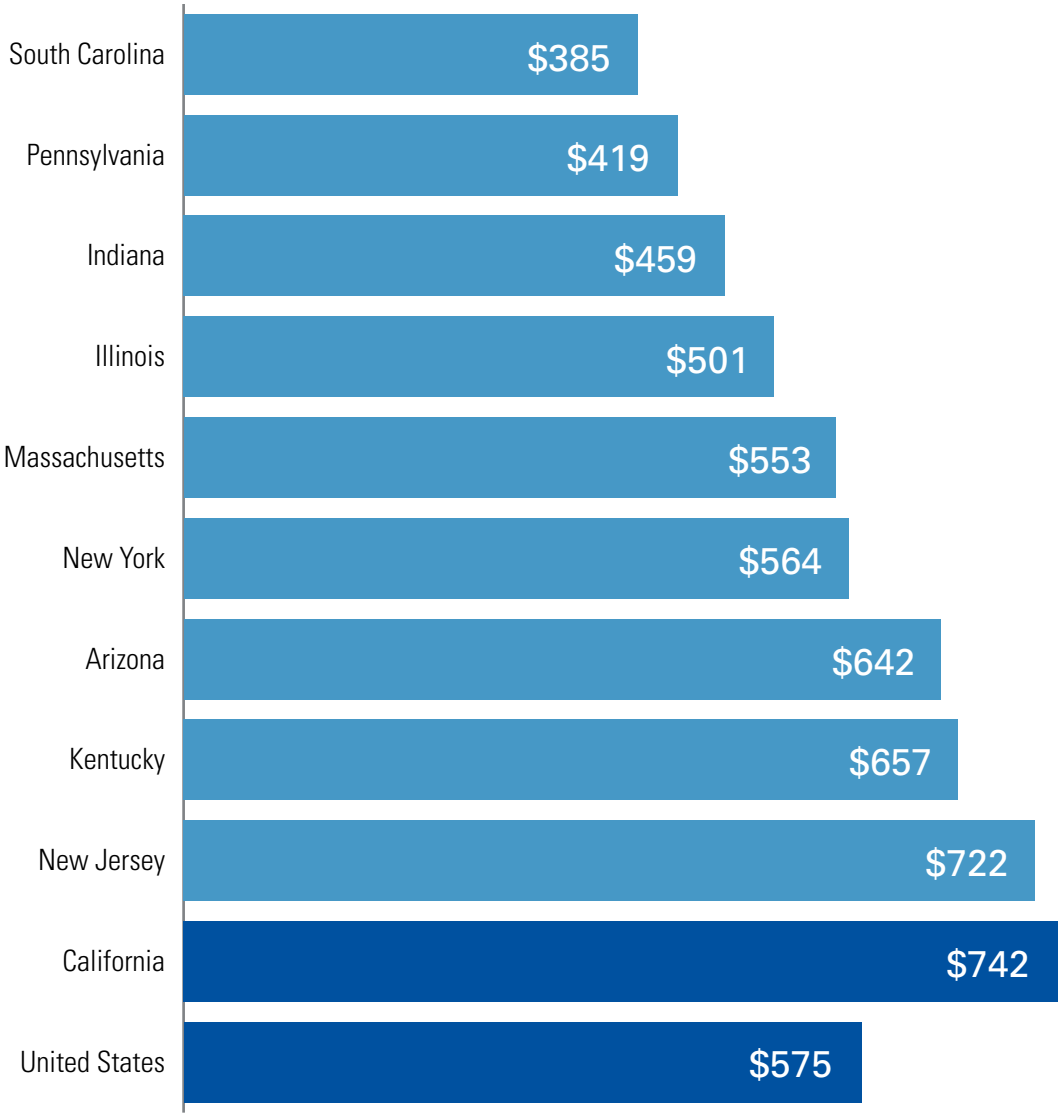
Dental Care, by Number of Visits in Past Year, California, 2007



Source: *Drilling Down: Access, Affordability, and Consumer Perceptions in Adult Dental Health,* report for the California HealthCare Foundation, November 2008.

Although twice-yearly visits are considered the standard for preventive care, nearly half of all Californians are failing to see a dentist on a regular basis.

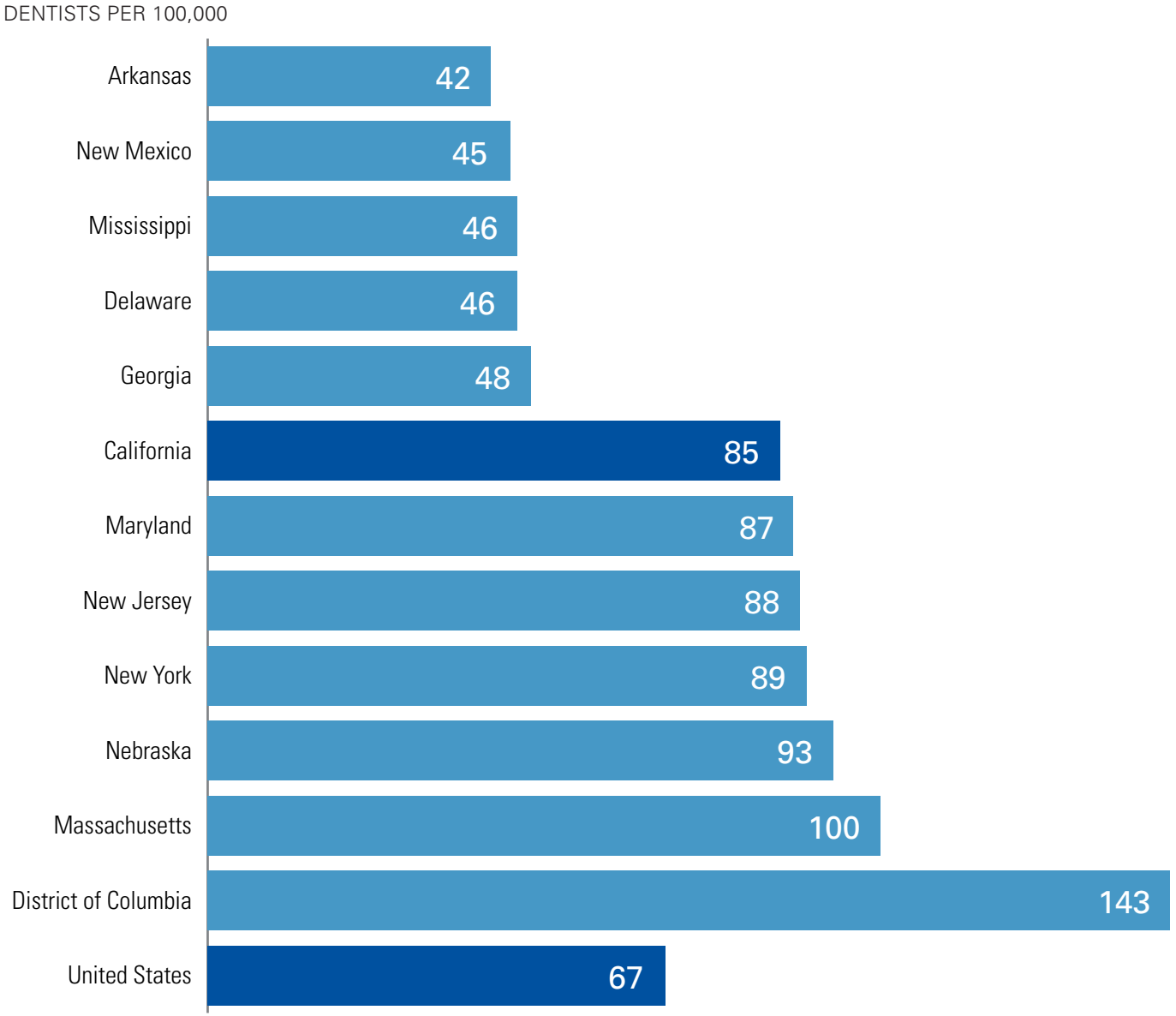
Out-of-Pocket Dental Expenses, U.S. and Select States, 2004



Sources: Medical Expenditure Panel Survey (MEPS) Data. Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services, 2004 (www.meps.ahrq.gov/mepsweb/data_stats/summ_tables/hc/state_expend/2004/table2.htm). MEPS Chartbook #17, Dental Use, Expenses, Dental Coverage, and Changes, 1996 and 2004 (www.meps.ahrq.gov/mepsweb/data_files/publications/cb17/cb17.pdf).

Californians paid more out of pocket ($742 per person for those incurring expenses) for dental care than individuals from any other state in the survey, about $150 more than the national average.

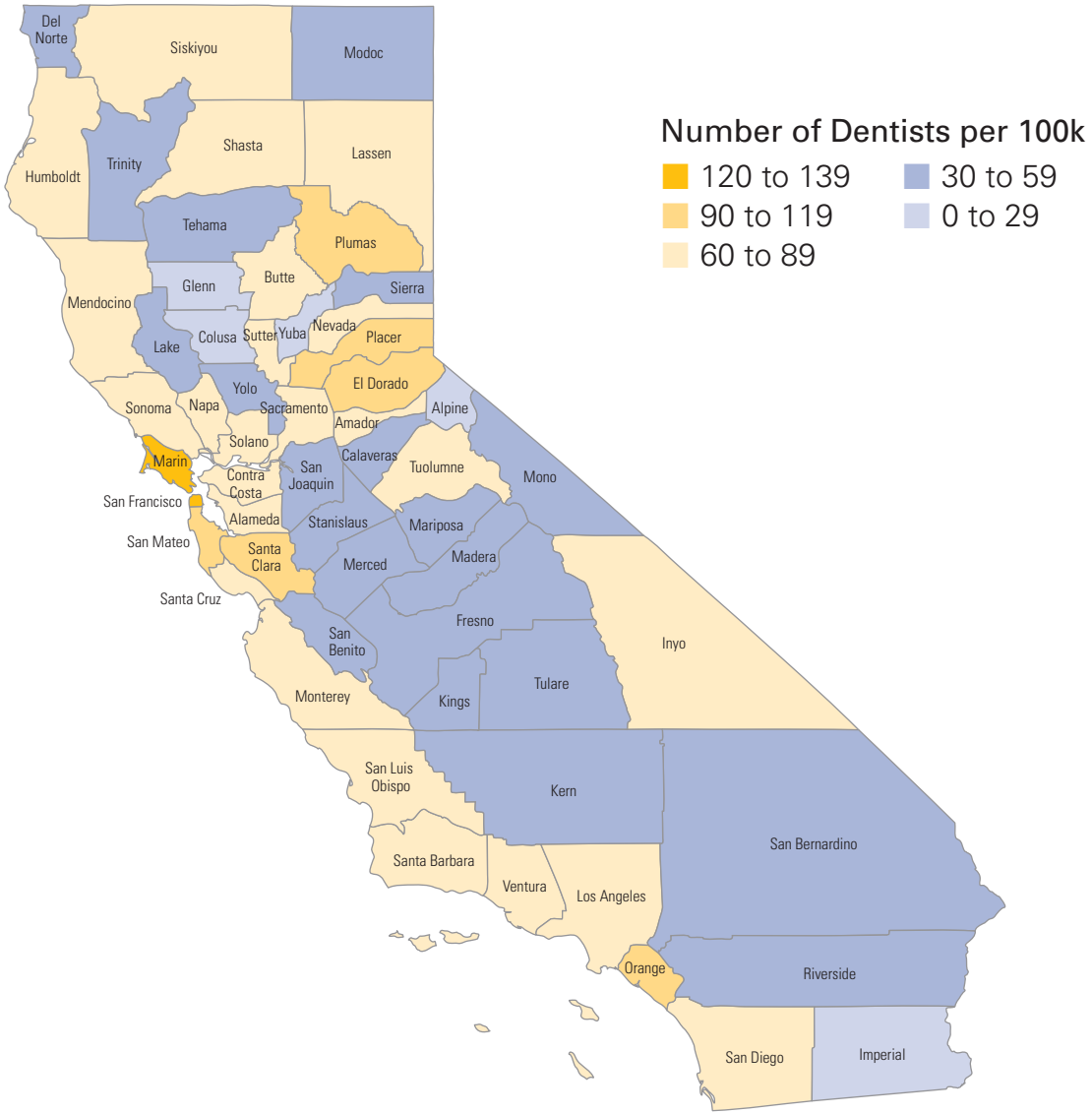
Supply of Dentists, U.S. and Select States, 2008



Sources: American Dental Association, special data request, 2008. *Kaiser State Health Facts,* population data, 2007.

