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The focus of this article is to highlight Western University, College of Dental Medicine’s improvement strategies and the outcomes associated with the delivery of risk-based dental care to children attending the Gidley Elementary School-based oral health center and the Jeff Seymour Family Center dental clinic.
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A code of ethics provides a critical framework for decision-making. It can tell us a lot about the group that promulgates that code. It underscores what is important to that group. It can tell us how each member is expected to behave both with other members of the group and with nonmembers. It helps us envision how the group sees itself in relation to society at large.

The ADA Code of Ethics turns 150 years old this year. In 1866, the ADA convened its sixth annual session. On April 14 the year prior, President Abraham Lincoln was assassinated. The Civil War ended less than a month later on May 9, 1865.

The nation survived the horrific turmoil of war. Cities were destroyed and few were unaffected by the unprecedented loss of life. In this context of change and rebuilding, the ADA devised and approved its original Code of Ethics.1

At the 1866 annual meeting, doctors Watt, McQuillan and Allen were tasked with writing a Code of Ethics. At the fourth meeting of that assembly, they presented their report. During the heated debate that followed, Dr. McQuillan is purported to have said, “I have read the proposed code, I could claim no part in its preparation, nor was I in sympathy with its adoption, being unnecessary for gentlemen, and enforcement impractical for those who are not gentlemen.” His position that ethical behavior is inherited or instilled in early childhood and not the result of a list of rules, is a sentiment that has been held by others.

Article I: The Duties of the Profession to Their Patients

Section 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are, in most cases, unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patient; and even the simplest case committed to his care should receive that attention which is due to operations performed on living sensitive tissue.

Section 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficial efforts of our profession. He should encourage no false hopes by promising success, when, in the nature of the case, there is uncertainty.

Article II: Maintaining Professional Character

Section 1. A member of the dental profession is bound to maintain his honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; and the aged special encouragement to their juniors.

Section 2. The person and the office arrangements of the dentist should indicate that he is a gentleman; and he should sustain a high-tone moral character.

Section 3. It is unprofessional to resort to public advertisements, cards, handbills, posters or signs calling attention to the peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to published reports of cases or certificates in the public prints; to go from house to house to solicit or perform operations; to circulate or recommend nostrums; or to perform any other similar acts.

Section 4. When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient’s confidence in him; and if the interests of the patient will not be in danger thereby, the case should be temporarily treated, referred back to the family dentist.

Section 5. When general rules have been adopted by the members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from these rules, except when variation of circumstances requires it, and it is ever to be regarded as unprofessional to warrant operations or work, as an inducement to patronage.
Article III: The Relative Duty of Dentists and Physicians

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and the mouth. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the superiority of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainment in his specialty. When this principle governs, there can be no conflict or even diversity of professional interests.

Article IV: The Mutual Duties of the Profession and the Public

Dentists are frequent witnesses, and at the same time, the best judges of the impostions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this, and the many other benefits conferred by the competent and honorable dentist, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity, against the in empiric and imposter. The public has no right to tax the time and talents of the profession and examinations, prescriptions, or any way without proper remuneration."

Paraphrased and summarized, the original code has nine main points:

1. The dentist is expected to provide emergency and appropriate care as well as comport himself in a mature manner and demonstrate respect for life.
2. The dentist should promote health literacy and aid in obtaining informed consent after explaining potential risks and less than optimal outcomes.
3. Dentists must behave honorably and respect colleagues, young and old.
4. The dentist must appear honorable and respectable.
5. No advertising.
6. Dentists must not disparage the work of colleagues and not steal patients.
7. Dentists must honor local fees and not give guarantees.
8. Dentists have their own scope of care within medicine.
9. Dentists are expected to expose charlatans to the public. The public should confide in and honor dentists. The public should expect to pay fees for services rendered.

Since the 1866 Code of Ethics, there have been perhaps two dozen iterations. Over these 150 years, there have been some interesting variations. The most glaring change was the result of the Federal Trade Commission’s order in 1979 that instructed against restricting truthful advertising by dentists.2

Number 7 appears a bit like fee setting so its omission from later iterations is not surprising. Number 9 leaves little room for treating the poor but that is addressed in subsequent versions. The later versions go into greater detail about the need for continuing education, the perfection of skills, the sharing of knowledge and the admonition against patenting and keeping secret procedures that aid in patient care. Later versions also address contracts, group practices and third parties.

The wording of the 1866 Code of Ethics may seem stilted and the tone a bit pretentious, but much of what is elemental to ethical behavior was expressed in 1866 and remains relevant today. The section detailing oral health literacy and informed consent seems prescient for the time.

Some have said that a code of ethics has two purposes:

1. To make the profession respectable by controlling the character of dentists.
2. To make the profession respected by making known to the public its elevated standards.3

It is debatable whether an expressed reason for an expressed code has … nothing whatever to do with controlling or forming … professional conduct … A professional man is a professional man, not because of forced obedience to special law, but to inherent instinct. Per contra, no amount of written law will convert a blackguard into a gentleman, nor make a charlatan a professional man …”4

In 2015, the ADA Council on Ethics, Bylaws and Judicial Affairs secured funds to research and test the second purpose of the Code of Ethics. They asked the question “Does public knowledge of the ADA Code of Ethics … resonate with the public and … result in channeling patients to ADA member dentists.”5

They found that “When a person has a better understanding of the Code of Ethics, 69 percent are more likely to choose an ADA dentist.”6 This seems to support the second purpose of a code of ethics: to make the profession respected by making known to the public its elevated standards.

A code of ethics may not determine how a member acts, but there may be a community pressure to normalize ethical behavior both from within by the other members of the profession and from without by our patients, the public at large. Perhaps it is the expectation of others that enhances our adherence to the code rather than the minutiae of each version of the code.

After its 150 years, the Code of Ethics seems to be healthy and helpful. Happy Birthday, ADA Code of Ethics, and many happy returns.

REFERENCES

6. ADA 2015.
Impressions

Free-Range, Gluten-Free, Eco-Friendly Advertising

David W. Chambers, EdM, MBA, PhD

A friend of mine, who is very proud of his heritage, reminds me often that the Italians know the secret to long life: just eat spaghetti for 100 years. I recently read a cereal box that boasted a full helping of the product, with a cup of whole milk, supplies most of the minimum daily requirement for vitamin D.

Some of my colleagues and I have been working on a research project to see how dentists read the literature. Rather than ask authors or editors, we give practitioners a journal article about an innovative way to make a composite provisional and videotape them as they react to it. The article has lots of photos and is universally regarded as demonstrating an outstanding result. It is from the American Journal of Esthetic Dentistry, a rigorously peer-reviewed publication that accepted no advertisements, and is now out of publication after about three years.

Standards in the medical literature call for detailed documentation of products by brand name and manufacturer in publications to permit replicability, create an impression of attention to detail and advertise products for sale. The most common reaction to product mention of the readers we have studied is suspicion. We hear the opinion that the literature (and C.E. presentations) often list product names connected to advertisements and to compensation for authors. Sometimes our readers thumb through the journal looking for a disclaimer at the end of the piece or advertisements placed near the article. Even though there is no evidence of such connections in the article we use, readers want to make a point they are on guard against the possibility of this effect.

Another common attitude is that product placement, even in the dehydrated formal style found in most publications, is a distraction. Dentistry is becoming product sensitive rather than technique sensitive. As one reader remarked, “I know most of these products, I have my favorites, and they’re all about the same anyway.”

A couple of readers were cautious of this type of article in general. “What general dentist needs to be instructed in how to make a provisional? This particular example is outstanding and beautifully documented. The point is not so much to inform as to demonstrate the technical superiority of the author. This is how you establish your pecking order among the elite on the C.E. circuit. And there is a difference in the honoraria one can charge depending on where one is in the pack.”

A few readers took a different attitude toward product placement. “I used to be worried when I saw products mentioned prominently in clinical articles. But now that I have started lecturing, it doesn’t bother me as much.”

The nub:

1. Regardless of one’s attitude toward product promotion in publications, one’s own words must be defensible (see 10C in the CDA Code of Ethics).
2. There is no way to avoid participation in the value exchange of American commercial culture.
3. One’s opinion about product placement is dependent on where one is in the system.

David W. Chambers, EdM, MBA, PhD, is professor of dental education at the University of the Pacific, Arthur A. Dugoni School of Dentistry, San Francisco, and editor of the Journal of the American College of Dentists.
Mouth’s Bacterial Balance Altered by Smoking

A recent study led by the NYU Langone Medical Center and its Laura and Isaac Perlmutter Cancer Center has found that the oral microbiome is drastically altered by smoking. According to the researchers, this analysis is the most comprehensive to date to examine the effects of smoking on the makeup and action of bacterial species in the human mouth based on precise genetic testing.

“Our study is the first to suggest that smoking has a profound impact on the oral microbiome,” said the study’s senior investigator and epidemiologist Jiyoung Ahn, PhD, in a news release. “Further experiments will be needed, however, to prove that these changes weaken the body’s defenses against cancer-causing chemicals in tobacco smoke, or trigger other diseases in the mouth, lungs or gut,” said Ahn.

Using mouthwash samples from 112 smokers, 571 former smokers (among whom 17 percent had quit within the past 10 years) and 521 people who never smoked — and with genetic tests and statistical analyses to tell apart the thousands of bacteria in each study participant’s mouth — the researchers found that the oral microbiome of smokers differed significantly from that of people who had never smoked and those who had quit smoking. The team also found that the oral microbiome of smokers bounces back after they quit smoking, with all former smokers who had not smoked for at least 10 years showing the same microbial balance as nonsmokers.

More than 150 bacterial species showed significantly increased growth in the mouths of smokers, while another 70 showed sharp decreases in growth. For instance, smokers had relatively fewer species of Proteobacteria, at 4.6 percent of overall bacteria in the mouth, than nonsmokers, at 11.7 percent, with Proteobacteria shown to be involved in the breakdown of toxic chemicals introduced by smoking. By contrast, smokers had 10 percent more species of Streptococcus than nonsmokers, with Streptococcus known to promote tooth decay.

The study’s co-lead investigator, Brandilyn Peters, PhD, indicated that further experiments are planned to determine the precise timeline for microbiome recovery.

For more, see the paper published online in the ISME Journal, March 25, 2016.

P. Gingivalis May Increase Pancreatic Cancer Risk

Researchers recently found that men and women whose oral microbiomes included Porphyromonas gingivalis had an overall 59 percent greater risk of developing pancreatic cancer than those whose microbiomes did not contain the bacterium. The presence of the specific bacteria in the mouth may reveal the increased risk and enable earlier, more precise treatment.

Pancreatic cancer patients are known to be susceptible to gum disease, cavities and poor oral health in general, according to study authors. That vulnerability led the team of researchers to search for direct links between the makeup of bacteria driving oral disease and subsequent development of pancreatic cancer, a disease that often escapes early diagnosis and causes 40,000 U.S. deaths annually.

“Our study offers the first direct evidence that specific changes in the microbial mix in the mouth — the oral microbiome — represent a likely risk factor for pancreatic cancer along with older age, male gender, smoking, African-American race and a family history of the disease,” said senior investigator and epidemiologist Jiyoung Ahn, PhD.

For the new study, the researchers compared bacterial contents in mouthwash samples from 361 American men and women who developed pancreatic cancer with samples from 371 people of similar age, gender and ethnic origin who did not. Mouthwash samples were obtained at the beginning of each investigation, after which participants were monitored for nearly a decade to determine who got cancer.

The study findings were presented at the annual meeting of the American Association for Cancer Research in New Orleans on April 19, 2016.

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Researchers Identify Area of the Brain That Recognizes Facial Expressions

Researchers at The Ohio State University have pinpointed the area of the brain responsible for recognizing human facial expressions. The area is on the right side of the brain behind the ear, in a region called the posterior superior temporal sulcus (pSTS).

The researchers report that they used functional magnetic resonance imaging (fMRI) to identify a region of pSTS as the part of the brain activated when test subjects looked at images of people making different facial expressions. Further, the researchers have discovered that neural patterns within the pSTS are specialized for recognizing movement in specific parts of the face. One pattern is tuned to detect a furrowed brow, another to detect the upturn of lips into a smile and so on.

Using fMRI data, the authors developed a machine learning algorithm that has about a 60 percent success rate in decoding human facial expressions, regardless of the facial expression and regardless of the person viewing it.

The authors placed 10 college students into an fMRI machine and showed them more than 1,000 photographs of people making facial expressions. The expressions corresponded to seven different emotional categories: disgusted, happily surprised, happily disgusted, angrily surprised, fearfully surprised, sadly fearful and fearfully disgusted. While some of the expressions were positive and others negative, they all had some commonalities among them. For instance, “happily surprised,” “angrily surprised,” and “fearfully surprised” all include raised eyebrows, though other parts of the face differ when we express these three emotions.

The researchers were able to obtain images of the part of the brain that was activated when the students recognized different expressions and found, regardless of the expression, all the students showed increased activity in the same region — the pSTS.

For more, see the study published in the Journal of Neuroscience, 20 April 2016, 36(16): 4434-4442.

Silicon Nitride Bioceramics Could Help Fight Gum Disease

According to a recent study published by the American Chemical Society, researchers have discovered that new approaches involving silicon nitride, a ceramic material used in spinal implants, may be effective in treating periodontitis, as the surface of silicon nitride (Si3N4) has a lethal effect on the bacteria that commonly cause periodontitis.

By studying the reactions of bacteria to antimicrobial silicon nitride, the authors of the recent study discovered how the ceramic material changes the metabolism of Porphyromonas gingivalis — the bacteria species primarily responsible for periodontitis. They observed degradation of the bacteria’s nucleic acid, drastic reduction in phenylalanine and reduction of lipid concentration due to short-term exposure (six days) to silicon nitride, the authors wrote. The study noted that altering the surface chemistry of silicon nitride by either chemical etching or thermal oxidation influenced peroxynitrite formation and affected bacteria metabolism in different ways.

“Exploiting the peculiar surface chemistry of Si3N4 bioceramics could be helpful in counteracting Porphyromonas gingivalis in an alkaline pH environment,” the authors concluded.

While further studies are needed, the results show silicon nitride holds promise as a therapeutic aid for treating severe gum disease.

For more information, see the report published in the journal Langmuir, 2016, 32 (12), pp. 3024-3035.
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Gene Transfer Between Pathogenic Bacteria

A team of researchers recently mapped the core set of genes that are consistently controlled during DNA uptake in strep bacteria. Bacteria possess the ability to take up DNA from their environment, a skill that enables them to acquire new genes for antibiotic resistance or to escape the immune response — the scientists hope their new findings will allow them to cut off the microbes’ ability to do that.

The researchers, from the University of Oslo, the Forsyth Institute and the University of Illinois at Chicago, wanted to know precisely which metabolic pathways in the bacterial cell must be activated for the bacteria to become “competent,” or able to acquire genes from DNA in the environment. They focused on Streptococcus mutans, a strain involved in tooth decay.

While earlier studies of competence pointed to more than 300 active genes, this study identifies only 83 genes in 29 regions of the strep chromosome that are specific to the competence pathway, with 27 of these genes lying within an interconnected network controlled by one of three key regulator molecules.

When the researchers compared the new results to earlier studies in five other strep species, they found that in all those species a core set of only 27 activated competence genes was required for DNA uptake.

“Streptococcus is a diverse group of species that evolved from a common ancestor to adapt to diverse hosts and sugar-rich niches,” said study co-author Donald Morrison, professor of biological sciences at UIC, in the news release. “Our findings — that two-thirds of the core activated genes in Streptococcus have transformation functions — suggest that this is an ancient response, maintained because of its value in promoting ready access to external DNA.”

For more, see the study in the American Society for Microbiology’s new open-access journal, mSystems, published April 12, 2016.
Xenograft Improves Soft Tissue Support for Dental Implant

An article recently published in the Journal of Oral Implantology discusses the use of porcine collagen xenograft to augment supporting soft tissue at the facial of dental implant-supported fixed dentures and crowns using a bis-acryl stent technique, according to the author. The article explains how the newer type of xenograft can help improve the existing soft tissue support for existing dental implants. The stent helps the oral surgeon properly place a soft tissue graft that ensures the soft tissue stays in its desired position during the first few days of healing.

Ultrasonic Surgery Reduces Pain, Swelling

In a recent study in The Journal of Craniofacial Surgery the authors discovered that the use of ultrasonic “piezosurgery” equipment reduces trauma, pain and swelling, compared to traditional surgical drills.

“Piezosurgery may be a viable alternative to traditional osteotomy [bone-cutting] technique, as it reduces the degree of inflammation, pain, swelling and morbidity, improving satisfaction and patient comfort,” the authors wrote.

Piezosurgery is a relatively new approach that uses ultrasonic energy, rather than conventional surgical instruments, for cutting bone.

This study included 40 patients scheduled for genioplasty, as a primary procedure or after corrective jaw surgery, and patients were randomly assigned to undergo genioplasty using either ultrasonic piezosurgery instruments or traditional drills. Pain, healing and complications were compared from one to 15 days after surgery and the results showed lower pain scores for patients undergoing piezosurgery, although the difference was significant only on the third and seventh day after surgery. Swelling also seemed to be reduced with piezosurgery, compared to cutting drills.

Both groups had reduced feeling in the chin area throughout the first 15 days after surgery, mainly due to nerve stretching. By six months, sensation normalized for all patients in both groups and pain and swelling were completely resolved as well.

“Bone undergoes less stress during surgery and thus less pain and swelling postoperatively, which is in agreement with the results found in our trial: pain and discomfort were minimal compared to the traditional technique (saw and drills) especially in the immediate postoperative period of healing (within three days),” the authors concluded.

The dental care landscape is changing. On the demand side, several demographic, economic, fiscal and political forces are converging to bring important changes to how the population uses dental care. On the supply side, dental practice models are changing, the demographics of the dentist workforce are shifting and payment models are evolving. On top of this, the Affordable Care Act (ACA) will bring dental benefits to an additional 8.3 million adults on Medicaid — 2.5 million of whom are estimated to live in California. The ACA is also expected to extend dental benefits to up to 8.7 million children, 1.2 million of whom live in California.

To help shed light on these issues, the California Dental Association commissioned the ADA Health Policy Institute (HPI) to carry out a series of targeted studies related to the capacity of the California dental care system.

Key Findings From the Research
Assessing dental care delivery system capacity is multifaceted. It is also empirically challenging due to data constraints (e.g., availability of disaggregated data on supply of dentists and demand for dental care). As a result, the analysis focused on three specific topics. The key findings are summarized below.

The Future Supply of Dentists in California
- HPI projected the supply of dentists through 2033 under alternative scenarios. Under the most probable scenario, the per capita supply of dentists in California is projected to increase through 2018 and then decrease through 2033. Total inflows to the dentist workforce are expected to exceed total outflows through 2033 but the gain is smaller than the expected growth in California’s population.
- This research does not attempt to make judgments on the adequacy of the future dentist workforce or its capacity to meet the needs of the population. That would require much further investigation, incorporating demand side factors, alternative delivery models, workforce productivity and local market analysis. Understanding the future evolution of the total supply of dentists, however, is one important aspect of assessing provider adequacy.

Dentist Participation in Medicaid
- HPI examined the dentist attitudes toward the Medi-Cal (throughout this report, “Medi-Cal” refers to California’s fee-for-service (Denti-Cal), Medicaid and the
executive summary

Children’s Health Insurance Program (CHIP) dental programs) dental program and, through an innovative methodology, predicted how dentist participation in the program would change in response to alternative policy reforms. A majority of dentists in California expressed their discouragement with many aspects of the Medi-Cal dental program, including low reimbursement rates, missed appointments among patients, denied or delayed payments, the claim submission process and patient noncompliance with recommended treatment.

■ A significant portion of dentists in California — about one out of four — expressed a desire to be busier and to see more patients. This suggests there is currently, in aggregate, substantial unused capacity within the dental care system that could potentially be leveraged and made available to Medi-Cal patients.

■ The single most important barrier keeping more dentists from participating in Medi-Cal is low reimbursement. California has one of the lowest dental care reimbursement levels of any state.

■ A combination of increasing reimbursement to 55 percent of typical commercial dental insurance charges, reducing missed appointments, making timely payments to providers and providing some assistance to providers for administrative tasks is a relatively effective strategy for increasing dentist participation in Medi-Cal. However, this set of interventions would represent a significant reform to the Medi-Cal dental program.

Dental Care Services in FQHCs

■ HPI examined dental care service delivery in federally qualified health centers (FQHCs) and “look-alike” facilities. Nearly two-thirds of FQHCs and look-alike sites do not provide any type of dental care services. However, looking at dental care service provision at the FQHC level, which can encompass multiple sites, 27 percent of FQHCs have no sites where dental care services can be accessed (either on site or off site).

■ Among sites that provide dental care services, there is significant demand for these services. Almost a quarter of FQHCs and look-alikes report being “too busy to treat all people requesting appointments” and another third report being overworked. Wait times for dental appointments in FQHCs are also significantly higher than in typical dental practices.

■ The analysis suggests strongly that significant opportunities may exist to expand the dental safety net by increasing the number of FQHC and look-alike sites that provide dental care services through partnerships with dental practices, dental school clinics, innovative technologies such as teledentistry and mobile dental services.

Big Picture Takeaways

Assessing the current and future adequacy of the dentist workforce is challenging. It requires estimating the demand for dental care and supply of dental care providers within highly disaggregated “markets” (i.e., certain geographic areas or certain population segments, such as Medi-Cal beneficiaries). Due to various factors, HPI’s analysis has focused on examining the “supply side” of the issue at the aggregate, statewide level. The analysis has provided considerable insight into the capacity within dental practices and FQHCs as well as how dentist participation in the Medi-Cal dental program is likely to change in response to alternative policy reforms. The analysis does not, however, shed any light on the quantitative impact potential Medi-Cal dental program reforms would have on access to dental care or whether the current or future supply of dentists is sufficient to meet current or future demand for dental care in California. In other words, the research does not answer the question, is the California dental delivery system able to meet the dental needs of its population? Such an analysis would require a much more disaggregated approach and requires access to data that is currently inaccessible to HPI researchers.

