Journal *of the* American College *of* Dentists

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Mission

The *Journal of the American College of Dentists* shall identify and place before the Fellows, the profession, and other parties of interest those issues that affect dentistry and oral health. All readers should be challenged by the *Journal* to remain informed, inquire actively, and participate in the formulation of public policy and personal leadership to advance the purposes and objectives of the College. The *Journal* is not a political vehicle and does not intentionally promote specific views at the expense of others. The views and opinions expressed herein do not necessarily represent those of the American College of Dentists or its Fellows.

Objectives of the American College of Dentists

THE AMERICAN COLLEGE OF DENTISTS, in order to promote the highest ideals in health care, advance the standards and efficiency of dentistry, develop good human relations and understanding, and extend the benefits of dental health to the greatest number, declares and adopts the following principles and ideals as ways and means for the attainment of these goals.

A. To urge the extension and improvement of measures for the control and prevention of oral disorders;

B. To encourage qualified persons to consider a career in dentistry so that dental health services will be available to all, and to urge broad preparation for such a career at all educational levels;

C. To encourage graduate studies and continuing educational efforts by dentists and auxiliaries;

D. To encourage, stimulate, and promote research;

E. To improve the public understanding and appreciation of oral health service and its importance to the optimum health of the patient;

F. To encourage the free exchange of ideas and experiences in the interest of better service to the patient;

G. To cooperate with other groups for the advancement of interprofessional relationships in the interest of the public;

H. To make visible to professional persons the extent of their responsibilities to the community as well as to the field of health service and to urge the acceptance of them;

I. To encourage individuals to further these objectives, and to recognize meritorious achievements and the potential for contributions to dental science, art, education, literature, human relations, or other areas which contribute to human welfare—by conferring Fellowship in the College on those persons properly selected for such honor.

ADEA Commission on Change and Innovation

Issues in Dental Ethics

Departments

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From the Editor

The Golden Rule Isn't

The Golden Rule usually makes its appearance after the fact; like other proverbs, it is brought out to justify a course of action that it illustrates.

What could anyone say to tarnish the gold of "Do unto others as you would have them do unto you?" In one form or another, this moral advice has a longer history than "look before you leap" or "he who hesitates is lost." Like all condensed wisdom, the Golden Rule works wonderfully when it is successful, and not so well otherwise.

There are two parts to the Golden Rule: impartiality and private standards. There is much to like about the first part.

Ethics standards should not play favorites. The Golden Rule makes a strong case against privileged positions. The proverb, "What is good for the goose is good for the gander" says much the same thing. But the Golden Rule does not extend to saying that everyone should enjoy the same benefits in life or get what they want. The original version of the proverb about cooking geese is "What is sauce for the goose is sauce for the gander," meaning that one can cook both sexes of the bird the same way, but the hen is always more tender.

The impartiality of the Golden Rule makes the case that no one is personally above the moral law he or she uses. There is a suggestion of universality about doing unto others as you would have them do unto you. One cannot lie while expecting others to be truthful or expect people to do what you tell them to do without being willing to follow the same practice yourself in similar situations. The late eighteenth century philosopher Immanuel Kant called this the "categorical imperative" (a term meaning it is self-evident and impossible to believe otherwise). He said, "So act that you could will that your action becomes a universal law." A more modern version of this approach would be to imagine that you would answer in the affirmative to the question, "would it be all right for anyone to behave the way you do?"

The impartiality of the Golden Rule works well most of the time. But it can be defeated by paying close attention to the little qualifying clause "under similar circumstances." Killing is wrong because we do not want to be killed—except where self-defense is involved, or in cases of just war, or for non-vegans, pro-choice advocates, or.... Dentists expect that their views regarding proper treatment choices will be accepted over those of the patient or the hygienist because they have greater training. Allowing any variance for special circumstances introduces new values and gives them higher status than the Golden Rule. We do it all the time. The Golden Rule works best when it conforms with our other views on ethics.

Steven Covey tells this story in his *Seven Habits of Highly Effective People*. A man visited the optometrist because he felt his vision had gotten worse recently. The optometrist listened to him briefly and then, without performing any examination, handed the patient a pair of glasses and said, "Here, use these. I'm confident you will find them effective." The patient was surprised and managed to say something to the effect, "That was quick. You didn't even examine me. How do you know these glasses will work?" The optometrist smiled paternalistically, "I have years of training, and besides they work great for me."

