Thought Leadership
Insights and Perspectives

Guardian®

The Future of Dentistry

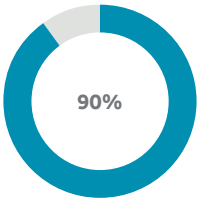
Improving America's Oral Health and Wellness

Contents

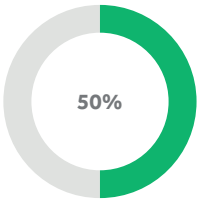
Introduction

Dentistry is a topic that affects everyone — a fact that is probably just as evident through personal experience as it is confirmed by national studies.

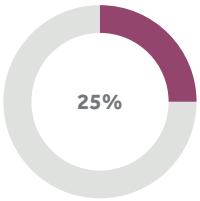
Oral health issues are among the most common — and the most preventable — health concerns impacting the American public. The Centers for Disease Control and Prevention (CDC) calculate that 80% of the U.S. population has had at least one cavity by age 34, and more than 50% show signs of periodontal (gum) disease.[1] And while asthma is often considered the most common chronic childhood health condition, dental decay is actually five times more common.[2] As the relationship between oral health and overall health becomes clearer, the health implications of untreated oral disease continue to expand: exacerbating other diseases possibly including the opioid epidemic and involving facets of mental health such as self-confidence and social stigma.[3]



of adults have had dental decay at some point in their lives.[1]



of adults show signs of periodontal disease.[1]



of the population has untreated decay.[1]

The impact of dentistry also extends into economics, representing a significant portion of the U.S. healthcare economy. The CDC estimates that $6 billion in lost worker productivity annually is attributable to oral disease.[4] According to the American Dental Association (ADA), emergency room (ER) visits for conditions related to dental disease account for nearly $2 billion in annual costs.

The public knows little about oral health and the state of dentistry in 2019. Even dental professionals are sometimes challenged when trying to understand the big picture — expressing concerns ranging from a perceived shortage of dental services to fears about an oversupply of dentists. We also hear that dentists will "put themselves out of business" because of all the known preventive interventions. The profession bemoans its omission from Medicare in 1965, and yet is fearful of any kind of government-sponsored healthcare program in the future. Are we a branch of medicine? Should we be? Would that be better or worse for the profession? And would that be better or worse for the patients we serve?

This paper begins with an overview of emerging trends in the dental profession, including the changing demographics of the profession and the U.S. population at large. What impact will this have on the future of the dental healthcare system? It also addresses advancements in our scientific understanding of dental disease; specifically, the interrelationship between medical diagnoses and dental disease. Closely related to this concept is the issue of value: How do we recognize, measure, and systematize value in oral healthcare? Do our models of delivery and reimbursement need to evolve to keep up with our knowledge on other fronts?

It can be difficult to sort out myth from reality, especially in the current environment. With a strong legacy and an eye on the near future, Guardian brings together insights from across the industry that provide clarity to these issues.

Children with poor oral health may receive lower grades and may have a greater risk of sleeping and eating disorders compared to those children with good oral health.[5]

History of Dentistry

The first dental college was opened in 1840 at the University of Maryland. But it wasn't until much later, in the 1920s, that the practice of dentistry was accepted as an essential component of higher education. This was in large part because of William J. Gies, a biological chemist who conducted an assessment of the dental profession for the Carnegie Foundation. In his assessment, titled The Gies Report, Gies concluded that, "dentistry can no longer be accepted as mere tooth technology."[6] The Gies Report helped to successfully establish the education of dentistry in the university setting.

While Gies advocated to incorporate dentistry into the medical profession, professionals of organized dentistry wanted to remain separate and apart from the medical delivery system to retain their autonomy and independence.[7] Organized dentistry reacted in a similar way to the inception of Medicare and Medicaid in 1965, when it lobbied against the inclusion of dentistry in Medicare health benefits. Years later, though, we are still dealing with the artificial segregation of medical and dental health. Only recently has the dental profession, along with our medical colleagues, asked the question: Does it make sense that what happens in one part of the body may impact what happens in another? Stated more simply: Isn't the mouth a part of the body?