California ranks 7th in the nation for number of dentists per 100,000 population. In contrast, the five states with the lowest dentist supply rates have roughly half as many. While California has more dentists per capita than the national average, only 40 percent accept Medi-Cal patients (not shown).

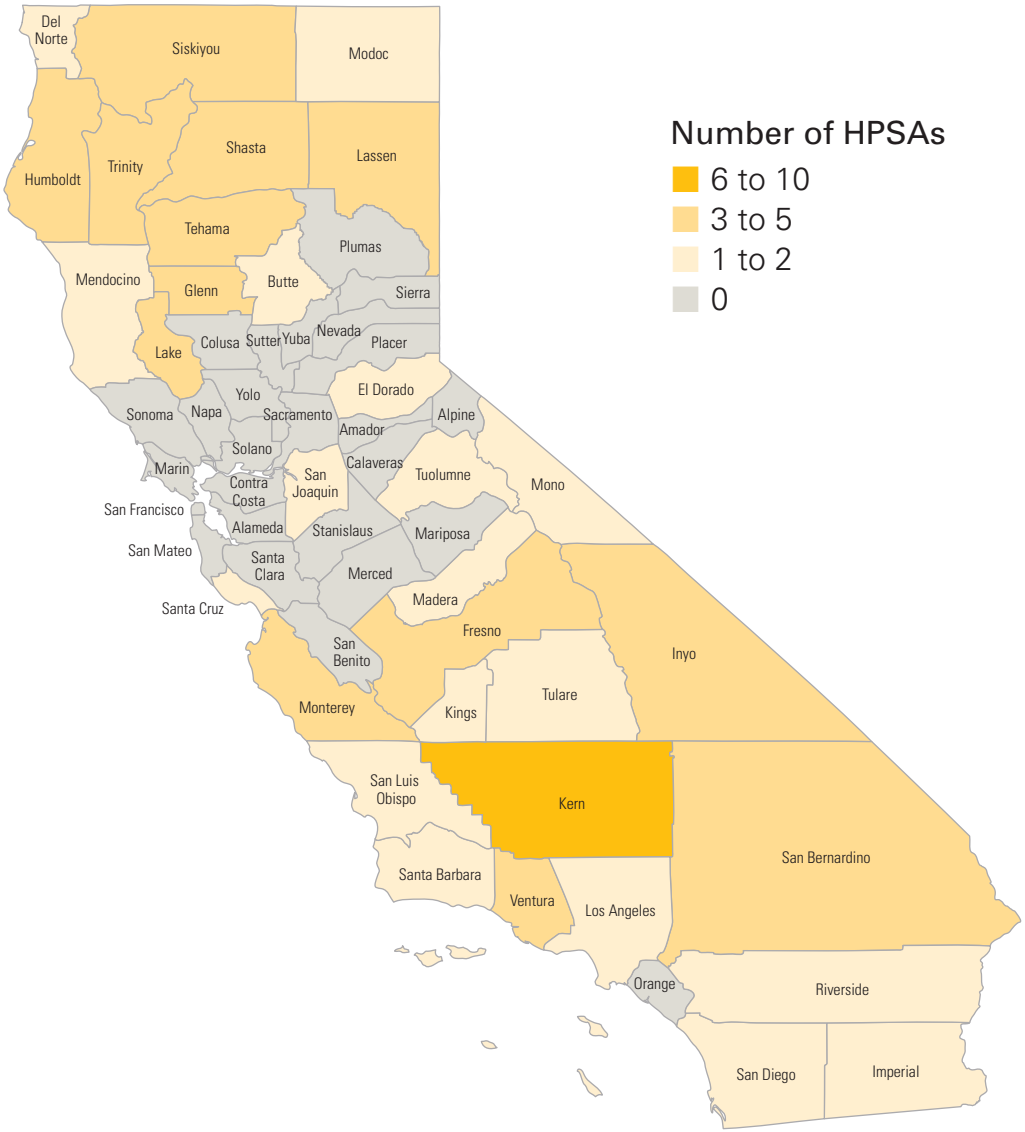
Distribution of Dentists, by County, California, 2005



Sources: Kaiser State Health Facts, population data, 2007. Pourat, N., et al. "Is There a Shortage of Dental Hygienists and Assistants in California?: Findings from the 2003 California Dental Survey" (December 1, 2005). UCLA Center for Health Policy Research. (http://repositories.cdlib.org/ucla_healthpolicy/49). California Dental Board License File, 2005, Active Practitioners, per Beth Mertz' and author's analysis.

Although California suffers no shortage of dentists statewide, supply varies considerably by county. Counties with fewer dentists tend to be rural and/or low-income areas. The supply rate ranges from zero in Alpine to 139 per 100,000 in San Francisco. Counties such as Alpine, Yuba, Colusa, Glenn, and Imperial with 0 to 29 dentists per 100,000, fall well below the national and state average.

Dental Health Professional Shortage Areas (HPSAs), 2008



Notes: The U.S. Department of Health Services designates dental HPSAs based on the following factors: 1) population to dentist ratio; 2) 100 percent poverty rate; 3) no fluoridation; 4) average travel time or distance to the nearest source of non-designated accessible care. State agencies must apply to obtain HPSA status for a particular geographic area, population group, or facility. The max HPSA score possible is 26. On the date when the database was accessed, California's median score was 10, the minimum was 4, and the maximum was 21 for an individual HPSA in a rural area of Kern County. The federal HPSA database is updated weekly. Since August 2008, the number of HPSAs in Kern County and across California has increased, and the maximum score is now 24.

Source: U.S. Department of Health and Human Services, Bureau of Health Professions, Health Resources and Services Administration (http://bhpr.hrsa.gov/shortage). Accessed August 7, 2008.

In California, 80 designated dental HPSAs fall within 32 counties. The vast majority of HPSAs are in rural or very rural (also known as "frontier") areas. Residents within an HPSA may find it challenging to get dental health care. Kern County, identified as having the largest dental personnel shortage in the state, has 10 designated dental HPSAs.

Dental Safety-Net Clinics

- California's dental safety net is not an organized system but a loose association of clinics with limited structure for exchanging medical, operational, or other information.
- Community health center dental clinics usually provide very basic dental services, e.g., x-rays and cleanings.
- Dental clinics reported an average 28-day waiting time for new patient exams.
- No shows or cancellations accounted for almost 20 percent of unused chair time.
- In 2005, 60 percent of dental clinics planned to expand dental services in the next 1 to 3 years.
- Many clinics reported personnel shortages (from hygienists to specialists).

Source: Glassman, P. and Subar, P., *The California Community Clinics Oral Health Capacity Study,* report to the California Endowment, December 31, 2005. University of the Pacific, San Francisco, CA. (Based on a survey of 706 community clinics, 212 having actual dental facilities and dentists, http://dental.pacific.edu/documents/community/pipeline/acrobat/pacific_communitycapacitysurveycaendowmentreport123105.pdf.)

Ambulatory Care-Sensitive (ACS) Dental Conditions

The five ACS dental conditions, otherwise known as preventable dental conditions,* studied in this report include cases where:

- Tooth decay or periodontal disease has become so severe that patients must seek immediate care.
- Good outpatient care could potentially prevent the need for hospitalization, or for which early intervention could prevent complications or more severe disease.[1]

Issues with treating ACS dental conditions in an ED:

- Visiting an ED or hospital for ACS dental conditions often points to poor prevention and inadequate access to outpatient services.[2]
- Providing dental care in EDs, which are not prepared to offer definitive treatment for dental conditions, is often an inefficient use of provider resources.[3]
- Costs rise precipitously when patients receive dental care in ED or hospital settings.[3]

*See Appendix A for a complete description of the five ACS dental conditions and scenarios that might lead someone to visit an ED.