This story goes to the second part of the Golden Rule, the part we need to be cautious about: it is egocentric. The Golden Rule makes each individual a private ethical standard. Treating others as you want to be treated is a formula for creating a world in your own image. I hear senior dentists summarize dental ethics as treating every patient as though he or she were your mother. That sounds fine, but what if your mother were edentulous, or addicted to Botox, or very rich or very poor? As the old joke goes, a sadist is a masochist who has read Immanuel Kant.

"Wait," the reply comes back, "you are taking it entirely too literally. What I mean is that others should be treated the way I want to be treated with respect to general characteristics such as consideration, honesty, caring, and those sorts of things." That is the same dodge we have already encountered with respect to "circumstances being equal." It is an attempt to smuggle in one's personal candidates for ethical standards under the flag of universal impartiality. It still makes each believer in the Golden Rule the would-be ethical standard for all other humans.

The Confucian and Old Testament versions of the Golden Rule blunt this criticism by framing the maxim in negative terms: "Do not do anything to others you would not want done to you." This is a neat protection against imposing oneself on others. But it is rather problematical to watch others starve because one personally would feel awkward accepting charity.

The Golden Rule usually makes its appearance after the fact; like other proverbs, it is brought out to justify a course of action that it illustrates.

Some folks jump from the frying pan of the Golden Rule into the fire of altruism. Rather than treating others the way you think they should be treated, treat them the way you think they want to be treated. Benevolent dictators make a fine living deciding what others really mean when they express their wishes. Even complete surrender to the literal wishes of others is self-defeating because it involves inconsistencies across individuals in similar circumstances. It makes others the individual arbiters of what is ethical.

Personally, I am prepared to go forward on a democratic view of ethics: a majority vote is needed in all cases to find how you and I should proceed. Let's lay out our positions and have a discussion. It usually works out that we can quickly agree on a mutually acceptable view of what is right and good for both of us. Heaven help us if there is no way forward unless others agree to be treated the way I want them to be treated.

AN INTRODUCTION TO THE ADEA COMMISSION ON CHANGE AND INNOVATION IN DENTAL EDUCATION

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ABSTRACT

New developments in dentistry are appearing rapidly, and new electronic means for making information available are already in the hands of our dental students. Recognizing a dramatic shift in the landscape, the American Dental Education Association developed, in 2004, the Commission on Change and Innovation. The commission has coordinated a national effort to identify a new dental education curriculum, beginning with a revision of the Competencies for the New General Dentist. From this starting point, the association is working to identify foundation knowledge and skills that support these competencies and new assessment methods. There is now a network of faculty liaisons at most schools throughout the United States and Canada. The future will likely see much of dental education delivered in community and other settings besides the traditional lecture room.

Just about everyone agrees that changes are needed in what we teach in dental schools. The great influx of new knowledge in our profession and the challenges we face have made this change absolutely necessary. The connection between oral and systemic health, genomics, salivary diagnostics, proteomics, bioinformatics, dental implants, and the needs of underserved populations are some of the candidates for the new "must know" list.

As technology has changed, so too have those who are mastering it. Today's dental and allied dental students and residents differ from preceding generations by virtue of their fluency with digital technology and their connectedness with the wider world. Pollster John Zogby, in his book, *The Way We'll Be: The Zogby Report on the Transformation of the American Dream* (2008), dubbed today's 18-to-29-year-olds "First Globals" because they are "the most outward looking and accepting generation in American history." If so, this represents a dramatic paradigm shift. These highly self-directed learners do not need us to feed them information. They have a world of information at their fingertips. This new paradigm moves teachers away from their traditional role as gatekeepers of knowledge, but that does not make them irrelevant. Instead it opens up a new role for faculty as mentors in both academic and clinical settings.

The combination of new technologies and "First Globals" means that changes are needed in some of the ways we

teach. "Tell them again louder" pedagogy is not going to produce a generation who take responsibility for their own learning throughout their lifetimes. These are the professionals who will need to evaluate and incorporate the even newer knowledge that will never stop coming through the pipeline, including new materials, techniques, and procedures.

Thus, our task, most briefly stated: change what we teach and how we teach and make it work. And that is why we have the American Dental Education Association Commission on Change and Innovation in Dental Education (ADEA CCI).

