Ensuring a vibrant future for dentistry through research and discovery

Paul Krebsbach, DDS, PhD
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When my husband was in dental school (a long time ago), he told me that restorative dentistry would become irrelevant once a vaccine for Streptococcus mutans was discovered and perfected. Some day that may be the case, but for now, the number of safe and effective vaccines are limited and do not include one that prevents tooth decay. The World Health Organization (WHO) lists 26 diseases that can be prevented by vaccination.\(^1\) Hepatitis B is No. 6 on the list and human papillomavirus (HPV) is No. 8.

Dentistry has a special interest in the development of the hepatitis B vaccine because that disease used to be a common occupational hazard for dentists before universal precautions were adopted in all dental settings. Mandatory vaccination is now required in 43 states.

Vaccines are miraculous. They harness the natural process of acquired immunity and save untold numbers of lives. Alternative medicine is based in large part on magical thinking, but vaccinations can almost seem like magic. After all, vaccination introduces a tiny amount of a substance into the body. Our bodies mount a natural response and build up the immune system’s ability to fend off future challenges by the actual disease-causing organism.

Conceptually, that sounds like the perfect marriage of homeopathy and acupuncture with maybe a little magical thinking thrown in. What is not to like about it?

One would think that vaccines would appeal to those who prefer alternative medicine and magical thinking over science-based logic. However, for these individuals, there can never be sufficient evidence to reassure them of the validity of the underlying science and safety of vaccination.

They ignore or deny existing, relevant scientific evidence that reinforces our understanding of science and how the body works. Their reluctance to vaccinate is motivated by fear. Fear is powerful. It can play a deciding role in many of our everyday decisions. When fear is the determining factor in decisions about the health and welfare of our children, it can be detrimental to exactly what we are trying to protect.

No one wants to make a wrong decision. No one wants their decision to put the ones they cherish in jeopardy. No one likes being wrong. So, here is where the ideas of empathy and trust come into play.

In an open society, shaming can harden an individual’s mistrust of others who do not share their own views.

Shaming individuals who do the wrong thing or who fail to do the right thing is a natural reflex. Shaming and ostracizing may help keep individuals in a small closed community within the bounds of rigid social norms. But does shaming really help someone change their behavior? In an open society, shaming can harden an individual’s mistrust of others who do not share their own views.

Consider, for example, those people who fear and distrust vaccinations for themselves and their children. These individuals are sometimes labeled “anti-vaxxers.” Their behavior is sometimes referred to as vaccination hesitancy.

Vaccination hesitancy is on the WHO 2019 list of the top 10 threats to global health.\(^2\) In our office, our medical history form includes a question about vaccination status. If the individual is not up to date on vaccinations, we use this as a chance to engage the patient or parent in a discussion of their view on vaccination.

It would be easy and quick to shame the individual by pointing out that their view is misinformed and that if they knew better, they would certainly get all recommended vaccinations. Behavior research indicates that this technique usually backfires. It can accentuate the divide between the patient and the dentist. The anti-vaxxer might align even more rigidly with the vaccination-hesitant group that shares their view.

Empathy can be more helpful than shame in this interaction. The patient is seeking our care because they have some level of trust in our opinion of their oral care. Building on that trust can facilitate an openness to considering our advice on positive actions the patient can take to improve their overall present and future health.

We know that vaccination hesitancy is primarily the product of fear. It can be productive to start the conversation there. Opening a dialog by asking about their feelings about vaccination is a way to allow the dentist to empathize with the patient’s fear and agree that there are some continuing questions about vaccination.
It is important to tailor the conversation to the specific concerns of the individual. An honest conversation must include information about the risks of vaccinations. Acknowledging the risks and their very low incidence is crucial to building trust. Talking about the possible side effects and how to manage them reinforces the message that we are concerned for the patient's welfare.

The discussion can then move to emphasizing the risks of not getting vaccinated. Though the idea of herd immunity is a driver for public health initiatives, individual parents are probably more concerned with the risks to their own child rather than their duty to protect other members of their community.

Vaccination discussions can be difficult, not only because they require vulnerability and empathy but they (as in the case of HPV) can deal with sensitive topics, like sexual behaviors and cancer. However, we have a duty to inform because we may be the only opportunity that this patient has to get scientific, evidence-based information on the risks and advantages of vaccination from someone they trust.

The dental office environment is also a very good example of positive vaccination behavior. Our personnel receive hepatitis B vaccinations because they work in a healthcare setting. Most offices encourage annual flu vaccinations for the same reason. If appropriate, many of us get shingle and pneumonia vaccinations. It is important that we communicate that we get those vaccinations not only to protect ourselves and our co-workers, but also to protect the patients who we come in contact with. It is our duty to protect those who seek care from us.

As dentists, we are privileged to be the recipients of great respect from our patients. They trust us. We know the science and the evidence. We can certainly show empathy for those seeking our care. Sensitivity to another's dignity is essential to protecting the doctor/patient relationship.

We can help guide them through an understanding of the science and the available evidence pertaining to issues that are pivotal to their present and future health. We can do that, and it is our duty.

REFERENCES

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Impressions

Electrochemical Approach Treats Implant Infections

Titanium has many properties that make it a great choice for use in implants. Its low density, high stiffness, high biomechanical strength-to-weight ratio and corrosion resistance have led to its use in several types of implants, from dental to joints. However, a persistent problem plagues metal-based implants: The surface is also a perfect home for microbes to accumulate, causing chronic infections and inflammation in the surrounding tissue. Consequently, 5% to 10% of dental implants fail and must be removed within 10 to 15 years to prevent infection in the blood and other organs.

But new research from the University of Pittsburgh’s Swanson School of Engineering introduces a revolutionary treatment utilizing electrochemical therapy (ECT) to enhance the ability of antibiotics to eradicate these infections. The study was published in ACS Publications in October 2019.

Researchers led by Tagbo Niepa, PhD, assistant professor of chemical and petroleum engineering at the Swanson School, investigated the antifungal properties of low-level electrochemical treatments delivered using titanium electrodes against *Candida albicans*. Their research showed that *C. albicans* can be readily controlled with electrical currents/potentials, reducing the number of viable planktonic cells by 99.7% and biofilm cells by 96.0% to 99.99%. Additionally, the study explored the ability of the electrochemical treatments to potentiate fluconazole, a clinically used antifungal drug.

“We have found that electrochemical treatment substantially enhances fluconazole killing activity,” wrote the authors. “While fluconazole alone exhibits a low efficiency against the stationary phase and biofilm cells of *C. albicans*, complete eradication corresponding to 7-log killing is achieved when the antifungal drug is provided subsequently to the electrochemical treatment.”

Further mechanistic analyses revealed that the sequential treatment shows a complex multimodal action, including the disruption of cell wall integrity and permeability, impaired metabolic functions and enhanced susceptibility to fluconazole, while altering the biofilm structure.

“We live in a crisis with antibiotics: Most of them are failing. Because of the drug resistance that most microbes develop, antimicrobials stop working, especially with recurring infections,” said Dr. Niepa. “With this technique, the current doesn’t discriminate as it damages the microbe cell membrane. It’s more likely that antibiotics will be more effective if the cells are simultaneously challenged by the permeabilizing effects of the currents. This would allow even drug-resistant cells to become susceptible to treatment and be eradicated.”

The researchers hope this technology will help advance the use of electrochemical approaches in the treatment of infections caused by *C. albicans* in both nosocomial and clinical cases.

Read more of this study in ACS Publications (2019); doi.org/10.1021/acsa.9b09977.
Tooth Loss Associated With Heart Disease

Adults who have lost teeth due to nontraumatic reasons may have a higher risk of developing cardiovascular disease, according to a presentation at the American College of Cardiology Middle East Conference 2019 held in Dubai, United Arab Emirates, in October 2019.

Cardiovascular disease is the No. 1 cause of death of men and women in the United States, and previous studies have linked cardiovascular disease with oral disease. The causal association between oral disease and cardiovascular disease is not well understood or documented, so researchers in this study conducted a secondary analysis of the 2014 Behavior Risk Factor Surveillance System that looked at tooth loss not caused by trauma, as well as cardiovascular disease including heart attack, angina and stroke.

The study included 316,588 participants from the United States and territories aged 40–79. Overall, 8% were edentulous and 13% had cardiovascular disease. The percentage of people who had cardiovascular disease and were edentulous was 28% compared to only 7% who had cardiovascular disease but did not have missing teeth.

In addition to edentulous participants, those who reported having one to five missing teeth or six or more, but not all, missing teeth were also more likely to develop cardiovascular disease, even after adjusting for other factors such as body mass index, age, race, alcohol consumption, smoking, diabetes and dental visits.

“Our results support that there is a relationship between dental health and cardiovascular health,” said Hamad Mohammed Qabha, MBBS, lead author of the study and chief medical and surgical intern at Imam Muhammad Ibn Saud Islamic University. “If a person’s teeth fall out, there may be other underlying health concerns. Clinicians should be recommending that people in this age group receive adequate oral health care to prevent the diseases that lead to tooth loss in the first place and as potentially another way of reducing risk of future cardiovascular disease.”

For more about steps to prevent heart disease, visit the American Heart Association at heart.org.

Interdental Brushes Better Than Flossing

A literature review published in the Australian Dental Journal reported that interdental brushes were more effective than flossing or wood sticks in removing interdental plaque and ranked high for reducing gingivitis. The review was conducted by researchers from the Australian Research Centre for Population Oral Health at the Adelaide Dental School at the University of Adelaide.

To identify and map existing evidence on the effectiveness of interdental cleaning devices in preventing dental caries and periodontal diseases, the research team conducted a scoping review by electronically searching PubMed, Scopus and Embase. Studies on interdental cleaning devices, written in English and published from January 2008 up to April 2019, were included in the review.

Of 1,860 studies identified, six systematic reviews (SRs) were included in the review. One SR each was on flossing, interdental brushes, wood sticks and oral irrigation. Of two SRs on the multitude of interdental cleaning devices, one assessed comparative efficacy while the other assessed both the individual and comparative efficacy. All reviews had assessed the heterogeneity and the methodological quality of studies included and performed data extraction and meta-analysis where appropriate.

Evidence ranged from weak to moderate with very low- to low-certainty for the adjunctive benefit of these devices to control plaque and gingivitis. Available evidence on the efficacy of interdental cleaning devices, suggested that dental practitioners recommend patient-specific interdental cleaning devices that enable patients to achieve a safe and high standard of interdental cleaning.

“Based on the available body of evidence, the [interdental brush] may be more effective in removing interdental plaque than the other interdental devices provided the interdental spaces are accessible,” wrote the authors, led by Najith Amarasena, PhD, MD, BDS, a research fellow at the Australian Research Centre for Population Oral Health.

Learn more about this study in the Australian Dental Journal (2019); doi.org/10.1111/adj.12722.
Dental Stem Cells Regenerate Mammary Gland

In a recent paper published in the journal *Cells*, a team of researchers led by Thimios Mitsiadis, DDS, PhD, a professor at the Institute of Oral Biology of the University of Zurich, has shown for the first time that dental epithelial stem cells isolated from the continuously growing incisors of young mice are indeed able to form mammary glands in female mice.

The ability of adult stem cells to generate various tissue-specific cell populations is of great interest in the medical and dental research fields. Dental epithelial stem cells are able to generate all epithelial cell types of the teeth; however, it was not yet clear whether these cells could also produce nondental cell populations.

For this study, researchers removed all cells of mammary origin and then injected dental epithelial stem cells and mammary epithelial cells directly into the areas where the mammary glands normally develop. The team used advanced genetic, molecular and imaging tools that allow the precise follow-up of the transplanted dental stem cells in the mammary gland fat pad of the animals.

In a second set of experiments, dental epithelial stem cells were injected alone, without mammary epithelial cells. In this case, the dental stem cells were also able to form small ductal systems consisting of branching rudiments. However, in some cases, this resulted in the formation of cysts.