Nevertheless, the analysis provides compelling evidence that, in aggregate, there is excess capacity within dental offices that, with certain reforms to the Medi-Cal dental program, could be leveraged for the Medi-Cal population. Capacity within FQHCs could be enhanced as well through partnerships with dental practices, dental school clinics, teledentistry and other innovations. Further research is needed to explore the cost-effectiveness of alternative policy approaches to leveraging the existing unused capacity within the dental care delivery system as well as modeling the future demand for dental care under various scenarios. Such analysis would greatly contribute to the policy debate in California.
With any type of health care service, having a sufficient number and distribution of providers is critical in ensuring the population can access the care they need. In the dental care sector, there is intense debate both at the federal level as well as in many states concerning the adequacy of the dentist workforce to meet current and future population needs. The Health Resources and Services Administration (HRSA), for example, estimates that there will be a shortage of 1,234 dentists in California by 2025.\(^1\) Several dental schools that have opened in recent years cite insufficient numbers of dentists as a key factor supporting the need for more dental school graduates.\(^2\) The aging of the dentist population is another reason commonly put forth as driving a looming shortage of dentists in the United States, with retirements and reduced hours worked commonly cited as factors driving down the labor supply of dentists.\(^3\)

Assessing the adequacy of the dentist workforce, of course, is not simply a supply-side issue. The demand for dental care on the part of the population, the mix of patients in terms of type of payer and geographic location, and a host of other factors all influence the judgment of whether the current and future dentist workforce is adequate. For example, the aggregate supply of dentists may be adequate in size when compared to the aggregate demand for dental care. However, there may be an insufficient number of dentists relative to need or demand for dental care among disadvantaged populations or in certain geographic areas. The issue of adequacy of the dentist workforce is complex and further conceptual and empirical work is needed. This is true not just of dentistry, but also for other types of health care service providers.\(^4\)

In this study, we project the number of dentists in California through 2033 based on various modeling scenarios and using the best available data. This research does not attempt to make judgments on the adequacy of the future dentist workforce or its capacity to meet the needs of the population. This would require much further investigation, incorporating demand side factors, alternative delivery models, workforce productivity and a host of other factors. Understanding the future evolution of the total supply of dentists, however, is one important aspect of assessing provider adequacy and we feel our analysis is a major contribution to the evidence base.

Data and Methods

**Data Sources and Methodological Approach**

We used five data sources in our analysis. The American Dental Association (ADA) masterfile contains the most up-to-date information on dentists in the United States. The masterfile is a database of all dentists, practicing and nonpracticing, in the United States. It is updated through a variety of methods including reconciliation with state licensure databases, death records, various surveys...
and censuses of dentists carried out by the ADA. We used the masterfile’s archived datasets from December of 2003, 2008 and 2013 to gather historical information on the profile of the dentist population, including dentists’ ages, dental school graduation years, licensure status, practice location, retirement dates and deceased dates. This provides us with a “snapshot” for each of our study years. In addition, through various unique identifiers, we are able to track critical information for each dentist over time.

As a supplement to the ADA masterfile, we used the ADA Health Policy Institute’s Distribution of Dentists (DOD) survey data from 1998 through 2013. This rolling census is sent to all dentists in the U.S. using a panel methodology. All dentists are assigned to one of three panels, and each year one panel is surveyed for their location, practice status and demographic information. The survey’s response rates for the three most recent years were 75.9 percent, 68.4 percent and 72.0 percent.

To calculate historical measures of dentists per 100,000 population, we used U.S. Census Bureau population counts. To calculate future estimates of dentists per 100,000, we combined our future dentist supply modeling results with the state government’s population projections.

We relied on the ADA’s Survey of Dental Education for historical data on the number of graduates of U.S. dental schools.

The workforce projection model uses historical trends in inflows of dentists to and outflows of dentists from California’s workforce to inform various assumptions about future inflows and outflows. We defined four types of outflows of dentists: (1) those who retired, (2) those who moved out of state, (3) those whose license expired and (4) those who died before retirement.

### TABLE 1

<table>
<thead>
<tr>
<th>Age</th>
<th>Retired</th>
<th>Moved out</th>
<th>License inactive</th>
<th>Deceased</th>
<th>Retained in workforce</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>0.6%</td>
<td>9.4%</td>
<td>1.8%</td>
<td>0.2%</td>
<td>88.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>35–44</td>
<td>1.3%</td>
<td>3.4%</td>
<td>2.6%</td>
<td>0.2%</td>
<td>92.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>45–54</td>
<td>2.8%</td>
<td>1.8%</td>
<td>2.5%</td>
<td>0.5%</td>
<td>92.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>55–64</td>
<td>14.4%</td>
<td>1.5%</td>
<td>2.8%</td>
<td>1.5%</td>
<td>79.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>65–74</td>
<td>38.2%</td>
<td>0.5%</td>
<td>3.2%</td>
<td>4.0%</td>
<td>54.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>75–84</td>
<td>51.7%</td>
<td>0.3%</td>
<td>3.0%</td>
<td>11.7%</td>
<td>33.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>85–99</td>
<td>39.3%</td>
<td>0.0%</td>
<td>21.4%</td>
<td>26.8%</td>
<td>12.5%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: ADA Health Policy Institute analysis of ADA masterfile. Note: Rates denote the percentage of California dentists active in 2003 who had retired, moved out of state, had a license that lapsed or who had died by 2008.

### TABLE 2

<table>
<thead>
<tr>
<th>Age</th>
<th>Retired</th>
<th>Moved out</th>
<th>License inactive</th>
<th>Deceased</th>
<th>Retained in workforce</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>0.6%</td>
<td>11.5%</td>
<td>1.8%</td>
<td>0.2%</td>
<td>86.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>35–44</td>
<td>0.5%</td>
<td>3.2%</td>
<td>2.6%</td>
<td>0.2%</td>
<td>93.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>45–54</td>
<td>2.0%</td>
<td>1.6%</td>
<td>2.5%</td>
<td>0.4%</td>
<td>93.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>55–64</td>
<td>8.9%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>1.5%</td>
<td>85.4%</td>
<td>100.0%</td>
</tr>
<tr>
<td>65–74</td>
<td>33.2%</td>
<td>0.7%</td>
<td>3.2%</td>
<td>4.0%</td>
<td>58.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>75–84</td>
<td>56.6%</td>
<td>0.0%</td>
<td>3.0%</td>
<td>11.7%</td>
<td>28.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>85–99</td>
<td>64.5%</td>
<td>0.0%</td>
<td>6.5%</td>
<td>29.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: ADA Health Policy Institute analysis of ADA masterfile and ADA Health Policy Institute Distribution of Dentists surveys. Note: Rates denote the percentage of California dentists active in 2008 who had retired, moved out of state, had a license that lapsed or who had died by 2013.

### TABLE 3

<table>
<thead>
<tr>
<th>Age</th>
<th>Retired</th>
<th>Moved out</th>
<th>License inactive</th>
<th>Deceased</th>
<th>Retained in workforce</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35</td>
<td>0.6%</td>
<td>10.4%</td>
<td>1.8%</td>
<td>0.2%</td>
<td>87.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>35–44</td>
<td>0.9%</td>
<td>3.3%</td>
<td>2.6%</td>
<td>0.2%</td>
<td>93.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>45–54</td>
<td>2.4%</td>
<td>1.7%</td>
<td>2.5%</td>
<td>0.4%</td>
<td>93.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>55–64</td>
<td>11.4%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>1.5%</td>
<td>82.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>65–74</td>
<td>35.4%</td>
<td>0.6%</td>
<td>3.2%</td>
<td>4.0%</td>
<td>56.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>75–84</td>
<td>54.4%</td>
<td>0.1%</td>
<td>3.0%</td>
<td>11.7%</td>
<td>30.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>85–99</td>
<td>48.3%</td>
<td>0.0%</td>
<td>16.1%</td>
<td>27.6%</td>
<td>8.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

We defined five inflows of dentists: (1) new U.S. dental school graduates who became licensed to practice in California, (2) established dentists who moved to California from another state, (3) foreign-trained dentists who became licensed to practice in California, (4) dentists who reactivated an expired license and (5) dentists who returned from retirement to the workforce.

We analyzed seven age groups of dentists separately to capture important differences in behaviors across the life cycle (e.g., propensity to graduate or retire). The age groups are under 35, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84 and 85 to 99.

Calculation of Historical Outflows

Historical data on outflows were first analyzed across two five-year periods, 2003 to 2008 and 2008 to 2013. Given that we found important differences in dentist behavior across these two historical periods, we also used a 10-year period of 2003 to 2013 in our modeling. The 2008-2013 period covered a major economic downturn in the U.S. which has significantly affected the dental care sector and could have led to changes in dentist behavior, namely retirement patterns. At the same time, labor supply analysis suggests that much more permanent changes are occurring in the dental care sector, and dentist behavior may not revert back to pre-Great Recession patterns once the economy rebounds. As a result, we felt it was important to distinguish these three distinct timeframes in our analysis.

For each of the three time periods, we calculated outflow rates for each age group. For example, for dentists in the workforce who were ages 55 to 64 in 2008, we calculated the proportion who were deceased or whose license was expired in 2013.

We calculated the outflow rates using the ADA masterfile and DOD surveys. By analyzing and combining results from both sources, we computed retirement rates (the majority share of outflows) and we found that retirement rates were higher for most age groups in 2003-2008 compared to 2008-2013. Outflows, attributable to dentists moving out of state, expired licenses or deaths from 2003-2008 and from 2008-2013 were more consistent for most age groups.

TABLES 1–3 display the outflow rates for the three time periods in our analysis. We used these three historical periods of outflow rates to help guide our assumptions on future scenarios for our workforce model. For most age groups, the 2003-2008 period (“high outflow”) had higher percentages of dentists retiring compared to the 2008-2013 period (“low outflow”). The 10-year 2003-2013 period (“medium outflow”) had percentages falling between the two five-year periods.

Our overall “baseline” scenario corresponds to the assumption that future outflow rates would be the same as the low outflow period of 2008-2013. Our choice is influenced heavily by the trend of increasing average retirement age for California dentists, a trend that clearly preceded the recession (FIGURE 1). It is also based on new research showing the dental economy is unlikely to return to prerecession growth levels and, therefore, we feel retirement patterns are not likely to return to prerecession levels.

Calculation of Inflows, Step 1: Total U.S. Dental School Graduates

We used a three-step process to calculate inflows of dentists into the California workforce. The first step was to consider three scenarios for the number of future graduates from U.S. dental schools from 2013 to 2033. The first scenario was that the annual number of dental school graduates would remain constant at the 2013 level. The second and third scenarios were that the annual number of graduates would increase linearly to a certain year (2018 or 2023, respectively) and then remain constant. For the second and third scenarios, we projected future linear trends to correspond to historical linear trends from 2004 through 2012.

FIGURE 2 displays both historical and projected numbers of graduates per year under these three assumptions. Our “baseline” scenario assumed that the medium inflow projection would apply, that is, that the annual number of graduates would increase until 2018 and then remain constant. Our choice
of inflow projection is influenced by the opening of nine dental schools\textsuperscript{10} since 2008 that would increase the total graduates per year after 2012.

We recognize that the future number of dental school graduates is subject to intense debate and speculation. On one hand, there are the dental schools that have recently opened with others in the planning stages.\textsuperscript{11} On the other hand, the flattening of dentist earnings in recent years\textsuperscript{12} combined with increases in educational debt could place downward pressure on the number of dental school applicants, as suggested in previous research.\textsuperscript{13,14}

Calculation of Inflows, Step 2: California’s Share of New Graduates

Historical data on California’s inflows were analyzed for the periods 2003-2008 and 2008-2013 as seen in TABLES 4 and 5. The first columns of these tables display the number of new U.S. dental school graduates who started practicing in California. These numbers declined from 3,296 (2003-2008) to 2,999 (2008-2013). Expressed as a proportion of total U.S. dental school graduates, this was a decline from 14.4 percent to 12.0 percent. We used those numbers to create three assumptions for future inflows of new graduates from U.S. dental schools:

(1) a “low” assumption based on the proportion of graduates who started practicing in California between 2008 and 2013,
(2) a “high” assumption based on the proportion who started in California between 2003 and 2008 and
(3) a “medium” assumption based on the overall proportion who started in California between 2003 and 2013. Expressed as a proportion of total U.S. dental school graduates, this was a decline from 14.4 percent to 12.0 percent.

We used those numbers to create three assumptions for future inflows of new graduates from U.S. dental schools: (1) a “low” assumption based on the proportion of graduates who started practicing in California between 2008 and 2013, (2) a “high” assumption based on the proportion who started in California between 2003 and 2008 and (3) a “medium” assumption based on the overall proportion who started in California between 2003 and 2013. We applied these three sets of proportions to the baseline assumption of future U.S. dental school graduates described in Calculation of Inflows, Part 1 to describe three possible assumptions for future trends of new dentists practicing in California.
Example of Workforce Model Projection, California, 2013–2018, for Baseline Scenario

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
<th>Column F</th>
<th>Sum of D, E, F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age under 35</td>
<td>3,508</td>
<td>86.0%</td>
<td>3,016</td>
<td>875</td>
<td>3,046</td>
<td>307</td>
</tr>
<tr>
<td>Age 35 - 44</td>
<td>7,444</td>
<td>93.5%</td>
<td>6,962</td>
<td>5,483</td>
<td>614</td>
<td>907</td>
</tr>
<tr>
<td>Age 45 - 54</td>
<td>7,649</td>
<td>93.5%</td>
<td>7,155</td>
<td>7,126</td>
<td>50</td>
<td>396</td>
</tr>
<tr>
<td>Age 55 - 64</td>
<td>6,934</td>
<td>85.4%</td>
<td>5,925</td>
<td>7,382</td>
<td>2</td>
<td>185</td>
</tr>
<tr>
<td>Age 65 - 74</td>
<td>3,250</td>
<td>58.9%</td>
<td>1,913</td>
<td>3,531</td>
<td>0</td>
<td>87</td>
</tr>
<tr>
<td>Age 75 - 84</td>
<td>598</td>
<td>28.7%</td>
<td>172</td>
<td>712</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Age 85 - 99</td>
<td>42</td>
<td>0.0%</td>
<td>0</td>
<td>34</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>29,425</td>
<td>85.4%</td>
<td>25,143</td>
<td>25,143</td>
<td>3,712</td>
<td>1,912</td>
</tr>
</tbody>
</table>

Source: ADA Health Policy Institute analysis of ADA masterfile. Notes: Data for 2013 are based on the ADA masterfile. Results after 2013 are projected. Totals in the projection may not match the sum of age groups due to the rounding of fractional numbers produced by the model. Assumes a) U.S. total annual dental school graduates will increase linearly to 2018 and then remain flat and b) future outflow rates are same as 2008-2013 historical percentages. “Retention rate” in column B is the percentage of dentists retained in the workforce after combining assumed percentages for dentists who are retired, moved out of state, deceased or have expired licenses.

Calculation of Inflows, Step 3:
Established and Foreign-Trained Dentists

Historically, at least 60 percent of California’s inflows have been new U.S. dental school graduates with remaining inflows coming from established dentists who moved in state or reactivated an expired license, foreign-trained dentists and dentists who came out of retirement. TABLES 4 and 5 show that these smaller subsets of inflows have been a variable proportion of the total supply of dentists. As with Calculation of Inflows, Step 2, we created “low,” “high” and “medium” assumptions for the proportions of dentists entering the California dentist workforce based on historical numbers from 2008-2013, 2003-2008, and 2003-2013 respectively.

Combining Outflows and Inflows in the Model

The model started with California’s 2013 active licensed dentist workforce broken out into seven age groups. We applied various assumptions for outflows per age group to calculate the number of these dentists still working in 2018. We applied aging logic, based on masterfile historical patterns of how these seven age groups move from younger to older groups in a five-year period, to yield an updated age distribution for 2018. To this total, we added the estimated inflows of new dental school graduates, established dentists moving in state, foreign-trained dentists, relicensed and unretired dentists — by age group.

TABLE 6 summarizes the basic working of the model and shows results for our baseline scenario of the projected dentist workforce in 2018. We reiterated the process to calculate projections for 2023, 2028 and 2033.

Our three alternative assumptions for inflows of new graduates and three alternative assumptions for inflows of established and other dentists (TABLE 7) yield a total of nine possible modeling scenarios for the size of California’s dentist workforce through 2033.

Results

In 2013, there were 29,425 practicing dentists in California. This translated to 76.8 dentists per 100,000 population. Our main modeling results for the dentist workforce through 2033 are summarized in TABLE 8, which shows all nine scenarios corresponding to nine different sets of assumptions.

Our “baseline” modeling scenario was defined based on assumptions that we feel are most probable: that future outflow rates would be the same as the outflow rates for 2008-2013; that the annual number of U.S. dental school graduates would increase linearly through 2018 and then remain constant; and that the
percent of U.S. dental school graduates settling in California would remain constant at the 2003-2013 average (the “medium” assumption), as would inflow rates of established, foreign-trained, relicensed, and unretired dentists. This baseline scenario is shaded in **TABLE 8**. The last column in **TABLE 8** denotes our assessment of the relative likelihood of each of the nine scenarios. As noted in the methods section, we base this on the best empirical evidence available and our subjective appraisal of future trends.

Under the baseline, most probable scenario, the number of dentists per 100,000 population is estimated to increase from 76.8 in 2013 to 77.2 in 2018 and then decrease to 74.7 in 2033.

The aging of the dentist workforce is a common concern due to potential labor supply implications. If older dentists work significantly fewer hours, then total labor supply will evolve differently than the total number of dentists. To examine dentist workforce aging, **FIGURE 3** and **TABLE 9** show the historical and projected age distribution of dentists from 2003 to 2033 under the baseline scenario. **FIGURE 4** takes the baseline scenario and displays the data in a different way, looking at the supply of dentists in three age groups: all dentists, dentists under age 75 and dentists under age 65. Under our baseline scenario, the number of dentists under age 65 per 100,000 population decreases from 69.5 in 2008 to 62.8 in 2033. Our analysis does not incorporate hours worked by various age groups of dentists. This is an important area for future research.

**TABLE 10** and **FIGURES 5–7** summarize the projected annual outflows and inflows per five-year period from 2003 through 2033. The baseline scenario projects that inflows and outflows will both increase after 2013 and inflows will continue to exceed outflows through 2033. As the anticipated aging of the dentist workforce leads to a dramatic increase in retirements, the increased number of inflow dentists is expected to more than compensate, although not at the same projected growth rate as California’s population.

Moving beyond the baseline scenario that we feel is most probable, our modeling results from **TABLE 8** show that from 2013 to 2033, the supply of dentists in California is estimated to decrease under seven of the nine modeling scenarios.
Discussion

We developed a model to project the supply of practicing dentists in California that incorporates various sources of outflows from and inflows to the dentist workforce. The model, while conceptually straightforward, has the potential to generate numerous alternative scenarios based on different assumptions. We have taken considerable care to focus our analysis on what we feel are the most reasonable assumptions and have based this on extensive analysis of the best available empirical data. We emphasize, however, that different sets of assumptions will yield different results.

Our main finding is that, under what we consider to be the most likely scenario, the per capita supply of dentists in California is projected to increase through 2018 and then decrease through 2033. Although total inflows to California’s dentist workforce are expected to exceed total outflows, this net gain is smaller than the expected growth of California’s population. Comparing 2013 and 2033, the total per capita supply of dentists is expected to decrease by 2.7 percent while the per capita supply of dentists under 65 years of age is expected to decrease by 5.7 percent. Looking at alternative scenarios we modeled, we find that most are also associated with a declining per capita supply of dentists.

Our analysis also suggests that the dentist workforce is expected to age through 2033. Put another way, the per capita supply of younger dentists (e.g., under 65 years of age) is expected to decline faster than the per capita supply of older dentists. The projected aging of the dentist workforce is likely to have important implications on productivity since older dentists, on average, see fewer patients and work fewer hours than their younger counterparts. A comprehensive analysis that models the total hours of care or total number of visits potentially provided by the future supply of dentists under various productivity assumptions is beyond the scope of this research brief. However, based on a preliminary analysis of ADA Health Policy Institute data on hours worked among California dentists, we estimate that while the number of dentists per capita will decline by 2.7 percent between 2013 and 2033, total hours worked by dentists (per capita) will decline by 3.6 percent.

As we note in the introduction, our analysis needs to be interpreted carefully. Understanding how the total supply of dentists might evolve contributes only
partially to the central policy question of whether or not there is likely to be a shortage of dentists in California. The issue of provider adequacy is far more complex and, even at the most aggregate level, requires some type of assessment of the demand for dentists. The future demand for dentists, in turn, will depend on the future demand for dental care among the population, the future productivity and efficiency of dentists, as well as potential changes in dental workforce models such as the introduction of teledentistry or community dental health coordinators. On the demand side, a recent analysis predicts that dental spending in the United States is expected to grow at much lower rates than in previous decades, even after taking into account the aging of the U.S. population. At the same time, the Affordable Care Act is expected to expand dental coverage for certain groups, mainly children and low-income adults, and this is likely to increase demand for dental care among these groups. In California, the introduction of adult dental benefits in Medicaid as well as Medicaid expansion under the ACA will have a significant impact on demand for dental care among lower income populations. A recent analysis estimates that Medicaid expansion could increase the number of adults on Medicaid by 43 percent and the number of children on Medicaid by 17 percent. In addition, the take-up rate of private dental benefits in Covered California was 36 percent, suggesting that demand for dental care in the private market could increase as well. Beyond changes in dental insurance coverage patterns, changes in population demographics, household income, oral health statuses, and economic growth will likely play an important role in shaping demand for dental care in California in the coming decades.