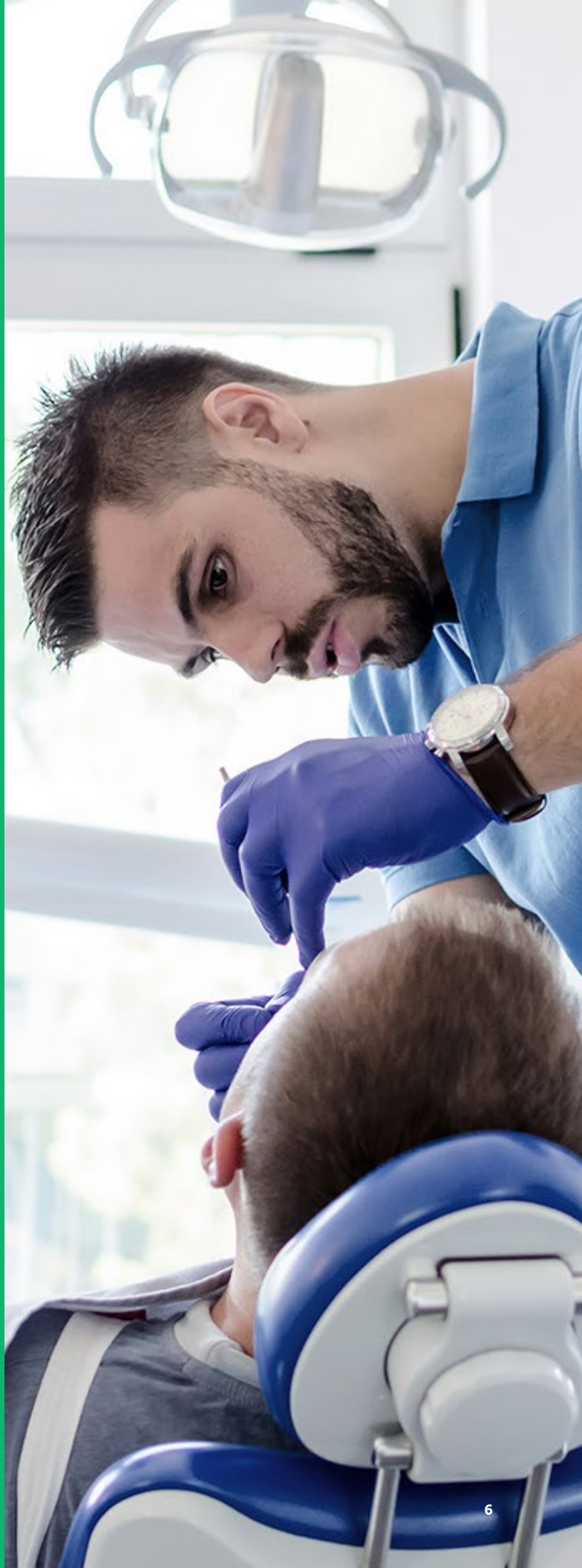
According to Bruce Donoff, DMD, MD, Dean of the Harvard School of Dental Medicine, "Poor oral health is more than a 'tooth problem.' We use our mouth to eat, to breath, and to speak. Inflammation in the gums and mouth may help set the stage for diabetes, cardiovascular disease, and other chronic conditions."[8] In addition to health implications, good-looking teeth are an important component of self-esteem for people of all ages.

"Dentistry can no longer be accepted as mere tooth technology."

The Gies Report, 1926

As we approach the end of the second decade in the 21st century, it seems an appropriate time to ask the question:

What's next for the practice of dentistry?



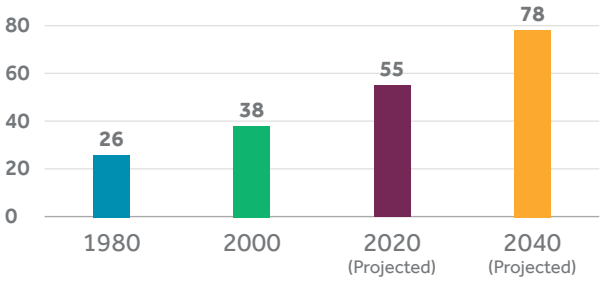
Demographics:
Patients Age 65+

One of the most interesting factors of patient demographics is the population growth of people over 65 — presenting unique considerations for focused clinical care as well as dental coverage through Medicare.

Every month, more than 250,000 Americans turn age 65. By 2030, close to 20% of the U.S. population, or 67 million Americans, will be age 65 or older.[9] People in this country are living longer and keeping their teeth longer as well. It is not unreasonable to expect that patients will keep their natural teeth well into their 80s and 90s because the rising generation of seniors has had access to better preventive care than their predecessors.

U.S. Population Age 65 and Older[9]

(millions)



The aging U.S. population presents challenges on multiple fronts.

From a clinical perspective, it is more difficult to diagnose and treat an aging population that still has its teeth than it is to make dentures. The mouth of the older adult may reflect a complex mix of root surface decay and varying stages of periodontal disease.

Many older patients will have chronic medical conditions; therefore, managing their oral health may be more challenging. Medical diagnoses may impact the dentist's treatment options; local anesthesia is one example of a routine procedure that may have to be altered because of certain medical conditions.

The elderly may have difficulties with the routine maintenance of their oral health — such as daily brushing and flossing — because vision, coordination, and cognition can decline with age.

Older adults may take multiple medications, some of which can cause dry mouth. Dry mouth creates the optimal environment for the proliferation of oral bacteria and reduces the natural "washing" of teeth and other oral tissues. Bacteria and reduced salivary flow contribute to the development or exacerbation of decay and periodontal disease.

There are also challenges from a public health perspective. Apart from some Medicare Advantage plans, Medicare does not cover routine dental care as part of its basic benefits package. In many cases, Medicare provides coverage for oral health conditions involving a hospital stay and/or medical treatment; however, that still leaves most seniors without coverage for routine dental care.

A population that is living longer and keeping their teeth longer may not have access to routine dental care or even coverage for the treatment of dental emergencies. As of 2016, only 12% of Medicare beneficiaries had some form of dental insurance coverage. Of those, fewer than half visited a dentist in the preceding year.[10] Coverage and access to dental care is even more restricted among low-income populations. Of course, a small minority of seniors may be able to obtain dental coverage through working spouses as a post-retirement benefit, or may be eligible for Medicaid coverage in a state that offers Medicaid dental benefits.