BACKGROUND

In 2004, the ADEA Board of Directors identified curriculum development and design to meet the changing needs of oral health care as one of the association's strategic directions. In 2005, then-ADEA President Eric Hovland created ADEA CCI to lead and coordinate ADEA's efforts to help develop curricula for the 21st century. Dr. Kenneth Kalkwarf, a former ADEA president and dean of the dental school at the University of Texas Health Science Center at San Antonio Dental School, was appointed as the first chair of the commission.

Many have observed that "it's easier to move a cemetery than to change a

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curriculum," Dr. Kalkwarf noted in his 2005 *Journal of Dental Education* "Perspectives" article (Kalkwarf et al, 2005). He continued, "What is lacking in most proposals for innovation is a single Archimedean leverage point from which to shift the entire system."

The dental education system includes not only educators but also representatives of accreditation, national board testing, licensure, and practice. These are the major groups essential to systemic change. When ADEA called on the Commission on Dental Accreditation, the Joint Commission on National Dental Examinations, the ADA Council on Dental Education and Licensure, the ADA Board of Trustees, and the American Association of Dental Examiners to participate in ADEA CCI, we found them all primed for change and ready to work together. And we found the point of focus: development of a new "Competencies for the New General Dentist."

This document, developed through the ADEA Council of Sections, identifies 39 competencies within six domains: critical thinking, professionalism, communications and interpersonal skills, health promotion, practice management and informatics, and patient care. The document is now ADEA policy (American Dental Education Association, 2009). Within the next 12–18 months, the ADEA Council of Sections will finish the next step, linking each competency to the foundation knowledge that makes achieving the competency possible and that defines dentistry as a learned profession.

As an example, no one doubts that dental school graduates must be competent to prevent and manage pain and anxiety in the dental patient. But on what specific scientific knowledge is that competency built? That is what our basic and clinical science programs should be teaching to and the test developers should be testing for, using best practices in education, curriculum structure, and performance evaluation.

Though work goes on to define and refine the foundation knowledge, ADEA CCI is not trying to develop a national curriculum. We are well aware that curricular emphasis at a research-oriented facility where most dental graduates go on to advanced education will not be the same as it is at a dental school whose graduates go immediately into practice. Mission makes a difference. In addition, integration of scientific discovery with clinical education, assessment (including assessment associated with accreditation standards), national boards and clinical licensure examinations, the culture of existing dental practice, the milieu of higher education, and even other health professions all affect the process and outcomes of dental education.

Curriculum change will happen now because we have finally tied it to specific objectives, and because now a team of faculty members working as liaisons at nearly every United States and Canadian dental school have the connections to people and ADEA CCI support to become

> For the first time in history, the major stakeholder groups have come together. By working together, they can create systemic change.

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conduits to get their entire faculty involved. For the first time in history, the major stakeholder groups have come together. By working together, they can create systemic change.

The Future

The academy of the future may not be visible at all. In a wired world, where we can share information digitally, reduced costs and increased convenience may well trump the perceived benefits of bringing students, residents, and faculty together under one roof. Each year more and more institutions adapt portions of their curriculum for delivery online. In some systems, education is distributed across campuses, allowing students to remain in their home communities and creating the conditions that encourage them to practice there as well.

The faculties of tomorrow also will evolve. They will become more interdisciplinary, in keeping with the practice community, and they will represent expertise in areas we can only start to imagine. The knowledge needed by the clinician of the future will extend well beyond the bounds of what previous generations learned in school. As knowledge expands with dizzying rapidity, professors of diagnostics, genomics, informatics, and new sciences that have yet to fully develop may all play a part in educating future practitioners.

Clinical education, too, is ripe for change. Hands-on experience with patients will remain an essential part of our educational models, but virtual technologies are already under development to reduce the amount of time that our students and residents need to spend working directly with patients during the early periods of their education and training. While most clinical dental education is currently delivered within the footprint of academic dental institutions, by mid-century a great deal of it will

have moved to sites in the community. This will be motivated in part by a desire to reduce costs; it also will have tangible benefits for those in our academic programs and those in underserved communities. Students and residents will be able to observe and treat a greater variety of patients, and through their efforts, clinics that serve those with limited or no insurance will have the opportunity to expose more potential recruits to careers in the dental, allied dental, and advanced dental professions.