This work demonstrates the exceptional plasticity of dental epithelial stem cells to generate not only dental tissues but also other tissues of the body.

“These findings represent a major contribution to the understanding of the cellular and molecular mechanisms involved in the regenerative capacity of dental stem cells, and, furthermore, indicate the clinical potential of these specific stem cell populations,” Dr. Mitsiadis said.

Learn more about this study in *Cells* (2019); doi.org/10.3390/cells810302.

Obesity and Tooth Wear Linked by Soft Drinks

A study published in the journal *Clinical Oral Investigations* found that sugar-sweetened acidic drinks, such as soft drinks, are the common factor between obesity and tooth wear among adults.

Scientists from King’s College London found that being overweight or obese was undoubtedly associated with tooth wear. Significantly, they also found that the increased consumption of sugary soft drinks may be a leading cause of the erosion of tooth enamel and dentine in obese patients.

Drawing on data from the National Health and Nutrition Examination Survey of 2003–2004, the scientists analyzed a representative sample of survey participants of 3,541 patients aged 2 and older in the United States. Patient body mass index and level of tooth wear were the exposure and outcome measurements in the analysis. The intake of sugar-sweetened acidic drinks was recorded through two nonconsecutive 24-hour recall interviews where the patients were asked to provide details of diet intake across these two days.

The study concluded that obesity was positively associated with tooth wear and this association was partially accounted for by the consumption of sugar-sweetened acidic drinks, which are a common risk factor for both conditions.

“This is an important message for obese patients who are consuming calories through acidic sugar-sweetened drinks. These drinks may be doing damage to their body and their teeth,” said Saoirse O’Toole, DentSc, PhD, from King’s College London. “There is also an important message for dentists. We should be asking our patients who are obese and have tooth wear what calories they are drinking as this may be having an effect on their full bodies — not just their teeth.”

Learn more about this study in *Clinical Oral Investigations* (2019); doi.org/10.1007/s00784-019-03079-5.
Ensuring a Vibrant Future for Dentistry Through Research and Discovery

Paul Krebsbach, DDS, PhD

The vibrant future of our dental profession depends on the constant drive to generate new knowledge. As oral health experts, we are in the best position to ask and answer the pressing questions about the complex conditions that affect our patients’ health. Overlooking this important concept could put our profession at risk of returning to the trade school-like practices of the past.

The wonders of current clinical care were founded in science and technology and driven by curiosity. Although certain areas of dental research have been comprehensively developed in the corporate sector, many of the most innovative oral health advances were generated by researchers in dental schools. Dental and craniofacial scientists and engineers who populate our dental schools, in collaboration with funding agencies and corporate partners, fuel these advances and share this knowledge with students and residents. It is imperative that we maintain this drive for new knowledge as a core value in our educational institutions and private practices.

Exposing trainees to the principles and practice of science fuels a sense of curiosity and is one of the primary tools for teaching critical thinking, promoting a habit of lifelong learning.

Maintaining an innovative research program is difficult for many schools, and this is particularly true in times of declining resources. However, without this integral part of education, dental schools may fall short in preparing future dentists for the dynamic future that lies ahead.

In this issue of the Journal of the California Dental Association, we present three articles from leaders who have dedicated their professional careers to teaching dental students, mentoring young scientists and making important scientific discoveries that have had a positive impact on our profession.
Dr. Rena D’Souza describes a personal journey of service and leadership in oral health-related research. The article describes the need to maintain a vibrant oral health research workforce and calls on schools of dentistry to renew their investments in training the next generation of clinician-scientists in order to maintain our rich professional traditions and prepare for the rapidly changing health care environment. By expanding the research workforce for the dental profession, Dr. D’Souza stresses the need to train clinical faculty and graduate trainees in patient-related research methodology. She also makes the case for enhanced opportunities to collaborate with our medical research colleagues to holistically improve the health and wellness of all our global citizens.

Dr. Mark Herzberg’s article takes us on a fascinating historical journey that traces the scientific roots of our profession from ancient civilizations to the fast-paced and technology-driven present. Although the scientific method was not formally recognized as a disciplined practice until the 17th century, the seeds of the process of discovery were nurtured several centuries earlier. Driven by curiosity and the quest to improve living conditions, the earliest human civilizations began to observe, question and test methods to ensure their survival.

Dr. Herzberg describes that while in the moment our advances appear to be adequate, our actual progress has moved at glacial speeds. Undoubtedly, this deliberate pace is not uncommon in the pursuit to solve complex problems. However, with many schools failing to adequately invest in science and technology, we are likely not doing as much for our profession and our patients as we could be. This article suggests we need to do more and describes how organized dentistry and dental schools can galvanize our scientific curiosity and drive for discovery for the good of our patients.

Dr. Peter Polverini describes why it is essential that the training of future dentists includes exposure to discovery science. He makes a compelling argument that through meaningful scientific experiences students develop a deeper appreciation for the biosocial underpinnings of the dental profession and acquire the critical thinking skills necessary to evaluate and incorporate new knowledge into clinical practice.

Like Dr. Herzberg, Dr. Polverini raises questions and offers some solutions in the form of collaborative efforts with medical and engineering colleagues at our own universities, and he makes a point to urge dental schools to take the lead in performing the research that will advance our profession. He closes by succinctly discussing a series of cutting-edge technologies that are certain to affect our patient care activities with greater precision in the near future.

As educators and practitioners, we have a responsibility to leave our learned profession to the next generation in a more advanced state than when we entered it. Dental schools should be the primary source of discovery and dissemination of new knowledge to be the driving force behind improving oral health. Our practicing colleagues should contribute to the process by actively participating in continuing learning and advocating for basic and clinical research at dental schools. They should also consciously remember that every time we diagnose and develop treatment plans, we make observations, raise and test hypotheses, record data and make conclusions. We engage in the scientific method — the foundation of our profession.
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The Importance of Research in Dental Education and Practice

Peter J. Polverini, DDS, DMSc

ABSTRACT Advances in the biosciences and technology have defined dentistry as a profession and led to improved health outcomes for patients. The continued decline in the number and quality of dental research programs threatens the future of dental education and practice. Failure to expose dental students to cutting-edge scientific and technologic advances and to develop a competent dentist-scientist workforce will produce a practitioner unable to compete in the emerging precision health environment.

AUTHOR Peter J. Polverini, DDS, DMSc, is the Jonathan Taft distinguished university professor of dentistry at the University of Michigan School of Dentistry, department of periodontics and oral medicine, division of oral medicine, pathology and radiology. Conflict of Interest Disclosure: None reported.

Research and discovery science have informed dental practice and produced the evidence required to establish scientifically based practice guidelines. The result has been continued improvement in the quality of care and better patient outcomes. Research in the biosciences and advances in technology have resulted in improved therapies for chronic oral diseases such as periodontal disease and dental caries. The sequencing of the human genome and the detailed characterization of the mutational landscape of oral and head and neck cancer have led to the development of precision diagnostics and the discovery of new therapeutic biomarkers.

The groundwork for modern dental practice was outlined in the Gies Report. Gies emphasized the importance of research in dental education and the implicit role of the university in establishing a culture of scientific inquiry. While subsequent reports have affirmed Gies’ position on research in dental education, many dental schools continue to have difficulty developing productive research programs capable of offering mentored research experiences to predoctoral and postgraduate specialty dental students. Moreover, the majority of dental schools have failed to take advantage of training programs designed to expand the dentist-scientist workforce. This decline in dental school-based research programs is due to several factors, including uncertainty of future research funding, increased financial constraints facing dental schools and universities and increasing demands on faculty time and effort. Additionally, there is a critical shortage of faculty trained in basic science or clinical research capable of developing established competitive research programs and who are able to train the next generation of researchers.
So why is research conducted in dental school critical to the future of dentistry?11 Most would agree that dental students who engage in research develop a deeper appreciation for the biosocial underpinnings of the dental profession and acquire the critical thinking skills necessary to evaluate and incorporate new knowledge into practice.12 Many of the advances in patient diagnosis and treatment that are now taken for granted were discovered and developed in research laboratories located in dental schools, at the National Institutes for Dental and Craniofacial Research (NIDCR) and at several independent research institutes in the U.S. and abroad. However, recent data indicate that the majority of U.S. dental schools are unwilling or unable to develop competitive research programs.13,14 The rank listing of NIDCR grants to U.S. dental institutions in fiscal year 2017 shows that of the $148,551,217 awarded to 46 dental schools out of a total of 66 schools, 56% of the dollars went to 10 schools.14,15 As the support of dental school-based research programs decreases, NIDCR support of researchers working outside of dental schools has increased.14,15 Since 2011, less than half of NIDCRs external research funding goes to schools of dentistry, according to the National Institutes of Health (NIH) Office of Budget.

This apparent discrepancy in research funding raises the question of who will be responsible for conducting the research that will advance dental practice in the future and prepare dental students and future dental practitioners for a practice environment that is technology driven and more focused on managing health rather than disease maintenance.14,16–19 Organized dentistry must play a key role in promoting research in dental schools. The Commission on Dental Accreditation (CODA) standards 6-1 and 6-2 have been revised to reflect the importance of research and student research experiences in dental schools. While these changes took effect Jan. 1, 2020, it remains to be seen if dental schools will be held accountable to meet these standards and whether verifiable assessment strategies will be developed and implemented across all dental schools.

Dental schools and the practicing community need to work collaboratively to increase the recruitment and retention of promising dentist-scientists by aligning them with experienced mentors and role models. Because not every dental school has the resources to establish an independent research program, schools will need to expand scientific opportunities through interdisciplinary and transdisciplinary collaborations across the spectrum of health sciences and leverage resources in academic health centers. More schools need to tap into training programs and other NIH-sponsored initiatives and employ faculty who can work collaboratively and build a culture of science at their institutions.20

As dentistry considers adopting a more collaborative approach to care, there may be opportunities to free up resources and reduce costs, enabling dental schools to expand their commitment to research and discovery science. Collaboration and sharing of academic resources among dental schools and the other health professions offer ways to advance and invest in new scientific and patient care initiatives. Intra- and interinstitutional collaborations provide unique opportunities to identify and expand challenging research questions that address total health. Some examples of ways dental schools can increase research opportunities and establish a culture of sciences include developing regional research consortia and research collaboratories, creating virtual research laboratories, encouraging collaborative training and mentored research experiences for clinical faculty and transitioning dental school clinics into practice-based networks.21 Dentistry’s challenge is to break down existing barriers and work on approaches that encourage creative and productive scientific collaborations. By expanding interdisciplinary and transdisciplinary collaborations with the health science and health professions, dental schools can lead in the development of these emerging scientific disciplines.