Demographics:
Dental Providers

The demographics of dental providers also continue to evolve. Here we consider how the trends of significant student debt, shifting gender representation, and care for underserved communities impact the industry landscape.

The current generation of dental school graduates carries significant debt. According to the American Dental Education Association (ADEA), the average debt per graduating dental student was $287,000 in 2016.[11]

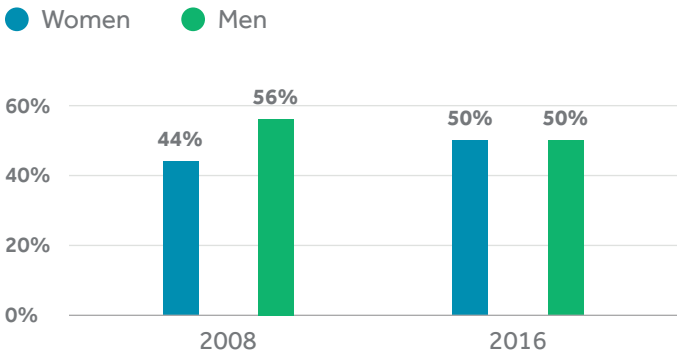
80% of dental school graduates in 2016 had at least $100,000 in debt.[11]

When dental students graduate with hundreds of thousands of dollars in loans, it certainly influences their choice of practice and career path. These factors tend to make a student more risk-averse and unwilling to assume the debt necessary to start their own practice. It also affects practice style, and some believe it may have the potential to increase dentist-induced demand for services.

It is little wonder that the corporate dentistry model holds greater appeal for graduating students who are deeply in debt. Corporate dentistry models, such as Dental Service Organizations (DSOs), offer an opportunity for debt-laden and newly minted dentists to enjoy a more predictable income stream without the burden of additional financial obligations. It also allows them to spend more time and attention on the practice of clinical dentistry rather than running a business. The impact of this new delivery model on the health and financing of oral care is still to be determined.

Changes in the demographic composition of dental school students are also impacting the new provider model. Today, the average dental school class is composed of at least 50% women, indicating a gender balance emerging in the profession.

Gender of Dental School Graduates[11]



Another important development is the opening of new dental schools, several of which have a more community-based focus. Students in these schools are placed in rural and underserved communities early in their dental school careers and are encouraged to return to underserved areas upon graduation.

The question of how to best meet the oral healthcare needs of those in underserved communities is an ongoing and somewhat heated debate in the dental profession. Is there a shortage of dentists or a maldistribution? The latest iteration of this debate centers on the utilization of mid-level providers. Some states recently have approved the use of dental therapists to help address the oral health crisis and lack of access to dental services in low-income and rural communities.[12]

New Insights into the Dental-Medical Connection

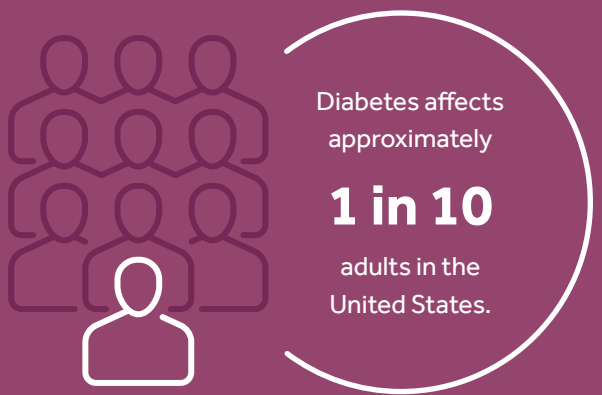
Too often, oral health has been narrowly defined as the absence of disease. But in 2016, the FDI World Dental Federation changed its definition of "oral health," broadening it to encompass the relationship between oral health and systemic health.[13] The implications of this decision for the dental profession are significant. It moves the practice of dentistry from strictly the treatment of disease to management of the entire oral healthcare system and all that is associated with the maintenance of its component parts.

> "Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex."
>
> **Definition of "oral health" from the FDI**

This change was intended to better align healthcare providers and policy advocates and to advance our understanding that oral health involves so much more than just healthy teeth. This common definition, one that reflects the evolving knowledge of oral health, helps to facilitate discussions among educators, physicians, dentists, policy analysts, insurance carriers, government programs, and others with a vested interest in public healthcare.

Oral Health's Connection to Overall Health

Good oral health extends beyond having an attractive smile and pain-free teeth; however, most Americans have limited awareness and understanding of the relationship between oral health and overall health. A clear linkage exists among oral health, preventive care, and overall wellness. For example, in recent years, a substantial body of credible, scientific literature has been published on the connection between periodontal disease and overall health. Yet, the profession has failed to reach agreement on the precise methodology and outcomes for measurement. Most studies have limitations in terms of their ability to adequately quantify the precise relationship. We know it exists; the challenge is to find the right definitions and measurement methods.