While it is possible that some academic dental institutions eventually will eliminate their bricks-and-mortar facilities entirely, that does not mean they will cease to exist. Our institutions will continue to coordinate and validate the educational experience, but the physical plant may be reduced to merely house information technology equipment rather than people. In other words, they will become communication hubs, with their professors and learners distributed in ways that suit each individual best. With a shift to the use of community-based facilities for clinical care, this reality need not be far away.

One major advantage of an arrangement of this sort would be that students and residents could learn at their own pace. Highly capable individuals who are able to pursue their educations full-time might easily attain competency in a short period of time, while others could complete their programs at a pace that would accommodate work or family obligations. So long as individuals gain the competencies they need to be competent practitioners, the duration of their education would not matter, putting to rest arguments about the appropriate length of an education program.

Assessment will play an even more vital role in the educational system of the future. With less face time between professors and learners, we will need even more reliable methods of assessing competency to ensure that our students

and residents are ready for independent practice in their respective fields. ADEA CCI and many of our members have been working assiduously on this last piece of the puzzle for some time now, and many of the tools we need already exist in preliminary form.

By 2050, our academic dental institutions also will have placed greater emphasis on positioning themselves as a resource for lifelong learning. In the past, dental knowledge was relatively static, but tomorrow's general dentists, specialists, and allied dental professionals will need to continually adapt their practices to incorporate new knowledge.

As the landmark work of ADEA CCI goes on, it is good to take the long view. Many of us have friends we only know in cyberspace, and perhaps even manipulate avatars through virtual second lives—and we likely will lead even more complex digital existences in the decades to come—but we must remember that flesh-and-bone patients will continue to need our care. Today I call more forcefully than ever upon our profession to teach the next generation how to help and how to heal. ∎

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Sustaining an Educational Environment for Change and Innovation

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Abstract

Sustainability refers to the capacity to continue. For the most part, United States dental schools have shown an amazing ability to endure over the past century. Dental schools have continued through fluctuations in application cycles and through persistent faculty shortages. Today, dental schools, particularly public institutions, find themselves faced with draconian budget cuts as states slash funding to higher education. While dental schools face threats, they also enjoy unprecedented opportunities. Scientific advances, particularly in genetics and molecular biology, presage the emergence of new modalities of patient care. The desirability of the dental profession as evidenced by the demand for dental services and the rising income of dentists is at an all time high. Public awareness about the importance of oral health care continues to grow.

L ike ecosystems, academic dental institutions are constantly changing due to interaction with both internal communities and the external environment. Change has frequently come as a reaction to environmental pressures rather than a proactive effort to innovate to meet threats and opportunities head on. In 2005, the American Dental Education Association (ADEA) initiated an effort through the ADEA Commission on Change and Innovation in Dental Education (ADEA CCI) to build consensus within the dental community by providing leadership and oversight to a systemic, collaborative, and continuous process of innovative change in the education of general dentists. The ultimate goal is to ensure that students enter the profession competent to meet the oral health needs of the public throughout the twenty-first century and to function as important members of an efficient and effective healthcare team.

From the its beginning, the ADEA CCI recognized that a variety of factors influence the curriculum at each dental school. Among these factors are expectations of the parent institution, standing or emerging research foci, strengths among specialty education programs, approaches to clinical education, and pedagogical philosophies and practices. The Commission on Dental Accreditation process recognizes legitimate differences among schools in the priority they place on biomedical, clinical, and behavioral sciences. ADEA CCI continues to support the position that diversity of curricula is a strength and creates the opportunity for dental schools to learn from each other.

Academic dental institutions must prepare students to enter the practice of dentistry as lifelong learners, professionals, informed citizens, and enlightened leaders in a changing healthcare system. If dental educators are to meet these purposes, change and innovation in dental education must be responsive to evolving societal needs, practice patterns, scientific developments, and economic conditions. As in an ecosystem, sustainability refers to how dental education can remain both diverse and productive over time. Sustainability is about creating an environment that meets the needs of the present and the future. To facilitate innovative change while respecting institutional diversity, ADEA CCI turned its attention to the educational environment (Haden et al, 2006).

Principles to Shape the Educational Environment

The 2006 report of the ADEA CCI, *The Dental Education Environment,* outlined eight principles to guide academic dental institutions as they seek to implement changes. These eight principles are repeated below, in most cases verbatim, from the original ADEA CCI report. In addition, two principles that emerged

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subsequent to the publication of the initial paper follow the eight.