**Research Opportunities That Will Impact Dental Practice**

Emerging scientific fields, such as “smart” biomaterials and biomimetics, data analytics, stem cell biology, tissue engineering and advanced and systems biology, will impact dental practice in a number of ways. Recently, synthetic “smart” restorative materials have been developed that are capable of undergoing self-repair while others are able to deliver therapeutic drugs on demand.22–24 Smart biomaterials are materials that can be altered in a controlled fashion by changes in the environment such as stress, temperature, moisture, pH and electric or magnetic fields.22–24 Some smart materials currently used in dental practice include piezoelectric...
materials that produce a voltage when stress is applied, shape memory alloys or polymers that are responsive to changes in temperature or pH and pH-sensitive polymers that swell or shrink as a response to a change in pH.35

As progress in the biosciences continues to reveal new discoveries and insights into the diagnosis and treatment of disease, a comparable increase in the complexity of patient data will need to be analyzed and synthesized into manageable data sets.26–28 Data analytics have not only increased the speed and efficiency of retrieving information but have also made it possible to reveal novel insights into complex diseases such as periodontal disease. Analysis of patient records, health plans, payer data and other patient-related information can reveal valuable information that can lead to advances in life-saving diagnoses and treatment options. As new information technology platforms emerge, the integration of patient data has the potential of revolutionizing the patient care environment and, at the same time, further enhancing the effectiveness and efficiency of health care providers.29,30 An excellent example of how analytics can improve patient outcomes and improve efficiencies is in the application of the principles of a learning health care system.81–83

The learning health care system is predicated on a collaborative approach to care. Great value is placed on sharing information and insights across traditional practice boundaries to deliver better, more efficient patient care. Key to this vision is the creation of a system linked by a common electronic health record and shared databases. This interconnected learning health care system is informed by new evidence-based practice through clinical research, data analysis, modern information technology and bioinformatics. The learning health care system creates a continuous cycle or feedback loop in which scientific evidence informs clinical practice that in turn informs scientific investigation.31,32

As our health care system continues to evolve and collaborative approaches to care become the norm, dental providers will be expected to rapidly adopt and implement best practices. The promise of stem cells as a strategy to replace congenitally missing or damaged dental and craniofacial tissues has gained considerable interest in recent years.34,35

Stem cells are responsible for healthy tissue development and maintenance. In addition to their role in growth and development and healthy tissue maintenance, stem cells also contribute to the pathogenesis of diseases such as oral and head and neck cancer, where they have been shown to drive tumor development and progression and are responsible for therapeutic failures.36–38

In addition to stem cell-mediated tissue or organ regeneration, advanced material sciences and biologically inspired engineering have great potential to impact patient therapy.39,40

The oral microbiome, a unique ecological community of symbiotic and pathogenic microorganisms, has gained considerable attention in recent years as a key determinant of health and disease.41,42 This microbial community impacts metabolic, physiologic and immunologic functions in the organism where they reside and when unbalanced can be detrimental to oral and systemic health. In addition to its role in dental disease, recent studies suggest the unbalanced or dysbiotic oral microbiome can contribute to oral and gastrointestinal cancers by activating alcohol- and tobacco-related carcinogens.43,44 These paradigm-shifting observations create new research opportunities to investigate the complicated relationship between the oral microbiome and the process of carcinogenesis and perhaps lead to new preventive and treatment strategies.45

Systems biology is an innovative approach to integrating complex biological information using computational tools and mathematical modeling. Its value to precision medicine is in its ability to integrate and consolidate complex data and elucidate the complex pattern of networks that govern the behavior of living organisms and provide new insights into the mechanisms underlying complex diseases.46 For complex diseases such as cancer or periodontal disease, the genomic alterations, dysregulated metabolic pathways and aberrant signaling networks make it virtually impossible to identify a single reliable therapeutic target. A systems approach is a more systematic method of integrating information, separating disease drivers from noise and identifying actionable therapeutic targets.47 As systems biology continues to reveal the complexity of biological systems, disciplines such as tissue engineering, nanotechnology, stem cell biology and the oral microbiome will lead to innovations in precision disease diagnosis and treatment.29,48–50 Other emerging technology, such as robotics, 3D printing, advanced imaging, teledicine
and remote monitoring of patients undergoing care, will no doubt find its way into dental practice. To make this a reality, however, all dental schools must make research, innovation and collaboration an even larger part of a modern educational experience. Dental school must become less reliant on outdated technology while at the same time introducing the most up-to-date scientific evidence into the dental curriculum. With the extraordinary amounts of data available to us, it would be wiser to teach students the skills to find, critically analyze and synthesize complex data rather than just memorizing facts. By expanding interdisciplinary and transdisciplinary research efforts, these seemingly impossible ideas and revolutionary approaches to patient care can become the norm.

The Evolving Health Care Environment

One of the clearest examples of where fundamental scientific discoveries and new technologies have led to promising new treatments is the precision medicine initiative. Precision medicine is a model of health care where a patient’s genomic data, cultural values, lifestyle influences and health and behavioral history are used to predict disease onset and response to tailored therapy. It is a proactive approach to health care with a greater focus on prevention, early intervention and risk assessment. This new model of health care is in stark contrast to the current health care environment, which is sporadic, fragmented and reactive and employs a one-size-fits-all approach to treatment. While precision health is not a new concept, it is just now beginning to gain traction in dentistry.

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With the extraordinary amounts of data available to us, it would be wiser to teach students the skills to find, critically analyze and synthesize complex data rather than just memorizing facts.

To date, precision health has had a limited impact on dental practice. As diagnostic and therapeutic biomarkers are successfully validated, new diagnostic devises and precision therapies will take precedence over current approaches to care. While no one expects the focus of dental practice to change in the immediate future, there is no doubt there will be increased pressure from patients and payers to reduce costs and improve patient outcomes by placing greater emphasis on disease prevention, early diagnosis and customized therapy. Innovations in science and technology will continue to drive the precision-medicine environment for the foreseeable future. If dental schools want their graduates to succeed in this new health care environment, new knowledge domains will need to be incorporated into a contemporary dental school curriculum.

One of the biggest challenges to adopting a precision approach to oral health care is the educational deficit in genomic and molecular medicine. A significant challenge for providers in the emerging precision oral health care environment is communicating disease risk to patients so they can make informed decisions. An understanding of genetic principles is vital to meet this challenge. At a minimum, oral health care professionals will need to know what genetic tests are indicated, what they mean and how best to inform and interpret the results for their patients. Understanding the limits of genetic testing is particularly important today, where over-the-counter genetic testing is often misused to assess risk leading to misinterpretation of results. As genomic medicine continues to develop, many more common biologically complex dental diseases will be found to have an underlying genetic basis. As with all health-related disciplines, educating oral health care professions about genomics and the molecular mechanisms underlying health and disease will be essential for future clinical practice. While genomic medicine may be peripheral to current dental practice, the ability to understand the power and limitations of genetic testing will no doubt be an essential part of the oral health care professional’s toolbox in the emerging precision medicine environment. New approaches to prevention, greater use of risk assessment and targeted therapies are likely to affect significant changes in clinical practice. Clinical biomarkers will be used to match specific therapies to specific patient characteristics. Addressing
ethical and legal issues facing precision medicine, the evolving regulatory framework and more widespread adoption of a values-based insurance design will shape the future of precision medicine and its impact on dental practitioners.2

Conclusions
Dental schools must be one of the primary sources of new knowledge to advance the profession into the future. If the dental profession ascribes to the belief that emerging technologies and new therapies will be, there is little doubt it will change, perhaps dramatically. If dental schools fail to meet these challenges, the dental profession runs the risk of reverting to its proprietary origins and mortgaging its future to another health care discipline. Dentistry must decide if it will continue its investment in research and discovery science to ensure a prosperous future for dental practitioners and their patients or leave the decisions about the future of dentistry to a disinterested third party. ■

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Enriching the Oral Health Sciences Workforces

Rena N. D’Souza, DDS, MS, PhD

ABSTRACT As dental care providers, educators, researchers, legislators and advocates, we are united by the single mission of improving oral health for all. This article discusses the need for expanding the dental research workforce by investing in the development of clinicians through formal instruction in clinical research methodology. The rationale of such an approach is explained in the context of the role dental schools must play in enriching the pipeline of clinical scholars.

AUTHORS

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On June 20, 2019, at the general session of the International Association for Dental Research (IADR)/American Association of Dental Research (AADR)/Canadian Association of Dental Research (CDAR) held in Vancouver, British Columbia, dental researchers, clinicians, educators, research trainees, corporate representatives and administrators listened spellbound to Dr. Lee Hood’s plenary address. As the senior vice president and chief strategy officer at the Institute for Systems Biology and the senior vice president and chief science officer of Providence St. Joseph Health in Seattle, Dr. Hood focused on how 21st century medicine is transforming health care by describing the paradigm shifts driving radical changes in science. He explained how the practice of medicine in the 1900s was influenced by the primary goal to understand disease, the germ theory, basic chemistry, physiology, physics and early tenets of precision medicine. Unprecedented advances in science and technology have since integrated the 20th century concept of “find it, fix it” into systems-driven approaches of 21st century medicine that involve holistic strategies. Dr. Hood detailed five converging thrusts that are transforming health care today — systems biology, systems medicine, big data and its analytics, the digitalization of personal measurements and patient-activated social networks. Hence, the use of multimodal therapies will advance our understanding of wellness, disease and their transitions, he explained. Such approaches of proactive health care are driven by the four Ps: predict, prevent, personalize and participate.1-4

Although I was familiar with Dr. Hood’s platform and have attended conferences on precision/personalized medicine while keeping pace with the
literature on these emergent fields, my mind was flooded with questions. How will these advances directly impact the practice of dentistry and transform the profession? Are there educational systems in place to train future oral health professionals in this transformative era? How will these changes benefit the patients we treat? As I served as president of the IADR at a time when the association was celebrating its first century of major accomplishments, it seemed appropriate to ponder about the future. How can the world’s largest association of dental, oral and craniofacial researchers help shape the future of health care in the coming century? IADR’s newly formulated mission for the next century is: “To drive dental, oral and craniofacial research for health and well-being worldwide.” IADR’s members have embraced the bold vision: “Oral health for the world through discovery and dissemination.” The moral compass that will guide IADR’s leadership and its members is based on core values that embrace scientific excellence, social responsibility and scientific community. The purpose of this article is to draw attention to IADR’s new mission and the critical need for the dental profession to heed the call to expand its research workforce by engaging clinicians at all levels of training and practice so as to ride this new wave of opportunity and promise.

Where the Gaps Lie

It is exciting to be an educator, clinician and researcher in this golden era when science and technology advances have converged to create unprecedented opportunities for new discoveries, cures and therapies. However, it is important to consider whether we in the dental profession are indeed well-positioned to leverage from the science and technology resources available today. As Dr. Mark C. Herzberg describes in his article, the profession has a remarkable history of innovative discovery; yet, we continue to grapple with ways to prevent, diagnose, treat and halt craniofacial disorders, dental caries, periodontal disease, oral cancer and orofacial pain, etc. Dr. Peter J. Polverini eloquently describes the urgent need for dental schools to take a lead role in not only disseminating the latest information on emerging technologies to practicing clinicians but also as producers of new knowledge that can drive changes for dental practices.

The American Dental Association’s 2009 tribute to the growth of America’s scientific advancements in dentistry over 150 years provides insights into the valuable contributions made by dental clinicians and dentist/physician-scientists who have directly benefited patients. Several of these discoveries grew out of the native ingenuity of clinicians who invented new dental materials, instrumentation, devices and procedures that improved our chairside delivery of care. The population of knowledge creators now includes those who have earned a DDS or an equivalent degree and who are actively engaged in research involving the dental, oral and craniofacial complex. Hence, individuals with a DDS, DDS/PhD, DDS/other (MS, MPH) and DDS/PhD/other are included in this pool of dental profession scholars. In the past few decades, innovative funding mechanisms for clinician scientists have been made available from the National Institutes of Health (NIH) and its National Institute for Dental and Craniofacial Research (NIDCR, formally known as NIDR). These awards provide individual and institutional stipends for formalized research training and career development and have greatly enriched the pipeline of dental scholars. However, best practices are yet to be adopted to ensure that we are able to retain all DDS/PhD graduates as research-centered faculty who are continually supported to be successful within dental school environments. An analysis of the research workforce available within 66 U.S.-accredited dental schools points to an overall decline in the number of research faculty with protected time for research.
Future Imperatives and Pathways for Change

Dentistry ranks among the top professions for attracting the brightest and most talented of applicants. In 2002, Bertolami stressed how important it is for dental schools to therefore provide an environment of scholarship and inquiry that best cultivates this invaluable pipeline of future scholars. Formal training in clinical research methodology is one such way to create an early imprinting in the minds of our DDS/DMD trainees about the need for studies that create the evidence to guide best practices of care. 

Another perhaps more difficult challenge to overcome is the lack of availability of faculty mentors with formal training and expertise in patient-oriented research. Deans and university administrators must invest in the resources needed to develop faculty further through regional collaborations. Importantly, the American Dental Educators Association (ADEA) in collaboration with the AADR can create collaborative programming and online instructional resources on clinical research methodology. This would benefit the current pool of clinical faculty who did not have the benefit of such an education while in dental school but who retain a high level of interest and capacity to contribute as mentors and role models.