Diabetes

An example of a medical condition that may have dental implications is diabetes. Patients with diabetes are less able to control infections of any kind. Periodontal disease, a chronic infectious disease (in most cases), may appear mild in a healthy individual, yet the same disease in a diabetic may be much more severe. Patients with diabetes and periodontal disease may see significant improvement in their diabetes if they are able to control their periodontal disease.[14] According to Dr. David DePorter, DDS, and Dental Director for Pacific Resources: "The net result is early tooth loss, increased periodontal-related infection, and diminished ability to intake a balanced diet."[15]

Heart Health

In addition to the diabetes-oral health connection, recent studies have addressed the relationship between coronary artery disease and oral health, particularly periodontal disease. While the supporting data is still somewhat imprecise, a connection appears to exist between oral health and cardiac health. The strongest hypothesis for this relationship is related to inflammatory pathways; the fact is that the presence of inflammation in one part of the body can adversely impact inflammation elsewhere in the body. If we accept the fact that inflammation is the common denominator among patients with periodontal disease and systemic disease, then what is the relationship of periodontal disease to other inflammatory diseases, such as arthritis or Crohn's disease? These questions have yet to be answered.

The FDI reports "up to 57 diseases and conditions have been studied regarding their potential correlation with periodontitis. A strong level of evidence, based on biological plausibility models, epidemiological studies, and/or intervention studies, is available for diabetes, cardiovascular diseases, and adverse pregnancy outcomes, while emerging evidence has also been published for other relevant conditions."[16] Numerous articles address the correlation of periodontal disease to stroke, chronic obstructive pulmonary disease, and a host of other chronic conditions. But the most credible, outcomes-based association still appears to be with diabetes and cardiovascular disease.

Pregnancy

The relationship between oral health and pregnancy has been known for many years. However, for the first time in 2011, the Health Resources and Services Administration convened a professional panel to develop a consensus statement on the management of oral health during pregnancy. Participants included representatives from the ADA as well as the American College of Obstetricians and Gynecologists, among others. An important outcome of the panel's efforts was to refute former beliefs and debunk myths related to the dental treatment of women during pregnancy. Among its conclusions, the consensus statement established that dental treatment for pregnant women is significantly safer than previously thought. Routine preventive, diagnostic, and restorative care is safe for most pregnant women. Moreover, it was found to be in the best interest of both the mother and the unborn child to receive these treatments. Failure to maintain good oral health during pregnancy — and treat oral issues related to pregnancy — can have negative, long-term consequences for both mother and child. Studies indicate that mothers with high levels of certain oral bacteria (e.g., strep mutans) were found to have children with similarly high levels of the same bacteria, predisposing both to a higher risk of decay. In addition to decay, pregnant women are at risk for inflammation of the gums due to their hormonal fluctuations. It is strongly recommended that pregnant women visit their dentist during their pregnancy, so that any changes in the oral cavity can be handled at the onset.

The Cost Factor

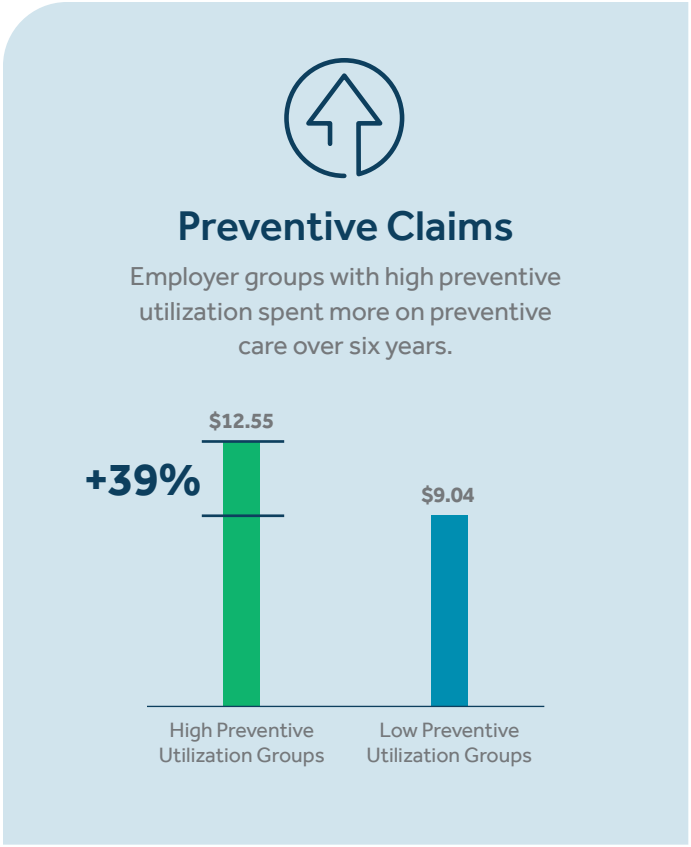
Understanding the relationship between oral health and systemic health is more than just the right thing to do; there are significant cost-saving opportunities if this knowledge is applied correctly.