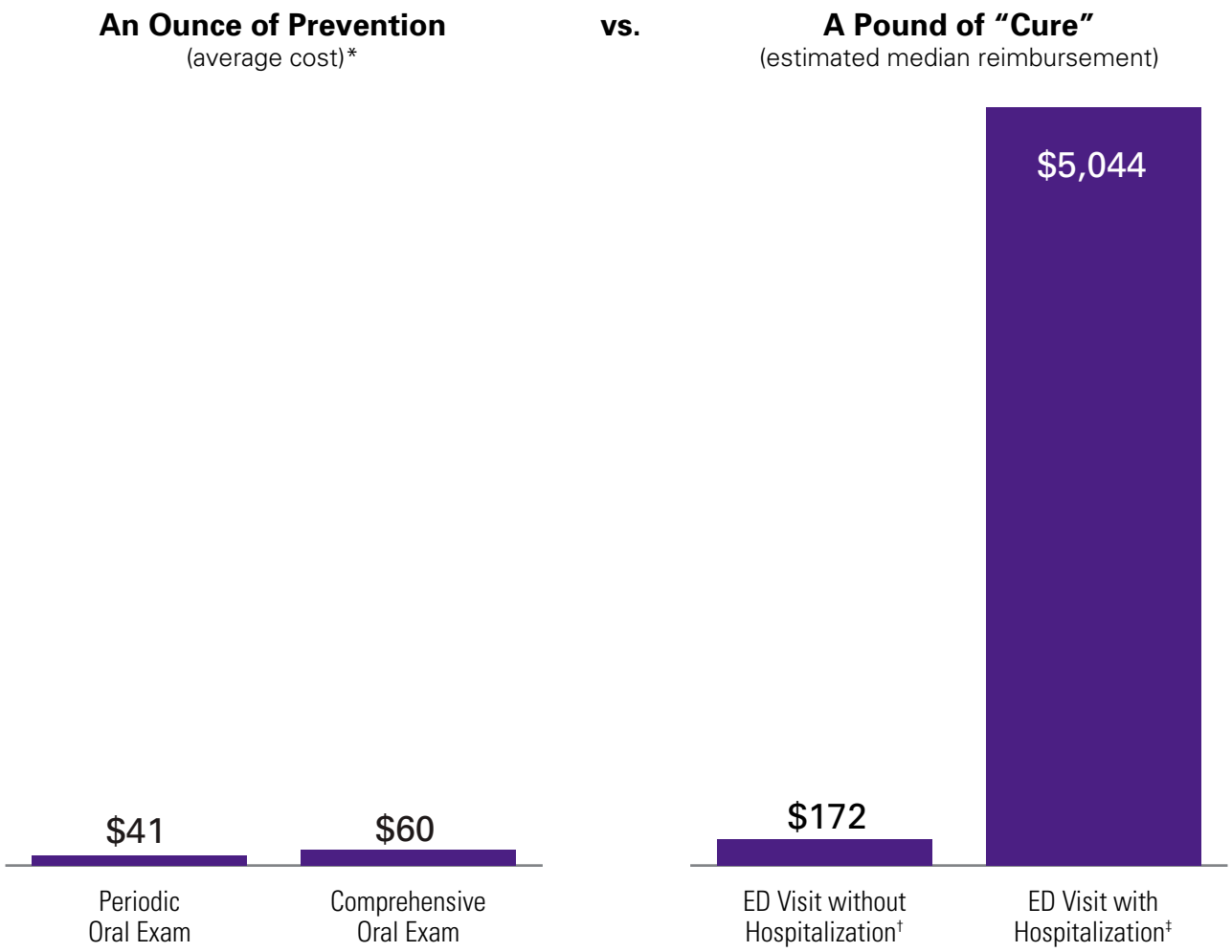
Sources:

1. *Prevention Quality Indicators Overview,* AHRQ Quality Indicators, July 2004. Agency for Healthcare Research and Quality, Rockville, MD (www.qualityindicators.ahrq.gov/pqi_overview.htm).

2. Bindman, A. B., Grumbach, K., Osmond, D., et al. "Preventable Hospitalizations and Access to Health Care." *JAMA* 1995;274(4): 305–311.

3. Cohen, L.A., Manski R.J., Magder, L.S., et al. "Dental visits to hospital emergency departments by adults receiving Medicaid: Assessing their use." *JADA* 2002;133(6): 715–724.

The Cost of Dental Neglect—ED Visits



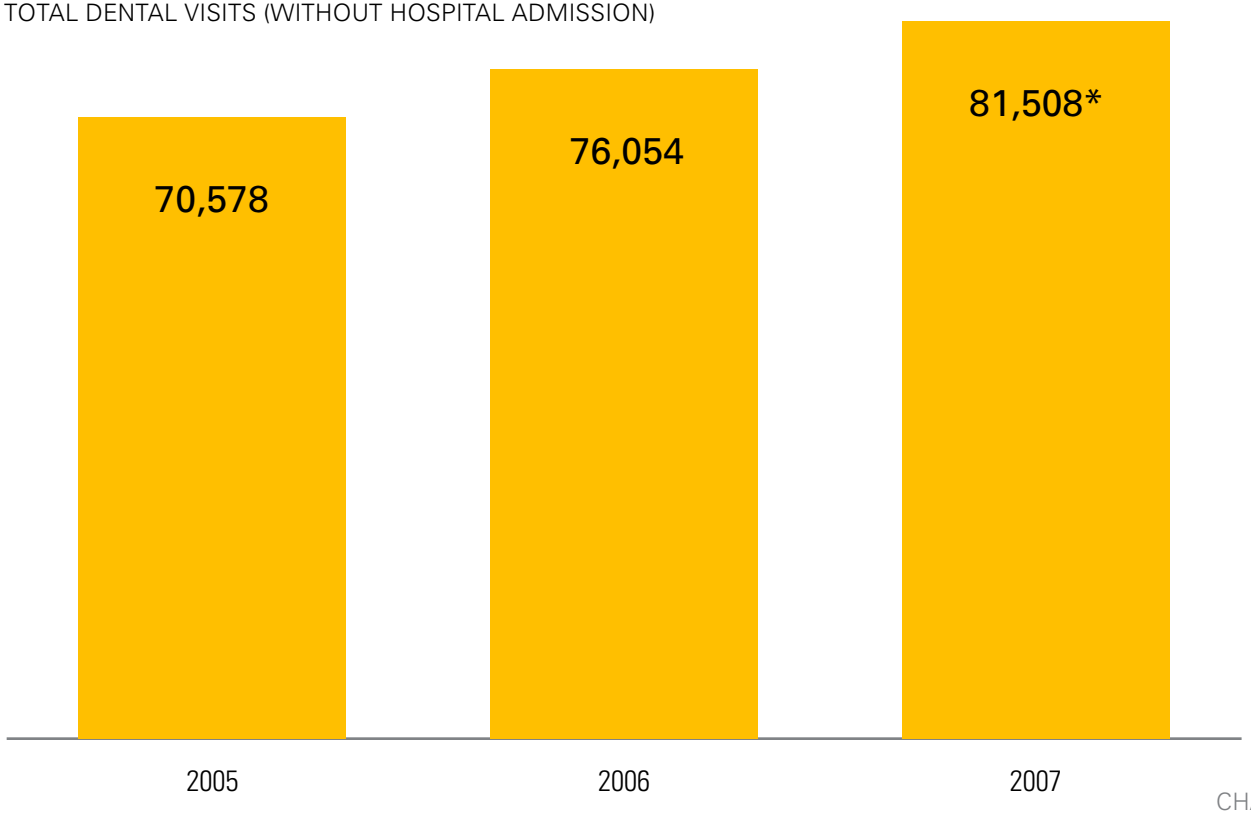
Notes: The median ED charge is based on an analysis of Medi-Cal claims data, however, there is a high standard deviation in Medi-Cal ED charges indicating large variation in the charges for an ED visit. Charges for ED visits are not available from OSHPD ED data. Charges for inpatient hospital stays were based on OSHPD patient discharge data. Reimbursement was estimated by adjusting ED charges by the 2007 cost-to-charge ratio for all general acute care hospitals. Median Medi-Cal payments run about 18 percent of charges. Exam fees shown are for the Pacific Region 50th percentile.

Sources:
*American Dental Association, Survey of General Practice Fees, 2005.
†Analysis of Medi-Cal MIS/DSS data provided by Medi-Cal Dental Service Branch, Department of Health Care Services, 2007.
‡Analysis of California OSHPD patient discharge data, 2007.

Good dental care begins with a periodic or comprehensive oral exam that averages $41 and $60 (Medi-Cal fees run $15 and $25), respectively. Poor preventive dental care can lead to costly stopgap emergency treatment ($172 median) that typically provides only temporary pain relief through medication and, in some acute cases, surgical care or hospitalization ($5,044 median).

ED Visits for Preventable Dental Conditions and Rate per 100,000, by ACS Condition, California, 2005–2007

TOTAL DENTAL VISITS (WITHOUT HOSPITAL ADMISSION)



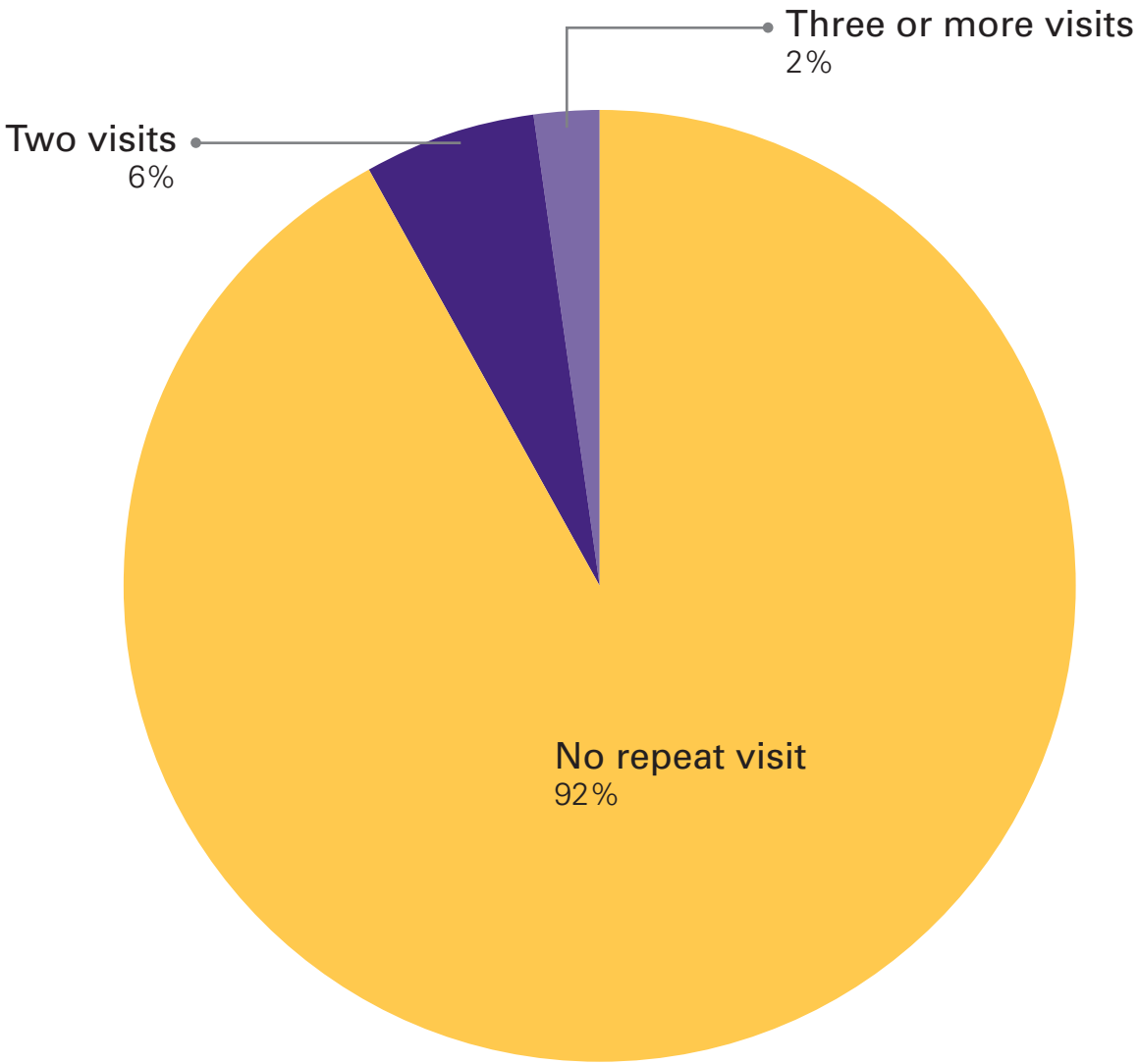
RATE PER 100,000 (WITHOUT HOSPITAL ADMISSION)	2005	2006	2007	CHANGE (05–07)
Dental	191	203	215	▲ 12%
Diabetes	139	143	148	▲ 6%
Asthma	392	372	365	▼ 7%

*ED visits for preventable dental conditions, including those resulting in hospital admissions, totalled 83,610 in 2007.