While I consider this “intervention” in the DDS/DMD curriculum as a ground-level approach for building the next generation of clinical scholars, other transformative benefits exist. For example, a recent graduate instructed on how to select patient populations and design a well-controlled and unbiased study and who understands the regulations for human-subjects research, etc., becomes part of the pipeline of recruits for residency programs that provide clinical certificates along with master’s degrees. Dentists who choose to practice general dentistry or a specialty can be later drawn to serving as faculty in a dental school and becoming mentors themselves, thus enriching the circle of life in dental academia.

I consider my time as director of research in the department of orthodontics at the University of Texas in Houston as one of the most enriched periods of my academic life. In these years, I mentored several brilliant residents in orthodontics, endodontics and periodontics on basic science projects ongoing in my laboratories. As a dentist-scientist myself, each of my projects had clinical relevance but only one involved patients and chairside research. Offering residents a more diverse array of projects involving patient-oriented research would have enriched their master’s-level thesis experiences. The importance of discovery or curiosity-based research involving basic mechanisms that
provide the biological underpinnings for clinical advances should not be underestimated. Rather, a better balance of master's thesis offerings can be achieved through the support of well-calibrated, patient-focused research. Clinical research methodology must be taught to all postgraduate trainees and residents regardless of the specialty such that applications of this specialized knowledge can be incorporated into master's-level thesis projects. Residents who have succeeded in moving the needle forward through graduate-level research projects will contribute much to the dental profession in both its educational and private-practice sectors. Reaching out to faculty in other health professional disciplines in order to provide a more holistic approach to problem-solving provides postgraduate and resident trainees lessons in team science and mentoring. Needless to say, leadership from specialty boards and the Commission on Dental Accreditation in revising competency requirements and tightening accreditation standards that assess research and scholarship in schools of dentistry is essential for this transformative change.

Conclusions

The history of how discovery research uplifted the dental profession into one that is driven by biologic principles inspires me. Equally compelling is the promise that as a community of oral health professionals we can come together to leverage science and technology advances in order to improve oral health for all.

Ensuring that clinicians who are on the frontlines delivering care to patients suffering from craniofacial defects, childhood caries, unresolved periodontal disease, failed implants, radiation-induced xerostomia and Sjögren’s syndrome, oral cancer and mandibular reconstruction are embraced as a valuable resource is simply key to our survival. Our challenges today transcend the discussion about the decline of federal dollars awarded to research performed in dental schools. The question that must be resolved is how such a decline in support for research within dental schools is affecting the profession’s ability to train a new workforce skilled with recording and studying observations from chairside, bedside and population-based experiences.

This is how I translated Dr. Hood’s talk into a meaningful set of actions for the dental professional community. Indeed, the time has come to drive change.

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6173 SONOMA  Great location in desirable valley community. 2019 trending $745,000 in collections. 6-days of Hygiene. Successor shall grow practice by appealing to younger demographic while retaining loyal patients.

6172 SAN FRANCISCO'S EAST BAY - "OUT-OF-NETWORK" Should be available mid-February. 2019 collected $850,000 with Available Profits of $525,000. 4-days of Hygiene. Requires skilled and polished Successor.

6171 SANTA ROSA  Great DNA here for this long-established practice. Strong patient foundation evidenced by 6+ day Hygiene Schedule. Consistent $1+ Million in Collections in each of the last 5-years.

6170 TRACY AREA  Revenues in 2019 totaled $850,000+. 5-days of Hygiene. Refers endo, most OS and implant placements. Extensive patient base. Successor should contract with specialists to perform work being referred. Office perfect to make into full-service practice.

6169 VACAVILLE  Long established Delta PPO practice. 5-days of hygiene. 2019 trending $700,000+ with Available Profits of $280,000. Great north side location. Full Price $300,000.

6168 SACRAMENTO'S CAMPUS COMMONS  “Bread & butter” Delta PPO practice averages $480,000 in collections per year. Well liked Dentist. 10+ weeks off. 3-D Cone Beam. Great implant upside as retirees in area require this service. Full Price $200,000.

6167 NORTH SANTA CLARA COUNTY - “OUT-OF-NETWORK” Perfect for Skilled Dentist who seeks strong patient relationships and wants to be insurance independent! 2019 trending $840,000+ on Owner's 3-day week. Office has been upgraded and charting is paperless.


6165 ROSEVILLE ORTHO - "OUT-OF-NETWORK"  Stanford Ranch. Great satellite office. $455,000 invested in build-out, furnishings, computers and equipment. 3-chair Bay. Digital Pan with Ceph. 51 active patients and averages 3 New Patients per month. Full Price $125,000.

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6158 FORTUNA  Relaxed lifestyle in Humboldt County’s Banana Belt. Adjacent to Ferndale. Perfect for Dentist seeking small town living. 2018 Collected $395,000 with $156,000 in Profits. 2019 trending $400,000+. 6-weeks off. Lots of work referred. Full Price $75,000.

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6147 SAN FRANCISCO BAY AREA - “OUT-OF-NETWORK”, "SOLD"  2018 collected $2.2 Million. Hygiene produced $1+ Million. $700,000+ in profits. Seller available for long transition.

4003 PEDO CHINESE / HISPANIC  3,000+ Charts. Move to your office. Full Price $150,000. 

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TOGETHER WE ARE LIMITLESS
History and Importance of Research in Dental Education

Mark C. Herzberg, DDS, PhD

**Abstract** Dentistry is a time-honored profession with deep historical roots. Our ability to provide optimal services today has evolved from centuries of research. Our tools to perform research to advance oral health now far exceeds our investment in new information and utilization of what we are learning. Dental schools should be leading the charge to know more and do more for our patients. Are they?

**Author** Mark C. Herzberg, DDS, PhD, is a professor in the University of Minnesota School of Dentistry’s department of diagnostic and biological sciences. He is the inaugural director of the Minnesota Craniofacial Research Training (MinnCResT) program and a former director of graduate studies for the graduate program in oral biology. Conflict of Interest Disclosure: None reported.

Dentistry as a profession has roots in the ancient Indus Valley civilization (~ 7000 BCE). Two thousand years later, Sumerian texts documented the presumptive cause of tooth decay. Indeed, the legend of the tooth worm explains the cause of dental caries to be worms that had infiltrated the sweet dates that children loved to eat.2

The Egyptian empire dating from 3000 to 2600 BCE was the ancient center of the emerging patient care disciplines of dentistry and medicine. Ancient documents and petroglyphs indicate that Hesy-Ra was the first expert in the care and treatment of dental diseases.3 Archeological remains suggest that Egyptians enjoyed an extensive armamentarium for the care of teeth, including oral hygiene measures and prescriptions for the treatment or relief of gingivitis, tooth erosion, pulpitis and periapical abscesses.

Amazingly, some of the remedies survive to this day, but the origins of diagnoses and treatments mark the emergence of the profession. How did ancient practitioners come to know?

The answer is likely through a process termed empiricism. Although ancient texts — to the extent that they existed — did not explain the scientific basis of care and treatment, the legend of the tooth worm marked the need for evidence to assign causation. Here’s how the process probably worked. Ancient dentists witnessed many cases of tooth decay and recognized that children who ate dates were most at risk. The astute practitioners also noted that dates tended to be infested with tiny worms that ate the meat of the fruit. Children who ate fewer dates had fewer carious lesions.2 Ancient practitioners correctly recognized dates as causative with a dose-response relationship. No doubt, the dentists collected and evaluated evidence in a primitive observational study. Their resulting concept of an infectious cause of caries was prescient, but they erred in assuming that the worms in infested dates could initiate disease and erode enamel.

The discovery of a bacterial kingdom inhabiting the mouth awaited Antony van Leeuwenhoek, the Dutch maker of the first compound microscopes. Using his microscopes, which magnified more...
than 200 times with sufficiently bright fields, he discerned motile “animalcules” in his dental plaque.\(^4\) Today, Christina Warinner, PhD, and colleagues are mining dental calculus to determine the composition of ancient microbiomes using the exquisite tools of high-throughput genomic sequencing and biomolecule identification.\(^5\) This unique historical record identifies ancient oral microbiomes in health and disease and associated dietary and environmental debris. From this remarkable record, we can infer how these factors interacted and changed over time. The relationship between diet, environment and dental disease has evolved and is quite clear today.

And has our fundamental approach to treatment of caries changed over time? During a period from 7,500 to 9,000 years ago in a Neolithic Mehrgarh region in what is now Pakistan and Afghanistan, molar teeth were drilled to remove enamel and dentin in association with carious decay, suggesting that the treatment was intended to be therapeutic.\(^6\) Based on archeological remains, cutting of enamel was achieved by use of a handbow, similar to primitive devices used to start fires but fashioned with a flint head. As we consider the far-reaching oral health needs of the U.S., ranging from caries and periodontal disease to disparities in the access to care to resolving craniofacial disorders and cancer, how far have we come?

The modern dental school is accredited by the American Dental Association Council on Dental Accreditation. Accreditation standards require that schools contribute new knowledge to the profession to perform systematic research. Why? William J. Gies, PhD, the first editor of the Journal of Dental Research, was commissioned by the Carnegie Foundation to report the state of dental education and analyze how schools of dentistry might better serve the public and advance the profession. Dr. Gies recognized that “[r]esearch is the … register of a profession’s achievement and standing” … and would steadily extend the boundaries of dental knowledge.”\(^6\) The Gies Report of 1926 has been revisited periodically and its premises and aspirations reaffirmed, but unfortunately the curricula at most schools reflect a schism between instruction for eventual practice and advancement of the profession through the scientific method.\(^9\) To realize research and scholarship as progress in the services provided by dentists since prehistory has advanced at a glacial pace. The profession and the public seeking care deserve more.

Schools do teach how to make teeth mechanically sound after compromise by caries, but can we repair ailing dental pulps? How can we restore health after periodontitis? Can lost alveolar bone and epithelial attachment be regenerated in a biologically compatible manner, perhaps avoiding surgery? Can missing teeth be replaced by newly erupting replacements? Can oral cancer be reversed by treating with known tumor suppressors and inducing death signals in malignant cells? Perhaps cleft palate and lip can be repaired by application of missing or dysregulated growth factors and template instructions?

Dental students are taught to rely on an impressive array of materials to restore function and cosmetics, but recapitulating nature requires more.

Dental students are taught to rely on an impressive array of materials to restore function and cosmetics, but recapitulating nature requires more.

Through research, we can contribute to advancement of the profession for the public good, improve the quality of care, increase practitioner happiness/satisfaction and make discovery an exciting element in dental education. What might the process look like? Research is “seeing what everyone else has seen and thinking what no one else has thought,” according to Albert Szent-Györgyi, MD, PhD, a 1937 Nobel Prize winner. How can discovery be integrated into the dental school curriculum and the professional practice culture? How can we educate rather than train practitioners to provide precision and customized care for each patient? No doubt, there are many possible strategies, and of these, some certainly will ensure that practitioners are able to offer comprehensive treatment.
So who are the change agents? Whereas the current research agenda is the focus of the National Institute of Dental and Craniofacial Research (NIDCR) and the American and International Associations for Dental Research serve as a major platform for dissemination of new findings, at the top of my list are the American Dental Association, the Council on Dental Accreditation (CODA) and the American Dental Education Association (ADEA). These organizations could work collaboratively to reappraise the goals of the profession to better serve the public good. To determine how the assets of dental schools can better serve the goals of the profession, deans and senior academic leadership would need to step forward. Faculty of dental schools need to be encouraged to think vigorously about their legacies and educate students in the fullest scope of opportunities that serve the goals of the public and the profession. Dental students would need to be set free to think beyond the boundaries of procedure-based formulaic care to imagine how they can best serve the public and their futures.