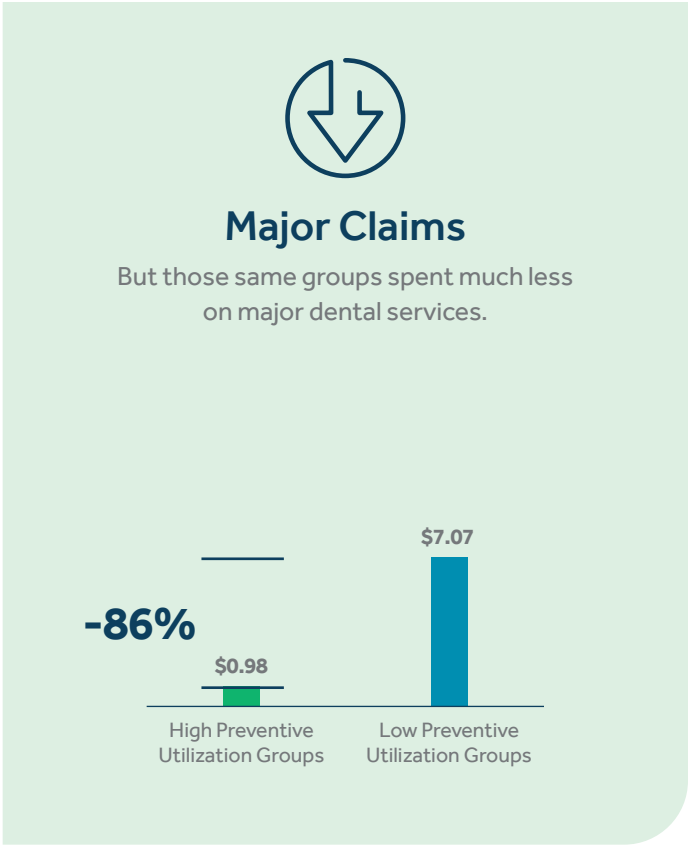
Research conducted by Optum shows that compliance with oral healthcare recommendations can help generate significant savings on related medical costs.[17] The overall net savings (after subtracting the cost of dental care) was $1,037 per patient (and as high as $1,849 per patient) among those who received cleanings and routine periodontal care over a 12-month period. Not surprisingly, the greatest savings were associated with patients who were otherwise non-compliant with their medical management protocols.

The most prevalent diagnosis studied was diabetes and the findings were dramatic. Among patients who were noncompliant with their diabetes protocols, annual medical care cost-savings were $1,674, compared to $925 in savings for diabetic patients who were compliant with disease management recommendations. For patients with both diabetes and coronary artery disease, the annual savings on medical care costs was nearly $4,000 per patient.

Intuitively, we expect that more regular preventive dental care (e.g., at least one exam/cleaning every twelve months) not only leads to better oral health but lower dental claim-related costs, as well. Research conducted by Guardian in 2018 validates these assumptions. Employer groups with high utilization of preventive dental benefits over a six-year-period spent 39% more on preventive care but 86% less on major dental services in the seventh year. Greater use of preventive dental care services resulted in a net savings of 16%, or the difference between total per-member-per-month (PMPM) costs of $13 among high preventive utilization groups vs. $16 PMPM among low preventive utilization groups.[18]

The trend is obvious. Taking care of one's oral health has the potential to decrease the cost of medical and dental care for patients and benefit plan sponsors. Future research is likely to show that it also lowers pharmacy costs, reduces lost workdays, and increases workforce productivity.





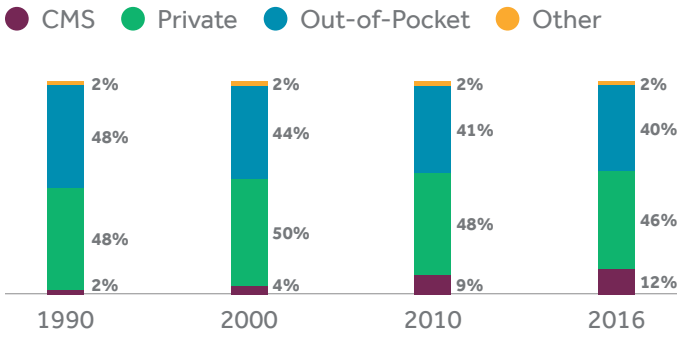
Medical-Dental Integration: Where Are We?

Some physicians say that in medical school, they are taught to look straight past the teeth, tongue, lips, palate, and cheeks and focus immediately on the throat. What if medical schools taught their students how to examine the whole patient, including the mouth and teeth? A well-trained physician, who includes a cursory dental exam as part of a physical exam, might help to eliminate the problems created by the alarming number of patients who never go to the dentist. Several pilot studies teach medical students to do just that; and at the same time, they teach physicians and nurse practitioners to apply fluoride varnish during well-baby and well-child visits to the medical offices.

As one of the largest purchasers of dental insurance in the nation, Medicaid is considered a leader in this area. Nearly 40% of children ages 2-18 have dental coverage through Medicaid or the Children's Health Initiative Program (CHIP), and another 7% of adults have dental benefits through Medicaid. The Centers for Medicare and Medicaid Services (CMS) account for 12% of total dental benefit expenditures in the U.S.[19]

Distribution of Dental Expenditures[19]

by Funding Source



State Medicaid agencies increasingly ask for integration of medical and dental care services in an effort to control overall healthcare costs and promote greater efficiency within the system. This impacts the 38% of dentists who participate in Medicaid and CHIP. These dentists are asked to collaborate with their medical colleagues on treatment for pregnant patients and those with diabetes and heart disease. In addition, dental treatment by medical providers is a metric that states have been required to report to CMS since 2010, placing these government health programs at the forefront of care integration.