1. Critical Thinking

Through a process of integration, reflection, and examination and analysis, students develop foundations for curiosity, an understanding of the value of science as it applies to clinical practice, and the desire and motivation for lifelong learning to contribute to the profession's place in society and its standing in the healthcare team. The components of critical thinking are: the application of logic and accepted intellectual standards to reasoning; the ability to access and evaluate evidence; the application of knowledge in clinical reasoning; and a disposition for inquiry that includes openness, self-assessment, curiosity, skepticism, and dialogue. In professional practice, critical thinking enables the dentist to recognize pertinent information, make appropriate decisions based on a deliberate and open-minded review of the available options, evaluate outcomes of diagnostic and therapeutic decisions, and assess personal performance.

Critical thinking is foundational to teaching and learning any subject. An educational environment characterized by the discipline of critical thinking develops self-directed, self-disciplined, self-aware, and self-corrective learners. Dental faculty must model critical thinking not only in their pedagogy—what and how they teach—but also in their own learning.

2. Assessment

The effectiveness of educational principles and pedagogical practices is known when student learning is assessed. Academic dental institutions should conduct regular assessments of students' learning throughout their educational experience.

Such assessment should not only focus on whether the student has achieved the competencies necessary to advance professionally (summative assessment), but should also assist learners throughout their educational experience in developing the knowledge, skills, attitudes, and values considered important at their stage of learning (formative assessment). Students should be encouraged to self-assess. Self-assessment is indicative of the extent to which students take responsibility for their own learning.

Successful assessment not only improves student learning; it is basic to curriculum management. As a means to improve curricula, assessment involves a dialogue between and among faculty, students, and administrators. Based on the assumption that the society of learners—faculty and students at an institution—is responsible for its outcomes, the evaluation of a curriculum is a process in which both faculty and students should engage.

3. Evidence-based Oral Health Care

The American Dental Association (ADA) defines evidence-based dentistry (EBD) as an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences. EBD is based on using thorough, unbiased reviews and critical appraisal of the best available scientific evidence in combination with clinical and patient factors to make informed decisions about appropriate health care for specific clinical circumstances. EBD relies on the role of individual professional judgment in this process. The content of dental curricula should be based on the principles of evidence-based inquiry; faculty should practice EBD and model critical appraisal for students in dental school clinics; as

> Learning should occur in the context of real problems rather than within singular content-specific disciplines.

scholars, faculty should contribute to the body of evidence supporting oral healthcare strategies by conducting research to determine best practices; and students should learn and practice critical appraisal of research evidence while they are in dental school.

4. Faculty Development

Faculty development is a necessary condition for change and innovation in dental education. The environment of higher education is changing dramatically, and with it, health professions education. New dental faculty face challenges that are different from their predecessors': significant student debt and a growing gap between academic and private practice incomes; more diverse students; an explosion of knowledge and information made available through new technologies; more rapid emergence of science, such as molecular biology, which promises to change the practice of dentistry within their lifetimes; greater public accountability; more use of part-time and non-tenure-track faculty; and increasing expectations that threaten to undermine the quality of faculty work-life. As stated in a recent study of higher education, "The present educational system of courses, credits, and calendar-based systems of teaching and learning focuses by its very nature solely on how faculty work. As a result, all attempts to achieve efficiency and productivity within this system inevitably involve increases in faculty workload" (Guskin, & Marcy, 2003). The situation in dental education has been similar.

Self-assessment is an expectation not only of students, but of faculty as well. The concepts in this document call for teachers to reexamine the relationship between what they do and what students learn, to change from the expert who imparts information to a facilitator of learning who helps the student discover new knowledge. Faculty must re-examine their teaching assumptions and practices. These concepts constitute a cultural change in dental education. For change and innovation to occur in dental education, faculty knowledge, skills, attitudes, and values must also change. Compelling reasons for change and innovation must be clearly stated, and the rationale for new ways of teaching and learning must be substantiated. Reward systems must recognize those who successfully make change, and administrators must align respected colleagues as champions of new ideas. Ongoing faculty development is a requirement not only to foster curricular change, but also to preserve the academic dental profession.