Sources: Cohen, L.A., Manski R.J., Magder, L.S., et al. "Dental Visits to Hospital Emergency Departments by Adults Receiving Medicaid: Assessing Their Use." *JADA* 2002;133(6): 715–724. State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001–2008, with 2000 Benchmark. Sacramento, California. California OSHPD emergency department data, 2005–2007.

The number of ED visits for preventable dental conditions is growing at a faster rate than California's population. ED visits for preventable dental conditions (without hospital admission) were higher than those for diabetes.

Repeat ED Visits within One Year for Preventable Dental Conditions, California, 2005–2007

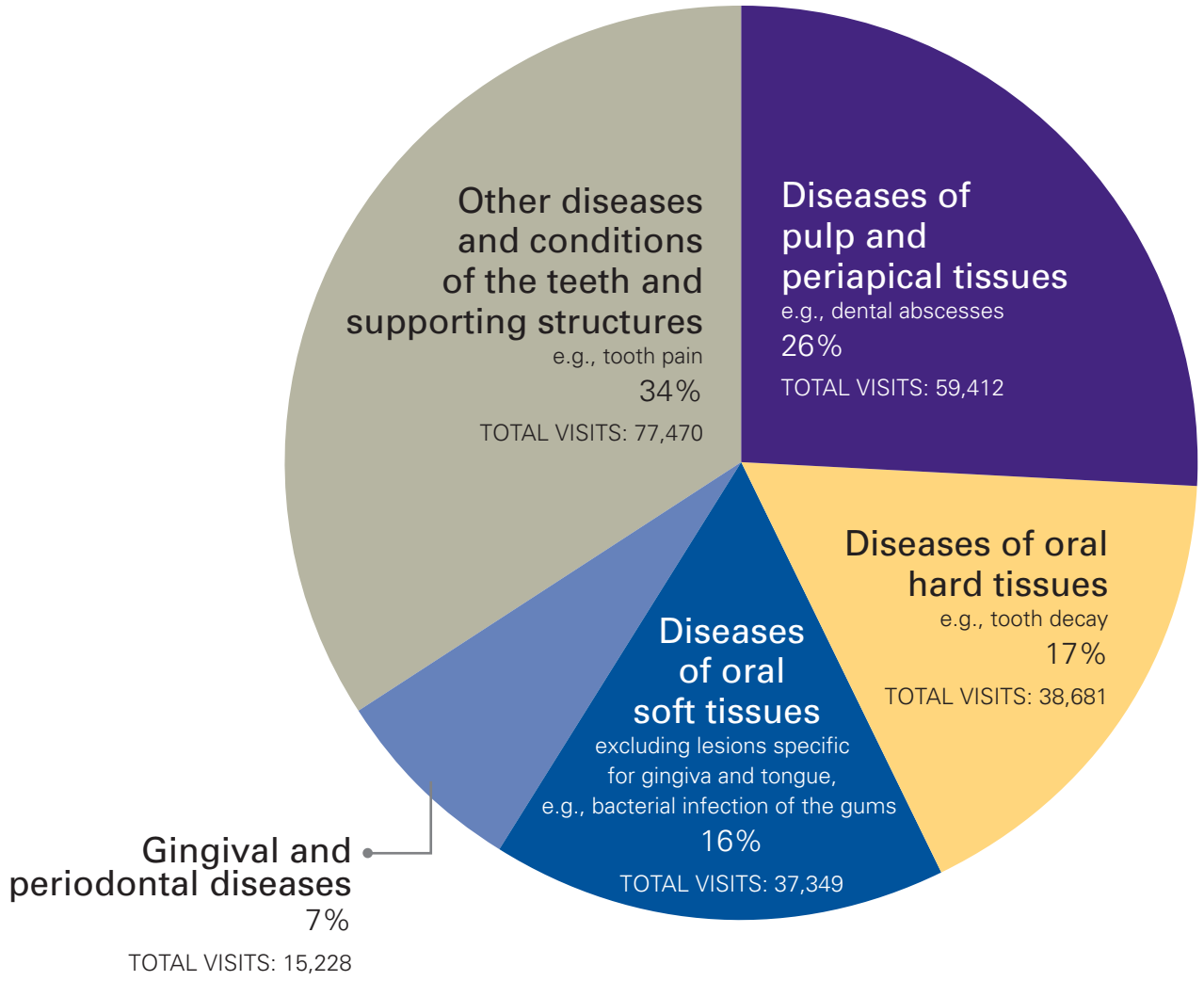


Note: Proportion remained the same across all three years studied.

Source: California OSHPD emergency department data, 2005–2007.

Only a very small proportion, about 8 percent, visit the emergency department more than once yearly for a preventable dental condition.

ED Visits, by Preventable Dental Condition, California, 2005–2007

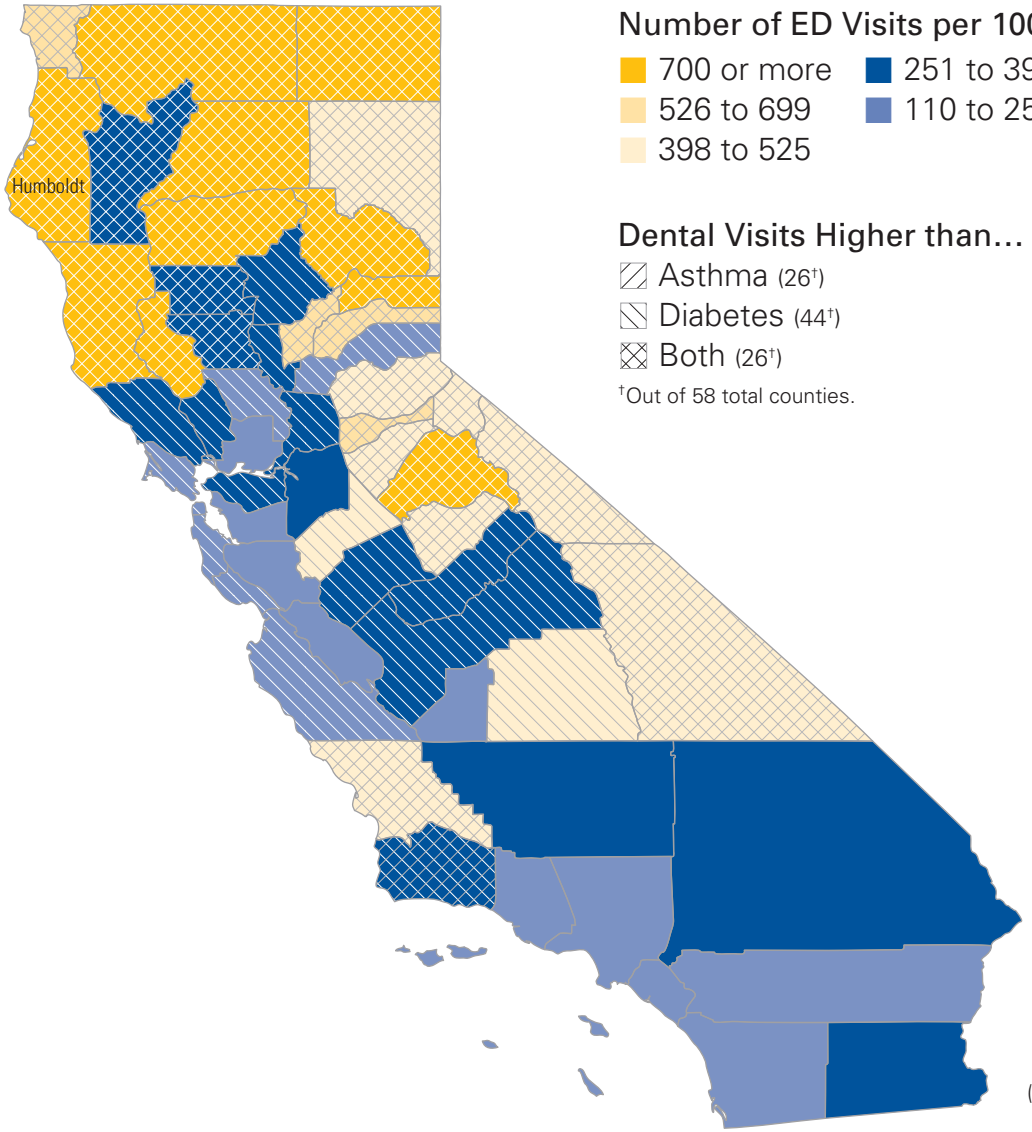


Note: Data combined for three-year period. Please see Appendix A for a more complete description of the five preventable dental conditions studied for this report.

Sources: www.icd9data.com. California OSHPD emergency department data, 2005–2007.

Diseases of the pulp and periapical tissues (often inflammatory in nature or due to infections such as abscesses) made up about a quarter of the visits to emergency departments. Tooth decay and other less specific conditions such as tooth pain accounted for another 17 and 34 percent, respectively.