The need to efficiently manage taxpayer dollars prompted CMS to promote medical-dental care integration.

The days of "one-size-fits-all" dental benefits are behind us, and support for fundamental changes to dental benefits design is gaining momentum.

The Implications for Benefits Design

The winds of change are blowing in the dental benefits industry. The days of "one-size-fits-all" dental benefits are behind us, and support for fundamental changes to dental benefit design is gaining momentum. To keep up, coverage providers that want to be in good company must rethink old assumptions about dental care benefits. The typical indemnity benefit design has generally paid 100% for preventive services; 80% for restorative services; and 50% for everything else. But, 100/80/50 is yesterday's news. The concept of two cleanings a year dates back to a 1950s toothpaste advertisement. The standard of two-cleanings has been supported actively by the ADA to keep patients coming back.

The industry debate is migrating toward more "personalized dentistry," analogous to the emerging model in medical care and benefits. A risk assessment makes it possible to determine that one employee needs two cleanings per year while another, due to health issues, should have four cleanings per year. Dental carriers are working to achieve greater flexibility in their plan offerings to accommodate this type of variability. However, introducing such plans in the market can be challenging because employers and employees may be resistant to this change.

For example, an employee in good oral health who needs only one dentist visit/cleaning per year may be dissatisfied because he/she perceives that the dental plan is providing "fewer benefits" — it could seem like a coverage reduction for good health. The challenge is to design, price, and market a plan that can meet the personal needs of each employee, while not alienating those employees who have "earned" a decrease in benefits.

Evolving Models of Reimbursement and Benefit Design

Fee-for-Service Model

Reimbursement in dentistry has historically been structured around the fee-for-service model. Of course, the fee-for-service model is based on the concept that the more services a dentist performs, or bills, the more money he/she makes. Healthcare payers (government and commercial; medicine and dentistry) have long realized that inherent in this model could be a perverse incentive to over-treat and over-prescribe. Fortunately, most practitioners (dentists, physicians, etc.) are motivated by "doing the right thing" for their patients and not by simply enhancing their earnings potential. Historically, in the vast majority of cases, the dentist's own sense of ethics and integrity has protected patients from being over-treated or over-charged.

Capitation

Over the years, multiple initiatives have attempted to manage the risk of overtreatment and over-billing inherent in the fee-for-service paradigm. One such model is capitation, which has been used in both dental and medical benefits to re-align the financial incentives for the practitioner.

Under capitation, the dentist or physician is paid a set amount, per member per month. The practitioner is incentivized to keep the patient healthy so that there will be fewer patient visits and less disease. In theory, it is a win/win situation: it allows the purchaser to better predict and manage their healthcare expenditures while providing the practitioner with a predictable and steady income stream. While capitation creates an incentive for practitioners to keep patients healthy, the risk is that it can lead to under-treatment. An optimal reimbursement model that best aligns with provider incentives has yet to be developed.

The concept of "pay-for-performance" is attracting attention and slowly gaining market support as well.

Pay-for-Performance Models

Is it possible to award financial incentives to providers who are delivering superior care? Several "pay-for-performance" (P4P), or value-based payment models, have been discussed in the past few years. P4P is a newly established concept in medicine that attaches financial incentives/disincentives to provider performance based on clinical outcomes. While adoption of a P4P model in dentistry has been slow, one can imagine establishing preventive targets for dental offices by identifying patients who are at high risk for periodontal disease or decay. Dentists could be rewarded financially for providing outreach, education, and preventive treatment for those patients known to be at risk. The ultimate goal is to base provider rewards on clinical outcomes; however, the current process allows only for recognition of behaviors and not outcomes. Ideally, value-based payments would align with improving oral health in the population.

The P4P model is another area where government health programs are ahead of the curve. In 2017, CMS began a pilot program within its Medicaid Innovation Accelerator Program (IAP) to provide state agencies with technical support for value-based incentive payment models. More than 18 states plus the District of Columbia have been selected to participate in the program, with the goal of eventually moving to quality-driven capitation models.[20]

Dental Plan Design

Many carriers are beginning to address the reimbursement conundrum by changing the dental plan design. Among the more popular plan designs under discussion these days are those that vary according to the patient's "risk," as discussed above. Risk can be defined as either the patient's medical condition or their oral health status. In all cases, the intent in these leading organizations is to steer away from a "one-size-fits-all" approach to plan design and instead create dental benefits that are more tailored to an individual's needs.

Value: Definition, Measurement, and Education

The dental profession has been somewhat late to the game in terms of defining and promoting the concept of value in healthcare services. Whereas procedures like sealants and fluorides have long been studied as valuable contributors to any preventive oral healthcare regimen, utilization of these services has been consistently below expectations given the preponderance of evidence.