How do we get started? Deans of our dental schools need to recruit scientifically engaged faculty who will actively educate our students, ask probing questions, engage in dialogue and expect creative responses. Students must be encouraged to tackle important research questions and write papers for publication in responsible journals as a requirement for graduation from dental school, and CODA needs to make this a requirement for accreditation. The burgeoning number of schools not affiliated with an academic health center will need to figure out bona fide solutions to remain accredited, and dental schools situated in major research universities need to better align with other disciplinary faculties, schools and colleges for the profession to change culturally and realize greater public service. The American Dental Association (ADA) needs to place public service as the highest mission of the organization and the profession, whereas the ADEA needs to muster its intellectual strength to create complementary curricula and educational tools. Professionals now providing care in communities need to reimagine their work and services. How could their activities be made more interesting, if not exciting, through an entire career?

There are organizations that can provide resources to each constituency. Many dental school faculty members are active in the American and International Associations for Dental Research. These organizations provide a platform to disseminate cutting-edge science that may impact dentistry and can provide a bridge to dental school change agents. Their membership represents a cadre of contemporary clinician-scientists, who populate too few of our dental schools. With greater commitment from schools, this cadre of faculty will grow in number and strength. The NIDCR is not only a flagship research engine and training center for scientists aligned with dentistry, but is also the major funder of research in our academic community. Where do these external funds go? Increasingly, the support from NIDCR goes to research teams working outside of dental schools.¹⁰ Since 2011, less than half of NIDCR’s external research funding went to schools of dentistry. There are several messages here to consider. State-of-the-art research questions that are attractive to the NIDCR mission are being pursued by scientists in medical schools and other nondental research institutes. All things being equal, dental school faculty are less than competitive in...
competing for research funds to answer questions that are central to their profession. Of the NIDCR support for research at dental schools, nearly 60% of the funds go to 25% of the schools (based on 2014 data). Since 2003, total National Institutes of Health (NIH) and NIDCR appropriations have increased by about 140%. Furthermore, the size of our NIDCR-supported clinician-scientist workforce is smaller than that of veterinary medicine, nursing, MD/PhDs and MDs. Effectively then, nearly 75% of dental schools are essentially inactive in their academic and research missions. Given that NIDCR dollars represent about 70% of the NIH funding to schools of dentistry, our four-cylinder dental school research car is running on only one cylinder. No wonder we are sputtering.

Our engine needs computer diagnostics, fresh ignition coils, an oil change and new tires. To this end, CODA has revised standards 6-1 and 6-2, effective Jan. 1, 2020, which require scientific inquiry to be integral to the dental school. The intent statements include that: “Annual evaluations should provide evidence of innovations and advances which reflect research leadership within research focus areas of the institution … [supported by an] adequate number of full-time faculty … [and] should introduce students to the principles of research and provide elective opportunities beyond basic introduction.”

Let’s begin the broad discussion among stakeholders about implementation to advance the profession and to better serve the public good.

REFERENCES
4. Leenheer H. An abstract of a letter from Mr. Anthony Leenheer to Delft, dated Sep. 17, 1683. Containing some microscopical observations, about animals in the scurf of the teeth, the substance call’d worms in the nose, the cuticula consisting of scales. Phil Trans 1683:14:56–574.

THE AUTHOR, Mark C. Herzberg, DDS, PhD, can be reached at mcherzb@umn.edu.

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QUESTIONS MOST OFTEN ASKED BY SELLERS:

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2. If I decide to assist the Buyer with financing, how can I be guaranteed payment of the balance of the sales price?
3. Can I sell my practice and continue to work on a part time basis?
4. How can I most successfully transfer my patients to the new dentist?
5. What if I have some reservation about a prospective Buyer of my practice?
6. How can I be certain my Broker will demonstrate absolute discretion in handling the transaction in all aspects, including dealing with personnel and patients?
7. What are the tax and legal ramifications when a dental practice is sold?

QUESTIONS MOST OFTEN ASKED BY BUYERS:

1. Can I afford to buy a dental practice?
2. Can I afford not to buy a dental practice?
3. What are ALL of the benefits of owning a practice?
4. What kinds of assets will help me qualify for financing the purchase of a practice?
5. Is it possible to purchase a practice without a personal cash investment?
6. What kinds of things should a Buyer consider when evaluating a practice?
7. What are the tax consequences for the Buyer when purchasing a practice?

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**NORTHERN CALIFORNIA**

**CONCORD:** East Bay, Contra Costa Community: Digital Practice with 3 Ops, modern, attractive bldg., 1,200 sf, and Dentrix. 2018 GR $76K on 4.5 day/wk. #CA562

**CONTRA COSTA COUNTY:** Records for only the P&O and/or Ortho portion of Practice. 11 yrs. Goodwill. Buyer must be within 15 miles of Contra Costa County. Asking Price is below appraised value. #CA576

**FAIRFIELD:** New Listing! 4 Ops in 1,800 sf. 40+ yrs Goodwill. Priced to sell quickly. #CA595

**GLENDALE:** New Listing! 3 Ops, 4 Equip. High-end 1st and 2nd flr. 40 yrs Goodwill. Seller will consider all serious offers. #CA596

**GREAT GLORIATOWN:** Office on ground level of residential. 4 Ops, Dentrix, Digital X-rays, CMG/Dental Mate. 14 yrs Goodwill. #CA672

**HAYWARD:** Office on ground level of mid-rise. 4 Ops, Prof. bldg. Seller retiring, room to grow! 2018 GR $375K. #CA630

**NORTHERN CALIFORNIA:** 3 Ops, 4 Equip, Digital X-rays, Prof. bldg. Seller retiring, room to grow! 2018 GR $375K. #CA628

**SACRAMENTO:** Beautiful 1,130 sf office w/ 3 Ops. Dentrix PMS, highly desirable area with plenty of free parking. Established for 70+ yrs, 32 w/ present owner. #CA608

**SACRAMENTO:** Practice+RE/Merger w/ AC622 - 5 Ops, 4 hyg days. Most specialty referred out, room to grow! 2018 GR $375K. #CA628

**SACRAMENTO:** Pediatric practice ready to purchase a successful 30+ yr old practice w/ Ortho/Ortho practice. Excellent location, high upside potential. 2018 GR $500K w/ $141K Adj. Net. #CA564

**SACRAMENTO:** Office w/ 3 Ops and 3 Equip. Mix of GP and Endo. 14 yrs Goodwill, A-dec equip, CEREC, Digital X-rays, 35+ hrs/wk. 2018 GR $409K. #CA573

**SONOMA COUNTY:** 3 Ops, 3 Equip. Perfect opportunity to merge two practices to one large one. #CA622

**SOUTHERN CALIFORNIA:** 6 Ops, 39 yrs Goodwill. Strong hygiene program. Prof. bldg. Digital, Dental, Pano. 2018 GR $783K. #CA617

**SOUTHERN CALIFORNIA** 4 Ops, 3 Equip. Coastal Community, Modern, Busy strip center location near hi-end residential. 2018 GR $900K+. #CA643

**SONOMA COUNTY:** Price Reduced! Modern GP offering a broad range of service. 6 Ops in 3,000 sf. Owner-patient owned facility. 2018 GR $880K w/ 4 hyg days. Digital, Dentrix, I/O Laser. MOVE-IN READY, this will not last! #CA654

**SONOMA COUNTY:** GR $1M+ on 3 day/wk. Dental Condo also available #CA652

**SAN DIEGO EAST COUNTY:** New Listing! 4 Ops, 18 equip, Digital, Seller motivated for quick sale. #CA630

**SAN DIEGO COUNTY ORTHO:** New Listing! 4 Ops, 18 equip, Digital, Seller motivated for quick sale. #CA630

**SOUTHERN CALIFORNIA** 4 Ops, 3 Equip, Digital X-rays, Seller refers out most dental specialty work so there is room to grow. Bright, cheery space, word-of-mouth referrals. #CA634

**SOUTHERN CALIFORNIA** 4 Ops, prof. med. Seller retiring 14 yrs Goodwill. CEREC, Digital X-rays, 35+ hrs/wk. 2018 GR $497K. #CA573

**SOUTHERN CALIFORNIA** New Listing! West Side, 5 Ops, 4 Equip, Digital X-rays. GP and Endo in good upcoming area. 2018 GR $525K. #CA640

**SONOMA COUNTY:** This 5 Op practice has been open since 1965. Dentrix, digital Pano. Seller retiring will assist w/ a smooth transition. 2018 GR $311K. #CA518

**SONOMA COUNTY:** 3 Ops, Digital X-rays, I/O Cam, SoftDent. Goodwill in well-established location. 1,800 sf. 40 yrs Goodwill. 2018 GR $430K. #CA628

**SONOMA COUNTY:** Price Reduced! Modern GP offering a broad range of service. 6 Ops in 3,000 sf. Owner-patient owned facility. 2018 GR $880K w/ 4 hyg days. Digital, Dentrix, I/O Laser. MOVE-IN READY, this will not last! #CA654

**SONOMA COUNTY:** GR $1M+ on 3 day/wk. Dental Condo also available #CA652

**SOUTHERN CALIFORNIA** New Listing! 4 Ops, 18 equip, Digital, Seller motivated for quick sale. #CA630

**TRANSITION PLANNING** Making your transition a reality.
Telecommuting is becoming increasingly common in the workforce. In fact, a 2017 Gallup survey showed at least 43% of Americans work from home at least part time, a number that has been steadily rising. This is now common in the fields of information technology, finance, marketing and customer service, but the field of dentistry is quickly following suit. More and more dental employees are working from home, particularly those who perform administrative duties such as scheduling and billing.

Many employers still fear that allowing employees to work from home will result in lowered productivity and misrepresented time sheets. However, several studies have shown that allowing employees to work from home on occasion has numerous benefits, including improved morale, better employee retention and reduced employer costs.

But the question of whether to allow employees to telecommute often leaves employers uncertain about their responsibilities in terms of managing risk. Who is responsible if an employee becomes injured on the job? How is overtime calculated? What about HIPAA considerations?

The Dentists Insurance Company recently had a case reported to its Risk Management Advice Line in which a seasoned office manager was injured while working from home after tripping over a power cord. His employer allowed him to work remotely to plan the annual community outreach program, as there were fewer distractions in his home office than in the dental office. One day as he was reviewing papers, talking on the phone and walking around his home office, he stumbled over the power cord that was connected to his laptop and printer. The result was a badly sprained ankle, as well as hand, wrist and forearm contusions — not to mention broken computer equipment. The office manager was taken off work for several weeks and received conservative treatment over the span of seven months. He also filed a workers’ compensation claim.

Crystal Potch, TDIC workers’ compensation claims manager, said the incident could have been prevented had the dentist had a policy in place...
addressing telecommuting. In this case, the policy should have included a telework agreement and checklist as part of the office’s injury, illness and prevention plan. Prior to working from home, employees should be required to use the checklist to perform a safety inspection of their home-office workspace. The U.S. Office of Personnel Management offers a safety checklist and other resources for telework employees at telework.gov/federal-community.

For employees who work from home full time, this inspection should be conducted quarterly. “Employees should review the safety of their workspace to ensure it is free from hazards,” Potch said. “They should complete and sign a checklist confirming that this inspection was completed.”

In another case reported to TDIC, a special-projects coordinator was in charge of preparing a dentist’s presentation for a conference. She was allowed to work remotely to research, analyze and summarize the presentation material. Over the period of a few months, the employee began to suffer from excruciating pain in her neck, shoulders and wrists. Her pain became so severe that she was unable to perform her work. She filed a workers’ compensation claim due to her injuries and received treatment, which included injections, physical therapy and surgery to correct what was ultimately diagnosed as a cumulative trauma injury.

Her employer was surprised that she experienced such a severe injury, as he provided her with all necessary office equipment, including an ergonomic chair, for use at home. It was soon discovered that she failed to use the chair, instead working from her bed or couch, which did not provide her with the necessary ergonomic support to keep her in a neutral working position throughout her work day.