ED Visits* for Preventable Dental Conditions, by County, 2007



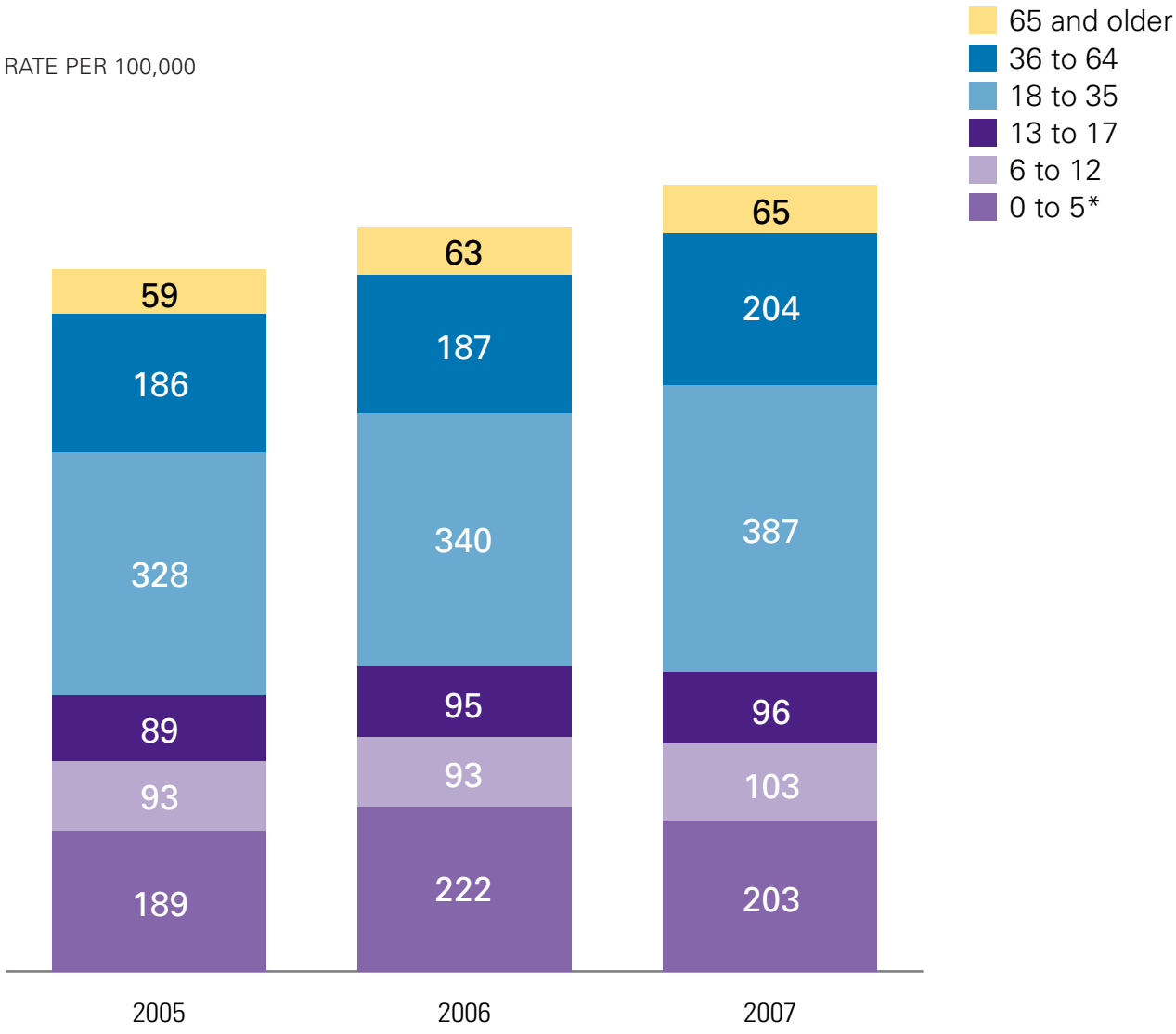
*Without subsequent hospitalization.

Source: California OSHPD emergency department data, 2005–2007.

Notes: Data for 10 of California's 58 counties are consolidated into three regions: CE (Alpine, Inyo, Mariposa, and Mono), NE (Modoc, Plumas, and Sierra), NW (Colusa, Glenn, and Trinity); however, each county is included individually in the total. See supplemental county publication for more information about asthma and diabetes comparison rates by county (www.chcf.org/topics/view.cfm?itemID=133902).

Humboldt County topped the list for emergency department visits resulting from preventable dental conditions at 960 per 100,000. Overall, rural counties in northern California reported the highest ED visits per 100,000 relative to the rest of the state. Counties with major metropolitan areas reported the lowest rates. In 26 counties, rates ran higher than those for both asthma and diabetes.

ED Visits for Preventable Dental Conditions, by Age Group, California, 2005–2007

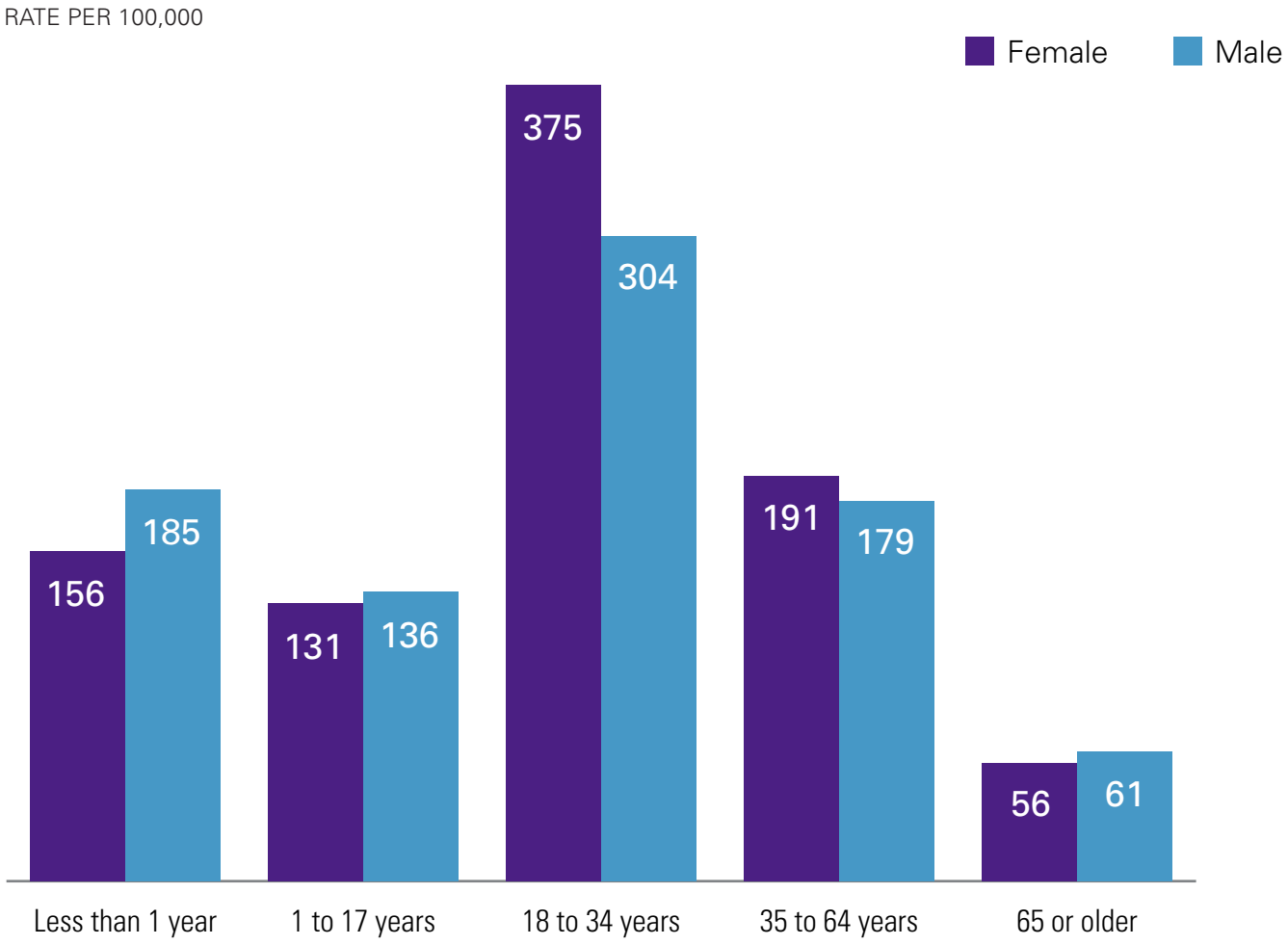


*Data for children's categories segmented into age groups by special request.

Source: California OSHPD emergency department data, 2005–2007.

Adults under age 65 account for about 80 percent of all ED visits for preventable dental conditions. Rates are highest for adults ages 18 to 35. This age group also experienced the largest rate increase (18 percent) over the three-year period shown. Most children who end up in the ED for preventable dental conditions are ages five and under.

ED Visit Rates for Preventable Dental Conditions, by Age and Gender, California, 2005–2007

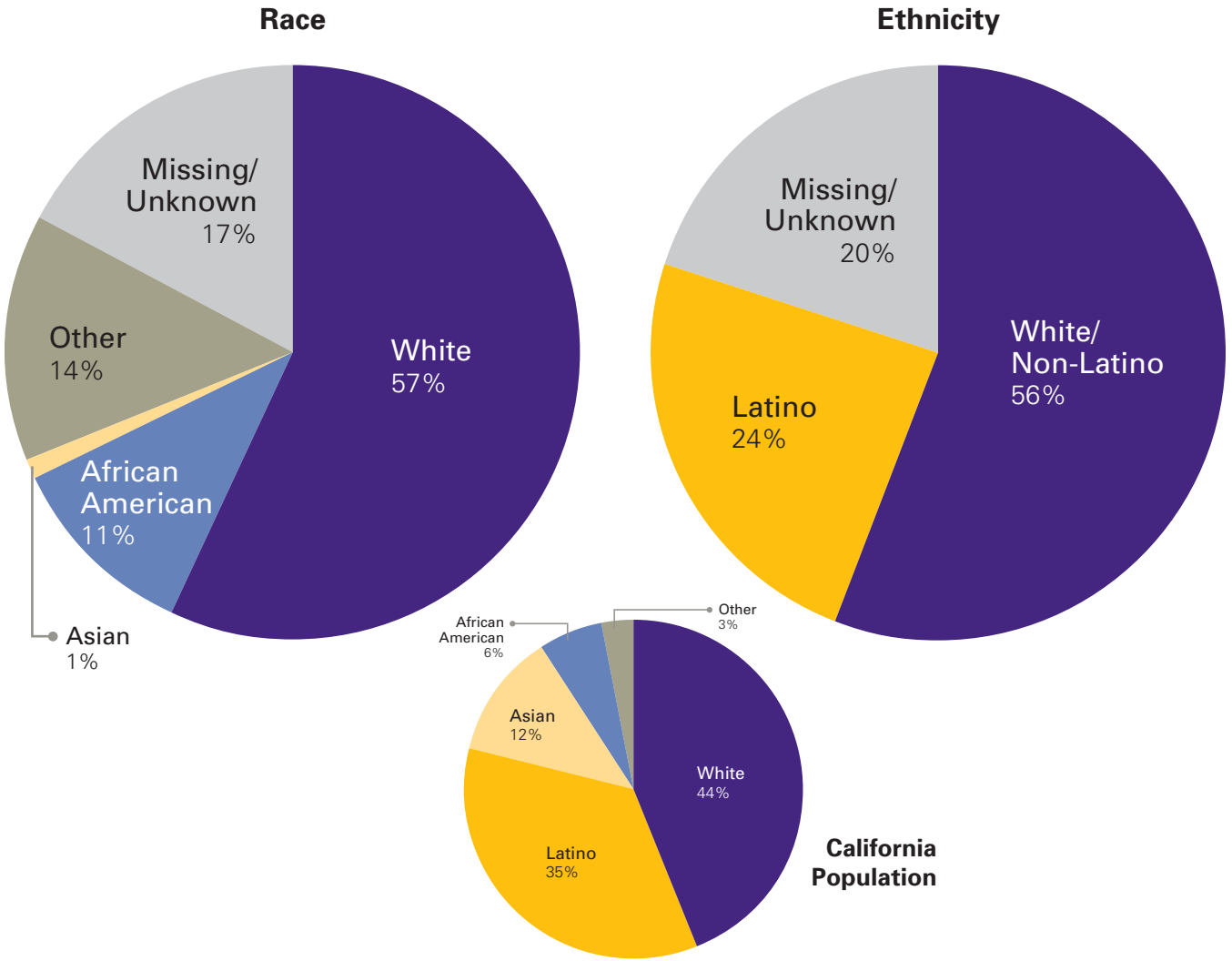


Notes: Data combined for three-year period. See Additional Resources on page 31 for citations on the effects of gender on oral health.