Healthcare disciplines, such as pharmacology, have established traditions of pharmacoeconomics. That is, they evaluate the clinical value, measured in a multitude of ways, derived from a financial expenditure. The ultimate question is, "Value from whose perspective?"

The Institute of Medicine considers a similar idea using the term "quality" defined as "the degree to which healthcare services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."[21] We are a long way from applying these principles in the practice of dentistry, yet that is exactly where the dental profession needs to go. Accountability in healthcare is more important than ever, and in this age of limited resources and limited funds, one could argue that it is more important to know the health economic "value" of a procedure. For example, what is the value of removing third molars that have no symptoms? And from whose perspective? Certainly, the perspectives of the patient, payer, and provider may differ in answering this question.

To address the question of value and quality in an objective, scientific, and quantifiable manner, the ADA established the Dental Quality Alliance (DQA) in 2010. This consortium was developed in recognition of the increasing demand for accountability from the public and payers. How does a non-clinician know if a procedure is "worth" the cost? The stated goal of the DQA is to improve the oral health of the population overall and to involve all stakeholders in the measurement and definition of quality and outcomes. To date, a majority of the DQA measures are process measures only; it will take time for credible outcome measures to be included in this undertaking.

What Does the Future Hold?

The ancient Greek philosopher Heraclitus is believed to have said that the only thing that is constant is change itself. Market trends suggest we are on the precipice of significant change in the practice of dentistry and the delivery of dental benefits. We are witnessing change in the demographics of the patient population and the characteristics of new dental school graduates. We see change in the broader healthcare environment with an increased focus on value and outcomes. The advent of corporate dentistry models has altered the dental landscape, and their impact over time is yet to be determined. Advancements in technology and data analytics will yield even more credible measurement of the relationship between oral health and overall wellness.

In the next decade, five factors that will likely accelerate change in the practice of dentistry are:

An Aging Population

Will Medicare ultimately incorporate dental benefits into the basic Medicare benefit, and if so, what might that look like?

Growth of Corporate Dentistry

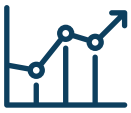
Will the continued expansion of DSOs lead to greater access to care? How will the dentist-patient relationship be impacted? Will the heavy burden of school debt be a determining factor in this trend?

Greater Dental-Medical Integration

How will new learning about the relationships between systemic health and oral health impact dental care delivery? Is it possible that we will see improved communication and interface between physicians and dentists? Might there be more information-sharing and perhaps medical and dental providers co-locating in the same physical space?

Risk-Based Models and Predictive Analytics

As our ability to reliably measure and predict outcomes improves, how will that impact the practice of dental care? What are the implications for dental benefits plan design and pricing?



Clinical Focus on Quality and Value

As our understanding evolves, what might that mean for procedures that are part of routine practice today? Will every adult receive (or need) two professional cleanings a year? Might we consider procedures that have been primarily aimed at the pediatric population as appropriate preventive procedures for adults, such as fluoride treatments and sealants?

Are you in good company to face the future of dentistry?

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Dr. Tillman earned her DMD from the University of Pennsylvania School of Dental Medicine and an MBA from Columbia University. She has more than 30 years of experience in dental insurance, managed care, and health economics.

She began her business career as the Director of Dental Products & Policy at Empire Blue Cross and Blue Shield in New York. She subsequently assumed dental leadership positions at Prudential, Cigna, and Oxford Health Plans.

In an unusual career trajectory, Dr. Tillman spent 10 years within the biotech and medical device industries, where she leveraged her knowledge of healthcare and reimbursement to pursue her interests in health economics and outcomes research.

In recent years, Dr. Tillman has turned her attention to the economics of oral healthcare delivery and issues related to reimbursement, utilization management, and the detection of potential fraud, waste, and abuse. She joined Guardian in 2017 and serves as Chief Dental Officer and Second Vice President. She has been a champion for initiatives related to oral health and wellness throughout her career.