As we noted, our analysis does not attempt to make judgments on the adequacy of the future dentist workforce or its capacity to meet the needs of the population. This would require much further investigation, incorporating demand side factors, alternative delivery models, workforce productivity and a host of other factors. The recent analysis released by HRSA, for example, on the adequacy of the dentist workforce in California illustrates a flawed methodological approach. Understanding the future evolution of the total supply of dentists, however, is an important aspect of assessing provider adequacy and our analysis contributes significantly to the evidence base in this area.

![Figure 5](image-url)

**Figure 5.** Historical and projected California dentists workforce annual inflows and outflows, baseline scenario.

**Source:** ADA Health Policy Institute analysis of ADA masterfile; U.S. Census Bureau, Intercensal Estimates and California Department of Finance Population Projections. **Notes:** Data up through 2013 are based on the ADA masterfile. Results after 2013 are projected. Totals in the projection may not match the sum of subsets due to the rounding of fractional numbers produced by the model. Assumes a) U.S. total annual dental school graduates will increase linearly to 2018 and then remain flat and b) future outflow rates are same as 2008-2013 historical percentages.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outflow of dentists</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>373</td>
<td>338</td>
<td>455</td>
<td>506</td>
<td>548</td>
<td>577</td>
<td>521</td>
</tr>
<tr>
<td>Moved out</td>
<td>167</td>
<td>183</td>
<td>175</td>
<td>191</td>
<td>201</td>
<td>207</td>
<td>194</td>
</tr>
<tr>
<td>License lapsed</td>
<td>132</td>
<td>143</td>
<td>154</td>
<td>160</td>
<td>167</td>
<td>173</td>
<td>163</td>
</tr>
<tr>
<td>Deceased</td>
<td>50</td>
<td>55</td>
<td>73</td>
<td>80</td>
<td>87</td>
<td>92</td>
<td>83</td>
</tr>
<tr>
<td>Inflow of dentists</td>
<td>1,041</td>
<td>921</td>
<td>1,127</td>
<td>1,185</td>
<td>1,211</td>
<td>1,230</td>
<td>1,188</td>
</tr>
</tbody>
</table>

**Table 10:** Historical and Projected California Dentist Workforce, Annual Inflows and Outflows, Baseline Scenario

**Source:** ADA Health Policy Institute analysis of ADA masterfile; U.S. Census Bureau, Intercensal Estimates and California Department of Finance Population Projections. **Notes:** Data up through 2013 are based on the ADA masterfile. Results after 2013 are projected. Totals in the projection may not match the sum of subsets due to the rounding of fractional numbers produced by the model. Assumes a) U.S. total annual dental school graduates will increase linearly to 2018 and then remain flat and b) future outflow rates are same as 2008-2013 historical percentages. Data are taken from TABLES 9 and 10.
REFERENCES
10. The nine dental schools are Midwestern University College of Dental Medicine, Arizona (opened 2008), Western University of Health Sciences College of Dental Medicine, California (opened 2009), Midwestern University College of Dental Medicine, Illinois (opened 2011), East Carolina University School of Dental Medicine, North Carolina (opened 2011), Roseman University of Health Sciences College of Dental Medicine, Utah (opened 2011), LECOM College of Dental Medicine, Florida (opened 2012), University of Utah School of Dentistry (opened 2013), University of New England College of Dental Medicine, Maine (opened 2013), and Missouri School of Dentistry and Oral Health (opened 2013).

FIGURE 6. Historical and projected California dentist workforce average annual outflows, baseline scenario. Source: ADA Health Policy Institute analysis of ADA masterfile; U.S. Census Bureau, Intercensal Estimates and California Department of Finance Population Projections. Notes: Data up through 2013 are based on the ADA masterfile. Results after 2013 are projected. Assumes a) U.S. total annual dental school graduates will increase linearly to 2018 and then remain flat and b) future outflow rates are same as 2008-2013 historical percentages. Data are taken from TABLE 10.

FIGURE 7. Historical and Projected California Dentist Workforce Average Annual Inflows, Baseline Scenario Source: ADA Health Policy Institute analysis of ADA masterfile; U.S. Census Bureau, Intercensal Estimates and California Department of Finance Population Projections. Notes: Data up through 2013 are based on the ADA masterfile. Results after 2013 are projected. Assumes a) U.S. total annual dental school graduates will increase linearly to 2018 and then remain flat and b) future outflow rates are same as 2008-2013 historical percentages. Data are taken from TABLE 10.
You are the protector of the smile. You prevent the cavities, ease the pain, straighten the wayward. In doing so, you give your patients a world of possibility filled with happiness and laughter. That gift is why CDA passionately supports and protects your profession. Because the world is a better place when people are smiling, and that’s thanks to you.

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n most states, and nationally, Medicaid children have seen significant gains in access to dental care during the past decade. In fact, dental care utilization among low-income children is at its highest level since the Medical Expenditure Panel Survey (MEPS) began collecting data on this measure in 1996. In California, for example, dental care utilization among Medicaid enrolled children increased from 29.8 percent in 2000 to 39.9 percent in 2013, a 34 percent increase. Over this same period, nationwide, dental care utilization among Medicaid enrolled children increased from 27 percent to 43 percent, a 59 percent increase. For low-income adults, trends in dental care utilization and access to care have been very different. As of 2012, dental care utilization among working-age adults is at its lowest level since the MEPS began collecting data on this measure in 1996, with a steady downward trend among low-income adults. The percentage of low-income adults that reported financial barriers to dental care increased from 17.4 percent in 2000 to 30.1 percent in 2013, a 73 percent increase. Dental-related emergency department visits increased significantly from 2000 through 2013, in particular for young adults ages 21-34. In fact, the gap in dental care use between poor and non-poor adults widened in many states from 2002 through 2010, California being one of them.

The historical gains among Medicaid children and erosion among Medicaid adults in access to dental care are important context for the forthcoming influx of Medicaid enrollees. Due to the Affordable Care Act (ACA), an estimated 3.2 million children and 8.3 million adults nationwide could gain dental benefits through Medicaid. In California, an estimated 772,000 previously uninsured children and 2.2 million previously uninsured adults became eligible for Medicaid in 2014 due to the ACA. This translates to a 16.9 percent (children) and 43.7 percent (adults) expansion of the Medicaid population. Because California re-introduced an adult dental benefit in Medicaid in 2014, more than 7 million adults, the entire potential adult California Medicaid population, suddenly became eligible for Medicaid dental benefits in 2014.

A critical policy issue is whether expanded Medicaid coverage will translate to expanded access and, ultimately, improved oral health for both kids and adults. There is very strong evidence that certain “enabling conditions” are needed to ensure access to dental care within Medicaid program. These include adequate provider...
reimbursement,17,18 case management programs to reduce cancellations, streamlined credentialing, loan forgiveness programs and an enhanced Medicaid dental provider network.19 It is difficult to get accurate, cross-state comparable data on key aspects of state Medicaid programs. With respect to provider reimbursement, an area where data are available, fees have not kept up with inflation the past decade in the majority of states, including California.20 Moreover, California has among the lowest Medicaid reimbursement rates in the country. As of 2013, Medi-Cal reimbursement for dental services was, on average, 29 percent of typical commercial insurance charges for both children and adults.21 This was third lowest among all 50 states and the District of Columbia. There is no reliable source for state-by-state data on dentist participation in Medicaid. Thus, it is difficult to compare California, where previously reported dentist participation rates in Medi-Cal range from 25 to 66 percent,22-25 to other states.

Experiences in several states this past decade have illustrated that Medicaid reforms can lead to substantially increased access to dental care for enrollees. For example, Connecticut, Maryland and Texas reformed their Medicaid programs by putting in place key enabling conditions — e.g., streamlined administrative procedures, increased provider and patient outreach, enhanced provider incentives — and saw substantial increases in provider participation and dental care use among Medicaid children.26

In this study, we examine factors driving dentist participation in the Medi-Cal dental program through an innovative survey of a representative sample of California dentists. Specifically, we study current attitudes and participation rates of dentists in the Medi-Cal dental program, identify the critical factors that drive participation, and then use an innovative methodology to simulate the impact of alternative policy reforms on dentist participation. We discuss the policy implications of our findings. Please note that, throughout this report, Medi-Cal refers to California’s fee-for-service (Denti-Cal), Medicaid and CHIP dental programs.

### Data and Methods

The analysis in this report is based upon a representative survey of professionally active dentists in California. As of October 2014, there were 29,637 professionally active dentists in the state according to the American Dental Association (ADA) masterfile, the most comprehensive data source of all dentists in the United States. A total of 16,538 dentists had a valid email

---

**TABLE 1**

Survey Respondents Versus All Dentists in California

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Dentist population</th>
<th>Dentists receiving survey</th>
<th>Survey respondents</th>
<th>P-value (population versus respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>29,637</td>
<td>16,538</td>
<td>1,403</td>
<td></td>
</tr>
<tr>
<td><strong>Background characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>32.3%</td>
<td>33.9%</td>
<td>32.6%</td>
<td>0.8185</td>
</tr>
<tr>
<td>ADA member</td>
<td>64.9%</td>
<td>76.0%</td>
<td>82.8%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>General practice dentist</td>
<td>82.2%</td>
<td>80.4%</td>
<td>82.6%</td>
<td>0.7819</td>
</tr>
<tr>
<td>Rural provider</td>
<td>3.4%</td>
<td>3.4%</td>
<td>4.8%</td>
<td>0.0056</td>
</tr>
<tr>
<td>under 35</td>
<td>11.2%</td>
<td>12.3%</td>
<td>11.2%</td>
<td></td>
</tr>
<tr>
<td>35 to 44</td>
<td>24.4%</td>
<td>28.2%</td>
<td>21.2%</td>
<td></td>
</tr>
<tr>
<td>45 to 54</td>
<td>26.0%</td>
<td>25.7%</td>
<td>25.6%</td>
<td></td>
</tr>
<tr>
<td>55 to 64</td>
<td>24.0%</td>
<td>21.7%</td>
<td>28.7%</td>
<td></td>
</tr>
<tr>
<td>65 and older</td>
<td>14.4%</td>
<td>12.2%</td>
<td>13.3%</td>
<td>0.0006</td>
</tr>
<tr>
<td>Mean Age</td>
<td>50.4</td>
<td>49.1</td>
<td>50.8</td>
<td>0.18</td>
</tr>
<tr>
<td>County population</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 90,000</td>
<td>1.1%</td>
<td>1.1%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>90,001 to 285,000</td>
<td>6.0%</td>
<td>6.1%</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>285,001 to 700,000</td>
<td>7.2%</td>
<td>7.6%</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>700,001 to 1,500,000</td>
<td>19.9%</td>
<td>21.1%</td>
<td>21.4%</td>
<td></td>
</tr>
<tr>
<td>1,500,001 to 11,000,000</td>
<td>65.7%</td>
<td>64.1%</td>
<td>60.1%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>27.2%</td>
<td>25.7%</td>
<td>26.5%</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>1.6%</td>
<td>1.4%</td>
<td>1.4%</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>4.8%</td>
<td>4.3%</td>
<td>8.5%</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>37.4%</td>
<td>33.9%</td>
<td>45.3%</td>
<td></td>
</tr>
<tr>
<td>Not reported</td>
<td>27.3%</td>
<td>32.7%</td>
<td>11.4%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.2%</td>
<td>1.5%</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>0.2%</td>
<td>0.4%</td>
<td>0.9%</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Source: 2014 California Dentist Survey and ADA masterfile.
A total of 1,404 dentists completed the survey for a total response rate of 8.5 percent. Excluding undeliverable email responses (1,777 individuals), the final adjusted response rate was 9.5 percent. Subsequently, one dentist was dropped from the analysis because the individual moved out of California over the survey period. In total, 1,403 dentists were included in the final analysis.

Attitudes of survey respondents were captured by asking them if they agree with several statements, using a 5-point Likert scale. New” adult and child patients enrolled in Medi-Cal, the state Medicaid program for children and adults in California.

TABLE 1 presents the background characteristics of all professionally active dentists in California, dentists to whom the survey was mailed and survey respondents. Compared to the entire dentist population in California, survey respondents were slightly younger, more likely to be an ADA member, more likely to be white or Asian, and more likely to practice in a rural region. There were no significant differences by gender or general practice dentist status between the dentist population in California and the survey respondent sample. To adjust for these differences, we used survey weights in the analysis to compensate for survey non-response bias with respect to the following dentist characteristics: age, general practitioner or specialist status, ADA membership status, and the population of the county where the dentist’s practice is located. Due to a high rate of missing values on race/ethnicity in the ADA masterfile (approximately 27 percent), this variable was not used in the weighting methodology. Weighting ensures that the analysis is not skewed by dentists whose characteristics are overrepresented in the survey relative to the California dentist population. After applying the sample weights, the profile of survey respondents is very consistent with all professionally active California dentists in key characteristics such as age, rural or urban location, or county population. While we feel that we have adequately controlled for any systematic response bias with respect to observable characteristics, we recognize there may be some response bias with respect to individual unobservable factors.

The survey consisted of three sections. In the first section, dentists were asked whether they “currently treat” or “accept
variations to elicit changes in responses. The attributes and alternative levels are summarized in the Table (see Appendix).

To generate the Medi-Cal scenarios presented to respondents, we used a standard main-effects orthogonal array. Specifically, an array for four attributes with three levels each was identified in the SAS catalog and consisted of nine profiles. The order of the profiles and attributes within the profile were randomized and the experimental design was tested for orthogonality (i.e., that the attributes remained independent of each other). Respondents were presented each of the nine profiles, representing nine different policy options. Similar to previous work, two preference elicitation approaches were used. First, each respondent was asked whether they would accept Medi-Cal patients under each scenario. Second, respondents were asked to identify the best and worst attribute. When sufficient variation exists in responses under the first approach (i.e., when there is variation in the rates of acceptance across the attributes), it is possible to simply estimate a choice model via standard conjoint analysis. The second approach is useful when sufficient variation does not exist (i.e., ceiling or floor effects), and an alternative model of best-worst scaling is needed. Fortunately, in our case, sufficient variation was present and the standard conjoint analysis modeling was feasible. A sample scenario is provided in the Appendix.

A total of 920 respondents completed each of the nine profiles. Respondents who did not complete a profile were dropped from the conjoint analysis. Based on stated-preference data elicited from the nine presented profiles, we estimated a logit regression model to identify the impact of each attribute of the Medi-Cal program on the likelihood that a dentist will accept a new Medi-Cal patient.

Standard errors for parameter estimates were clustered at the respondent-level to account for serial correlation and heteroskedasticity. We used the estimated parameters to predict the probability of Medi-Cal patient acceptance under various policy scenarios. These policy simulations are extremely powerful in illustrating the likely effect of alternative Medi-Cal reforms. Since we are primarily interested in understanding how the typical dentist would respond to reforms, our conjoint analysis model does not control for individual characteristics.

The third section of the survey elicited information on whether respondents currently treat or accept new adult and child patients that pay out-of-pocket or through their private dental insurance carrier. We also elicited information on busyness over the past 12 months. Respondents were asked if they are 1) too busy to treat all people requesting appointments, 2) provided care to all who requested appointments but was overworked 3) provided care to all who requested appointments but was not overworked and 4) not busy enough, could have treated more patients. Dentists were also asked to provide the average wait times for patients asking for an initial appointment or a return appointment. Dentists were also asked to provide information on specialty (general practice [GP], oral and maxillofacial surgery, endodontics, orthodontics, pediatric dentistry, periodontics, prosthodontics, oral and maxillofacial survey, public health and oral/maxillofacial radiology) and race/ethnicity. Where possible, missing values on specialty and race/ethnicity were backfilled using information from the ADA masterfile. Age and gender were also determined based on data from the ADA masterfile.

We analyzed the percentage of dentists who currently treat and accept new adult and child patients by source of payment (private insurance, out-of-pocket, Medi-Cal). We analyzed these responses by age, gender, race/ethnicity, rural/urban office location, GP dentist/specialist status, ADA membership status and busyness level. We also presented basic tabulations of subjective attitudes and assessment of the Medi-Cal program. We estimated separate linear probability model regressions for adult and child Medi-Cal acceptance. We used age, gender, subjective attitude and assessment of Medi-Cal program, dentist specialty, ADA membership, the percentage of the population in Medi-Cal at the county level and rural/urban office location. These regressions were used to determine the individual and community factors that predict Medi-Cal acceptance of new adult or child patients. Stepwise selection was used to determine statistically significant covariates at the 10 percent significance level. Medi-Cal population data at the county level was collected from the five-year 2008-2012 American Community survey.
Results

The percentage of dentists who indicated they accept new patients or currently treat patients varies substantially by source of payment (TABLE 2A). Among survey respondents, 89.1 percent said that they accept new adult patients with private insurance and 94.7 percent said that they accept new child patients with private insurance. A nearly identical percentage of dentists accept new child (94.9 percent) or adult (89.3 percent) patients who pay out-of-pocket. However, Medi-Cal acceptance is much lower. Only 33.5 percent of respondents said that they accept new Medi-Cal adult patients while 40.7 percent said that they accept new child patients on Medi-Cal.

In terms of current patients, 89.7 percent of respondents said that they currently treat adult patients with private insurance and 95.1 percent said that they currently treat child patients whose parents have private insurance. About 89 percent of dentists currently treat adults who pay out-of-pocket while 94.2 percent of dentists currently treat child out-of-pocket patients. The percentage of dentists who currently treat adults or children on Medi-Cal is substantially lower. Only 37.1 percent of dentists currently treat adults on Medi-Cal while 45.8 percent of dentists currently treat children on Medi-Cal.

TABLE 2B presents the percentage of respondents who currently treat or accept new Medi-Cal patients based on dentist demographic characteristics. Compared to dentists whose offices are located in urban areas, dentists in rural California are less likely to currently treat or accept new adult and child Medi-Cal patients. For example, 15.9 percent of rural dentists and 34.2 percent of urban dentists accept new adult Medi-Cal patients. Similarly, 26.3 percent of rural dentists and 41.2 percent of urban dentists accept new child Medi-Cal patients.

Younger dentists are also more likely to accept new or currently treat Medi-Cal patients. For example, 60.6 percent of dentists ages 25 to 34 accept new child Medi-Cal patients while only 25.3 percent of dentists 55 to 64 accept new child Medi-Cal patients. Compared to male dentists, a higher percentage of female dentists accept new or currently treat Medi-Cal patients. For example, 48.5 percent of female dentists accept new Medi-Cal child patients while only 36.1 percent of male dentists accept new Medi-Cal child patients. Compared to dentists with other race/ethnic backgrounds, non-Hispanic white dentists are less likely to accept new or currently treat Medi-Cal patients. For
**TABLE 2C**