Sources: California OSHPD emergency department data, 2005–2007. California Department of Finance, State of California, Race/Ethnic Population with Age and Sex Detail, 2000–2050. Sacramento, CA. July 2007.

Women ages 18 to 34, followed by 35 to 64, visit the ED for preventable dental conditions most often. Although women tend to take better care of their oral health than men, other factors tend to work against these efforts. Hormonal fluctuations, current use of oral contraceptives, and being overweight (as it coincides with oral bacteria and bone loss) are all associated with poor oral health in women.

ED Visit Rates for Preventable Dental Conditions, by Race and Ethnicity, California, 2005–2007

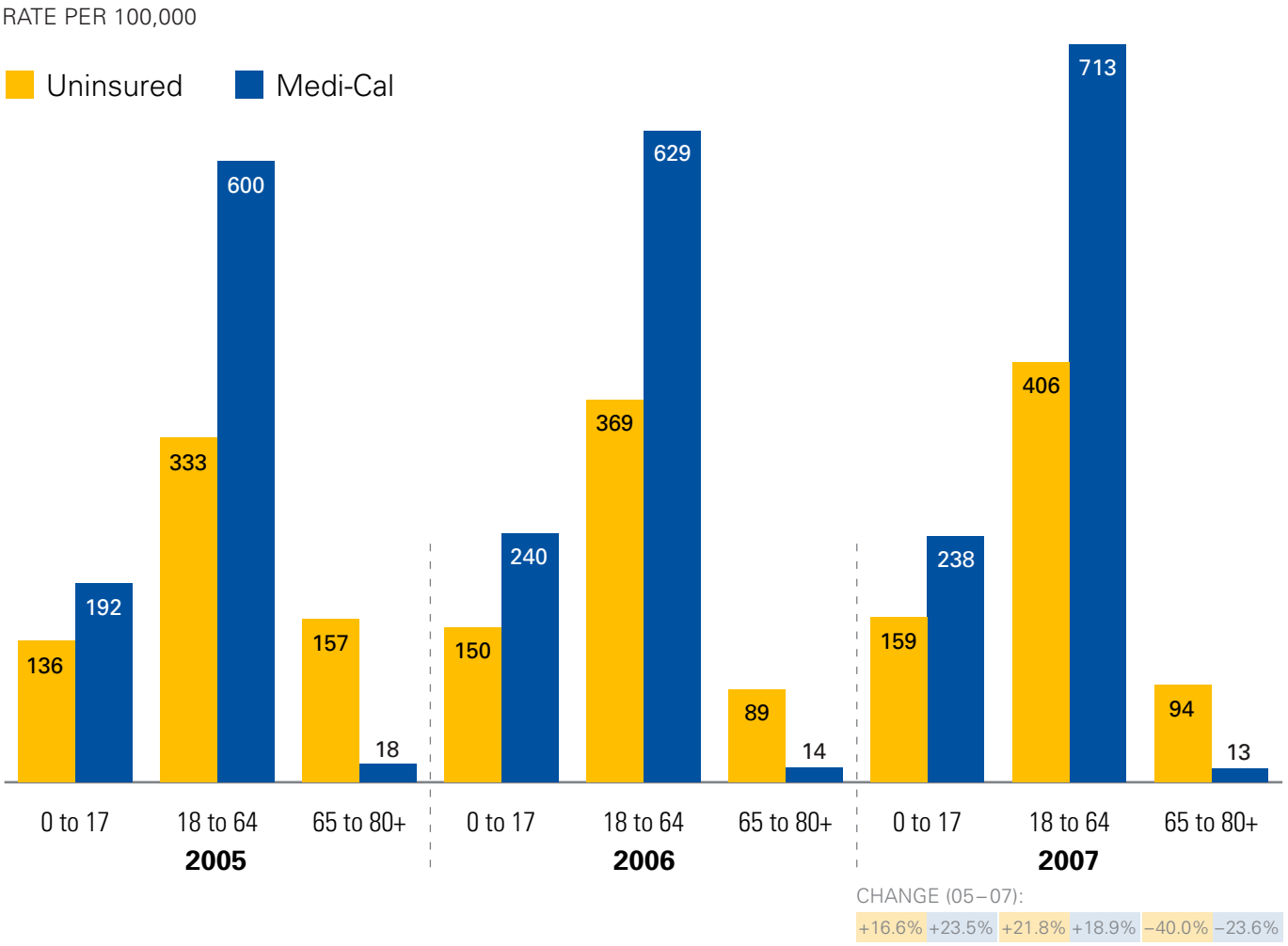


Notes: Data combined for three-year period. Race and ethnicity are self-reported by the patient. Latino representation is consistent with CHIS. "Other" includes American Indian and multiracial individuals. "Asian" includes Pacific Islanders.

Sources: California Office of Statewide Health Planning and Development (OSHPD) emergency department data, 2005–2007. California Department of Finance, State of California, Race/Ethnic Population with Age and Sex Detail, 2000–2050. Sacramento, CA. July 2007.

Asian Americans, 12 percent of California's population, account for less than two percent of ED visits for preventable dental conditions. In contrast, African Americans, 6 percent of the population, account for about 11 percent of visits. Whites, 44 percent of the population, account for 56 percent. Latinos represent about a third of the state's population but account for only a quarter of the ED visits.

ED Visits, Uninsured vs. Medi-Cal, by Age Group, California, 2005–2007



Notes: Some uninsured may qualify for and enroll in Medi-Cal when they enter the ED. U.S. Census data was not completely compatible with OSHPD payer categories, allowing direct comparison of only uninsured and Medi-Cal payer groups, the two groups with the highest ED use. Data for the 0 to 5 age group could not be separated from the entire 0 to 17 age group.

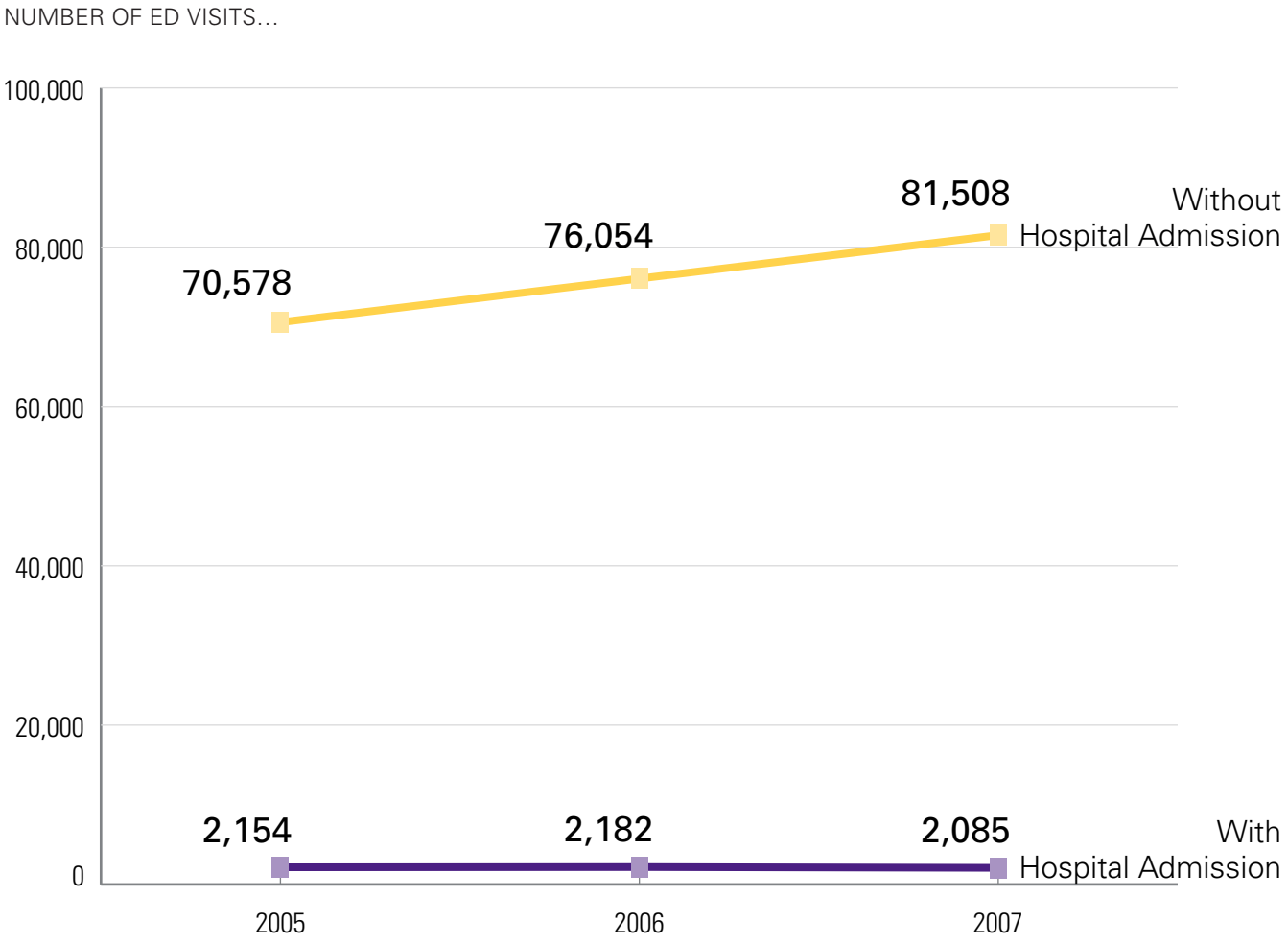
Sources: California OSHPD emergency department data, 2005–2007. California Department of Finance State of California, Race/Ethnic Population with Age and Sex Detail, 2000–2050. Sacramento, CA, July 2007. U.S. Census Bureau, Current Population Survey's Annual Social and Economic Supplement, 2005–2008.

ED Visits for Dental Care
ED Use

<< PREVIOUS NEXT >>

In 2007, the ED visit rate for preventable dental conditions for Medi-Cal recipients under the age of 65 was three times the rate for all Californians. They were also much more likely to visit the ED than those without dental insurance. All groups experienced substantial rate increases, with the exception of those ages 65 and older, where rates fell by large margins.