5. Healthcare Team

The year 2000 report of the U.S. Surgeon General on Oral Health in America clearly placed oral health within the context of systemic health. The Surgeon General's positioning of the nation's often substandard oral health as a "silent epidemic" made a compelling case that access to oral health care is among the nation's most significant health care problems. As access to oral healthcare drives a new vision of the dental team, dental school curricula must change to develop a different type of dentist, engaging dental students early in their educational experiences to work with expanded duty allied colleagues in a team environment with the dentist serving as a manager of care.

Access to oral health care and the connection of oral health to general health form a nexus that links oral healthcare providers to colleagues in other health professions. In 2003, a special ADEA President's Commission on access argued that family physicians, pediatricians, other primary care physicians, nurse practitioners, and physician assistants should be enlisted as part of the oral health team. Moreover, the commission maintained that dentists must become vital members of the healthcare team by assessing the overall health of patients through diagnosis, screening, and referral (Haden et al, 2003). These positions are reflective of a 2001 Institute of Medicine (IOM) study that concludes: "All healthcare professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and information" (Institute of Medicine, 2001).

6. Humanistic Environment

A humanistic environment is centered on the unique needs of people, whether they are students, patients, faculty, or staff. Academic dental institutions are societies of learners. Dental students will graduate and join a learned and, ideally, a learning society of oral health professionals. A humanistic pedagogy is one that inculcates respect, tolerance, understanding, and concern for others. When faculty and students exhibit humanistic values, there is freedom to explore, to take appropriate risks, and to learn without intimidation. A humanistic approach is characterized by close professional relationships between faculty and students, fostered by mentoring, advising, and small group interaction.

Students who are respected learn to respect their patients, both present and future, as living human beings, as individuals with a diversity of backgrounds, life experiences, and values. Patient-centered approaches in teaching and oral health care delivery should be promoted so that patient-centered comprehensive care is the norm. In brief, a humanistic environment establishes a context for the development of interpersonal skills necessary for learning, for patient care, and for making meaningful contributions to the profession.

7. Lifelong and Self-Directed Learning

Traditional dental school curricula have been constructed based on the supposition that students must learn all current scientific and clinical content during dental school. Over time, with new discoveries and applications, students must work harder, faster, and longer or neglect content deemed critical by the faculty. Combine this assumption with the reality that most students enter dental school as dependent learners, dependent on the teacher to impart information while de-emphasizing the responsibility of the students to learn on their own. Students are adept at memorizing facts, and the traditional pedagogy in dental education readily focuses on this ability. The result of the above supposition and the state in which students enter dental school is an overcrowded curriculum and the stultification of self-directed learning.

As a corollary to critical thinking, dental curricula must help students learn how to learn. Academic dental institutions must break from the traditional teacher-centered and discipline-focused pedagogy to shift the burden of learning to the student. As students progress through dental school, they should progress from being dependent learners to independent learners. Curricula must be contemporary, appropriately complex, and designed to encourage students to take responsibility for their learning. The explosion of scientific knowledge makes it impossible for students to comprehend and retain all the information necessary for a lifetime of practice during the four years of the dental school curriculum. Students must "learn how to learn," and faculty must serve as role models who understand and value scientific discovery.

8. Scientific Discovery and Integration of Knowledge

Academic dental institutions play a critical role in developing new knowledge, transferring that knowledge for the improvement of the oral, craniofacial, and systemic health of the public, and educating the next generations of researchers and scholars. The interrelationship among basic, behavioral, and clinical sciences is a conceptual cornerstone to clinical competence. Basic and behavioral science integrated with clinical practice is essential in the preparation of the new general dentist so that he or she can solve patients' problems and incorporate new concepts and therapies over lifetime careers. Advances in genetics and molecular biology promise to change the healthcare system in significant ways—probably within the lifetime of today's dental school graduates.

Learning should occur in the context of real problems rather than within singular content-specific disciplines. Learning objectives that cut across traditional disciplines and inform the expected competencies of graduates are important components to curricular design. Beyond the acquisition of scientific knowledge at a particular point in time, the capacity to think scientifically—to apply the scientific method—is pivotal if students are to analyze and solve oral health problems, understand research, and practice evidence-based dentistry. Included in the commitment to science, scientific values, contemporary curricula, and integration of knowledge are the recognition and action needed to reconstitute and represent the social and behavioral sciences in a substantive and visible manner. The behavioral and social sciences create a true intersection for professional practice that is humanistic, scientific, and ultimately patient-centered.