**Probability of Accepting a New Medi-Cal Child Dental Patient**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>Standard error</th>
<th>T-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspects of Medi-Cal program (reference category for each attribute is “somewhat discouraged”)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discouraged by reimbursement</td>
<td>-0.102</td>
<td>0.059</td>
<td>-1.740</td>
<td>0.083</td>
</tr>
<tr>
<td>Not discouraged by reimbursement</td>
<td>0.001</td>
<td>0.079</td>
<td>-0.020</td>
<td>0.988</td>
</tr>
<tr>
<td>Discouraged by delayed payments from Medi-Cal</td>
<td>-0.089</td>
<td>0.040</td>
<td>-2.240</td>
<td>0.025</td>
</tr>
<tr>
<td>Not discouraged by delayed payments from Medi-Cal</td>
<td>0.036</td>
<td>0.052</td>
<td>0.690</td>
<td>0.488</td>
</tr>
<tr>
<td>Discouraged by claim submission process</td>
<td>-0.074</td>
<td>0.037</td>
<td>-1.990</td>
<td>0.047</td>
</tr>
<tr>
<td>Not discouraged by claim submission process</td>
<td>0.067</td>
<td>0.049</td>
<td>1.370</td>
<td>0.172</td>
</tr>
<tr>
<td><strong>Attitudes regarding Medi-Cal (reference category for each attribute is “neither agree nor disagree”)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree that Medi-Cal is less complicated than five years ago</td>
<td>0.175</td>
<td>0.053</td>
<td>3.300</td>
<td>0.001</td>
</tr>
<tr>
<td>Disagree that Medi-Cal is less complicated than five years ago</td>
<td>0.151</td>
<td>0.030</td>
<td>5.090</td>
<td>0.000</td>
</tr>
<tr>
<td>Agree that Medi-Cal has a process in place that allows me to provide feedback</td>
<td>0.094</td>
<td>0.055</td>
<td>1.710</td>
<td>0.088</td>
</tr>
<tr>
<td>Disagree that Medi-Cal has a process in place that allows me to provide feedback</td>
<td>0.137</td>
<td>0.031</td>
<td>4.450</td>
<td>0.000</td>
</tr>
<tr>
<td>Agree that Medi-Cal respects my professional judgment</td>
<td>0.095</td>
<td>0.044</td>
<td>2.160</td>
<td>0.031</td>
</tr>
<tr>
<td>Disagree that Medi-Cal respects my professional judgment</td>
<td>-0.010</td>
<td>0.032</td>
<td>-0.330</td>
<td>0.740</td>
</tr>
<tr>
<td>Agree that when program changes are made to Medi-Cal, my office hears about them in a timely manner</td>
<td>0.107</td>
<td>0.041</td>
<td>2.640</td>
<td>0.008</td>
</tr>
<tr>
<td>Disagree that when program changes are made to Medi-Cal, my office hears about them in a timely manner</td>
<td>-0.022</td>
<td>0.031</td>
<td>-0.710</td>
<td>0.479</td>
</tr>
<tr>
<td>Agree that dentists have an ethical obligation to treat Medi-Cal patients</td>
<td>0.179</td>
<td>0.039</td>
<td>4.640</td>
<td>0.000</td>
</tr>
<tr>
<td>Disagree that dentists have an ethical obligation to treat Medi-Cal patients</td>
<td>-0.061</td>
<td>0.029</td>
<td>-2.080</td>
<td>0.038</td>
</tr>
<tr>
<td><strong>Dental specialty (reference category: GP dentist)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral surgeon</td>
<td>-0.097</td>
<td>0.062</td>
<td>-1.560</td>
<td>0.118</td>
</tr>
<tr>
<td>Endodontist</td>
<td>-0.159</td>
<td>0.033</td>
<td>-4.790</td>
<td>0.000</td>
</tr>
<tr>
<td>Orthodontist</td>
<td>0.132</td>
<td>0.074</td>
<td>1.780</td>
<td>0.076</td>
</tr>
<tr>
<td>Pediatric dentist</td>
<td>0.121</td>
<td>0.058</td>
<td>2.070</td>
<td>0.039</td>
</tr>
<tr>
<td>Periodontist</td>
<td>-0.268</td>
<td>0.082</td>
<td>-3.270</td>
<td>0.001</td>
</tr>
<tr>
<td>Other dental specialist</td>
<td>0.009</td>
<td>0.066</td>
<td>0.140</td>
<td>0.887</td>
</tr>
<tr>
<td><strong>Age of dentist (reference category: age 25-34)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 35-44</td>
<td>-0.148</td>
<td>0.051</td>
<td>-2.930</td>
<td>0.003</td>
</tr>
<tr>
<td>Age 45-54</td>
<td>-0.200</td>
<td>0.049</td>
<td>-4.070</td>
<td>0.000</td>
</tr>
<tr>
<td>Age 55-64</td>
<td>-0.299</td>
<td>0.049</td>
<td>-6.140</td>
<td>0.000</td>
</tr>
<tr>
<td>Over age 64</td>
<td>-0.263</td>
<td>0.055</td>
<td>-4.750</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Percent of children 0-18 on Medicaid (reference category: less than 20 percent)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%-29.99%</td>
<td>0.148</td>
<td>0.052</td>
<td>2.860</td>
<td>0.004</td>
</tr>
<tr>
<td>30%-30.99%</td>
<td>0.171</td>
<td>0.055</td>
<td>3.090</td>
<td>0.002</td>
</tr>
<tr>
<td>Greater than or equal to 40%</td>
<td>0.309</td>
<td>0.053</td>
<td>5.800</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Other dentist characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not an ADA member</td>
<td>0.063</td>
<td>0.035</td>
<td>1.800</td>
<td>0.072</td>
</tr>
<tr>
<td>Rural dentist</td>
<td>-0.099</td>
<td>0.059</td>
<td>-1.690</td>
<td>0.092</td>
</tr>
<tr>
<td>Constant term</td>
<td>0.377</td>
<td>0.099</td>
<td>3.810</td>
<td>0.000</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.3701</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>1,044</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: 2014 California Dentist Survey. Notes: Regression estimated using a linear probability model. Robust standard errors are estimated. Stepwise selection used to determine statistically significant covariates at 10 percent significance level.
### Table 2D

#### Probability of Accepting a New Medi-Cal Adult Dental Patient

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>Standard error</th>
<th>T-Stat</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspects of Medi-Cal program (reference category for each attribute is “somewhat discouraged”)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discouraged by reimbursement</td>
<td>-0.163</td>
<td>0.062</td>
<td>-2.62</td>
<td>0.009</td>
</tr>
<tr>
<td>Not discouraged by reimbursement</td>
<td>-0.030</td>
<td>0.081</td>
<td>-0.37</td>
<td>0.71</td>
</tr>
<tr>
<td>Discouraged by denied Medi-Cal payments</td>
<td>-0.055</td>
<td>0.050</td>
<td>-1.1</td>
<td>0.272</td>
</tr>
<tr>
<td>Not discouraged by denied Medi-Cal payments</td>
<td>0.122</td>
<td>0.070</td>
<td>1.74</td>
<td>0.082</td>
</tr>
<tr>
<td>Discouraged by claim submission process</td>
<td>-0.092</td>
<td>0.034</td>
<td>-2.71</td>
<td>0.007</td>
</tr>
<tr>
<td>Not discouraged by claim submission process</td>
<td>0.034</td>
<td>0.050</td>
<td>0.69</td>
<td>0.492</td>
</tr>
<tr>
<td><strong>Attitudes regarding Medi-Cal (reference category for each attribute is “neither agree nor disagree”)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree that Medi-Cal patients make other patients feel uncomfortable in the office</td>
<td>-0.077</td>
<td>0.030</td>
<td>-2.55</td>
<td>0.011</td>
</tr>
<tr>
<td>Disagree that Medi-Cal patients make other patients feel uncomfortable in the office</td>
<td>-0.002</td>
<td>0.031</td>
<td>-0.06</td>
<td>0.952</td>
</tr>
<tr>
<td>Agree that compared to other patients, Medi-Cal patients are more difficult to treat</td>
<td>0.039</td>
<td>0.027</td>
<td>1.41</td>
<td>0.158</td>
</tr>
<tr>
<td>Disagree that compared to other patients, Medi-Cal patients are more difficult to treat</td>
<td>-0.043</td>
<td>0.035</td>
<td>-1.12</td>
<td>0.222</td>
</tr>
<tr>
<td>Agree that Medi-Cal is less complicated than five years ago</td>
<td>0.162</td>
<td>0.050</td>
<td>3.23</td>
<td>0.001</td>
</tr>
<tr>
<td>Disagree that Medi-Cal is less complicated than five years ago</td>
<td>0.108</td>
<td>0.029</td>
<td>3.8</td>
<td>0</td>
</tr>
<tr>
<td>Agree that Medi-Cal has a process in place that allows me to provide feedback</td>
<td>0.113</td>
<td>0.054</td>
<td>3.64</td>
<td>0</td>
</tr>
<tr>
<td>Disagree that Medi-Cal has a process in place that allows me to provide feedback</td>
<td>0.144</td>
<td>0.029</td>
<td>4.44</td>
<td>0</td>
</tr>
<tr>
<td>Agree that when program changes are made to Medi-Cal, my office hears about them in a timely manner</td>
<td>0.131</td>
<td>0.041</td>
<td>3.22</td>
<td>0.001</td>
</tr>
<tr>
<td>Disagree that when program changes are made to Medi-Cal, my office hears about them in a timely manner</td>
<td>-0.011</td>
<td>0.029</td>
<td>-0.36</td>
<td>0.717</td>
</tr>
<tr>
<td>Agree that dentists have an ethical obligation to treat Medi-Cal patients</td>
<td>0.170</td>
<td>0.038</td>
<td>4.44</td>
<td>0</td>
</tr>
<tr>
<td>Disagree that dentists have an ethical obligation to treat Medi-Cal patients</td>
<td>-0.042</td>
<td>0.028</td>
<td>-1.49</td>
<td>0.136</td>
</tr>
<tr>
<td><strong>Dental specialty (reference category: GP dentist)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral surgeon</td>
<td>-0.039</td>
<td>0.064</td>
<td>-0.61</td>
<td>0.542</td>
</tr>
<tr>
<td>Endodontist</td>
<td>-0.119</td>
<td>0.033</td>
<td>-3.64</td>
<td>0</td>
</tr>
<tr>
<td>Orthodontist</td>
<td>-0.296</td>
<td>0.053</td>
<td>-5.55</td>
<td>0</td>
</tr>
<tr>
<td>Pediatric dentist</td>
<td>-0.227</td>
<td>0.038</td>
<td>-5.92</td>
<td>0</td>
</tr>
<tr>
<td>Periodontist</td>
<td>-0.179</td>
<td>0.086</td>
<td>-2.07</td>
<td>0.039</td>
</tr>
<tr>
<td>Other dental specialist</td>
<td>0.015</td>
<td>0.067</td>
<td>0.22</td>
<td>0.828</td>
</tr>
<tr>
<td><strong>Age of dentist (reference category: age 25-34)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 35-44</td>
<td>-0.129</td>
<td>0.051</td>
<td>-2.51</td>
<td>0.012</td>
</tr>
<tr>
<td>Age 45-54</td>
<td>-0.122</td>
<td>0.050</td>
<td>-2.45</td>
<td>0.015</td>
</tr>
<tr>
<td>Age 55-64</td>
<td>-0.215</td>
<td>0.049</td>
<td>-4.35</td>
<td>0</td>
</tr>
<tr>
<td>Over age 64</td>
<td>-0.176</td>
<td>0.054</td>
<td>-3.24</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Percent of adults 19-64 on Medicaid (reference category: less than 10 percent)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater than or equal to 10%</td>
<td>0.069</td>
<td>0.024</td>
<td>2.84</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Other dentist characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not an ADA member</td>
<td>0.159</td>
<td>0.037</td>
<td>4.26</td>
<td>0</td>
</tr>
<tr>
<td>Rural dentist</td>
<td>-0.085</td>
<td>0.049</td>
<td>-1.76</td>
<td>0.079</td>
</tr>
<tr>
<td>Constant term</td>
<td>0.487</td>
<td>0.090</td>
<td>5.42</td>
<td>0</td>
</tr>
<tr>
<td>Rsquared</td>
<td>0.3268</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>1,039</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: 2014 California Dentist Survey. Notes: Regression estimated using a linear probability model. Robust standard errors are estimated. Stepwise selection used to determine statistically significant covariates at 10 percent significance level.
example, 29.3 percent of non-Hispanic white dentists accept new Medi-Cal child patients while 53.4 percent of Hispanic dentists accept new Medi-Cal child patients. General practice dentists are also more likely to accept new or currently treat Medi-Cal patients. More than four out of 10 general practice dentists accept new Medi-Cal child patients compared to less than one in three specialists. Non-ADA members are also more likely to accept new or currently treat Medi-Cal patients.

**TABLE 2C** summarizes multivariate regression results for the likelihood of accepting a new Medi-Cal child patient. Dentist attitudes toward the Medi-Cal program and how they rate various aspects of the Medi-Cal program have a significant impact on the probability of a dentist accepting a new child patient. Compared to dentists who are somewhat discouraged by reimbursement in Medi-Cal, dentists who are discouraged are about 10 percentage points less likely to accept a new Medi-Cal child patient (p<0.10). Also, dentists who are discouraged by delayed payments or the claim submission process are less likely to accept a new Medi-Cal child patient (p<0.05).

Compared to dentists who are “neutral” on the complexity of the Medi-Cal dental program, dentists who disagree or agree with the statement that Medi-Cal is “less complicated than it was five years ago” are more likely to accept a new Medi-Cal child patient. This inconsistent result may indicate that program complexity does not factor into whether a dentist accepts a new Medi-Cal child patient. Relative to dentists who are “neutral” on the Medi-Cal feedback process, dentists who agree or disagree that Medi-Cal has a process in place that allows for feedback are more likely to accept a new child patient. This may also suggest that the feedback process does not factor into whether a dentist accepts a new Medi-Cal child patient.

Dentists who feel that Medi-Cal trusts their professional judgment, notifies their office of administrative changes in a timely manner and that dentists have an ethical obligation to treat Medi-Cal patients are more likely to accept a new Medi-Cal child patient.

Dentists who have offices in counties with high percentages of children on Medi-Cal are more likely to accept a new child patient. Compared to dentists whose offices are in counties where less than 20 percent of children are on Medi-Cal, dentists whose offices are in a county where more than 40 percent of children are on Medi-Cal are about 31 percentage points more likely to accept a new Medi-Cal child patient. Non-ADA members, all else equal, are about 16 percentage points more likely than ADA members to accept a new adult Medi-Cal patient (p<0.01). Non-ADA members, all else equal, are about 16 percentage points more likely than ADA members to accept a new adult Medi-Cal patient (p<0.01).

**FIGURE 1** summarizes the analysis of dentist busyness. Overall, a majority of dentists reported that they were not busy enough (27.5 percent) or were not overworked (48 percent). Only 17.5 percent of dentists reported that they were overworked and 7 percent reported that they could not take on more patients. Dentists not accepting new Medi-Cal patients were more likely to say that they were not busy enough. This suggests that dental practices currently not accepting Medi-Cal have open chair time that, if leveraged for the Medi-Cal population, could contribute to the dental safety net.

**FIGURE 2** summarizes dentist attitudes toward Medi-Cal. A majority of dentists strongly agree (53.8 percent) that it is difficult to provide comprehensive
treatment to Medi-Cal patients. More dentists agree than disagree that it is more difficult to treat Medi-Cal patients, compared to other patients and that providers have an ethical obligation to treat Medi-Cal patients. A majority of dentists also indicated that the Medi-Cal program does not respect their professional judgment. There are mixed views on how effectively dentists are notified of changes to the program, whether Medi-Cal is more or less complicated than five years ago and program feedback mechanisms.

FIGURE 3 summarizes how dentists assess various aspects of the Medi-Cal program. The vast majority of dentists were extremely discouraged about reimbursement and denied payments. A majority of dentists were either extremely discouraged or very discouraged about missed appointments, delayed payments, the claims submission process and patient noncompliance with recommended treatment. Audit and oversight activities were rated more favorably.

Based on the conjoint analysis portion of the survey, we estimated the impact of alternative policy reforms on the probability that dentists would accept new Medi-Cal patients. In the conjoint analysis, we deliberately did not specify whether patients were adults or children. The results are summarized in FIGURE 4, which graphically captures the relative importance of changing fees, the timeliness of payment, support for administrative tasks and the likelihood of missed appointments. The steeper the slope of the line in FIGURE 4, the larger the impact of changes in that particular factor have on dentist acceptance of new Medi-Cal patients. For example, increasing Medi-Cal fees to 75 percent of commercial dental insurance charges dramatically increases the probability of a dentist accepting a Medi-Cal dental patient. Compared to changes in other program attributes (missed appointments,
administrative processes and timeliness of payment) raising fees induces, by far, the greatest lift in the probability of a dentist accepting a new Medi-Cal patient. When dentists are paid one month after claim submission compared to three months or six months, the likelihood of accepting a new Medi-Cal patient is much higher. A high rate of missed appointments discourages dentists from accepting Medi-Cal patients. Interestingly, dentists prefer only some administrative assistance from the Medi-Cal program rather than full support. This may suggest that dentists want to maintain some level of autonomy when dealing with Medi-Cal program administrators. But the main conclusion from FIGURE 4 is that low reimbursement is, by far, the largest factor keeping more dentists from participating in the Medi-Cal program.

In FIGURE 5, we present policy simulations that estimate the probability of a dentist accepting a Medi-Cal patient under various Medi-Cal program scenarios. Under what we consider the “baseline” scenario (Medi-Cal fees at 35 percent of commercial dental insurance charges, Medi-Cal patients slightly more likely to miss an appointment than the typical patient, no administrative assistance and payment received one month after claim submission) the estimated share of dentists accepting Medi-Cal patients is 19 percent. Previously reported estimates of dentist participation in Medi-Cal range from 25 percent to 66 percent. However, of interest in FIGURE 5 is the change in the probability of a dentist accepting Medi-Cal patients under alternative policy scenarios. If all of the Medi-Cal program policy parameters are set at their lowest levels, the model predicts that about 4.8 percent of dentists would accept a new Medi-Cal patient — about one-quarter of the baseline level. If all of the Medi-Cal program policy parameters are set at their highest levels, the predicted...

**FIGURE 4.** Impact of attribute levels on acceptance of Medi-Cal patients.

*Source:* 2014 California Dentist Survey. *Note:* Larger vertical distances signify larger importance of the particular attribute and level to dentist Medi-Cal acceptance.

**FIGURE 5.** Predicted probability of accepting a Medi-Cal patient under alternative policy scenarios.

dentist participation rate is 70.6 percent — more than triple the baseline level.

If everything remained at the baseline setting but Medi-Cal reimbursement was raised to 55 percent of commercial rates, an estimated 36.1 percent of dentists are predicted to be willing to accept a new Medi-Cal patient — almost double the baseline rate. Raising reimbursement to 75 percent of commercial rates, holding all other program parameters constant at baseline levels, would raise Medi-Cal provider acceptance to an estimated 65.8 percent — more than triple the baseline level. If Medi-Cal reimbursement was raised to 55 percent of commercial rates and some administrative assistance was provided, and all other aspects of the Medi-Cal program remained constant at baseline levels, the share of dentists participating in the program is predicted to increase to approximately 46.1 percent.

Discussion

About one out of four California dentists report a desire to be busier, suggesting that there is some level of unused capacity within the dental care system in California. At the same time, many dentists either do not treat Medi-Cal patients or are not accepting new Medi-Cal patients. In fact, dentists who are least busy tend also to be the ones least likely to be accepting Medi-Cal patients. Our findings related to dentist attitudes toward Medi-Cal provide considerable insight into this apparent paradox. There is a high degree of dissatisfaction with many aspects of Medi-Cal, especially reimbursement rates. Indeed, California has among the lowest reimbursement rates of any state when it comes to Medicaid dental services. Other factors such as timeliness of payment, patient cancellation rates and administrative processes also play a role in keeping more dentists from participating in Medi-Cal — but a much smaller role. The prominence of low reimbursement as a deterrent to provider participation is consistent with previous research in California and is supported by a recent audit of the Medi-Cal dental program.

The most important contribution of our analysis, in our view, is that it provides insights into what combination of policy reforms could have the biggest impact on dentist participation in Medi-Cal and quantifies these predicted effects. This is a significant contribution to the evidence base for California because, to our knowledge, no other research has applied our novel methodology to understand the impact of a multipronged approach to policy reform. For example, our analysis found that dentist participation in Medi-Cal is predicted to almost double if reimbursement rates were increased to 55 percent of typical commercial dental insurance charges. If patient cancellation rates were to be reduced and the administrative process were simplified, dentist participation is projected to increase even more. Cancellation rates could be reduced, for example, through better use of patient navigators, online appointment tracking or better patient outreach. Administrative processes could be simplified, for example, by providing a service to dentists that assists with some of these tasks. However, our policy simulations show convincingly that addressing only nonfinancial issues will not lead to a significant increase in provider participation. Fee increases are also required in order to achieve any substantial impact. Our conclusions are consistent with a recent audit of the Medi-Cal dental program, which also found that, among other things, low provider reimbursement was a significant factor limiting access to dental care for child enrollees.

A natural extension of our analysis is to estimate the costs associated with the alternative Medi-Cal reforms that we modeled. This would provide policymakers with a cost-benefit calculation against which alternative approaches could be measured. Such analysis, in our view, is crucial especially in a fiscally challenging environment.

While our analysis contributes significant empirical evidence on provider behavior, specifically, quantitative estimates of how dentist participation in Medi-Cal is likely to change in response to alternative policy reforms, it is important to understand what our analysis does not do. Our analysis is not designed to provide insight on what changes to the Medi-Cal program are needed in order to attract sufficient numbers of dentists into the Medi-Cal program to address the unmet need in low-income and disadvantaged populations. This type of research is well beyond the scope of this report. Such analysis would need to incorporate much more refined dentist participation measures than simply “are you willing to accept Medicaid patients?” and would require sophisticated geo-analytic techniques to analyze the proximity of Medi-Cal accepting providers to program beneficiaries. For example, increasing dentist participation in Medi-Cal by 5 percent could lead to a very wide range of effects on access to dental care depending on how many patients new Medi-Cal providers take on, where these new Medi-Cal providers are located, and what type of dental care services they are willing to provide. Our analysis does not shed light on any of these factors, by design. This is important follow-up research that would significantly contribute to the policy debate on the best approach to enhancing access to dental care for Medi-Cal beneficiaries.
Appendix – Survey Instrument

California Dentist Survey on the Medi-Cal Dental Program

Thank you for your willingness to participate in this survey. On the following pages, you will be asked various questions related to the Medi-Cal Dental Program. The purpose of this survey is to learn more about the factors that influence dentists’ decisions to become Medi-Cal Dental Program providers. Throughout the survey, “Medi-Cal” refers to California’s fee-for-service (Denti-Cal), managed care, Medicaid and CHIP dental programs. At the end of the survey, please be sure to click “Submit.” If you encounter any difficulties completing this form, please send an email to hpi@ada.org. **Note:** All reporting of data will be done in aggregate form. Your individual responses will remain confidential.