ED Visits with and without Hospital Admissions for Preventable Dental Conditions, California, 2005–2007

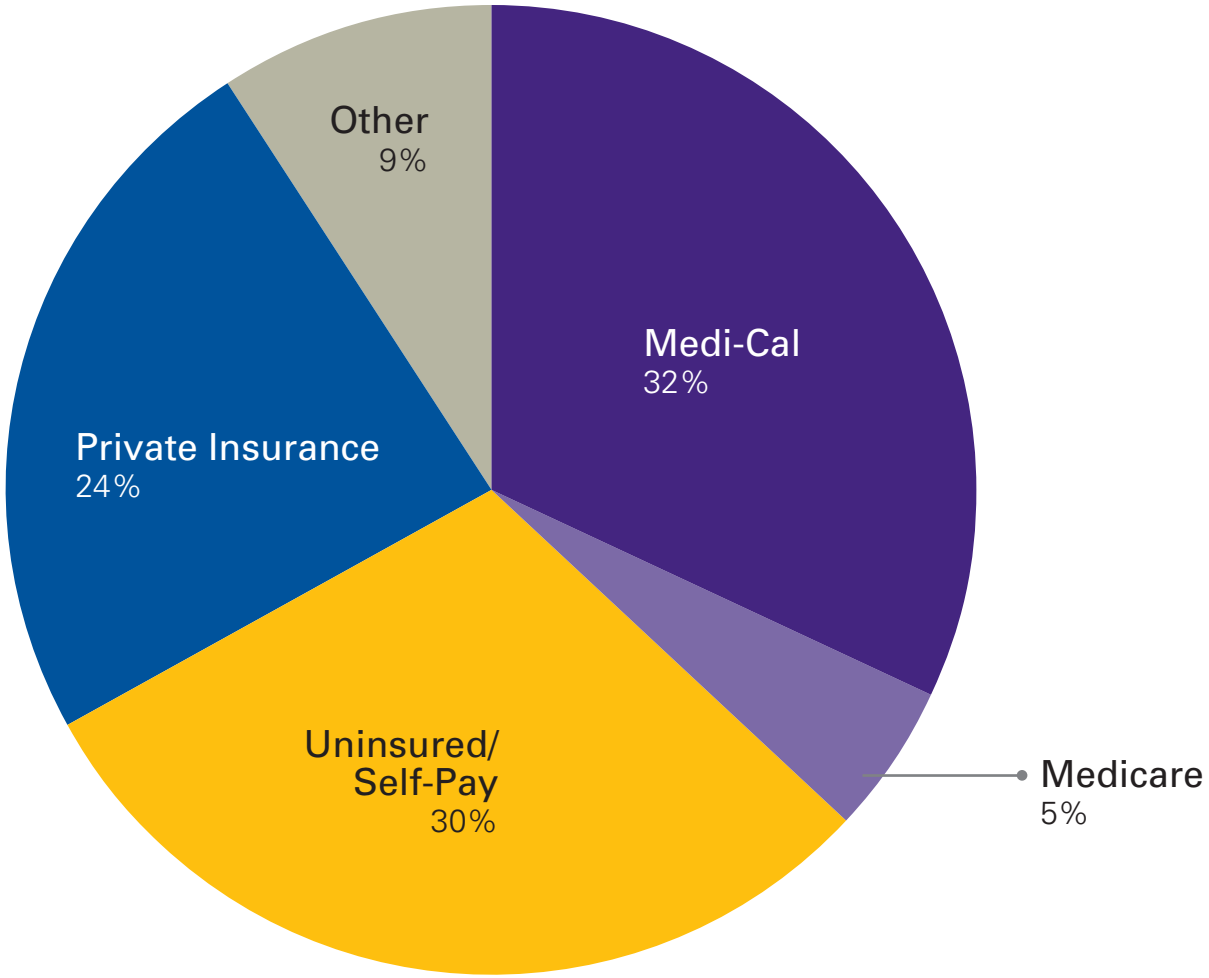


Notes: Hospitalizations for preventable dental conditions as a primary diagnosis make up about one half of one percent of all discharges, or 5.6 hospitalizations per 100,000 people. In comparison, diabetes and asthma, two other preventable conditions, account for almost one percent of discharges. The number of hospitalizations for preventable dental conditions is comparable to the number who are poisoned by substances other than drugs (e.g., alcohol, household cleaners, gas fumes, etc.) each year.

Sources: California OSHPD emergency department data, 2005–2007. OSHPD patient discharge data, 2005–2007.

Hospitalization for a preventable dental condition is relatively rare. From 2005 to 2007, less than two percent of visits to the ED for preventable dental conditions resulted in hospitalization. Although the number of visits to EDs has increased by 15 percent (12 percent when population-adjusted), the number of patients hospitalized has remained fairly stable.

Payment Sources for ED Visits for Preventable Dental Conditions, California, 2005–2007



Note: Data combined for three-year period.

Source: California OSHPD emergency department data, 2005–2007.

Medi-Cal recipients and the uninsured typically have the hardest time paying for emergency dental care or finding a dentist who accepts Medi-Cal. As a result, they turn to EDs for dental care. However, nearly a quarter of those with private insurance used an ED for dental care, suggesting they did not have dental insurance and/or had difficulty gaining timely access to dental providers.

ED Visits for Preventable Dental Conditions:
Predictors

More Likely to Visit the ED (under age 65)

- Insurance status, after controlling for other demographic factors, accounts for the largest increased risk of ED use for preventable dental conditions:
  - People without private insurance are at least 7 times more likely to visit.
- People living in rural areas are 15 to 47 percent more likely to visit.
- African Americans are more likely to visit.
- People ages 18 to 34 are significantly more likely to visit than other age groups under age 65.
- Women are slightly more likely (5 percent) to visit.

Less Likely to Visit the ED (under age 65)

- Latinos are 60 percent less likely to visit.
- People of non-White or non-African American races are less likely to visit.

Notes: Data limitations precluded other variables from being added to the model. All predictor variables were significant at levels of $p<.01$ except gender. See Appendix C for complete methodology description.

ED Visits for Preventable Dental Conditions:
Summary of Findings

- In 2007, over 83,000 Californians (222 per 100,000 population) visited the ED for preventable dental conditions, a 12 percent increase since 2005. Hospital inpatient admissions for these conditions were infrequent.
- From 2005 to 2007, Medi-Cal beneficiaries and the uninsured represented nearly two-thirds of all such ED visits, with visit rates increasing by about 20 percent over the three-year time period.
- Statewide, the ED visit rate for preventable dental conditions, without hospitalization, runs higher than that for diabetes. If ED visits with subsequent hospitalizations are included, the dental rate runs lower than those for diabetes and asthma, two other preventable conditions. However, 26* of California's 58 counties report higher rates than those for both asthma and diabetes.
- In 2007, the median charge for an ED visit for a preventable dental condition was $660, although charges varied widely. The median reimbursement was estimated at $172 based on a cost-to-charge ratio of about 26 percent for all payers at general acute care hospitals in 2007.
- Hospitals charged an estimated $55 million to commercial insurers, government programs, and uninsured individuals for preventable ED visits for dental conditions.

*The data for 10 of California's 58 counties are consolidated into 3 regions, all of which exceed the rates for diabetes and asthma; however, each county is included individually in the total.

Recommendations for Reducing Preventable ED Visits for ACS Dental Conditions

Dental Insurance Coverage and Preventive Services

- Federal and state policymakers: include dental benefits, such as payment for preventive dental services, in national and state coverage expansion legislation.
- Public health departments: start campaigns to promote oral health knowledge and good practices, particularly for children and pregnant women.

Health Care Workforce Training and Practice

- Federal and state policymakers: expand scholarships and loan repayment programs to oral health professionals choosing to practice in underserved areas.
- Dental and hygiene schools: provide training experience in treating underserved populations in non-dental school settings, such as community clinics, schools, nursing homes, and rural areas.
- Medical, nursing, and other health professions schools: include oral health in curricula and train students to identify and treat basic dental conditions.
- State policymakers: support demonstrations of new oral health workforce models (e.g., dental therapists) and expanded scope of practice for existing professionals (e.g., registered dental hygienists and dental assistants) to address unmet need in underserved areas.

Recommendations for Reducing Preventable ED Visits for ACS Dental Conditions, continued

Dental Care Delivery System

- Local health and public health systems: expand dental service capacity at community health centers, WIC clinics, school-based clinics, nursing homes, and mobile dental clinics.
- Private and community dental practices: establish "virtual dental homes" using teledentistry and community-based oral health teams to increase preventive services in underserved settings.
- Dental, medical, and nursing professionals: collaborate more across sectors and refer patients appropriately for needed oral and general health care.

Payers and Insurers

- State policymakers: increase dental reimbursement rates in Medi-Cal and Healthy Families to increase access to dentists for beneficiaries.
- State policymakers: offer tax incentives for dentists who treat Medi-Cal and other public program beneficiaries.
- Medi-Cal program: amend contracts with fiscal intermediaries and managed care plans to increase and measure the provision of preventive dental services in health and dental plans.

Additional Resources

Oral Health in America: A Report of the Surgeon General. 2000. Office of the Surgeon General, U.S. Department of Health and Human Services.

Links Between Oral and General Health. May 2000 fact sheet. Office of the Surgeon General, U.S. Department of Health and Human Services (www.cdc.gov/oralhealth/publications/factsheets/sgr2000_fs4.htm).

The Mouth Body Connection, American Academy of Periodontology, May 8, 2008 (www.perio.org/consumer/mbc.top2.htm).

Protecting Oral Health Throughout Your Life, American Academy of Periodontology (www.perio.org/consumer/women.htm). Accessed September 23, 2008.

Mullally, B.H., Coulter, W.A., Hutchinson, J.D., Clarke, H.A. "Current Oral Contraceptive Status and Periodontitis in Young Adults." *Journal of Periodontology* 2007; 78(6): 1031–1036.

Brennan, R.M., Genco, R.J., et al. "Bacterial Species in Subgingival Plaque and Oral Bone Loss in Postmenopausal Women." *Journal of Periodontology* 2007; 78(6): 1051–1061.

Acknowledgments

Author: **Lisa Simonson Maiuro,** M.S.P.H., Ph.D.
Health Management Associates

This project was guided by the expertise of the following advisors:

Anil Bamezai, Ph.D., M.S.
Adjunct staff, RAND Corporation

Jim Crall, D.D.S., Sc.D.
Professor and Chair, Section of Pediatric Dentistry
Director, Maternal and Child Health Bureau National Oral Health Policy Center, UCLA School of Dentistry

Robert Isman, D.D.S., M.P.H.
Dental Program Consultant, Medi-Cal Dental Services Branch, California Department of Health Care Services

Francisco Ramos-Gomez, D.D.S., M.S., M.P.H.
Professor, Section of Pediatric Dentistry, UCLA School of Dentistry

Jane Weintraub, D.D.S., M.P.H.
Lee Hysan Professor and Chair, Division of Oral Epidemiology and Dental Public Health, Center to Address Disparities in Children's Oral Health, UCSF School of Dentistry

GIVE US YOUR FEEDBACK

Was the information provided in this report of value? Are there additional kinds of information or data you would like to see included in future reports of this type? Is there other research in this subject area you would like to see? We would like to know.