Conversations within the ADEA CCI and with other stakeholders in dental education subsequent to the 2006 publication identified two additional areas important to shaping the dental education environment of the future:

9. Application of Technology

Advances in technology are shaping every facet of our lives, including education. Web 2.0 has brought social networking not only to our personal lives, but also to the professions. The vast and readily accessible information through the Internet means that consumers in general, including patients, are more knowledgeable than ever about their care. From the classroom to the lab and clinic, academic dental institutions should use technology to revolutionize all aspects of the curriculum. Academic dental institutions should regularly assess their use of technology and explore new applications of technological advances to enhance student learning. Moreover, technology use should include systems and processes to safeguard the quality of patient care and ensure the integrity of student performance. Technology has the potential to reduce expenses per student for teaching and learning, alleviate increasing demands on faculty and student time, and support self-directed distance and asynchronous learning.

10. Diversity

Diversity and inclusion are critical components of success in a global context and in an ever-changing world. In the academic environment, important learning occurs through informal interactions among individuals of different races, ethnicities, religions, backgrounds, and geographic regions. Values associated with diversity include respect and appreciation of race, ethnicity, religion, gender, nationality, physical abilities, age, sexual orientation, behaviors and perspectives of each individual. Academic dental institutions have a responsibility to create an environment that fosters learning, both formal and informal, across gender, racial, ethnic, cultural,

and socioeconomic differences. They have a responsibility to develop culturally competent oral health professionals. Diversity within faculty will play a critical role in the professional development of a culturally competent dental workforce for the future. In addition, recruitment, retention, and graduation of practitioners from disadvantaged groups are goals that are important for the public's health.

Next Steps

The ADEA CCI principles have had an impact on shaping change and innovations in dental schools. National meetings have addressed these themes as workshops directed toward improving critical thinking and developing new methods of assessment. The theme of the 2010 ADEA Annual Session was assessment. For the 2011 ADEA Annual Session, interprofessional education is the theme, fostering learning about the health professions team. These principles have been further developed in subsequent ADEA CCI white papers addressing broad themes such as visions of the future; finding, cultivating, and retaining faculty; assessing students progression toward competence; and leadership in academic dentistry. These papers are now available in a special ADEA CCI monograph, *Beyond the Crossroads, Change and Innovation in Dental Education* (American Dental Education Association, 2009).

One of the most important potential outcomes of these ADEA CCI principles is the reshaping of the Commission on Dental Accreditation predoctoral accreditation standards. In 2007 an ADEA Commission on Dental Accreditation Task Force reviewed the standards in the light of these principles. These principles informed a new preamble to the predoctoral standards as well as

guiding the development and elimination of other standards. It is anticipated that a substantially revised set of standards reflecting the framework for the educational environment delineated by these principles will be approved by the Commission on Dental Accreditation at the Commission's July 2010 meeting. These educational principles will continue to shape the dental education environment and sustain academic dental institutions as they improve and thrive in the decade ahead. ∎

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Diversity and inclusion are critical components of success in a global context and in an ever changing world.

CCI Liaisons

Guiding Change One School at a Time

Karen F. Novak, DDS, MS, PhD, and
Eugene L. Anderson, PhD

Abstract

Liaison teams have been developed in order to ensure that national initiatives identified in the American Dental Education Association's Commission on Change and Innovation (ADEA CCI) are implemented at the level of individual schools. Teams of four faculty members each have been identified at 43 United States and Canadian schools. These teams receive training at ADEA annual meeting and at summer institutes. Representative projects from three schools are described.

I n 2005, the American Dental Education Association a Commission on Change and Innovation in Dental Education (ADEA CCI) began to oversee and guide the association's educational change efforts. ADEA CCI is led by an oversight committee that serves as a focal meeting place for dental educators and administrators, representatives from organized dentistry, the dental licensure community, the Commission on Dental Accreditation, the ADA Council on Dental Education and Licensure, and the Joint Commission on National Dental Examinations. Another very important component of ADEA CCI is a group of nearly 200 faculty members at dental schools in the United States and Canada. This very important group is called the ADEA CCI Liaisons.