### Current and New Medi-Cal Dental Program Patients

<table>
<thead>
<tr>
<th>Do you currently treat:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children enrolled in Medi-Cal?</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Adults enrolled in Medi-Cal?</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Are you currently accepting:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>New child patients enrolled in Medi-Cal?</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>New adult patients enrolled in Medi-Cal?</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Aspects of the Medi-Cal Dental Program

Below is a list of factors that might affect a dentist’s decision to accept new Medi-Cal patients. Please rate how much each factor could discourage you from accepting new Medi-Cal patients.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not at all discouraging 1</th>
<th>A little discouraging 2</th>
<th>Somewhat discouraging 3</th>
<th>Very discouraging 4</th>
<th>Extremely discouraging 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed appointments by Medi-Cal patients</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Chart audits process</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Oversight of practice activities (i.e., audits by Medicaid Recovery Audit Contractors)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Delayed payment from Medi-Cal</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Denial of payment from Medi-Cal</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Medi-Cal claims submission process</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Reimbursement rate from Medi-Cal</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Medi-Cal patient noncompliance with recommended treatment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Medi-Cal Patients and the Medi-Cal Dental Program

Below is a list of statements about Medi-Cal patients and the Medi-Cal Dental Program. Please rate your level of agreement with each statement.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Medi-Cal patients make other patients feel uncomfortable in the office.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Compared to other patients, Medi-Cal patients are more difficult to treat.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is difficult to provide comprehensive treatment to Medi-Cal patients.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The Medi-Cal program is less complicated now than it was five years ago.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Medi-Cal has a process in place that allows me to provide feedback to Medi-Cal Dental Program administrators.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Medi-Cal respects my professional judgment regarding patient care.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>When program changes are made to Medi-Cal, my office hears about them in a timely manner.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Dentists have an ethical obligation to treat Medi-Cal patients.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Alternative Medi-Cal Policies

We would like to learn how you feel about various alternatives to current Medi-Cal policies. In order to do this, the next pages will present you with some hypothetical Medi-Cal scenarios. There will be 9 scenarios, and they will be presented to you in random order. The scenarios you will see vary based on four aspects of the Medi-Cal Dental Program: 1. Administrative arrangements, 2. Patient profile, 3. Reimbursement, and 4. Timeliness of payment. The table below provides definitions of these aspects and possible values that you will see under the hypothetical scenarios presented to you. Please review the table carefully.

<table>
<thead>
<tr>
<th>Aspect of Medi-Cal</th>
<th>Definition</th>
<th>Possible Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative arrangements:</td>
<td>Level of administrative assistance that will be provided to you by an outside entity, free of charge (e.g., enrollment verification, billings, general paperwork, etc.)</td>
<td>• An outside entity will provide assistance with ALL administrative tasks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• An outside entity will provide assistance with SOME administrative tasks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NO OUTSIDE ENTITY will provide assistance with administrative tasks.</td>
</tr>
<tr>
<td>Patient profile:</td>
<td>Likelihood that a Medi-Cal patient will miss an appointment, compared to your typical patient.</td>
<td>• NO more likely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SLIGHTLY more likely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MUCH more likely</td>
</tr>
<tr>
<td>Reimbursement:</td>
<td>Amount that Medi-Cal will reimburse you for services provided. This is measured as a percentage of your typical fees.</td>
<td>• 75%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 55%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 35%</td>
</tr>
<tr>
<td>Timeliness of payment:</td>
<td>How long it takes, on average, for you to receive payment from Medi-Cal.</td>
<td>• 1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6 months</td>
</tr>
</tbody>
</table>

Click “Next” to view an example of the Medi-Cal scenarios we will present.

Example Scenario

Below is an example of Dr. John Smith’s responses to a scenario. Please review this example thoroughly, then click “Next” to start evaluating the scenarios. In the scenario below, which aspect is best and which aspect is worst (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with ALL administrative tasks.</th>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is NO more likely to miss an appointment than your typical patient.</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 35% of your typical fees.</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, 1 month after submitting a claim.</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ● Yes  ○ No

In this example, Dr. John Smith felt that the best aspect was the patient profile; the Medi-Cal patient is no more likely to miss an appointment than the typical patient. He felt that the worst aspect was the reimbursement rate of 35 percent.

Considering all four of the aspects, Dr. John Smith said that yes, he would accept a new Medi-Cal patient in this scenario.

Now that you have reviewed this example, we will present you with more scenarios and questions.

Before you continue, please check the box below to indicate that you have reviewed the information above and are ready to proceed.

□ I am ready to proceed.

Click “Next” to see your first scenario. (Note: Scenarios to appear in random order.)
Scenario 1
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with SOME administrative tasks.</td>
<td></td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is NO more likely to miss an appointment than your typical patient.</td>
<td></td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 75 percent of your typical fees.</td>
<td></td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, one month after submitting a claim.</td>
<td></td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 2
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: NO OUTSIDE ENTITY will provide assistance with administrative tasks.</td>
<td></td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is SLIGHTLY more likely to miss an appointment than your typical patient.</td>
<td></td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 75 percent of your typical fees.</td>
<td></td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, three months after submitting a claim.</td>
<td></td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 3
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: NO OUTSIDE ENTITY will provide assistance with administrative tasks.</td>
<td></td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is NO more likely to miss an appointment than your typical patient.</td>
<td></td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 55 percent of your typical fees.</td>
<td></td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, six months after submitting a claim.</td>
<td></td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 4
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: NO OUTSIDE ENTITY will provide assistance with administrative tasks.</td>
<td></td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is MUCH more likely to miss an appointment than your typical patient.</td>
<td></td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 35 percent of your typical fees.</td>
<td></td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, one month after submitting a claim.</td>
<td></td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No
Scenario 5
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with ALL administrative tasks.</td>
<td>O</td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is SLIGHTLY more likely to miss an appointment than your typical patient.</td>
<td>O</td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 55 percent of your typical fees.</td>
<td>O</td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, one month after submitting a claim.</td>
<td>O</td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 6
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with ALL administrative tasks.</td>
<td>O</td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is NO more likely to miss an appointment than your typical patient.</td>
<td>O</td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 35 percent of your typical fees.</td>
<td>O</td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, three months after submitting a claim.</td>
<td>O</td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 7
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with SOME administrative tasks.</td>
<td>O</td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is SLIGHTLY more likely to miss an appointment than your typical patient.</td>
<td>O</td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 35 percent of your typical fees.</td>
<td>O</td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, six months after submitting a claim.</td>
<td>O</td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

Scenario 8
Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATIVE ARRANGEMENTS: An outside entity will provide assistance with ALL administrative tasks.</td>
<td>O</td>
</tr>
<tr>
<td>PATIENT PROFILE: The Medi-Cal patient is MUCH more likely to miss an appointment than your typical patient.</td>
<td>O</td>
</tr>
<tr>
<td>REIMBURSEMENT: You will be paid 75 percent of your typical fees.</td>
<td>O</td>
</tr>
<tr>
<td>TIMELINESS OF PAYMENT: You will receive payment, on average, six months after submitting a claim.</td>
<td>O</td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No
Scenario 9

Please carefully review the aspects of the Medi-Cal Dental Program in the scenario below. In the scenario below, which aspect is best and which aspect is worst? (Select only one aspect per column.)

<table>
<thead>
<tr>
<th>Administrative Arrangements: An outside entity will provide assistance with SOME administrative tasks.</th>
<th>Best aspect</th>
<th>Worst aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Profile: The Medi-Cal patient is MUCH more likely to miss an appointment than your typical patient.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reimbursement: You will be paid 55 percent of your typical fees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timeliness of Payment: You will receive payment, on average, three months after submitting a claim.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Would you accept a new Medi-Cal patient under this scenario?  ○ Yes  ○ No

[Almost finished! We just have a few more questions on the two final pages.]

Non-Medi-Cal Dental Program Patients

Do you currently treat:  Yes  No

Children covered by their parents’ private dental insurance?  ○ ○
Adults covered by private dental insurance?  ○ ○
Children whose parents pay fully out-of-pocket?  ○ ○
Adults who pay fully out-of-pocket?  ○ ○

Are you currently accepting:  Yes  No

New child patients covered by their parents’ private dental insurance?  ○ ○
New adult patients covered by private dental insurance?  ○ ○
New child patients whose parents pay fully out-of-pocket?  ○ ○
New adult patients who pay fully out-of-pocket?  ○ ○

You and Your Practice

Thinking about the past 12 months, which of the following statements best describes the capacity of your primary practice to treat patients?
○ Too busy to treat all people requesting appointments
○ Provided care to all who requested appointments but was overworked
○ Provided care to all who requested appointments but was not overworked
○ Not busy enough, could have treated more patients

For your primary practice during the past 12 months, how long did a new patient typically have to wait for:

(Please round to the nearest whole number of days. If you have not accepted any new patients during the last 12 months, please leave the fields blank and check the box below.)

An initial appointment? (in days)  _________________________________________________
A return appointment? (in days)  _________________________________________________
□ I have not accepted new patients during the last 12 months.

Which one of the following best describes your practice, research or administration area? (Please select only one.)
○ General practice
○ Oral and maxillofacial surgery
○ Endodontics
○ Orthodontics and dentofacial orthopedics
Please indicate your race:
- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or other Pacific Islander
- Two or more races
- Other, please specify: __________________________________________

Are you of Hispanic or Latino ethnicity?
- Yes  ○ No

Please use the space to share any other comments you have about Medi-Cal participation or the Medi-Cal Dental Program. Thank you for your time! Please click “Submit” to send your responses.
Federally qualified health centers (FQHCs) are an important aspect of the health care safety net for low-income populations. A recent analysis estimates that about 10 percent of dental care services for Medicaid children are delivered through FQHCs and other public safety net facilities. Using data from various government reports, we estimate that 24 percent of low-income adults who had a dental visit received services through an FQHC. However, many health care advocates feel that FQHCs could play a larger role in delivering dental care services to Medicaid populations. One important constraint, however, is that many FQHCs do not have the current capacity to provide additional dental care services, either because they do not have dentists on site or do not have arrangements with dental school clinics, private dental care practices or other dental care providers in the community.

In this study, we attempt to assess the capacity of FQHC and FQHC look-alike sites with respect to dental care service delivery in California.

Data and Methods

We collected data through a survey we developed in consultation with the California Dental Association that focused on provision of dental care (APPENDIX A). The survey focused on identifying whether FQHC sites provided dental care services, what types of services were provided, how easily new patients could get an appointment and whether contractual arrangements with dental practices in the community were used.

We intended to survey all FQHC and FQHC look-alike sites in California. A sample was created based on California data from the Health Resources and Services Administration (HRSA) website. According to HRSA, “FQHCs include all organizations receiving grants under Section 330 of the Public Health Service Act (PHS). FQHCs qualify for enhanced reimbursement from Medicare and Medicaid, as well as other benefits. FQHCs must service an underserved area or population, offer a sliding fee scale, provide comprehensive services, have an ongoing quality assurance program and have a governing board of
directors. Certain tribal organizations and FQHC look-alikes (an organization that meets PHS Section 330 eligibility requirements but does not receive grant funding) also may receive special Medicare and Medicaid reimbursement.”

Also according to HRSA, the data on the website is a comprehensive and up-to-date roster of all registered FQHC service delivery and look-alike sites.

Shortly before data collection started on Nov. 4, 2014, we confirmed that the file we accessed was the most current information available from HRSA. According to the HRSA data, there were 151 FQHCs and FQHC look-alikes in California (defined as “grantees” in the data set HRSA compiles) originating a total of 1,529 individual sites. Thus, an initial call list of 1,529 sites was created on Sept. 16, 2014.

Multiple sites could be managed under a single FQHC. The focus of our analysis was the care delivery site and, accordingly, we set out to contact each specific site. But multiple service delivery sites were found to have the same phone numbers. Thus, between Nov. 4, 2014 and the beginning of data collection, a portion of duplicate phone numbers were investigated and updated through web searches.

A reputable data collection vendor based in California was selected to conduct the survey through telephone interviews based on its significant experience in conducting surveys among public health entities. A letter was sent to all sites alerting them of upcoming telephone interviews as well as providing them an opportunity to call the research vendor at their convenience.

Data collection through telephone interviews began Nov. 11, 2014, and concluded Dec. 19, 2014. Up to eight attempts were made to contact each delivery site.

Once data collection began, it was apparent that a sizeable proportion of phone numbers were not in service. In order to ensure that the greatest number of delivery sites were contacted, we reached out to the California Primary Care Association (CPCA) and the National Association of Community Health Centers (NACHC) on Nov. 13 and 14, respectively. On Nov. 18, the CPCA provided a list of 276 California service delivery sites offering dental services. The corresponding contact information for those sites was also provided. After updating the initial call list with data provided by the CPCA, a final call list of 1,543 service delivery sites was obtained. In addition, for invalid phone numbers, we carried out web searches and consulted a list of sites provided by the California Dental Association to update telephone numbers when needed.

We received responses from 778 sites, which translates to a response rate of 50 percent. Due to the nature of data collection and how our list of FQHC and look-alike sites was compiled, we feel that if there is any bias in our responses, it is likely that our data over-represent sites that provide dental care. In other words, FQHC sites responding to our survey are those that are, in general, more likely to provide dental care services.

**Results**

The vast majority of FQHC sites do not provide dental care — 63.2 percent of the sites did not provide dental care services on site or under a contractual arrangement with an off-site provider. Slightly more than one-quarter of sites provided on-site dental care services, and 8.9 percent of sites contracted with off-site dental care providers (FIGURE 1).

However, looking at dental care service provision at the FQHC level, which can encompass multiple sites, yields a different profile. We are able to group 718 individual FQHC sites into 140 FQHCs (i.e., “parent” organizations). Out of these 140 FQHCs, 58 percent have at least one site where dental care services are available on site. An additional 15 percent of sites have a contractual arrangement with an off-site provider while the remaining 27 percent of FQHCs have no sites where dental care services can be accessed (whether on site or off site).

Out of the 286 FQHC sites that provided dental care services either on site or off site, 262 delivery sites (91.6 percent) indicated that they offer a sliding fee schedule for patients who are ineligible for Medi-Cal dental programs and cannot pay for full services.

**FIGURE 1.** Responding FQHC and look-alike sites’ provision of dental care services.

<table>
<thead>
<tr>
<th>Service Provision</th>
<th>Sites</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No dental care services</td>
<td>63.2%</td>
<td>778</td>
</tr>
<tr>
<td>On-site dental care services</td>
<td>27.9%</td>
<td>217</td>
</tr>
<tr>
<td>Arranged with off-site provider</td>
<td>8.9%</td>
<td>77</td>
</tr>
</tbody>
</table>

**FIGURE 2.** Responding FQHC and look-alike sites’ busyness levels.

<table>
<thead>
<tr>
<th>Busyness Level</th>
<th>Sites</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too busy to treat all people requesting appointments</td>
<td>22.6%</td>
<td>174</td>
</tr>
<tr>
<td>Provided care to all who requested appointments but was/were not overworked</td>
<td>40.1%</td>
<td>514</td>
</tr>
<tr>
<td>Not busy enough, could have treated more patients</td>
<td>5.1%</td>
<td>39</td>
</tr>
<tr>
<td>Provided care to all those who requested appointments</td>
<td>40.1%</td>
<td>514</td>
</tr>
<tr>
<td>Too busy to treat all people requesting appointments</td>
<td>22.6%</td>
<td>174</td>
</tr>
</tbody>
</table>
FIGURE 3. Types of dental services provided by responding FQHC and look-alike delivery sites.

Of the 217 sites reporting on-site dental services, the average number of dentist full-time-equivalents on staff (FTEs) is 2.4. Among those same 217 sites, the mean number of dental hygienist FTEs on staff is 0.5 and, on average, a dentist is on site 4.6 days per week.

For a new patient, the average wait time for an initial appointment is 27.1 days. The average wait time for a return appointment is 24.4 days. About 55 percent of sites providing dental care services reported that they were too busy or were overworked. Only 5 percent of sites reported that they were not busy enough and could treat more patients. (FIGURE 2)

The vast majority of sites that provide dental care serve children (95 percent of sites), adults (93 percent) and seniors (86 percent). Slightly fewer sites provide care to seniors compared to children or adults.

There are important differences in the capacity to deliver dental care services by category of services. For example, almost all sites providing dental care offer preventive services and basic restorative care. However, only two-thirds provide major restorative services such as crowns and dentures. Only 6.6 percent of sites provide orthodontic services. (FIGURE 3)

Discussion

While FQHCs are an important component of the health care safety net in California, when it comes to dental care, there are important issues for policymakers to consider. Nearly two-thirds of FQHC and FQHC look-alike sites do not offer dental care services. Those that do appear to be, in general, severely challenged when it comes to capacity. Only 5 percent of FQHC sites report being not busy enough and able to see more patients, much lower than the average dental practice in the United States.5 Wait times for dental appointments in California FQHC sites are also significantly higher than in typical dental practices.4 However, at the FQHC level — which can encompass multiple sites — the situation is more favorable. Three out of four FQHCs are able to provide dental care services in at least one of their sites, either on site or through contractual arrangements with off-site dental care providers.

Our results suggest strongly that significant opportunities may exist to expand the dental safety net by increasing the number of FQHC and FQHC look-alike sites that provide dental care services, either on site or off site through partnerships with dental school clinics or private dental practices. However, further analysis is needed to estimate how many additional patients would gain access to dental care if, for example, the 64 percent of FQHC sites currently not providing dental care services were to switch to being able to provide dental services. Such an analysis is beyond the scope of this report and requires a more detailed analysis of the productivity of dental care providers within FQHCs — currently, as well as under different settings that might include enhanced use of teledentistry, school-based programs, community dental health coordinators and expanded function allied dental health professionals. It also requires a better understanding of the geographic proximity of FQHC sites that are currently not providing dental care and low-income populations with unmet dental care needs.

Our analysis also does not provide any insight into the reasons why some FQHC sites provide dental care while others do not. All FQHCs are required to provide primary health services, which are defined to include some basic level of preventive dental services. However, the actual types of dental care services or specific procedures are not specified.6 There is some research addressing the underlying challenges, including the lack of guidance and resources provided to health centers,7 but much more research is needed in this area.

Looking forward, there are different options available to expand dental care capacity within FQHC sites. These include recruiting dentists on site, contracting with dental school clinics or dental practices in community settings, using innovative technologies such as teledentistry and arranging for mobile dental services. Further research is needed to study the feasibility of these alternative options, including their cost effectiveness and the timeframe within which they can be implemented.
For example, contracting with dental practices does not require investments in new infrastructure or recruiting new staff and can be implemented relatively quickly. But it entails finding dental practices willing to enter into partnerships with FQHCs. With the Medicaid population expanding in California under the Affordable Care Act and the re-introduction of adult dental benefits in 2015, FQHCs could potentially play a larger role in improving access to dental care for underserved populations and the alternative policy options merit further analysis.

REFERENCES


2. Based on data on dental care utilization among low-income adults from the Medical Expenditure Panel Survey (MEPS) and data on services provided in FQHCs from the U.S. Department of Health and Human Services (HHS). MEPS data are available at www.ahrq.gov/research/data/meps/index.html and HHS data are available at bphc.hrsa.gov/uds/datacenter.aspx?year=2013.


Appendix A

Telephone Survey Script

Hello this is _________. I am calling on behalf of the American Dental Association and the California Dental Association regarding a study to improve the oral health of the California population. We are contacting all FQHCs and look-alike sites such as yours to understand how they provide dental care. Is there someone in your office that might be able to answer a few questions about the services you offer? (IF NEEDED: The survey will take less than five minutes.) (If placed on hold, re-introduce yourself when they come to the phone)

The American Dental Association is analyzing the capacity of the California dental care system. As part of this research, we’re contacting all FQHCs and look-alike sites to understand how they provide dental care. The survey will take approximately five minutes of your time. Would now be a good time?