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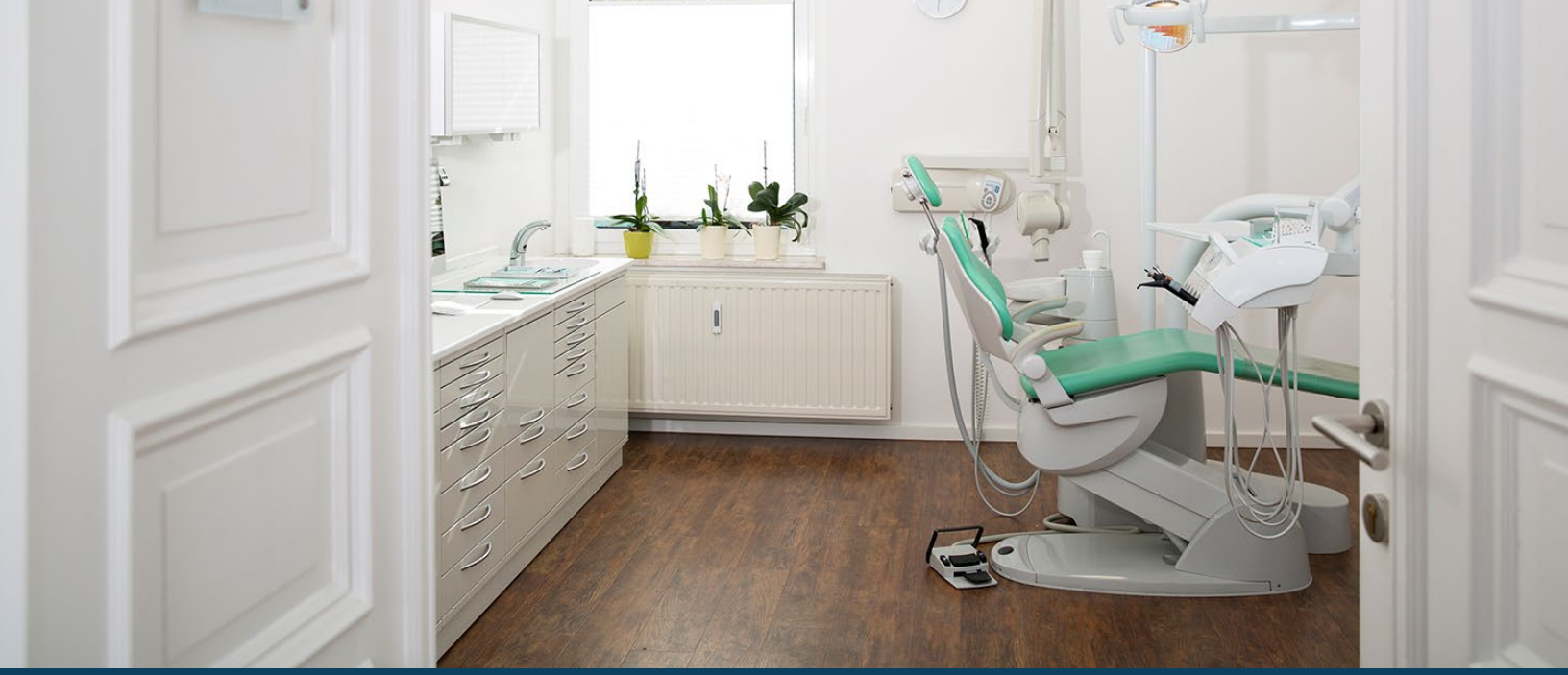

References

1 "Oral Health Basics," May 2, 2018, Centers for Disease Control and Prevention

2 "Improving Quality in Dentistry: An Imperative for the Profession," July/August 2016, The Journal of Pediatric Dentistry. Volume 36, Number 4

3 ER doctors are not trained, nor do they have the equipment, to treat dental problems. Therefore, the best they can do, often, is to write prescriptions for pain medications (often opioids) and, when indicated, antibiotics. Typically, a dental visit to the Emergency Department of a hospital results in costs to the healthcare system without really making a difference in the patient's well-being.

4 U. Kelekar, S. Naavaal, "Hours Lost to Planned and Unplanned Dental Visits Among U.S. Adults," January 11, 2018, Centers for Disease Control and Prevention

5 "Oral Health Basics/Children's Oral Health," April 25, 2018, Centers for Disease Control and Prevention

6 "The Gies Report: Dental Education in the United States and Canada," 1926, William J. Gies

7 Mary Otto, "Teeth: The Story of Beauty, Inequality, and the Struggle for Oral Health in America," (New York: The New Press, 2017)

8 R. Bruce Donoff, DMD, DDS, "It's Time to Break Down the Wall Between Dentistry and Medicine," July 17, 2017, Statnews.com

9 "Older People Projected to Outnumber Children for First Time in U.S. History," March 12, 2018, U.S. Census Bureau

10 Amy Willink, "Dental Care And Medicare Beneficiaries: Access Gaps, Cost Burdens, and Policy Options," December 2016, Health Affairs

11 T. Wanchek, PhD, JD; B. J. Cook, PhD; R. W. Valachovic, DMD, MPH, "Annual ADEA Survey of Dental School Seniors: 2016 Graduating Class," May 2017, The Journal of Dental Education

12 Y. T. Yang, B. Chen, and T. Wanchek. "Dental Therapists: A Solution to a Shortage of Dentists in Underserved Communities?" March 2017, Public Health Report

13 "Editorial: A new definition of oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health," 2017, Journal of Public Health Dentistry

14 Peter Russell, "Treating Gum Disease May Help Manage Diabetes," October 2018, Medscape.com

15 David DePorter, DDS, "Dental Benefits Evolve to Tackle Chronic Health Conditions." 2018, Pacific Resources

16 D. Herrera, J. Meyle, S. Renvert, and L. Jin, "White Paper on Prevention and Management of Periodontal Diseases for Oral Health and General Health," 2018, FDI World Dental Federation

17 "Medical-Dental Integration Study," 2013, Optum on behalf of United HealthCare

18 "Dental Benefits: A Bridge to Oral Health and Wellness," January 2018, 5th Annual Guardian Workplace Benefits Study

19 "U.S. Dental Expenditures: 2017 Update," 2017, Health Policy Institute, American Dental Association

20 "Value-Based Payment & Financial Simulation," November 2018, Medicaid.gov

21 "Understanding Quality Measurement: What is Quality," October 2018, U.S. Department of Health and Human Services, The Future of Dentistry

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