Potch said that employers who allow staff to work from home must outline the requirements of teleworking. Policies must be in place directing employees to work in ergonomic environments free from hazards. These policies must specify that employees who develop pain must follow up with their manager or supervisor, requesting an ergonomic evaluation. Employees should sign the policy acknowledging they understand and accept the conditions of telecommuting.

Another consideration regarding teleworking is regulating work hours and meal and rest periods. Nonexempt employees must still follow state and federal guidelines with regards to overtime and breaks, regardless if they work from home or in the dental office. This information should be outlined in office policies and signed by the employee.

The Health Insurance Portability and Accountability Act (HIPAA) is another crucial concern. It is an employer’s duty to ensure patients’ protected health information (PHI) is kept private, and that duty applies both within and beyond the dental office. The greatest concern with regards to telecommuting is the use of email. HIPAA recommends the use of encrypted email and messaging platforms, but should an employee use a personal, nonencrypted email service from home, it increases the likelihood that the PHI could be accessed by an unauthorized individual. Even the seemingly innocent practice of emailing a patient’s records from a company email to a personal email so that the file can be worked on at home puts the information at heightened risk of unauthorized access. To remain compliant, employers can install virtual private networks (VPN) on employee computers and specify that communication with patients should only be conducted via these encrypted systems, not via Gmail or other web-based email providers. Practices must also be diligent in capturing any relevant communications in patients’ charts.

Ongoing communication is key to preventing workplace injuries and protecting your practice from other liability claims — even when the workplace happens to be an employee’s home. Developing a formal telework policy, providing trainings and following up with regular emails, phone calls and video chats will keep your employees informed of their responsibilities as remote workers. Teleworking is a privilege that requires strict adherence to office policies in order to protect both your employees and your practice.

TDIC’s Risk Management Advice Line is a benefit of CDA membership. If you need to schedule a no-cost consultation with an experienced risk management analyst, visit tdicinsurance.com/RMconsult or call 800.733.0633.
Required HIPAA Documentation

CDA Practice Support

Enforcement agencies may verify a regulated entity’s compliance by reviewing the entity’s documentation that is required by law. If you were to receive a letter from the U.S. Health and Human Services Office for Civil Rights (OCR) notifying you of a complaint and of the agency’s authority to collect information to ascertain compliance, are you prepared to collect and submit to the OCR the requested information within a short period?

In October 2019, the OCR announced a settlement and a corrective action plan with a dental practice for potential HIPAA violations after the OCR investigated an individual’s complaint that the practice was disclosing patient health information on social media. The investigation revealed the dental practice did not have policies and procedures with regard to protected health information (PHI) and did not have the minimum content required in its notice of privacy practices. The corrective action plan requires the dental practice to develop and implement the required policies and procedures, to annually assess, update and revise if needed and to undertake several actions related to workforce training, mandated reporting of policy and procedure violations and breach notifications. The dental practice must regularly submit reports to OCR for at least two years.

It is apparent that the dental practice was unable to provide the documentation when OCR requested it and a person can only speculate as to why this was the case. Putting together policies and procedures for regulatory compliance does take a lot of time — time to understand the law and time to consider how the law applies in one’s own practice. It is not an impossible task, however, because assistance is available from the California Dental Association, American Dental Association and various consultants. The OCR websites have guidance that detail its expectations. A dental practice owner should invest sufficient time to create and implement policies and procedures, whether it is HIPAA, Cal/OSHA or employment-related, because one incident could easily cost a dental practice more than could be anticipated by the owner.

What type of documents does OCR normally request in an investigation? The requested documents vary and are dependent on the type of complaint or incident that initiates the investigation. In 2018, a California dental practice being investigated for a social media incident was asked to respond to a patient’s complaint by submitting its:

- Policies and procedures related to the uses and disclosures of protected health information.
- Policies and procedures for implementing minimum necessary requirements.
- Policies and procedures for safeguarding protected health information.
- Evidence of HIPAA training for the workforce.

When OCR decides to investigate a covered entity that had a data breach, requested documentation is likely to include the entity’s:

- Most recent risk analysis and risk management plan.
- Policies and procedures for regularly reviewing records of information system activity, such as audit logs, access reports and security incident tracking reports.
- Policies and procedures for addressing security incidents. Policies are statements of intent, and procedures describe how policies are implemented. More important, the policies and procedures must reflect the requirements of the law. Following is an example of policies and procedures for how a covered entity uses and discloses protected health information:

Our dental practice does not disclose patient information without written consent unless the use or disclosure is required or permitted under HIPAA and state law. Do not use or disclose patient information, except for routine purposes that you are authorized and trained to make, unless you have the prior approval of the privacy officer.

Our dental practice discloses patient information when required or permitted by HIPAA and state law. These include disclosures to law enforcement, regulatory and public health agencies and for legal purposes, such as mandated reporting. Any communications about required disclosures of patient information are given to the privacy officer.

Procedures should be detailed and anticipate the scenarios typically experienced by a dental practice. The procedures described above are incomplete because they do not include the considerations a dental practice’s privacy officer must take if presented with a request for PHI from, for example, a police officer, the parent of an adult patient, a social services agency or another health care provider. Each of the four situations requires an understanding of HIPAA’s applicability and the procedures should reflect that understanding.

If PHI is not to be used under any circumstance on any social media platform, the dental practice’s social media policy should be part of its policies for safeguarding PHI.

Sample Social Media Policy

Practice workforce may not mention or discuss patient treatment or other information about patients (whether or not patient identifiers are included) on any social media outlet unless authorized.
TABLE 1

Documents Requested by OCR From California Dental Practices

<table>
<thead>
<tr>
<th>Policies and procedures</th>
<th>Other documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses and disclosures of PHI.</td>
<td>Proof of workforce training.</td>
</tr>
<tr>
<td>Implementing minimum necessary requirements.</td>
<td>Covered entity’s organizational structure, contact information and custodian of records.</td>
</tr>
<tr>
<td>Safeguards to PHI.</td>
<td>Most recent risk analysis.</td>
</tr>
<tr>
<td>Regular review of records of information system activity, such as audit logs, access reports and security incident tracking reports.</td>
<td>Most recent risk management plan.</td>
</tr>
<tr>
<td>Authorizing access to ePHI.</td>
<td>Copies of business associate contracts.</td>
</tr>
<tr>
<td>Password management.</td>
<td>Evidence of technical access controls, unique user IDs for electronic information system.</td>
</tr>
<tr>
<td>Security awareness and training.</td>
<td>Evidence of implementation of hardware, software and/or procedural mechanisms to record and examine activity in electronic information systems.</td>
</tr>
<tr>
<td>Addressing security incidents.</td>
<td></td>
</tr>
<tr>
<td>Reporting security incidents.</td>
<td></td>
</tr>
<tr>
<td>Device and media controls.</td>
<td></td>
</tr>
<tr>
<td>Verification of person or entity seeking access to ePHI is the one claimed.</td>
<td></td>
</tr>
<tr>
<td>Allowing access to electronic information systems to only those with access rights.</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2

Required Policies and Procedures Under the HIPAA Security Rule

<table>
<thead>
<tr>
<th>Security management process.</th>
<th>Risk analysis (R).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk management (R).</td>
<td></td>
</tr>
<tr>
<td>Information system activity report (R).</td>
<td></td>
</tr>
<tr>
<td>Sanction policy (R).</td>
<td></td>
</tr>
<tr>
<td>Assigned security responsibility.</td>
<td>(R)</td>
</tr>
<tr>
<td>Workforce security.</td>
<td>Authorization and/or supervision (A).</td>
</tr>
<tr>
<td>Workforce clearance procedure (A).</td>
<td></td>
</tr>
<tr>
<td>Termination procedures (A).</td>
<td></td>
</tr>
<tr>
<td>Information access management.</td>
<td>Isolating health care clearinghouse functions (R).</td>
</tr>
<tr>
<td>Access authorization (A).</td>
<td></td>
</tr>
<tr>
<td>Access establishment and modification (A).</td>
<td></td>
</tr>
<tr>
<td>Protection from malicious software (A).</td>
<td></td>
</tr>
<tr>
<td>Login monitoring (A).</td>
<td></td>
</tr>
<tr>
<td>Password management (A).</td>
<td></td>
</tr>
<tr>
<td>Security incident procedures.</td>
<td>Response and reporting (R).</td>
</tr>
<tr>
<td>Contingency planning.</td>
<td>Data backup plan (R).</td>
</tr>
<tr>
<td>Disaster recovery plan (R).</td>
<td></td>
</tr>
<tr>
<td>Emergency mode operation plan (R).</td>
<td></td>
</tr>
<tr>
<td>Testing and revision procedures (A).</td>
<td></td>
</tr>
<tr>
<td>Applications and data criticality analysis (A).</td>
<td></td>
</tr>
<tr>
<td>Evaluation.</td>
<td>(R)</td>
</tr>
<tr>
<td>Business associate contracts and other arrangements.</td>
<td>Written contract or other arrangement (R).</td>
</tr>
</tbody>
</table>

(R) means the safeguard is required; (A) means the safeguard must be addressed by the covered entity who must determine if the safeguard is reasonable and appropriate to implement. If the entity determines it is not, then the entity must implement and describe an equivalent alternative measure.

by the privacy officer to do so. Practice workforce may not engage with a patient’s post on a third-party review website (Yelp, for example) unless authorized by the privacy officer to do so. Violation of this policy will result in sanctions for individual workforce members.

If a dental practice wants to include patient information in its social media postings and responses, then it must obtain authorization in advance from individual patients by using a HIPAA and California-valid authorization form. This process must be described in the practice’s policies and procedures for uses and disclosures of PHI. If the dental practice wants to post comments on social media, the practice’s procedures should include example comments.

The TABLES do not list all documentation required by HIPAA. A covered entity also should have policies and procedures for how it carries out requests from patients exercising their HIPAA rights, for example, accessing their records or requesting an alternative method of communication, and for how the entity complies with other HIPAA requirements such as breach assessment and notification.

REFERENCE


Regulatory Compliance appears monthly and features resources about laws that impact dental practices. Visit cda.org/practicesupport for more than 600 practice support resources, including practice management, employment practices, dental benefits plans and regulatory compliance.
4376 SANTA CRUZ COUNTY GP  Incredible practice opportunity offering 31 yrs of goodwill. EZ freeway access and parking. Close to amenities and shopping. Nicely appointed 1,200 sq. ft. office with 4 ops. Owner/Doctor works 4 days/week. Hygiene 6 days/week. 1,200+ active patients. Average GR $1.6M with average adj. net of $756,029.00. Owner/Doctor will help for smooth transition. Asking $1,206,000.

4381 SOUTH SAN FRANCISCO GP  Retiring dentist offering 23 year practice close to Kaiser Hospital. 4 op facility with new & recently upgraded equipment. Asking price to be determined.

4359 SANTA CRUZ GP  Offering 30+ years of goodwill within walking distance to the beach! Located in a well-established, attractive, single story professional building complex w/ample parking, good visibility and easy access. 2 doctor days/week, 2 hygiene days/week, 380 active patients with approx. 10 new patients/mo. 3 fully equipped ops in 850 sq. ft. Average GR $250K with Average adj. net of $135K. Asking price $150K.

4368 SANTA CLARA GP  25 year practice in community retail center near Levi Stadium. Nice fully-equipped 1,100 sq. ft. facility with 5 ops. Average Gross Receipts base components is $553K. Asking $350K.

4380 SAN MATEO GP  Unique opportunity to own a San Mateo GP. This location generates significant foot traffic. 1,498 square foot facility with 4 ops, reception area, business office, private office, staff lounge, lab area, sterilization area, bathrooms, storage & dedicated parking spaces. Current Gross Receipts annualizing at $431K with an adjusted net of $192K. Seller will help for smooth transition. Asking $292K.