1a. May I please confirm that this is the [SITE NAME] location at [SITE ADDRESS]?  
   a. Yes (Skip to Question 1) 
   b. No (Go to Question 1b)

1b. Would you be able to provide me with the phone number to that location?  
   a. Yes (Interviewer – phone change to new number and redial) 
   b. No (End survey)

1. Do you have onsite dental care services?  
   a. Yes (Skip to Question 3)  
   b. No (Go to Question 2)

If Question 1 is No

2. Do you have a contractual arrangement with dental care providers who are off site?  
   a. Yes (Skip to Question 8)  
   b. No. Please tell us why not: ___________________ (End survey)

If Question 1 is Yes

3. How many full-time equivalent (FTE) dentists do you have on site? One FTE corresponds to 35 hours per week.  
   **Interviewer note:** 1 day a week: 0.2 FTE 2 days a week: 0.4 FTE Half time: 0.5 FTE 3 days a week: 0.6 FTE 4 days a week: 0.8 FTE

4. How many full-time equivalent (FTE) hygienists do you have on site? One FTE corresponds to 35 hours per week.  
   **Interviewer note:** 1 day a week: 0.2 FTE 2 days a week: 0.4 FTE Half time: 0.5 FTE 3 days a week: 0.6 FTE 4 days a week: 0.8 FTE

5. How many days per week typically do you have one or more dentists onsite?

6. Thinking about your location during the past 12 months, how long did a new patient typically have to wait for:  
   a. An initial appointment? _____ days  
   b. A return appointment? ________ days

7. Thinking about the past 12 months, which of the following statements best describes the capacity of your dentist(s) to treat patients?  
   a. Too busy to treat all people requesting appointments  
   b. Provided care to all who requested but was/were overworked  
   c. Provided care to all who requested appointments but was/were not overworked  
   d. Not busy enough, could have treated more patients

8. Do you offer a sliding fee schedule for patients who are ineligible for Medi-Cal dental programs and cannot pay for full services? Yes/No

9. To which of the following age groups are dental services provided? (Select all that apply.)  
   a. Children  
   b. Adults  
   c. Seniors

10. What dental services are provided? (Select all that apply.)  
   a. Preventative services (cleanings, exams, fluoride treatment, X-rays, sealants)  
   b. Basic restorative services (fillings, extractions, root canals, periodontics)  
   c. Major restorative services (anesthesia, crowns, dentures, implant, endodontics, periodontics)  
   d. Orthodontics services  
   e. Emergency/urgent care  
   f. Other: ________________________________________________________________

Thank you for your time. We really appreciate your help. Have a good day.
### June

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>03</td>
<td>Minimally Invasive and Esthetic Dentistry: A Review of Available Treatment Options &amp; Materials</td>
</tr>
<tr>
<td>10 - 12</td>
<td>Advanced Soft Tissue and Bone Grafting with Cadaver Workshop</td>
</tr>
<tr>
<td>10 - 12</td>
<td>Endodontics from A to Z: Hands-On Workshop for the General Practitioner (Part I)</td>
</tr>
<tr>
<td>17 - 18</td>
<td>Temporomandibular Disorders, Arthrocentesis, and Botox/Trigger Point Injections (Webinar Available)</td>
</tr>
<tr>
<td>24 - 26</td>
<td>Endodontics from A to Z: Hands-On Workshop for the General Practitioner (Part II)</td>
</tr>
<tr>
<td>25</td>
<td>Suturing Techniques: A Practical Hands-On Course on Soft Tissue Suturing</td>
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### July

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<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>08 - 10</td>
<td>Advanced Clinical Dental Hygiene Techniques: Lectures and Hands-On Workshops</td>
</tr>
<tr>
<td>09 - 10</td>
<td>Complications of Implant Therapy</td>
</tr>
<tr>
<td>13 - 17</td>
<td>Parenteral Moderate Sedation for Dentists: Lectures &amp; Workshops</td>
</tr>
<tr>
<td>15 - 16</td>
<td>Advanced Restorative Options with Dental Implants for Fully Edentulous Arches</td>
</tr>
<tr>
<td>22 - 24</td>
<td>Esthetic Full-Mouth Implant Reconstruction: Advanced Prosthodontic Techniques for Challenging Patients</td>
</tr>
<tr>
<td>28 - 31</td>
<td>Parenteral Moderate Sedation for Dentists: Clinical Session I</td>
</tr>
<tr>
<td>30 - 31</td>
<td>Immediate Implant - Atraumatic Extraction, Immediate Implant Placement, Chairside Provisional Restoration - A Lecture and Hands-On Workshop (Las Vegas, Nevada)</td>
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### August

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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>01 - 04</td>
<td>The 42nd Annual Review of Continuing Education in Dentistry (Maui, Hawaii)</td>
</tr>
<tr>
<td>05 - 07</td>
<td>Parenteral Moderate Sedation for Dentists: Clinical Session II</td>
</tr>
<tr>
<td>12</td>
<td>New Approaches for Antimicrobial Treatment of Periodontal Disease</td>
</tr>
<tr>
<td>13 - 14</td>
<td>Safe, Precise and Predictable Implant Placement</td>
</tr>
<tr>
<td>19 - 20</td>
<td>The Artistic Dentist: Excellence in Direct Anterior and Posterior Composites</td>
</tr>
<tr>
<td>26 - 28</td>
<td>Fundamentals of Implant Surgery and Restoration (Part I)</td>
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### September

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>17 - 18</td>
<td>Horizontal and Vertical Augmentation - Myths Versus Reality</td>
</tr>
<tr>
<td>23 - 24</td>
<td>Minimally Invasive Adhesive and Esthetic Indirect Anterior Bonded Restorations: Lecture &amp; Hands-On</td>
</tr>
<tr>
<td>30 - 01</td>
<td>The USC Geriatric Dentistry Annual Symposium (Webinar Available)</td>
</tr>
</tbody>
</table>
The Impact of Risk-Based Care on Early Childhood and Youth Populations

Marisa K. Watanabe, DDS, MS; Josih T. Hostetler, MSW; Yesha M. Patel, MPH; Jessica M. Vergel de Dios, MS; Marc A. Bernardo, MPH; and Mary E. Foley, RDH, MPH

ABSTRACT This quality improvement project explored dental caries risk among children residing in El Monte, Calif., a low-income area 16 miles east of Los Angeles. In an attempt to decrease oral health disparities, Western University of Health Sciences, College of Dental Medicine established school-based oral health centers in El Monte and implemented a modified caries risk assessment protocol. Results showed a statistically significant decrease in caries risk following disease management interventions.

AUTHORS

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In 2011, the Institute of Medicine, in collaboration with the National Research Council, published two key reports entitled, Advancing Oral Health and Improving Access to Oral Health for Vulnerable and Underserved Populations aimed at promoting oral health for vulnerable populations. Incorporated in these reports were recommendations to the Health Resources and Services Administration and the U.S. Department of Health and Human Services, which included specific strategies to reduce oral health disparities among disadvantaged populations. Inherent in the reports was the underlying message that in order to maintain health and well-being, individuals must receive routine quality oral disease prevention and treatment services.
In an effort to align with the recommendations of the reports and effectively address the growing lack of adequate preventive and treatment services for vulnerable underserved children living in El Monte, an urban area of East Los Angeles County, Western University of Health Sciences, College of Dental Medicine (WesternU CDM) established a comprehensive dental home model, school-based oral health centers (SBOHCs). The goal of the WesternU CDM SBOHC model was to assure that all children living in El Monte received essential risk-based oral disease preventive and treatment services. By increasing access to routine risk-based oral health services through the SBOHCs, it was anticipated that a decrease in caries risk, caries experience and ultimately a healthier child and student population would be observed.

Using the free and reduced lunch program as a relative proxy for children who were Medicaid eligible, it was determined that 82.79 percent of children ages 5 to 17 in the El Monte City and El Monte Union High School Districts were eligible for the free and reduced lunch program.\(^2\) Based on the highest rates of children enrolled in the free and reduced lunch program by school, WesternU CDM selected Gidley Elementary School in 2012 as the first site for the SBOHC. In 2015, WesternU CDM moved the Gidley Elementary SBOHC to the Jeff Seymour Family Center (JSFC) to allow for the expansion of dental services.

As part of program planning, development, quality improvement and evaluation, WesternU CDM established a quality improvement (QI) project. Specific risk-based care quality improvement strategies were established. These preliminary strategies focused on reducing caries risk among children who received dental care at the Gidley Elementary SBOHC and the JSFC dental clinic. Project data from September 2013 through September 2015 revealed that early childhood, preschool and school-aged children who received routine preventive and treatment services experienced a significant reduction in caries risk.

The focus of this article is to highlight WesternU CDM’s improvement strategies and the outcomes associated with the delivery of risk-based dental care to children attending the Gidley Elementary SBOHC and the JSFC dental clinic.

In 2013, California ranked 49 out of 50 states, with one of the lowest Medicaid fee-for-service pediatric dental reimbursement schedule in the country.

**Oral Health Disparities and Disease Outcomes**

In 2012, Dye et al. published a National Center for Health Statistics (NCHS) data brief summarizing the key findings from the 2009 to 2010 National Health and Nutrition Examination Survey (NHANES) published by the U.S. Department of Health and Human Services. Dye reported “approximately one in four children ages 3 to 5 and 6 to 9 living in poverty had untreated dental caries.” Furthermore, Dye indicated that oral health disparities existed because of poverty status, race and ethnicity. Specifically, children ages 3 to 5 and 6 to 9 who came from lower-income families had significantly higher untreated caries among the Hispanic population. Moreover, Dye suggested that Hispanic children were less likely to utilize available preventive dental care services when compared to their African-American or Caucasian counterparts. This fact further demonstrated the increased disease risk among this particular ethnic minority group.\(^3\)

According to the U.S. Census Bureau, 24.3 percent of El Monte’s population lived at or below the poverty level compared to 15.9 percent across California (2009-2013). This paralleled the comparison of El Monte’s median household income of $39,535 (2009-2013) to California’s $61,094.\(^4\) With 28.4 percent of El Monte’s 113,475 population under the age of 18 and 69 percent of its population of Hispanic/Latino descent,\(^4\) the demographics in El Monte suggested a potential heightened risk of oral disease. Applying together the U.S. Census demographics and the key findings from the NCHS data brief regarding the association among caries disease, poverty and race, families in El Monte might be more vulnerable to dental disease.\(^5\)

Additionally, according to demographic socioeconomic status (SES), it was further estimated that families in El Monte were more likely to be eligible for Medicaid dental benefits (Denti-Cal). Based on the 2011 Milgrom study on Medicaid utilization and reimbursement, “larger proportions of children in states with higher Medicaid dental reimbursement rates see a dentist more often than children in states with lower reimbursement rates.” This implied that in states with lower reimbursement rates, fewer children received needed services.\(^6\) In 2013, California ranked 49 out of 50 states, with one of the lowest Medicaid fee-for-service pediatric dental reimbursement schedules in the country.\(^6\) Drawing from the Medicaid assessments, the NHANES report and demographics, El Monte was a niche in which an SBOHC might provide essential services to reduce the risk of disease and improve the health of the children in the community.
### TABLE 1

**DentaQuest Institute ECC Phase III Definitions**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>A “patient currently has clinical caries (demineralization or cavitation) or radiographic caries, or has a history of caries within the past six months.”</td>
</tr>
<tr>
<td>Moderate</td>
<td>A “patient does not have clinical or radiographic caries but has dietary or oral hygiene habits that increase the caries risk. Also, a previously ‘high-risk’ patient who has demonstrated improved diet, protective factors and/or presence of remineralization and absence of new demineralization and cavitation for the past six months.”</td>
</tr>
<tr>
<td>Low</td>
<td>A “patient does not have clinical or radiographic caries and has good dietary habits, oral hygiene and protective factors or a previously ‘high-risk’ or ‘moderate-risk’ patient who has demonstrated improved diet, protective factors and/or presence of remineralization and absence of new demineralization and cavitation for the past 12 months.”</td>
</tr>
</tbody>
</table>

### Patient Population

With full support from the El Monte City School District, an agreement for dental services memorandum of understanding (MOU) was established between the El Monte City School District and WesternU CDM. This MOU included services for children in the El Monte community and/or attending elementary, junior high or high school within the El Monte City and El Monte Union High School Districts during the time of the measurement, September 2013 through September 2015. El Monte students from all of these schools and any other children living in the community were eligible to receive care at the Gidley Elementary SBOHC or the JSFC dental clinic.

### Establishing a Caries Risk Assessment Protocol

As part of the SBOHC standard operating procedures to improve caries risk, WesternU CDM adopted the DentaQuest Institute Early Childhood Caries Collaborative (ECC) Phase III definitions of high, moderate and low caries risk. TABLE 1 describes the DentaQuest Institute ECC Phase III definitions for high, moderate and low caries risk.⁷

### Administrative and Clinical Protocol

The WesternU CDM SBOHCs implement standard operating procedures as well as administrative protocols, consistent with the WesternU CDM main campus dental center. Parents and caretakers of children living near the SBOHCs receive marketing brochures explaining the dental services provided. Parents call the school or walk into the clinics to schedule appointments for their children. The community health assistants, EMCSchool administrators or Head Start programs schedule the patient’s first visit into the universal health care scheduler either by phone or in person. A comprehensive patient health care information packet is hand delivered to the parents/caregivers either at the time of scheduling or at the beginning of the patient’s first oral examination. The patient health information packet (translated in Spanish, Chinese and Vietnamese) includes a health history questionnaire, as well as general information and a parental consent form. The signed informed parental consent is required for all patients seen at these SBOHCs. Unlike some school-based programs where informed consents are disseminated to the whole school population and only a subset are returned, 100 percent of the WesternU CDM SBOHC parental consent forms are completed and returned.

Parents/guardians are required to be present at the beginning and end of all dental examinations. During this time, clinic staff review the caries risk assessment (CRA) protocol, dietary evaluation, oral hygiene instruction and provide anticipatory guidance. As part of all oral health examinations, caries risk is assessed using a WesternU CDM modified version of the CRA protocol previously described in the literature.⁸ In an effort to eliminate caries-risk error by socioeconomic status (SES), WesternU CDM modified the CRA ages 0 to 5 and ages ≥6 protocol by eliminating the SES risk factor. The reason for this change is due to the potential of over classification of high caries risk among children enrolled at the Gidley Elementary SBOHC and JSFC dental clinic due to their SES status (FIGURES 1 and 2). The modified-CRA protocol helps to identify individual contributing conditions, general health conditions and clinical conditions that contribute to dental caries risk in children ages 0 to 5 and ages ≥6.⁵

All WesternU CDM dental students and faculty providers who participate in the community-based dental education program undergo calibration exercises in the use of the modified-CRA protocol, motivational interviewing, and standardized language for use in parent/guardian counseling. Such calibration exercises address caries risk factors associated with diet, general health and oral conditions such as cavitation, plaque and missing teeth, etc.

In determining dental caries risk, WesternU CDM dental student providers and faculty assess the clinical findings of cavitated and noncavitated clinical lesions. WesternU CDM incorporates the International Caries Detection and Assessment System (ICDAS) into the curriculum. This system offers methodology for documenting caries progression beginning from sound enamel to the development of large active decay. Below are the ICDAS classification codes and associated definitions as defined by Jenson et al.:

- **0** = Sound tooth surface with no evidence of caries after five seconds of air-drying.
- **1** = First visual change in enamel surface with opacity or discoloration (white/brown) visible at the entrance to a pit or fissure after five seconds of air-drying.
## WesternU CDM — AxiUm Electronically Modified-Caries Risk Assessment Form 0–5 Years of Age

### Contributing conditions

1. Are you exposed to fluoride (through drinking water, toothpaste, professional applications, supplements, etc.)?
   - Yes (low)
   - No (moderate)

2. Frequency of sugary or starchy foods or drinks (including juice, carbonated or noncarbonated soft drinks, energy drinks, medicinal syrups, etc.)
   - Primarily at mealtime (low)
   - Frequently between meals (moderate)
   - Bottle or sippy cup with anything but water (high)

3. †Caries experience of mother, caregiver and/or other siblings
   - No carious lesions in last 24 months (low)
   - Carious lesions last seven to 23 months (moderate)
   - Carious lesions in the last six months (high)

   - Yes (low)
   - No (moderate)

### General health conditions

1. Special health care needs (including developmental, physical, medical or mental disabilities that prevent or limit adequate oral care)?
   - No (low)
   - Yes (high)

### Clinical conditions

1. ‡Visual or radiographically evident cavitated lesions
   - No active cavitated lesions in one year (low)
   - No active cavitated lesions or restorations in last six months (moderate)
   - Presence of lesions/restorations in last six months (high)

2. ‡Non-cavitated ACTIVE carious lesions (e.g. active brown/white spot lesions)
   - No incipient active lesions in one year (low)
   - No incipient active lesions in last six months (moderate)
   - Presence of incipient noncavitated active lesions in last six months (high)

3. Teeth missing due to caries
   - No (low)
   - Yes (high)

4. Visible plaque
   - Yes (moderate)
   - No (low)

5. Dental/orthodontic appliances (fixed or removable)
   - No (low)
   - Yes (moderate)

6. Salivary flow
   - Visually adequate (low)
   - Visually inadequate (high)

**TOTAL** (auto-calculates electronically): High, moderate or low caries risk assessment.

†If the child showed improvement after six months with no change in the parent’s caries experience, the child was noted as “moderate” risk.

‡DentaQuest ECC Phase III definition of low, moderate and high caries risk assessment associated with cavitated or noncavitated lesions.

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**FIGURE 1.**
WesternU CDM – AxiUm Electronically Modified-Caries Risk Assessment Form 6+ Years of Age

### Contributing conditions

1. Are you exposed to fluoride (through drinking water, toothpaste, professional applications, supplements, etc.)?
   - a. Yes (low)
   - b. No (moderate)

2. Frequency of sugary or starchy foods or drinks (including juice, carbonated or non-carbonated soft drinks, energy drinks, medicinal syrups, etc.)
   - a. Primarily at mealtimes (low)
   - b. Frequently between meals, snacking (high)

3. "Caries experience of mother, caregiver and/or other siblings (for patients ages 6–14)"
   - a. No carious lesions in last 24 months (low)
   - b. Carious lesions last seven to 23 months (moderate)
   - c. Carious lesions in the last six months (high)

   - a. Yes (low)
   - b. No (moderate)

### General health conditions

1. Special health care needs?
   - a. No (low)
   - b. Yes (high)

2. Chemo/radiation therapy?
   - a. No (low)
   - b. Yes (high)

3. Eating disorders (anorexia, bulimia etc.)?
   - a. No (low)
   - b. Yes (moderate)

4. Smokeless tobacco?
   - a. No (low)
   - b. Yes (moderate)

5. Medications that reduce salivary flow?
   - a. No (low)
   - b. Yes (moderate)

6. Alcohol or drug abuse?
   - a. No (low)
   - b. Yes (moderate)

### Clinical conditions

1. "Cavitated or noncavitated carious lesions or restorations"
   - a. No lesions or restorations in one year (low)
   - b. No lesions or restorations in last six months (moderate)
   - c. Presence of lesions/restorations in last six months (high)

2. Teeth missing due to caries in past 36 months
   - a. No (low)
   - b. Yes (high)

3. Plaque index score (Rate each of the following surfaces — 3B, 8F, 14B, 19L, 25F, 30L and total)
   - a. 0 = no debris
   - b. 1 = soft debris not covering one-third of tooth
   - c. 2 = soft debris covering between one-third and two-thirds of the tooth
   - d. 3 = soft debris covering more than two-thirds of the tooth

4. Unusual tooth morphology that compromises oral hygiene
   - a. No (low)
   - b. Yes (moderate)

5. Interproximal restoration — one or more within last six months
   - a. No (low)
   - b. Yes (moderate)

6. Restorations with overhangs and/or open contacts with food impaction
   - a. No (low)
   - b. Yes (moderate)

7. Dental/orthodontic appliances (fixed or removable)
   - a. No (low)
   - b. Yes (moderate)

8. Severe dry mouth (xerostomia)
   - a. No (low)
   - b. Yes (high)

### Saliva test results

1. Saliva — check mutans: Is the result positive or negative? (optional)
   - a. Positive (>500,000 S. mutans colonies — high)
   - b. Negative (<500,000 S. mutans colonies — low)

**TOTAL** (auto-calculates electronically): High, moderate or low caries risk assessment.

1. If the child showed improvement after six months with no change in the parent’s caries experience, the child was noted as "moderate" risk.
2. DentaQuest ECC Phase III definition of low, moderate and high caries risk assessment associated with cavitated or noncavitated lesions.
2 = Distinct visual change in enamel with opacity or discoloration (white/brown) and extends beyond the fissure with no loss of surface integrity; visible both wet and dry.

3 = Localized enamel breakdown (widening of fissures) without clinical signs of dentinal involvement and observed both wet and dry; clinically observe microcavities in the white and brown spot lesions.

4 = Underlying dark shadow beneath the enamel from the underlying dentin with no enamel breakdown.

5 = Distinct cavity with visible dentin that is less than half of the tooth surface.

6 = Extensive distinct cavity with visible dentin that includes more than half of the tooth surface.

For charting interproximal lesions, the students and faculty are calibrated in the American Dental Association Caries Classification System radiographic interpretation as follows:

- **E1**: Outer one-half of enamel by radiograph.
- **E2**: Inner one-half of enamel by radiograph.
- **D1**: Outer one-third of dentin by radiograph.
- **D2**: Middle one-third of dentin by radiograph.
- **D3**: Inner one-third of dentin by radiograph.

Using the classification systems above, the dental providers assess and record each tooth surface condition. The dental providers then determine if the patient’s tooth surfaces present active, inactive cavitated or noncavitated lesions. Tooth surfaces classified as ICDAS 0-3 or E1-D1 and recommended for sealants or remineralization, respectively, are considered noncavitated and inactive lesions for this QI project. Tooth surfaces classified as ICDAS 3-6 or D1-D3 that require minimally invasive restorations such as preventive restorative resins or interproximal restorations are considered active cavitated lesions.

These conditions are recorded at the initial clinical oral examination (COE) using the odontogram tool in AxisUm, the WesternU CDM electronic health record. At the periodic oral examination (POE), the existing conditions are reassessed. If a new cavitation exists at the POE, the odontogram is updated and a “new cavitation” procedure tracking code is added to the patient’s record. In summary, this method monitors the child’s current existing cavitations as well as any new cavitations at the POE visits.

Once the child is determined to have active cavitations, the condition of risk is then applied to the clinical conditions portion of the child’s overall caries risk using ICDAS and radiographic findings mentioned above. For example, a child with active cavitated lesions (ICDAS 5) is considered high caries risk, a child with inactive noncavitated white or brown spot lesion (ICDAS 2) is considered moderate caries risk and a child with ICDAS 0-1 with no white or brown spot lesions or cavitations on any tooth surface in the mouth is considered low caries risk.

After a comprehensive assessment of contributing conditions, general health conditions and clinical conditions at the COE and POE, children are assessed as high, moderate or low caries risk. Each of the questions in the modified CRA ages 0 to 5 and ages ≥6 forms has an answer choice associated with a low, moderate or high caries risk classification. The classifications are established from the American Dental Association Caries Risk Assessment form, which corresponds the “yes” and “no” responses to high, moderate or low caries risk. The caries risk assessment of the patient will be determined based on the highest caries risk classification. Based on the determined caries risk status of the patient, recare visits, which include POE and preventive services (e.g., oral hygiene instruction, nutritional counseling, anticipatory guidance, child prophy and fluoride varnish application), are determined.

**TABLE 2**

<table>
<thead>
<tr>
<th>Demographics of the QI Project Sample</th>
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<tbody>
<tr>
<td><strong>Race</strong> [N (%)]</td>
</tr>
<tr>
<td>All (N = 315)</td>
</tr>
<tr>
<td>Male (N = 159)</td>
</tr>
<tr>
<td>Female (N = 156)</td>
</tr>
<tr>
<td>African-American</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>Caucasian</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>Mixed race</td>
</tr>
<tr>
<td>Pacific Islander</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Age</strong> [Mean yrs ± Std Dev]</td>
</tr>
<tr>
<td>All</td>
</tr>
<tr>
<td><strong>Insurance</strong> [N (%)]</td>
</tr>
<tr>
<td>All</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age [Mean yrs ± Std Dev]</th>
<th>Male [N (%)]</th>
<th>Female [N (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>8.49 ± 4.0</td>
<td>7.95 ± 3.8</td>
</tr>
<tr>
<td>Male</td>
<td>83 (51.87%)</td>
<td>40 (24.63%)</td>
</tr>
<tr>
<td>Female</td>
<td>86 (28.08%)</td>
<td>43 (27.04%)</td>
</tr>
</tbody>
</table>

**Risk-Based Care**
occur at varying intervals based on the patient’s caries risk status. According to the CRA treatment guidelines, it is recommended that high caries risk children receive a recare visit every three to four months, moderate caries risk children every three to six months based upon the clinician’s discretion, low caries risk children every six months and for children 5 and younger, up to one year.10 Each child is reassessed for caries risk at every recare visit.