PLEASE CLICK HERE
to give us your feedback.
Thank you.

FOR MORE INFORMATION

California HealthCare Foundation
1438 Webster Street, Suite 400
Oakland, CA 94612
510.238.1040
www.chcf.org

Appendix A | ACS Dental Conditions Descriptions and Scenarios

Ambulatory care sensitive conditions are those "for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease."[1] The five conditions studied for this report include the following:

1) Diseases of hard tissues of teeth
These are diseases or conditions that affect primarily those parts of the teeth that are visible above the gums. The most common of these diseases is dental caries (tooth decay). Other conditions include wearing away or progressive loss of the hard outer surface of the tooth, e.g., from brushing too vigorously or eating foods that are very acidic. Routine dental care can prevent most tooth decay.

A large portion of the visits for dental caries analyzed in this report was for unspecified dental caries defined as the "localized destruction of the tooth surface initiated by decalcification of the enamel followed by enzymatic lysis of organic structures and leading to cavity formation." If left unchecked, the cavity may penetrate the enamel and dentin and reach the pulp. The three most prominent theories used to explain the cause of the disease are that: 1) acids produced by bacteria lead to decalcification; 2) micro-organisms destroy the enamel protein; or 3) keratolytic micro-organisms produce chelates that lead to decalcification.

SCENARIO: Maria wakes up on a Monday morning with an excruciating toothache. She tries to lessen the pain by having a cold drink but notices that one of her upper right molars is very sensitive to cold. The right side of her mouth hurts when she bites down. She doesn't have a dentist or any dental insurance coverage, and she makes too much money to be eligible for Medi-Cal. She shows up at the hospital emergency room and pleads with the staff to relieve her pain.

2) Diseases of pulp and periapical tissues
These are diseases that affect the blood vessels and nerve inside the tooth and the tissues surrounding the root of the tooth inside the jaws. Routine dental care can reduce most periapical diseases, which are caused by dead pulp below the enamel of the tooth. Most, but not all, pulpal disease is caused by bacterial invasion from tooth decay or, less commonly, cracked teeth.

SCENARIO: Joe has had an ache in his jaw for several weeks that has gotten progressively worse. Now it is a constant, throbbing pain that is worse when he chews. He has a high fever and large, tender swelling on his gum. He goes to the hospital and is told that he has a severe infection. They give him antibiotics and send him home.

3) Gingival and periodontal diseases
Periodontal diseases include gingivitis (inflammation of the gums) and periodontitis, a more advanced inflammation in which the gums separate from the teeth, forming pockets (spaces between the teeth and gums) that become infected. As the disease progresses, the pockets deepen and more gum tissue and the bone supporting the teeth are destroyed. Gingivitis is a mild form of gum disease that can usually be reversed through daily brushing and flossing, and regular cleaning by a dentist or dental hygienist. Left untreated, it can lead to tooth loss and other serious medical issues.

SCENARIO: Rinsing her mouth after brushing her teeth one morning, Sally is alarmed to find that she is spitting blood into the sink and several of her teeth are loose. It's been five years since she last saw a dentist, and her health plan at work provides no dental coverage. She goes to the hospital emergency room to find out why her gums are bleeding.

4) Other diseases and conditions of the teeth and supporting structures
These are diseases or conditions that include: loss of teeth through extraction or periodontal disease; complete or partial absence of teeth; and poor fillings. Most encounters in this category are coded as an unspecified disorder of the teeth and supporting structures.

Partial or complete lack of teeth can have devastating effects on oral and medical health. Evidence published in 2008 revealed that people who lost all their teeth were more likely to have chronic kidney disease than patients who had maintained their natural teeth.[2]

SCENARIO: Seventy-five-year-old Martha had all her remaining teeth extracted six months ago as a result of periodontal disease. Since then, she has been losing weight and getting progressively weaker. She does not have a regular source of medical or dental care. Her friend is concerned about Martha and takes her to the ED to be examined.

5) Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue
These are diseases and conditions that primarily involve inflammation of the linings of the cheeks, lips, and tongue. They also include cheek and lip biting, sores caused by dentures, and some precancerous thickened white patches in the mouth. Medical issues related to these diseases can often be addressed in the course of a routine office visit.

SCENARIO: Rafael has worn dentures for ten years without regular visits to a dentist. Recently, his upper denture began causing him discomfort and doesn't seem to fit properly; his mouth hurts when he inserts or removes the denture. When he looked in a mirror at the roof of his mouth, he was alarmed to find a number of small red sores as well as some white patches. Since he has no dentist, he goes to the emergency room to find out what's wrong.

Sources: 1. *Prevention Quality Indicators Overview.* AHRQ Quality Indicators. July 2004. Agency for Healthcare Research and Quality, Rockville, MD. (www.qualityindicators.ahrq.gov/pqi_overview.htm).
2. Fisher, M.A., Taylor, G.W., et al. "Clinical and Serologic Markers of Periodontal Infection and Chronic Kidney Disease." *Journal of Periodontology* 2008; 79(9): 1670–1678.

Appendix B | ACS Dental Diagnosis Codes Not Included in the Analysis

Emergency Department ACS Visits

Other Dental Conditions Where ACS Is a Secondary Code

The data in this snapshot are based on Billings' AHRQ primary diagnosis medical codes (ICD-9 codes 521–523, 528,529), reflecting conditions that could have been handled in an outpatient non-emergency setting if addressed soon enough. However, there are other dental conditions that, arguably, could also be included in this list. In many cases medical chart reviews would have been necessary to determine this, a process that is time-consuming, expensive, and beyond the scope of this project.

In some cases a dental condition may not be coded as the primary diagnosis, but the problem may be dental in nature. For example, some experts have noted that dehydration, inflammation, or an infection of the face may be a primary diagnosis while a dental condition is secondary. Some clinicians suggest that the underlying condition may be primarily dental and miscategorized as medical. However, this occurs in fewer than 1,000 visits a year, less than one one percent of the total attributed to ACS dental ED visits. Additionally, patients very rarely have ED visits indicated as a routine dental exam.

Other Conditions with a Primary Dental Code

Other conditions or primary diagnoses outside the scope of our analysis that some dentists might consider ambulatory sensitive conditions include: problems with tooth development and tooth eruption; Vincent's angina (an acute communicable infection of the respiratory tract and mouth marked by ulceration of the mucous membrane); diseases of the jaws and salivary glands; and open wounds of the gums or broken teeth.

Among these other conditions, broken teeth due to trauma is the most frequent reason people use the ED. While a visit to one's dentist would be a more efficient and less costly way to deal with this situation, in many cases the dentist is unavailable, and there is no other choice but to go to the ED. Other common reasons for a dental ED visit include locked jaw or other problems associated with temporomandibular joint and muscle disorders (TMJDs) and diseases of the salivary glands caused by an infection of the salivary gland or duct. This problem is seen more often in people who are dehydrated or who have chronic illnesses.

Appendix C | Methodology

Goal: Identify factors that influence whether a person uses an ED for an ACS dental condition.

Data Sources and Methods

This analysis included two components. First we provided descriptive univariate and bivariate statistics on the California population using the emergency department data for ambulatory care sensitive (ACS) dental conditions based on data from the California Office of Statewide Health Planning and Development (OSHPD) Emergency Department Data, 2005–2007 and OSHPD Patient Discharge Data, 2003–2007.* We identified ambulatory care sensitive dental conditions, also referred to as "preventable conditions" in this document, based on the ICD-9 codes from Dr. Billings's published work (http://wagner.nyu.edu/chpsr/acs_codes.pdf). We recognize that this is not a definitive list, and a medical record review would be required to most appropriately identify ACS dental conditions; however, this list serves as a base for initiating a more in-depth look at an often neglected, but critical component of overall health, oral health. These dental ICD-9 codes have also been used in other work on ACS conditions, e.g., Bindman et al, *Preventing Unnecessary Hospitalizations in Medi-Cal: Comparing Fee for Service with Managed Care,* California HealthCare Foundation, February 2004.

Second, to differentiate between those who used the ED for ACS dental conditions and those who did not, we combined OSHPD data with 2007 California Health Interview (CHIS) data. The OSHPD ED visit data allowed us to identify the number of dental-related visits, as well as a few demographic characteristics (age, payer, ethnicity, gender, urban/rural location). The CHIS dataset includes individual-level data, identifying ED users and non-users. By identifying non-users from the CHIS dataset in combination with ED users for dental conditions from the OSHPD data, we were able to estimate the risk of an ED visit for dental conditions as well as how this risk varies by individual characteristics. Since the CHIS dataset does not include a field indicating the reason for ED use, we were forced to remove all ED users from this dataset, not just those who went to the ED for non-dental reasons. We do not think this limitation induced a significant bias, because only a small proportion of the population visits the ED in a given year, and possibly very similar reasons lead to ED visits for dental care as non-dental care (such as poor access to primary care).

Given that the CHIS dataset represents a sample of the population while the OSHPD dataset represents the entire universe of visits in a given year, we had to weight the data appropriately. The CHIS dataset includes weights that scale to the population, so by inference the weights for ED non-users scale to the population that never had an ED visit in our analysis year. For the OSHPD dataset, we gave each observation a weight so that the sum of these weights across all ED encounters (dental and non-dental) would match the population estimate of ED users from the CHIS dataset. This weight worked out to 0.85, a little lower than 1, because the OSHPD dataset includes a few individuals with multiple ED encounters that we could not uniquely identify, as well as possible coverage errors in the CHIS dataset that make the total estimate of ED users not match exactly across the two datasets.

To examine differences between ED ACS dental condition users and ED non- users, we employed a logistic regression model to control for various factors that could be associated with ED use and are compatible across both datasets. These factors include race, ethnicity, gender, insurance coverage, age, and an urban/rural indicator. These independent variables are comparable but not identical in the CHIS and OSHPD datasets and were subsequently recoded to reflect consistent values. Although the model is simple, it has high predictive power. Ideally, we would have included other potentially relevant fields, e.g., whether a given geographic area had fluoridated water, the number of dentists in the area, and so on. However, the CHIS public use files suppress the county of each respondent as part of its statistical disclosure control procedures, making linkage with other sources of geographic data impossible.

Model: The outcome (response) variable is binary (0/1) and indicates whether the individual used an ED for an ACS dental condition or did not use the ED at all. The predictor variables of interest are:

- Type of health insurance (not specifically dental),
- Age,
- Gender,
- Urban or rural treatment location,
- Race, and
- Ethnicity.†

All predictor variables were significant at levels of $p<.01$ except gender.

*California OSHPD emergency department data were only available for the years 2005 to 2007 at the time of the analysis.

†Data limitations precluded other variables from being added to the model.