4351 SEBASTOPOL AREA GP & BLDG.  Charming practice situated amidst rolling hills, soaring redwood trees and lush vineyards. Offering 70+ years of goodwill. Beautiful, modern facility with 3 fully-equipped ops (room for a 4th op) and digital x-ray. Equipment in pristine condition, most purchased 2016-2018. 2019 GR annualized at $679K+ with adj. net of $210K. Average 3.5 doctor days/week and 4 hygiene days/week. 800 active patients, all fee-for-service. Owner owns the building, it is available for purchase. Asking $305K for practice, $425K for building. Owner/Doctor willing to help for smooth transition.

4370 SAN JOSE PROSTHODONTIC PRACTICE  Cosmetic and prostodontic practice established 40+ years. Located in a busy commercial/residential area of San Jose, close to several amenities, referral sources. 4 fully equipped ops in 1,074 sq. ft. facility. Lots of on-site parking and EZ freeway access. 3 yr. average GR $554K+ with average adjusted net of $180K. Approx 700 active patients, all completely fee-for-service (Seller is not contracted with any insurance companies or Delta). 2 days of hygiene/week. Owner transitioning into retirement, will help for smooth transition. Asking $229K.

4382 MONTEREY COUNTY GP  Gorgeous practice in scenic Monterey Bay peninsula in ample seller owned building with state-of-the-art equipment. $900K+ average annual gross receipts with 4 doctor days. Asking $678K.

4343 CAPITOLA GP  Gorgeous, state-of-the-art practice offering 33+ years of goodwill. Beautifully appointed office environment and building, located within minutes of charming downtown Capitola, known for its colorful, seaside shops and restaurants tucked into a hillside along Soquel Creek. Must see this office to appreciate its splendor. Asking $643K for practice. Seller owns building, it is available for purchase, or to lease.

4366 SONOMA COUNTY GP  Fabulous practice and location within one of the North Bay’s gems of a town. Classically beautiful and well-appointed office with 4 ops in 1,425 sq. ft. Fantastic storefront location on a well traveled road, walking distance to the pedestrian-friendly center of downtown. 900+ active patients, all fee-for-service. No Delta Dental Patients. 4 doctor days/week and 4 hygiene days/week. Last two years average GR $865K with average adj. net of $407K. Seller will help for smooth transition. Asking $650K.

4375 LOS GATOS FACILITY  Seller offering fully equipped, state-of-the-art, modern, 2 operatory facility including furniture, fixtures and leasehold assets in medical office building adjacent to Los Gatos Community Hospital. Asking $250K.

4362 MARIN COUNTY GP  Seller owned 1,550 square foot facility with 5 fully-equipped ops. Owner/Doctor transitioning into retirement and offering 36 years of goodwill in desirable area. Located on a well traveled road in a charming town with temperate weather, easy, outdoor living and natural beauty. Enjoy California living at its best. No Delta Premier patients. Excellent reputation and word-of-mouth referrals. Seller will help for smooth transition. Average Gross Receipts last 2 yrs is $450K. Asking $248K for the practice. Bldg condo is available for purchase.

4355 SAN FRANCISCO ENDO  State-of-the-Art Endodontic practice in signature downtown building with wealth of referral sources. Modern, 1,027 square foot office with 2 fully equipped ops. Established, well-known practice. Seller is a highly regarded educator willing to assist for smooth transition. Average gross receipts $354K.

UPCOMING:
Santa Cruz County GP, San Francisco GP, Redwood Shores GP, Oakland GP & Fairfield GP

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Vista + RE: $450,000 | 4 ops
SOLD! Escondido: $180,000 | 2 ops
Chula Vista: $430,000 | 5 ops
Palm Desert Area: $199,000 | 5 ops
South Bay + RE: $649,000 | 6 ops
SOLD! Glendora: $425,000 | 4 ops
Glendale: $550,000 | 4 ops
Santa Monica: $510,000 | 5 ops
Agoura Hills: $365,000 | 3 ops
SOLD! Simi Valley: $225,000 | 3 ops
Newhall: $250,000 | 5 ops
Valencia: $600,000 | 5 ops
NEW! Thousand Oaks: $85,000 | 3 ops
NEW! Westchester: $550,000 | 4 ops
Camarillo: $275,000 | 5 ops
Camarillo: $360,000 | 4 ops
NEW! Ventura: $375,000 | 6 ops
Ventura Turnkey: $110,000 | 3 ops
Santa Barbara + RE: $1,050,000 | 4 ops
N. Santa Barbara County: $1,437,000 | 9 ops
Santa Barbara County: $179,000 | 4 ops
Santa Barbara: $122,000 | 4 ops
Santa Maria + RE: $360,000 | 4 ops
N. San Luis Obispo County: $1,475,000 | 6 ops
NEW! San Luis Obispo: $861,000 | 3 ops
NEW! Central Coast: $485,000 | 4 ops
Central Coast: $548,000 | 5 ops
Central Coast: $390,000 | 3 ops
Central Coast Endo: $950,000 | 5 ops
SOLD! San Luis Obispo: $1,220,000
San Luis Obispo County: $650,000 | 4 ops
San Jose: $200,000 | 4 ops
NEW! San Francisco: $979,000 | 4 ops
Watsonville + RE: $491,000 | 5 ops
San Anselmo: $230,000 | 2 ops
SOLD! Sacramento: $850,000
NEW! Bakersfield: $200,000 | 4 ops
Bakersfield: $275,000 | 3 ops
Fresno County: $343,000 | 4 ops
Davis: $1,700,000 | 6 ops
NEW! Folsom: $330,000 | 6 ops
Sacramento: $270,000 | 6 ops
NEW! Rancho Cordova: $225,000 | 4 ops
Sacramento Area: $315,000 | 5 ops
Roseville: $315,000 | 5 ops
Shasta County: $135,000 | 5 ops
NEW! S. Lake Tahoe: $225,000 | 3 ops
NEW! California City: $350,000 | 6 ops
I’d like to talk about how ethics can help build your practice, reduce stress and increase satisfaction in your chosen profession. Sounds like a lot, and it is.

Last week, a sharp-as-a-tack, 91-year-old retired machinist came in for an exam and consultation. His previous dentist had retired and a new fellow had taken over the practice. He wasn’t very pleased with him and that’s why he was in my office. We took radiographs and I did the exam. In my six years on the Council on Peer Review evaluating countless cases, I have rarely seen such beautiful restorations. He had crowns on almost all his posteriors and they were simply gorgeous. Margins, contours, occlusion, everything — wonderful. His only complaint was that recently he’s been experiencing food impaction between teeth Nos. 13 and 14 and 14 and 15, which had wide-open contacts. I explained how important adequate contacts are and the need to correct by replacing the crown on 14. He understood completely and set up an appointment to get it done. He then informed me that the new dentist proposed to replace ALL of his crowns for about $19,000. After the shock wore off, I told him that, as far as I could see, there was absolutely no justification to do that.

He left my office very satisfied and happy, and I know he will tell anyone who will listen how pleased he is. There is no better referral source than a happy patient. They will not only sing your praises verbally and online, but when a new patient whom they have referred comes in, they already respect and trust you. Sometimes, dentistry can be stressful. However, doing procedures on people who are solidly in your corner makes it much easier. Let’s be honest, we all like positive feedback and a sense of satisfaction in what we do. I can think of no better way to improve the atmosphere in an office than by filling it with happy patients who completely like and trust you.

Henrik Hansen, DDS, is a general dentist practicing in Fairfield, Calif. He currently serves on the CDA Judicial Council and is a past chair of the Council on Peer Review as well as a past member of the ADA Council on Dental Benefit Programs.

Have an ethical question you’d like to have addressed by the Judicial Council? Email lori.alvi@cda.org.
Your Life’s Work Comes Down To This Decision

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Top 10 Issues For Dentists Contemplating Retirement In 10 years or less

AC-989 SAN FRANCISCO (Facility): Busy Retail Shopping Plaza w/ major anchor tenants! 3 ops $125k
AC-1059 DAILY CITY: Amazing practice w/ seasoned staff in highly desirable neighborhood. 1500 sf w/ 4 ops $345k
AC-1072 DAILY CITY: Seller to work back until May 2022! 1045 sf w/ 3 ops. Plumbed for 1 addl $450k
AG-871 SAN FRANCISCO: Seller Motivated! ~600 sf w/ 2 ops Price Reduced $65k
AG-944 SAN FRANCISCO: An opportunity like this does not come along very often! ~998 sf w/ 3 ops Reduced $540k
AG-945 SOUTH SAN FRANCISCO: Be a part of this vibrant, diverse population. ~1800 sf w/ 4 ops $495k
AG-993 WEST PORTAL AREA: Desirable area w/ easy commute to downtown San Francisco. ~1000sf w/ 3 ops Reduced Price: $395k
BC-741 DANVILLE (FACILITY): Move in Ready! ~1600 sf w/ 3 ops. PRICED TO SELL! $10k
BC-949 ALBANY: Desirable commercial/residential area. Medical Prof Bldg w/ good frontage. 3200sf w/ 4 ops $695k Real Estate: $1.8
BC-1010 ANTIOCH: Amazing Opportunity in Health Prof. Complex 2118 sf w/ 2 equipped ops + 3 add'l $225k
BC-1022 OAKLAND: “Pill Hill” Area adjacent to hospital! 1064 sf & 2 ops. Plumbed for 1 addl $150k
BC-1056 SAN RAMON (Facility): Move-in ready facility in well maintained professional complex. 1698 sf w/ 4 ops $80k
BG-1025 WALNUT CREEK: You won’t find a more outstanding opportunity than this extraordinary practice! ~2138 sf w/ 6 ops. $750k Real Estate: $995k
BN-952 BERKELEY: Don’t hesitate on this incredible opportunity! ~835 sf w/ 3 Ops. Seller Motivated $200k
BN-1023 RICHMOND: This is a rich opportunity for the astute dentist! 1450sf w/2 ops + 2 addl. $50k/Real Estate $750k
BN-1060 LAFAYETTE: Imagine living, practicing & raising your family here in this community! 1400sf w/ 3op. Seller Motivated $225k
BN-1067 SAN LEANDRO: Imagine owning this family-oriented practice with a large patient base. 1495sf w/ 3 ops + 1 addl: $325k
CC-846 SAN RAFAEL: Prof/Retail Building Complex. 3 ops 640 sf Collections $433k in 2017 $275k

Bay Area

CC-927 SAN RAFAEL: Build the practice of your dreams by increasing this 2-day work week! 800 sf w/ 3 ops $175k
CC-979 NOVATO: Seller Retiring. 803 sf w/ 3 ops near downtown and Old Town Novato. $195k (Real Estate $215k)
CC-1030 SANTA ROSA: Condo office in modern bldg w/ ample parking & adjoining Ortho practice! 1683 sf w 5 ops $325k
CC-1049 SANTA ROSA: Fully Remodeled, Amazing Location. 2000 sf w/ 5 ops $685k Real Estate Also Available
CC-1074 SANTA ROSA: You will not find these build outs in this area for price! ~1200 sf 3 ops $300k
CG-995 VALLEJO: Live, play and practice here where your lifestyle can’t be beat! ~2035 sf w/ 7 ops $1.175M
CG-1048 SONOMA: This highly successful family-oriented practice has it ALL! ~1500 sf w/ 4 ops Reduced $630k
CN-911 SANTA ROSA: Want a change in lifestyle? This fabulous practice is the heart of the Wine Country! 2250 sf w/4 ops + 1 addl Seller Ready to Retire $499k
DG-862 MID-PENINSULA: Rare gem with up to 7 operatories in the Bay Area! ~2274 sf w/ 6ops + 1 addl $675k
DG-986 CAMPBELL: The ideal opportunity to practice in this community! ~988 sf w/ 3 ops Seller Motivated $288k
DG-1006 MONTEREY AREA: This practice is one which every dentist aspires to! ~3400 sf w/ 8 ops Reduced $1.325M
DG-1009 CARMEL: Amazing fee-for-service practice w/ no contracts! ~1150 sf w/ 4 ops Reduced $750k
DG-1014 MONTEREY: Don’t miss your opportunity to live and practice in beautiful Monterey! ~1125 sf w/ 4 Ops Reduced $750k
DG-1024 BELMONT: Med Prof Bldg on bustling commercial coridor. ~2000 sf w/ 5 ops $425k
DG-1042 MOUNTAIN VIEW: Amazing opportunity providing quality, high-end practice! ~ 890 sf w/ 3 Ops $895k
DG-1078 SARATOGA Ortho: One-of-a-kind, modern, high-tech orthodontic boutique practice! ~ 1400sf w/ 5 Ops $980k
DN-1031 CUPERTINO: This remarkable practice awaits only your talent and skill! 1500sf w 3 ops + 1 addl $1.25M