Protocol for Electronic Health Records
In an effort to secure patient health information and data, WesternU CDM maintains the AxiUm electronic health record software system, which is implemented at the Gidley Elementary SBOHC and JSFC dental clinic. Upon completion of each procedure, student/faculty dental providers document diagnostic and procedural CDT codes electronically in the patient record. The AxiUm data are also audited by two of the calibrated faculty preceptors for the school sites, thereby limiting erroneous data entry to assure accurate provider documentation. Total dental students in 2013 was 19, 2014 was 52 and 2015 was 48. Total dental faculty for the Gidley Elementary SBOHC and JSFC dental clinic over the course of September 2013 to September 2015 was three.

QI Project Methodology
Between September 2013 and September 2015, WesternU CDM conducted a QI project to assess dental caries risk among children who received dental care at the Gidley Elementary SBOHC and JSFC dental clinic over the two-year span. Data were collected from the electronic health records of the patients ages 6 months to 20 years who attended these clinics during that time.

Cohort Population
The QI project sample included a total number of 315 children in the El Monte community including early childhood, preschool and school-aged students ages 6 months to 20 years who received services at the two sites. Of the cohort population, 69 were ages 0 to 6, 173 were ages 6 to 12 and 73 were ages 13 to 20. The mean age was 8.49±4.0.

Of the 315, 156 were female and 159 were male, with 259 (82.22 percent) of Hispanic descent. According to parental consent forms, 225 (71.43 percent) of parents indicated that their child/children lacked dental insurance, while the remaining 90 (28.57 percent) indicated that they finance their child’s dental care through Denti-Cal fee-for-service or through a California-based Medicaid managed care organization. TABLE 2 shows the breakdown of demographics for the dental QI project sample.

Data Collection and Analysis
In order to assess the QI project outcomes, retrospective data analysis of all 315 patient records took place. The following data was then assessed for each patient in the project: COE (D0150), POE (D0120), CRA (D0601-low, D0602-moderate, D0603-high), existing and new cavitations, oral hygiene instruction (D1330), nutritional counseling (D1310) and fluoride varnish application (D1206).

Microsoft Excel was used to log specific patient information and data. Carious lesions classified as ICDAS 0-3 (recommended for sealant treatment) were classified as noncavitated and inactive lesions for this project. ICDAS 3-6 (minimally invasive restorations such as preventive restorative resins to larger restorations) were considered active cavitated lesions.

Data were then assessed to determine whether a change in caries risk from the COE to subsequent POE visits was observed. The following criteria were used to determine any change in risk status.7

- High-to-moderate caries risk: At least a COE and one POE visit, six months since the last active caries lesion, no new cavitations within the six-month span and an improvement in caries risk factors such as diet with inconsistent protective factors (e.g., fluoride varnish application and at-home fluoride mouth rinse and toothpaste).
- Moderate-to-low caries risk: At least a COE and one POE, one year since the last active caries lesion, no new cavitations within the one year span and balanced risk and protective factors.

In addition to assessing change in caries risk, this project also examined the impact of multiple recare visits (interventions) on risk status change. Specifically, this project explored the threshold number of recare visits necessary to decrease caries risk. To test this variable, Fisher’s exact test was used to determine significance in the decrease of caries risk between the COE and subsequent POE visits.
Baseline Data

Baseline data for all patients enrolled in the QI project was collected at the COE appointment. This data included dental caries risk status as well as the prevalence of cavitation. Of the 315 patients seen, 259 (82.22 percent) presented initially as high caries risk, 49 (15.56 percent) as moderate caries risk and seven (2.22 percent) as low caries risk. Additionally, 227 (72.06 percent) of the cohort presented with cavitated lesions while 88 (27.94 percent) presented with noncavitated lesions.

Preliminary Quality Improvement Strategies

The first quality improvement strategy to assist in the decrease of the patient’s caries risk status was the use of motivational interviewing during the modified CRA evaluation. This included the delivery of oral hygiene instruction, nutritional counseling and anticipatory guidance to the child and/or parent. The goal of using the motivational interviewing technique was to encourage positive oral health behavior change through a more patient-centered, goal-oriented communication. All of the 315 patients at the COE and subsequent POE visits received the modified CRA, oral hygiene instruction, nutritional counseling and anticipatory guidance in combination with motivational interviewing.

The second quality improvement strategy implemented was the delivery of fluoride varnish application during the COE and subsequent POE visits. Data indicated that 310 (98.4 percent) of the 315 patients received fluoride varnish at the COE, and 100 percent of the patients at the first, second and third POE visits received fluoride varnish application as well (FIGURE 3). In addition, WesternU CDM student and faculty dental providers recommended additional caries preventive products for use at home to enhance protective factors. Examples for children ages 6 to 20 included the use of sodium fluoride toothpaste, fluoridated water and prescription MI Paste on a case-by-case basis. Examples for children ages 0 to 5 included the use of xylitol wipes, sodium fluoride toothpaste and CariScreen saliva test as needed. These protective strategies were recommended based on Ramos-Gomez and Jenson’s clinical protocols for CRA in children ages 0 to 5 and 6 to 20, respectively.8,10

The third quality improvement strategy designed to decrease the caries risk of patients included scheduling disease management visits at two-weeks to one-month spans or at the restorative visit. The goals of the disease management visits were to encourage ongoing improved oral home care, deliver preventive fluoride varnish and monitor at-home behavior changes. During the disease management visits, examining of brown or white spot lesions (using ICDAS coding, DiagnoDent, radiographs and clinical inspection), delivering fluoride varnish, providing oral hygiene instruction, offering anticipatory guidance to parents or conducting therapeutic evaluations were performed.

QI Project Outcomes

Decrease in Dental Caries Risk

As noted earlier, the anticipated outcomes of the WesternU CDM school-based model were to decrease dental caries risk, caries experience and ultimately build a healthier early childhood and youth population in the El Monte community. TABLE 3 lists the caries risk status of all QI project participants by visit. FIGURE 4 illustrates the percent decrease in high caries risk children for each recare visit.

Results of the QI project demonstrated a statistically significant decrease in the overall caries risk in children who participated in the program after two examination visits. Specifically, patients...
who received the COE protocol and a subsequent POE protocol were more likely to have lowered their caries risk than those who only received the COE protocol ($p=0.0005$). No statistically significant decrease in risk status from high-to-moderate or moderate-to-low caries risk was observed between COE and first POE visits ($p=0.47$). In addition, there was no significant decrease in caries risk among the children who received a COE plus two subsequent POEs ($p=0.9404$). Table 4 lists the p-values associated with the impact of one, two and three disease management visits on caries risk.

**Decrease in New Cavitations**

Of the 315 children and youth who received an initial COE, 117 returned for at least one POE visit. Of the 117 who returned for the first POE visit, 46 presented with at least one new cavitation. Of the 65 who returned for a second POE visit, 21 presented with at least one new cavitation. Finally, of the 24 who returned for a third POE visit, nine presented with a new cavitation. Table 5 shows the number of individuals who presented with new cavitation at each POE visit.

**Creating a Healthier Future**

This QI project demonstrates the potential impact an SBOHC may have on dental caries risk and cavitation among community children and youth because of the implementation of a modified CRA protocol. Multiple studies have demonstrated that fluoride varnish alone will not decrease caries incidence and that additional preventive measures and treatments are needed. This project confirms the earlier findings. By educating parents/caretakers, changing children’s home care behaviors and increasing exposure to a variety of additional protective factors, the patients at the Gidley Elementary SBOHC and JSFC dental clinic returned with a decrease caries risk and ultimately, a lower number of active caries.

The authors concur that a combination of several quality improvement strategies, not any single strategy, contributes more effectively to a decrease in caries risk and a lower rate of new cavitation for the children and youth in the El Monte community.

The QI project also demonstrates that on average, high caries risk children ages 6 months to 20 who receive two POE visits are likely to transition to moderate caries risk. Based on the CRA recommended treatment guidelines, three-month recare visits are recommended for high caries risk children. This three-month recare visit protocol is supported by Hsu et al. who reported that compliant patients who returned for their three-month recare visit had a lower mean of caries.13

When observing the on-time recare visits for the patients in this project, the patients who remained high caries risk or who had a new cavitation had often missed their recare visit by three months or more.

Therefore, the results from the project suggest that cavitation can develop within a three-month timespan and as such, patients assessed previously as high caries risk are recommended to receive a follow-up recare visit within a three-month period. These on-time recare visits are important in monitoring any incipient, non-active, noncavitated lesions as additional preventive measures (e.g., localized fluoride varnish for remineralization at each one-month disease management visit) can be recommended on an individualized basis.

A systematic review of recare visits conducted by Patel in 2010 validates that recare visits must be associated with the CRA and not on time alone.14 WesternU CDM is in the process of studying the impact of on-time recare POE visits on new cavitations.

The QI project further suggests that despite SES and insurance status of patients, caries risk via CRA protocol may be adjusted with routine disease management visits. This is significant as an individual’s SES should not be the limiting factor for a child to have an improved caries risk. In addition, if policies transition to risk-based, preventive disease management care, the potential

### Table 4

<table>
<thead>
<tr>
<th>Impact of</th>
<th>P=Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>One visit</td>
<td>0.471</td>
<td>One visit is not enough to reduce caries risk</td>
</tr>
<tr>
<td>Two visits</td>
<td>&lt;0.0005</td>
<td>Two visits will likely reduce caries risk</td>
</tr>
<tr>
<td>Three visits</td>
<td>0.9404</td>
<td>Three visits does not have enough power to determine</td>
</tr>
</tbody>
</table>

### Table 5

<table>
<thead>
<tr>
<th>N = People</th>
<th>COE</th>
<th>POE-1</th>
<th>POE-2</th>
<th>POE-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people</td>
<td>315</td>
<td>117</td>
<td>65</td>
<td>24</td>
</tr>
<tr>
<td>with cavitations</td>
<td></td>
<td>Existing cavitations: 227</td>
<td>New cavitation: 46</td>
<td>New cavitation: 21</td>
</tr>
</tbody>
</table>

| Rate of new cavitation | 72.06% | 40.00% | 32.31% | 37.50% |

- Table 4 lists the p-values associated with the impact of one, two and three disease management visits on caries risk.
cost savings for the government programs will be greater as more and more children will need less surgical dental treatment.

In order to help educate and stress the importance of oral health, the need for community buy-in is also critical. The reiteration of oral hygiene, nutritional counseling and dental visits voiced not only at the dental clinics, but also by other community programs such as Women Infant and Children coordinators, the El Monte Head Start Program and the EMCSD school nurses, family nurse practitioners, teachers and principals can build a support system for the child and family. With studies indicating that children with toothaches are four times more likely to have a lower grade point average than healthy children, the impact on the child and school institution is observed at an academic level as well. By building trust and rapport with the community, this may help reassure the families that the school dental clinics are a safe and trusting environment to provide dental care.

Moreover, by educating families that carries risk is influenced by the carries experience in siblings, parents and extended family, this QI project suggests that motivational interviewing may play an integral part in carries prevention. Together with motivational interviewing and anticipatory guidance, these techniques can be used to help re-emphasize the parent’s active participation in the maintenance and improvement in the oral health of his/her child.

Just as dentistry has evolved, a child’s carries risk changes over time as well. Despite the positive impact the Gidley Elementary SBOHC and JSFC dental clinic have on the population ages 6 months to 20 in El Monte, reimbursement for CRA and frequent preventive services to maintain a healthy mouth (i.e., disease management visits for high-risk patients, additional child prophy and fluoride varnish application) are limited. With limited or no dental insurance (72 percent of the cohort population reported no dental insurance), patients are less likely to comply with the added number of recare visits due to out-of-pocket expenses.

By educating and training future clinicians about the principles of risk-based care, CRA utilization and creating policy change through organized dentistry, implementation into clinical practices will help manage best practices while providing the most-suited and minimally invasive treatment plan for the patient.

In order to help educate and stress the importance of oral health, the need for community buy-in is also critical.

Conclusion
This QI project concludes that a patient population ages 6 months to 20, who utilize the dental services at SBOHCs and follow the risk-based care recommended guidelines, can significantly decrease the risk of dental carries and the onset of new disease. Through routine disease prevention and treatment services focused on risk-based care, these children will have a reduced carries experience as well as improved overall health.

Limitations
The QI project had a limitation in the number of patients presenting for POE-3. This resulted in an insufficient power to determine the impact quality improvement strategies had on carries risk after three intervention visits. The program administrators believe that the lower number of patients returning for POE-3 was primarily due to lower health literacy among parents and caregivers failing to understand and/or value preventive dental care. As the program progresses, QI strategies to increase health literacy among parents and caregivers, as well as cultural competency among dental students and faculty, will be developed and implemented.

Future Study
In order to evaluate the impact of quality improvement strategies such as a CRA protocol on new cavitations in high carries risk children, WesternU CDM intends to conduct further study on the patient data. This effort will compare high carries risk children who followed the risk-based recommended three-month on-time recare visit as opposed to children who failed to do so. Furthermore, in order to continue the oral health services at SBOHCs, WesternU CDM will address Denti-Cal reimbursement and its effect on sustainability of SBOHCs.

Policy Considerations
Policymakers should consider the benefits associated with the implementation of risk-based dental care services. Improved health, health care and lowered costs are three potential benefits that may be observed. By expanding SBOHCs focusing on children and families, not only will children have an accessible comprehensive permanent dental home, but they will also be healthier. To facilitate this, government policies and programs need to be aligned and expand to incorporate risk-based care. Recommended by Fontana in 2011, “We need an educated public that will request insurance programs that allow for risk-based, patient-centered carries disease management.”

Ramos-Gomez and Ng stated, “providers and insurers alike must embrace the
dental ethics perspective of early disease prevention and early intervention that can benefit their future patients’ short- and long-term oral health outcomes.”17

If CRA becomes a standardized clinical protocol recognized and reimbursed by dental benefits plans, the associated reduction in dental disease will also reduce the financial burden high disease rates place on families, communities and government programs.

ACKNOWLEDGMENTS
Both the Gidley Elementary SBOHC and JSFC dental clinic were funded in part by grants including the First 5 LA Oral Health and Nutrition OHN, First 5 LA Children’s Dental Care Project CDPC and the California Community Foundation. The authors would like to thank WesternU CDM’s Dean Steven Friedrichsen, DDS, for his support and encouragement. The authors would also like to acknowledge the DentacQuest Institute for guidance in the use of quality improvement strategies through the ECC Phase III Collaborative. Furthermore, the authors would like to thank the El Monte City School District, in particular Gidley Elementary School, Jeff Seymour Family Center and the El Monte community for their warmth and kindness. WesternU CDM further acknowledges the support of the Medicaid|Medicare|CHIP State Dental Association for its technical support for writing this document. Lastly, the authors would like to thank Grace Wu for edits during the preparation of the manuscript. This study has IRB approval #15/IRB/098.

REFERENCES

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**Los Angeles County**


**Huntington Park** (GP) - 30 years of goodwill located in strip shopping center. 3 equipped ops. Some Dentical. Buyer’s Net of $105K. Property ID #5054.


**Pomona** — Leasehold Improvement and Equipment Only! Modern designed office w/ 4 eq ops in a single professional bldg. Property ID #5057.


**West Covina** — GP w/ 13 years of goodwill located in a 1 story building shopping center. Has 5 eq operators. Digital X-ray. Some Dentical. Buyer’s net of $179K. Property ID #5083.

**Orange County**


**Irvine** — Established in 2004 this GP office is located in a one story medical building. The practice consists of 2 eq ops and 1 plumbed not equipped for expansion. Digital office w/ 1 sensor. Seller works 2.5 days/wk and sees approx. 7-10 new patients/mo. Net OF $117K. Affordable rent. Property ID #5088.

**Newport Beach** — Established in 2002 this GP is located in a med bldg w/ 3 eq ops and 1 plumd not eq. PPO and Cash office. Taking $663K for 2015 with a Buyer’s net of $140K. Property ID #5086.

**Orange** — GP with over 30 yrs of goodwill located in a free standing bldg on the southwest of Orange w/ plenty of heavy traffic. Net of $334K. Property ID #5059.


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**Simi Valley** — GP + Bldg. 50 years of goodwill. Located in a free standing building with a large lot. Office has 4 eq operators and 1 plumbed not equipped. Seller works 3.5 days/wk. Computerized w/ Diamond Dental. Grossed approx. $454K in 2015.

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**San Diego** — GP established in 1986 located in a 3 story professional building consists of 7 eq ops. Net of $357K. Property ID #5072.

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Most of us have been at that point in life when we just need someone to tell us everything will be alright. That what we’re going through is normal. That we’re not alone, and we’ll get through it. That the difficulty we’re experiencing is temporary. “Hang in there,” “It’ll be alright,” “Don’t give up” are all words of encouragement we’ve heard at one time or another.

In dentistry, however, those seemingly innocent words can have unwanted consequences. When patients call to report pain or discomfort following a procedure, they sometimes need more than a sympathetic ear — they need the dentist’s advice and necessary assessment. When well-intentioned office staff attempt to problem solve without bringing the issue to the dentist, patients can be left without the follow-up care they need, leading to possible complications.

Sometimes, office staff provide more than consolation, they provide actual treatment advice. Most do so unwittingly, assuming they are simply being helpful. They may not want to bother the doctor with “minor” complaints. Other times, they do not take the patient’s concerns seriously. Whatever the case, the result can often be devastating for a practice.

In one case, a patient suffered complications following the placement of implants. She called the day after the procedure and complained that she was sore at the implant site and her lip was still numb. Without consulting the dentist, the front office staff member told her it was normal. Two days later, the patient called again, reporting pain and numbness. Although her dentist was not available, she was seen that evening by another dentist in the practice, who prescribed pain medication.

Months went by, and the patient’s pain and numbness continued, so she demanded the implants be removed. It wasn’t until that time that the operating dentist was made aware that she had called the day after the original procedure complaining of pain and numbness. However, the dentist stood by the action of the front office staff, explaining that it was office protocol to tell patients to wait to come in until their next scheduled postoperative appointment, because “patients often exaggerate pain.”
The patient eventually filed — and won — a negligence lawsuit, claiming the dentist didn’t care about the pain or numbness she was experiencing. Had proper protocols been in place, and the front office staff informed the dentist of the situation immediately, the outcome may have been different.

In another case, a patient emailed his orthodontist’s office with concerns about his new retainer. He complained about the device affecting his speech, causing a lisp. The treatment coordinator explained that lisp is normal for the first few days and recommended the patient exercise his tongue and mouth with the new retainer in place. The patient emailed again weeks later and complained of sensitivity and pain in his back teeth. The treatment coordinator again explained that his experience was normal, as his shifting teeth caused his bite to be off, causing sensitivity. She told him to “hang in there,” and recommended he continue wearing the retainer despite the discomfort. However, the treatment coordinator later spoke to the dentist, who recommended he not wear the retainer.

A week later, the patient emailed again, complaining that his bite was off dramatically and he was experiencing sharp pains. In the end, the patient insisted on coming in and speaking to the dentist directly. He lost confidence in the promised treatment outcome and requested a full refund. The dentist should have inserted herself and personally addressed the patient’s concerns from the beginning.

Despite the positive intentions of well-meaning employees, providing treatment advice, whether on the phone, over email or in person, can put your dental practice at risk. When staff take it upon themselves to handle patient complaints without involving the dentist, they are, essentially, practicing dentistry without a license. Needless to say, this can open dentists up to liability claims, as they are ultimately responsible for all employee actions.

However, having a proper protocol in place for follow-up care can help mitigate some of the potential fallout. Your employees should be advised to report all feedback, whether good or bad, and let the dentist decide what needs to be done. You should encourage open communication between front and back office staff and remind your employees that it is far better to over communicate than under communicate.

Your front office staff is often the first contacts a patient has with your practice. They are your eyes and ears, fielding phone calls and interacting with patients. Trusting these key players of your team is essential, and empowering them to handle patient issues legally and ethically is crucial to the long-term success of your practice.

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These incidents are not unusual. Infection control breaches can occur at any place and at any time. Dental practices should be prepared and have procedures in place to evaluate and respond to infection control breaches. Steps to take in case of occupational exposure to blood-borne pathogens are mandated by Cal/OSHA in California, and dental personnel should know these steps well. The U.S. Centers for Disease Control and Prevention has resources on its website, which includes an outline of steps for evaluating an infection control breach and a patient notification toolkit. The website is cdc.gov/hai/outbreaks/outbreak-resources.html.

The CDC describes six steps to follow when evaluating an incident with potential risk of blood-borne pathogen transmission. Following is a summary of those steps.

**Breach identification and correction.** Document the facts and events surrounding the breach. Conduct interviews with staff to get more details. Establish a timeline of events. Review the information to identify the chief cause or factors that led to the breach. Identify and implement corrective action to prevent repetition of the incident.

**Additional data gathering.** Identify to the extent feasible the individuals possibly exposed as a result of the breach. Also identify any individuals who could be potential sources of infection. Having the timeframe of the breach should aid in identifying individuals. The identification of individuals can help determine what viruses and other pathogens may be involved.

**Notification and involvement of key stakeholders.** Notify liability insurance carrier if one or more patients are at risk. Notify the local health department if transmission of a highly communicable disease is likely. A dentist also may contact the local health department to consult on doing a qualitative assessment to determine if the breach warrants patient notification.

**Qualitative assessment of breach.** A qualitative assessment should allow a dentist to classify a breach as Category A or Category B. A dentist should consider consulting with an infection control expert (e.g., local public health...
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4108 HUMBOLDT COUNTY GP
Well-established, high performing general practice boasts 6 fully equipped ops. in 2,900 sq. ft. free standing office w/Digital X-ray, 2 platinum Dextis sensors, & Cerec Omniam & MCXL units. Loyal & stable pt. base in charming community, w/ a small town feel. Perfect for a dentist who wants to escape the grind and live along the coastline. Avg. GR $1.4M+, 2016 on schedule for $1.5M+. Seller willing to help for smooth transition. Asking $1,041,000.

4091 HOLLISTER GP & PEDIATRIC
Country living at its best ~ small town community feel with affordable housing, in quaint bedroom community to Silicon Valley. General and Pediatric practice located in corner professional building on well-travelled street near Hazel Hawkins Hospital. Fully-equipped 1,600 sq. ft. office with 2 enclosed adult ops and 3 open pedo ops. Great opportunity for a turn key practice with trained staff and approximately 700 active patients. 2014 GR $228K. Seller is relocating out of the area, but will help for a smooth transition. Asking price only $125K.

4090 SANTA CLARA DENTAL FACILITY
Turn-key dental facility in highly visible 30 year old modern, commercial & professional mix building with large daytime business draw & large residential population, in a well-travelled area. Dental practice has been at this location for 30 years. Seller has relocated & is offering 6 fully furnished & functional operatories. Office remodeled in 2010. 2,240 sq. ft. suite includes large waiting room, large front office, central lab, 2 private offices, break room & bathroom. Existing lease has 4 options to renew for 5 years.

4110 SANTA ROSA GP
Don't miss this opportunity ~ absolutely gorgeous, state of the art office located within two major thoroughfares in the heart of Santa Rosa. Practice generating $2.1M+ in GR on 5 dr. days/week with 9 days of hygiene. 2015 Adj net over $569K. 3,000+ active patients, 9 fully equipped ops in spacious 2,950 sq. ft. Equipment includes digital x-rays, Sirona-D Cone Beam system, Cerec Blucam and Omniam. Asking $1,436,000.

4093 SAN JOAQUIN VALLEY ORTHO
Established over 35 years with a solid reputation, near several referral sources in seller owned building. 2,500 sq. ft. office with 7 chair open bay in professional center on a well-travelled street with many retailers. Avg. Gross Receipts $763K. Seller retiring and willing to help for smooth transition. Asking $561K. The building is available to purchase as well for $608K.

4086 SILICON VALLEY PERIO
Well-established Perio practice in prime San Jose location with referral sources nearby. Located in a commercial & residential mix neighborhood with a large daytime business draw. Approx. 1,100 sq. ft. office with 4 fully-equipped ops. Well trained dedicated staff, seller retiring and willing to help for smooth transition. 2014 GR $482K+, 2015 on schedule for $539K+ as of August. Asking $295K.

4065 LAKE COUNTY GP
Seller retiring from general practice located in a slower paced, relaxed community. Plenty of hunting and fishing and out door activities for the enthusiast. Approximately, 1,600 square foot office with 4 fully-equipped operatories. Over 2,000 active patients, average $697K+ in Gross Receipts with an overhead of just 56%, and 4 doctor days per week. Asking $463K.

4088 NEWARK/FREMONT DENTAL FACILITY
1,400 sq. ft. facility with 4 fully-equipped operatories setup for right-handed delivery, reception area, private office, consult room, staff lounge, lab area, sterilization area, storage area, 2 bathrooms, common area and plenty of parking. Located in mall close to new housing. Lease expires in 3 years with 5 year option to renew. Landlord willing to negotiate new 10 year lease at a fair market rate. Equipment list available. Asking $80K.

4096 MENDOCINO COUNTY GP
Seller offering well est. 48 year practice. Located in outdoorsman’s paradise. Just 2 hours North of SF surrounded by redwood forest, vineyards and mountains. 950 sq. ft. office in single level building w/ 4 fully equipped ops. 2014 GR $565. Asking $300K.

UPCOMING:

4105 STANISLAUS COUNTY GP
4114 CONCORD GP
4115 WALNUT CREEK GP
4116 SACRAMENTO COUNTY ORTHO

Carroll & Company
2055 Woodside Road, Ste 160
Redwood City, CA 94061
P (650) 362-7004  F (650) 362-7007
dental@carrollandco.info  www.carrollandco.info
CA DRE #0077682

Mike Carroll  Pamela Carroll-Gardiner
Replanted immature avulsed teeth

Purpose: The purpose of this systematic review is to determine when calcification following replantation of an avulsed immature tooth begins and evaluate the prevalence of pulp canal obliteration (PCO) in replanted immature avulsed teeth.

Methods and materials: A through literature search between January 1950 and April 2014 was completed. The articles included were published in English, dealt with human subjects with a minimum of a year follow-up and pulpal healing in the form of revascularization or pulpal obliteration. Case reports and avulsion of deciduous teeth were not included.

Results: A total of 257 studies were identified by two reviewers and only seven papers were selected. A total number of teeth included in the analysis was 228. Range of follow-up was three months to 13 years with a minimum of one year. Patient age was between 6 to 9 years old. Pulp healing after replantation occurred in 32.9 percent (N=75) while pulp necrosis occurred in 67.1 percent (N=153). PCO was the most common outcome of pulpal healing (96 percent). The first evidence of obliteration was observed from three to 14 months with a mean time of nine and one-half months.

Discussion: Extraoral dry time is the most important factor in determining pulpal and periodontal healing of avulsed immature permanent incisors. The most common successful outcome of the pulp after avulsion is PCO. The International Association of Dental Traumatology (IADT) recommends clinical and radiographic assessment in four weeks, three months, six months, one year and yearly after the injury. A few of these teeth (5 to 27 percent) that had undergone PCO will undergo pulp necrosis and this increases over time. The most common symptoms are lack of response to sensitivity tests and change in tooth color. If periapical radiolucencies occur and endodontic treatment is successful, the retention rate of these teeth is high.

Conclusion: PCO is the mechanism by which immature teeth heal after avulsion. This process is rapid and can be detected clinically and radiographically.

Reviewer’s comments: When an immature permanent incisor is avulsed, the most critical factor that determines survivability of the pulp and periodontal ligament (PDL) cells is the extraoral dry time of the tooth. Therefore, it is critical to try to replant the tooth into the socket as soon as possible. The best healing outcome for an immature avulsed tooth is pulp canal obliteration. Vigilant monitoring of the tooth in reference to the schedule recommended by the IADT guidelines (dentaltraumaguide.org) must be followed. If the tooth becomes necrotic, root canal treatment must be initiated in a timely manner. Revascularization/regeneration is a good treatment option because this allows root fortification of the dentinal walls, increasing the long-term prognosis of the traumatized tooth.

— Thomas S. Tanbonliliong Jr., DDS

Periscope Writers Wanted
The Journal of the California Dental Association is looking for writers to join the Periscope Review Board. Periscope provides readers synopses of current findings in dental research, technology and related fields. Review Board members select and summarize four to six of the best articles published in their field of interest in the last 12 months and write synopses of approximately 250 words each. Contact Andrea LaMattina at andrea.lamattina@cda.org for more information.
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Better Fit
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WESTERN PRACTICE SALES

BAY AREA

AC-335 SAN FRANCISCO: Great Practice! 2100sf, 8.ops in desirable location of SF. Call for Details $475k
AG-564 SAN FRANCISCO: Over 25 yrs goodwill. Large 5,600+ sf w/ 9 ops near Land’s End $2,225M
AN-514 SAN FRANCISCO Facility: Located in the bustling financial district! 1,007 sf w/ 4 ops. Reduced to $125k!
BC-361 OAKLAND: Established for over 23+ years! 2,200 sf w/ 7 ops. Seller is retiring. Now Only: $330k
BC-509 SAN LEANDRO: Facility Only, 800 sf, 3 ops w/xray in each op. Call for Details $60k
BC-520 HAYWARD Facility: Located in Downtown, 1500 sf, 4 equipped ops, X-Rays in 3 ops. Call for Details $65k
BC-432 PITTSBURG: Own this family-oriented Practice! 1,640 sf w/ 6 ops. $350k
BC-549 LAMORINDA AREA Facility: Excellent Location! Highly Visible Facility, 900 sf w/ 3ops +1 plumbed add’l. $125k
BN-504 RICHMOND: Established Practice and Real Estate! 1,450 sf w/ 2 ops + 2 add’l $100K/RE $700k
BN-505 CONCORD Facility: The essence of comfort and functionality. 800 sf w/ 3 ops. Now Only: $30k!
CC-456 SOLANO COUNTY: Highly visible! 2,997 sf w/ 6 Dr ops + 2 Hgy ops +1 add’l $850k
CG-537 MARIN COUNTY: Rare Opportunity in upscale, highly desirable area. State of the art office. 2400 sf w/ 7 ops $1.1M
CG-548 ROHNERT PARK: Award winning office by Jim Pride! Collections of $749k in 2015. 1250 sf w/ 4 ops $545k
CN-532 NAPA: Perfectly situated, this premier practice is located on a primary thoroughfare! 1900 sf w/ 5 ops + 1 add’l $850k
DC-476 DUBLIN: Shared Facility. Great for Specialist - Endo, Pedo or Ortho. 1100 sf w/ 2 ops+1 add’l $125k

BAY AREA CONTINUED

DC-522 PLEASANTON: Location, Location, Location! Do not pass this opportunity! 2ops in 712sf office $149k
DC-561 SAN JOSE: Eastridge Area, Seasoned Staff, Loyal Pts, 6 ops +1 add’l, 2400sf, 10npts/mo $300k
DG-550 SAN JOSE: TWO AMAZING PRACTICES. Call for Details! $1.4M
DN-497 PLEASANTON Facility: Great Location! 870 sf w/ 3 ops + 1 add’l. Owner Financing w/10% Down! Reduced! $95k
DG-519 SANTA CLARA Facility: Move In Ready! 2240 sf w 6 fully equipped ops $225k
DG-547 SUNNYVALE: 900sf w 3 ops & Priced to sell at only $195k - Call for Details!
DN-529 CUPERTINO: Must See to Appreciate! High-End Quality Practice. 4 ops w/1,664 sf $320k
DN-542 FREMONT Facility: Spacious & beautifully equipped State-of-the-Art! 3,400 sf w/ 5 ops + 4 add’l. $295k
DN-557 SALINAS: 3,000 sf w/ 7 ops and collecting over $2.225M. Priced at only $1.4M

NORTHERN CALIFORNIA

EC-525 SACRAMENTO: Great Location! Excellent Visibility! 1,500 sf w/ 3ops, 10-15 new pts/mo $220k
EC-531 GREATER SACRAMENTO: Practice and Real Estate for Sale! 1,750sf w/4ops + 1 add’l, 8npts/mo $800k
EN-464 ROCKLIN Facility: Don’t miss out on this remarkable opportunity! 2,150 sf w/ 4 ops. Now Only: $100k
EN-475 ROSEVILLE Facility: Hesitate and you might miss out on this opportunity! 875 sf w/ 2 ops + 2 add’l. $49.5k
EG-479 FOLSOM Facility: Award winning office by Jim Pride! Collections of $749k in 2015. 1250 sf w/ 4 ops $545k
EG-491 FRESNO: History is alive here with tributes to the past! 1,600 sf w/3ops. $225k
EG-484 FOLSOM Facility: Fantastic Turn-Key Opportunity! Come live, practice and grow here! 1,934 sf w/ 4 Ops. Now Only $125k

CALL FOR DETAILS!
**NORTHERN CALIFORNIA CONTINUED**

**EG-521 FOLSOM Facility**: Stands out above the rest! Don’t Miss this one! 1,200 sf w/ 3 ops. Well Equipped! **$55k**

**EG-526 CARMICHAEL**: Relocating and leaving 30yrs Goodwill behind! 1,350 sf w/ 4 ops & opt to grow! **REDUCED! $350k**

**EG-556 SACRAMENTO**: Near CSUS Campus. Long-term 2nd generation office. 935 sf w/ 4 ops **$389k**

**EN-534 ROSEVILLE Facility**: Location, Location, Location! Turn-key... just needs you! 2,000 sf w/4 ops. **$45k**

**EG-560 CARMICHAEL**: Focusing on the philosophy of treating patients as family! 1,200 sf w/ 3 ops + 1 add’l. **$130k**

**EN-558 DAVIS**: Designed for maximum office efficiency and patient flow! 1,487 sf w/ 4 ops + 1 add’l. **$650k**

**FC-334 NORTHERN CA**: Emphasis on prevention. 1,200 sf w/ 4 ops **$480k / Real Estate Also Available!**

**FC-415 FT. BRAGG**: Excellent Practice! Dr. avgs 18+ pts/day & 20+ npts/mo, 1,800 sf w/ 5 ops + 1 hyg. Op **$425k**

**FC-489 CLEARLAKE**: Located on “4-Corners” of Hwy 53, 4ops in shared 3600sf facility. **$470k / 50% interest in RE Also Available**

**FN-527 TRINITY COUNTY**: Be the only dentist in town! “Pride Institute” designed! 2350sf w/ 5 ops +1 add’l. **$250k**

**GC-472 ORLAND**: Live & Practice in charming small town community. 1,000 sf w/ 2ops. Seller Retiring. **$160k**

**GG-386 REDDING**: Amazing Practice. Lease or Buy Real Estate! 2,860 sf w/ 4 ops. Plumberd for 2 add’l!! **ONLY $260k**

**GG-453 CHICO**: 5,000 sf w/ 7 ops Perfect for 1 or more DDS **$395k**

**GG-454 PARADISE**: ~2,550 sf w/ 9 ops. 40 yrs goodwill! Amazing Opportunity! **$595k**

**GN-244 OROVILLE**: Must See! Gorgeous, Spacious. 2,500 sf w/5 ops! Collections over $450k in 2013. **$150k**

**GN-399 REDDING**: Loyal patient base and relaxed workweek schedule. 1,440 sf w/3 ops. **$150k**

**GN-507 CHICO**: It just doesn’t get any better than this! 3,000 sf w/7 ops. Practice **$535k Real Estate $750k**

**GN-546 CHICO AREA**: Well-known for offering quality dentistry with sedation. 2,600 sf w/ 4 ops. **$300k**

**HC-461 SONORA**: In the beautiful Sierra Foothills, 4ops, 1350sf, free-standing bldg. Practice **$700k & RE Also Available!**

**HG-298 REDDING FOOTHILLS**: HEALTH FORCES SALE! Includes Cercon! 2,000 sf w/ 5 ops. Practice **$75K & Real Estate Also Available!**

**HN-280 NO EAST CA**: Only Practice in Town 900 sf w/ 2 ops **REDUCED! ONLY $60k**

**HN-290 PLACERVILLE**: Perfect Merger Op! FFS. 1,400 sf 4 ops **$210k**

**HN-539 Central Sierra/Tuolumne Co**: The perfect Merger Op in a rural Sierra Community! 2,000 sf w/ 5 ops. **$175k**

**CENTRAL VALLEY**

**IC-468 SAN JOAQUIN VLY**: High-End Restore Practice! 2500+sf, 6 ops, **Price Reduced. All offers considered! $350k**

**IC-367 MERCEDES**: Newly Remodeled, Paperless. 1,550 sf w/4 ops **REDUCED! $270k**

**IN-474 STOCKTON**: Too good to be true? Absolutely not! 1,600 sf w/ 3 ops. **$95k**

**IN-506 TURLOCK**: Practice in the heart of the Central Valley! 2,000 sf w/ 5ops + 1 add’l. **$425k**

**IN-512 MERCEDES**: This immaculate practice is an absolute jewel! 1,200 sf w/ 4ops + 1 add’l. **Now Only: $110k**

**IN-554 TURLOCK**: A small town feel but with “big city” amenities! 1,900 sf w/ 5ops. **$795k**

**JC-541 FRESNO Facility**: 1,210 square feet and consists of 2 fully equipped ops and plumbed for add’l op **Call for Details!**

**JC-491 FRESNO**: Well-established. 40-50 new Pt/mo. 1,452 sf w/ 4 fully equipped ops. **REDUCED! $395k**

**JN-551 COALINGA AREA**: Serving this community of working families! Paperless Practice. 1,200 sf w/ 3 ops. **$450k**

**SPECIALTY PRACTICES**

**BC-544 ALAMEDA COUNTY Pedo**: 1,056sf w/ 4 chairs in growing, revitalized community, Seller Retiring **$225k**

**BG-517 NORTH EAST BAY Endo**: 2,750 sf w/ 8 ops! Strong Practice! **$500k**

**CC-346 SO MARIN CO Perio**: Beautiful 1,142 sf w/ 3 ops. No reasonable offer will be refused! **$199k**

**CG-424 NAPA Prosth**: Office has Digital X-ray & NEW 3D Imaging Unit! Ready for Experienced, high-end Prosthodontist! On track to collect just under $1m **$690k**

**DC-459 SF PENINSULA Perio**: 50% Partnership Buy In! **Call for Details!** **$580k**

**FN-536 LAKE COUNTY Pedo**: Focusing on Prevent dental problems before they begin! 1,750 sf w/3 ops. **Now Only: $275k**

**IC-543 CENTRAL VALLEY Ortho**: 1,650 sf w/ 5 chair bays & plumbed for 2 add’l, Strong Refs & Satisfied Pts Base **$180k**

**JC-540 FRESNO Sleep Apen**: Motivated Seller retiring! Step right in and make yours! **Call for Details!**

"**ASK THE BROKER**" can now be found at **WWW.WESTERNPRACTICESALES.COM**

Timothy Giroux, DDS  
Jon B. Noble, MBA  
Mona Chang, DDS  
John M. Cahill, MBA  
Edmond P. Cahill, JD
A look into the latest dental and general technology on the market

**Tech Trends**

**Smiles for Life Oral Health (Sandcastle, Free)**

Interprofessional education is an innovative health care approach to addressing global issues of access to care. Through collaborative learning among the various professions in health care, providers have an awareness of issues beyond their scope of practice and have the ability to perform basic diagnoses, treatments and appropriate referrals for patients who would otherwise not seek care for these other problems. Smiles for Life Oral Health is an app designed to assist primary care practitioners in making differential diagnoses for oral diseases and provides guidance on the management of these conditions. The app provides a series of diagnostic modules that take providers through various algorithms to reach a diagnosis. These modules cover a variety of oral conditions that include child tooth and mucosal lesions, adult tooth and mucosal lesions, oral emergencies and prenatal care. Selecting a module leads the provider through a series of easy-to-answer questions based on what the patient presents with. When the provider has answered the questions, a diagnosis of the oral disease is presented with a description, etiology, symptoms/signs and management of the disease. The app also provides a helpful caries risk assessment tool as well as a photo gallery to aid in providing their patients the most accurate evaluation and guidance.

— Hubert Chan, DDS

**Millennials Prefer Short Video on Mobile**

Many small business owners, including dentists, have considered incorporating video in their marketing efforts. A new study suggests that if you want to reach millennials on their mobile devices, it is best to keep the video short. In fact, according to Millward Brown Digital and Tremor Video, mobile videos that are 10 seconds can help reach millennials more than a video that is 30 seconds long (people ages 35 to 54 prefer that length). The study involved 1,800 people ages 18 to 54. While millennials prefer shorter videos, the study also found that the message must be concise as trying to put too much information in a 10-second video can lead to confusion. Smartphones are the key platform to reach millennials with video, according to the study, and videos on tablets are more effective when targeting consumers who are ages 35 to 54.

— Blake Ellington, Tech Trends editor

**The ‘Smart Carpet’ and ‘Smart Sock’**

Wearable devices have been labeled by many as the next step in the evolution of technology and researchers are trying to determine how to use that to our advantage when it comes to our health. Researchers at the Baylor College of Medicine are developing wearable technologies that could detect and prevent injuries. With watches already tracking steps per day and heart rates, the researchers believe more can be done to prevent serious problems before they happen. For example, researchers are working on a “smart carpet” that could track the walking patterns of the elderly to help prevent falls and even a “smart sock” that would “prevent diabetic foot ulcers and wound dressing that expedites healing.”

— Blake Ellington, Tech Trends editor

**Google Calendar for Desktop (Google Inc., Free)**

Google has added reminders to its desktop web application so that users can see their reminders and events together, no matter which device they use. Reminders within Google Calendar are just like events with the exception of additionally prompting the user of an item due on a specific date and time. When a reminder is entered within Google Calendar, the item shows up on both desktop web and mobile applications. Mobile users get reminder prompts on the specific date and time through the system notifications of their device. For the desktop, Google Calendar will alert the user of the reminder through a dialog box in the web browser. Desktop users must have their web browser launched with Google Calendar as the active site within an open window for reminder notifications to work. If Google Calendar is on an inactive tab or not loaded at all within the web browser, the user is never alerted for a reminder on a specific date and time, even if the user returns to Google Calendar when the notification is past due. Past due reminders not completed remain at the top of the calendar until they are marked done. While having reminders as an added feature to Google Calendar on the web makes it on par with its mobile counterpart, its ability to alert users of reminders on the desktop is extremely limited to specific end-user circumstances.

— Hubert Chan, DDS
What will you discover in San Francisco?

Community. Foster fantastic teamwork through shared experiences at CDA Presents. Get connected to your team, and collaborate with your colleagues and mentors during interactive workshops, networking events and after-hours fun.
With no impressions or custom trays necessary, Opalescence Go is ready to use right out of the package! The comfortable, adaptable UltraFit™ pre-filled tray provides molar-to-molar coverage, and quickly adjusts to any smile.