Call or email for a free copy of Dr Giroux’s book Top 10 Issues for Dentists Contemplating Retirement In Ten Years or Less

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**Bay Area Continued**

**DN-1032 Pleasanton Facility**: The perfect place to live, practice & raise a family! 1400sf w/ 4ops. Includes CT Scan! $185k

**DN-1041 San Jose**: This stunning practice is an excellent opportunity for new grads! 1207sf w/ 2ops + 1 add'l. Reduced! $175k

**DN-1003 Pleasanton Facility**: This is an excellent opportunity for a graduate or a dentist seeking a satellite location. 1000sf w/ 3ops. $68k

**DN-1046 Santa Cruz Area**: Opportunities like this does not come along, except once in a lifetime! Office 2050 sf w/ 5 ops. Total sq ft 3880. $595k/Real Estate: $1.1mil

**DN-1067 Castro Valley**: Conservative treatment & compassionate philosophy delivered in a warm environment. 1498sf w/ 5ops. $650k/Real Estate: $675k

**Northern California**

**EC-1018 West Sacramento**: All new leaseholds & top of the line PC EQ in 5 ops! 6 ops currently in use. 10 ops total available! $795k

**EG-910 Midtown Sacramento**: A thriving practice does not come along very often! ~1107 sf w/ 2 + 1 addl. Reduced $210k

**EG-968 Sacramento**: Desirable, mid-town neighborhood, w/ ample parking in garage! ~1527 sf w/ 5 Ops. Reduced $480k

**EG-972 Elk Grove**: Prime location! Real Estate available to purchase in the future! ~3500 sf w/ 8 ops+. Reduced $495k

**EG-1012 East Sacramento**: A practice like this one does not come available very often! ~2900 sf w/ 8 ops. $2.5M

**EG-1016 Lincoln**: Look no further than this growing community to springboard into your success! ~1800 sf w/ 4 Ops Reduced $560k

**EG-1039 El Dorado Hills Vicinity**: The ideal opportunity to practice in this community! ~1100 sf w/ 4 Ops. $350k

**EG-1061 South Auburn Vicinity**: Come live, play and practice in the heart of this pristine town! ~1100 sf w/ 4 Ops. $350k

**EN-1052 East Sacramento**: Remarkable, long-established opportunity, loaded w/ goodwill! 1100 sf w/ 4 ops. $590k

**EN-1055 Rocklin Facility**: Build your own success here in this family-oriented community! 1650 sf w/ 4 ops + 1 addl. $95k

**EN-1077 Davis**: Imagine living and practicing here! Hesitate and you may miss out on your dream! 1100sf w/ 5 Ops. $575k

**FC-650 Fort Bragg**: Family-oriented practice. 5 ops in 2000 sf $350k for the Practice & $400k for the Real Estate

**FG-841 Arcata**: Great demographics w/ little competition! ~1114 sf w/3 ops Reduced Price: $200k/Real Estate Available

**FN-961 Eureka**: Where the quality of life can’t be beat! 1400sf w. 4 ops. Practice Reduced: $395k/Real Estate Available $395k!

**FN-855 NO HUMBOLDT**: Seller relocating! Long-established, 100% FFS practice! 1600 sf w/ 3ops + 1 addl. $190k/Real Estate Available

**GN-1071 Redding**: Streamlined policies & loyal patient base, this quality practice is your springboard to success! 2264sf w/ 4 ops. $525k

**GN-1073 Butte CO**: Quality, fee-for-service practice with a stellar reputation! 1800sf w/ 4ops. $375k / Real Estate Available

**HG-1053 Grass Valley**: Well-established practice of 40+ years, known for its quality dentistry! ~1200 sf w/ 3 ops $420k

**Northern California Continued**

**HG-1068 Lake Tahoe Area**: ~2500 sf w/ 3 Ops. $315k/Real Estate Available

**HG-815 Truckee Area**: Amazingly priced at 50% of Collections! ~1000 sf w/ 3ops $165k/Real Estate Available

**HG-983 Grass Valley**: Newly remodeled office in highly desirable neighborhood! ~1250 sf w/ 3 ops. Reduced Price $185k/Real Estate Available

**HG-987 Lake Tahoe Area**: LIVE THE DREAM! The mountains are calling you to this Alpine Paradise! ~ 3,400 sf w/ 6 Ops $785k/Real Estate Available

**HN-879 Sonora**: Great Cash-Flow for Only 3 Days a Week! 2950 sf w/ 3 ops Reduced Price: $265k

**HG-934 Grass Valley**: Underworked PT base should support larger production numbers! ~1200 sf w/ 3ops Reduced $168,750/Real Estate Available

**HN-999 Calaveras Co. (Real Estate)**: 1,500 sf w/ 2 equipped Ops + 1 fully plumbed & 3 partially plumbed. $500k

**HN-991 Placerville**: Quality, conservative and compassionate practice! Will consider work back. 1,654 + 473 sf w/ 5 ops. $675k

**Central Valley & Southern California**

**IG-881 Turlock**: Long established has unsurpassed quality care. ~3500 sf w/ 10 Ops (shared). Reduced. $295k

**IG-1007 Greater Modesto Area**: Combines a quality learning environment with relaxed rural living. ~3000sf w/ 6 ops. $645k

**IG-1019 Tracy**: This opportunity is waiting for you to sink your roots down and invest your future here! ~1200sf w/ 4 ops. $745k

**IN-1069 Stockton**: Well-established & fully equipped w/ modern equipment, this is an excellent opportunity! 1450sf w/ 3ops + 1 addl! $260k

**JC-811 Fresno County**: Seller willing to consider Associateship for qualified DDS w/ Intention to Buy In! Considerable Goodwill in Community! 3,000 sf w/ 6 ops $350k

**JC-823 Los Banos**: Heavy emphasis on hygiene. 1000 sf w/ 3 ops $80k

**JC-1054 Visalia**: Practice AND REAL ESTATE! Prof Bldg on major thoroughfare. 2,260 sf w/ 6 ops $275k/Real Estate $517k

**Specialty Practices**

**BC-784 Central Contra Costa CO Perio**: Seasoned Staff. Office runs like well-oiled machine! 3 ops $295k

**BG-843 Walnut Creek Perio**: Priced at 50% of collections! ~1085 sf w/ 4 ops $390k

**BG-1024 Walnut Creek Prosth**: Stellar reputation for providing the highest level of treatment! ~2138 sf w/ 6 ops $750k Real Estate: $995k

**DN-1044 Foster City Pedo**: Shared Space Situation. Conveniently located within walking distance of major corporations. 830sf w/ 3 ops. $195k

**GG-940 North of Sacramento Pedo**: Practice is on track to collect more than $1,000,000 in revenues this year! ~3400 sf w/ 5ops. $660k

**JG-757 Visalia Perio**: Incredible Giveaway at this price! Collections over $800k! ~2000 sf w/ 5 ops. Steal at $150k

“Ask the Broker” can now be found at www.westernpracticesales.com
**Tech Trends**

A look into the latest dental and general technology on the market

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**BPM Connect ($99.95, Withings)**

With the widespread use of smart fitness trackers such as the Fitbit and Apple Watch, a new category of smart health monitors has risen in the marketplace. Withings’ BPM Connect is a smart blood pressure monitor designed to easily and accurately measure and record blood pressure and pulse data to the cloud.

BPM Connect requires users to download the Withings’ Health Mate app (available for iOS and Android) and sign up for a free Withings’ account. After account sign-in, users can begin a step-by-step walkthrough on the app to setup the blood pressure monitor to connect to a Wi-Fi network and add the device to their account. Once the setup process is complete, users place their arm inside the cuff, tighten the strap and press its single button on the monitor to turn on the device. The default mode BP is prominently displayed on the device and users can press the button again to begin measuring their blood pressure and pulse. Another mode, BPx3, can be enabled by a long press of the button for a triple measurement of blood pressure and pulse. Once taken, the measurements are displayed on the device where users can select a profile to assign the results via a long press followed by a normal press of the button. The monitor can support up to eight different profiles and results are automatically sent to the Health Mate app via Wi-Fi or Bluetooth. In the app, the timeline and dashboard record results longitudinally to track health trends. Users can also connect their profiles to Apple Health or Google Fit to share and combine data from other sources to create an overall snapshot of their health. The blood pressure monitor contains a battery that lasts up to two months and can be recharged through the included micro-USB cable. While it is easy to setup and use for a single profile, selecting multiple profiles with its single button is difficult. The device has been medically cleared by the FDA to provide reliable and accurate results.

Smart home health monitors such as the BPM Connect allow users to record important vital signs to the cloud, which, combined with other health data, can help with the integrated management of systemic conditions to increase overall health.

— Hubert Chan, DDS

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**ikling USB C Hub, 9-in-1 Adapter ($29.99, ikling)**

Combining different pieces of technology to make one consolidated amalgamation has been a time-honored obsession within the tech community for ages. Why else would refrigerators have TV screens and why would phones have built-in cameras, facial scanners and computers? Chinese company ikling has created an entire business model out of this obsession by specializing in manufacturing low-cost USB-C hubs to extend the accessory ports on computers. Their latest offering is the ikling 9-in-1 USB C Hub, which has a dazzling array of ports: ethernet, USB-C charging, HDMI, SD/TF card reader, 3.5 mm audio jack, VGA and two separate USB 3.0 ports. This product was reviewed on a Windows 10 PC. Of note is that while the company boasts MacBook compatibility, an error occurred when ikling was tested on a MacBook and was not functional. This may be due to a manufacturing issue.

The ikling USB C Hub measures 4.8 x 0.5 x 1.6 inches and comes in its own fabric carrying case. Operation is plug-and-play with no need to install any additional software. Individually, all the ports work as intended, extending displays, passing data and connecting to the internet reliably and quickly. When multiple devices are plugged in, the ikling’s limitations show. If multiple USB storage devices are plugged in and accessed at the same time, file transfer rates decrease. If two monitors are plugged in simultaneously, only monitor mirroring is enabled. The USB-C charging capability can charge laptops that require up to 65 watts of power, but it will slow charge for other devices plugged in. If all the ports are activated and used, the device becomes unpredictable and crashes. Despite these limitations, the ikling USB C Hub consolidates nine separate devices and performs competently in all its stated functionalities when under normal operating load. This is an excellent travel companion, assuring that users on the go will have a port for any given situation. Competing products cost twice as much and function similarly, so the ikling is a must-have for the practitioner who travels.

— Alexander Lee, DMD

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**Would you like to write about technology?**

Dentists interested in contributing to this section should contact Andrea LaMattina, CDE, at andrea.lamattina@cda.org.
Be a part of the most brilliant dental convention in the nation. Join in the excitement of CDA’s 150th anniversary in Anaheim this spring at CDA Presents The Art and Science of Dentistry. Stay for the sandy beaches, local attractions and fun outside the convention doors.

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Augustina, from China—a data analyst, painter, and kickboxer—travels the world with a smile. Opalescence™ Boost™ in-office whitening quickly whitens her smile to keep up with her jet-setting lifestyle. A brighter, whiter smile will help each of your patients live their best life. That’s the power of a smile. Find out more at ultradent.com/mysmileispowerful.