One objective of the ADEA CCI is to support the efforts of dental schools to develop curricula that prepare graduates to function effectively in the contemporary healthcare environment. To help address this objective, in Spring 2007 each dental school in the United States and Canada was invited to nominate individuals to serve as ADEA CCI Liaisons. Designed to be the conduits of information exchange between the ADEA CCI and the administration and faculty members at their respective dental schools, the teams include junior and senior faculty members, as well as faculty members from both basic and clinical sciences. Junior faculty members invited to participate were to have evidence of effective teaching and active participation in school programs, while senior faculty

members also were to have evidence of a track record of serving as respected opinion leaders within their schools and as having a personal involvement in educational innovation.

The Role of the ADEA CCI Liaisons

The individuals selected to serve on this important team are to serve as agents of change within their schools and to provide support to their faculty members who are responsible for development and implementation of the curriculum. Specifically, the ADEA CCI liaisons were charged with playing the following roles at their parent institutions: (a) to promote two-way communication between the schools and the Commission, (b) to assist with the process of disseminating information about educational innovations to their peers, and (c) to provide leadership for implementation of educational innovations at their own school.

To assist in these first two roles, each year since the liaisons were formed the ADEA has provided liaisons with professional development at the ADEA Annual Session & Exhibit, which is specifically designed to provide relevant educational information related to curriculum change and innovation. Topics at these sessions have included introduction to

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the critical thinking skills toolbox and the dental student assessment toolbox and fostering change and innovation in a fiscally conservative environment. In addition, each year since 2007 the ADEA sponsors an ADEA CCI Summer Liaisons Meeting that provides an excellent venue for liaisons to focus on issues related to change and innovation in dental education. Past themes for these meetings have included understanding the need for change in dental education, new methods in student assessment, and most recently, overcoming barriers to change. Each meeting has included keynote speakers, educational seminars, and small group discussions that revolve around the overall theme. The intent is not only to enhance the expertise of the liaisons, but also to provide relevant information that can be taken back to schools to share with colleagues. Perhaps of even greater importance, these meetings provide liaisons with valuable time to interact with their peers.

In response to the third role for ADEA CCI liaisons outlined above, in 2007 each liaison group was requested to identify a specific project within their school related to curriculum change and innovation that addressed either a current issue facing their school or a future direction of interest to the school. The liaison groups were asked to begin the process of developing the conceptual framework and aims for the project. The ultimate goal was to implement and assess the project and to report the progress and outcomes at future ADEA CCI liaison meetings. This last step was consistent with the concept that ADEA

CCI liaison activities related to curricular change and innovation at their individual schools would be a valuable resource to the dental education community as a whole and supportive of the overall objective of the ADEA CCI to coordinate efforts to improve dental education.

ADEA CCI Liaisons Projects

To date, 43 ADEA CCI liaison groups from dental schools across the United States and Canada have submitted titles and abstracts describing their proposed projects (Table 1). The projects cover a broad range of topics relevant to dental education, and many highlight efforts at addressing the eight core principles of the ADEA CCI: critical thinking, lifelong and self-directed learning, humanistic environment, scientific discovery and the integration of knowledge, evidence-based oral health care, assessment, faculty development, and the health-care team. Some projects are tightly focused (for example, "General dentistry internship honors program"). Others are broader in scope (for example, "Predoctoral curriculum review"). Of importance is the number of schools that have chosen to have their liaisons engaged in this activity—an indication of the value placed on academic and curriculum improvement within the dental education community.

In summer 2009, a large component of the ADEA CCI Summer Liaisons Meeting focused on the progress that liaison groups had made in accomplishing the

> The individuals selected to serve on this important team are to serve as agents of change within their schools and to provide support to their faculty members responsible for development and implementation of the curriculum.

Table 1: ADEA CCI Liaison–Curriculum Change and Innovation Projects

Converting to a systems-based basic science curriculum

Development of the clinical portfolio to facilitate comprehensive, patient-centered care

Student peer evaluation program

Students as active learners

Modify and enhance specific components of a PBL curriculum to improve content appropriateness and educational quality

Tri-level practice groups functioning within a four-year DMD program with optional PGY-1

Designing and implementing a clinical care management system

Implementing evidence-based dentistry and the development of critical thinking skills through case-based learning.

Implementation of asynchronous delivery of contemporary preclinical endodontics education through the use of podcasting

Effectiveness of the current curriculum at MCG School of Dentistry: A self-study creating AxiUm Ed for authentic case-based learning

Revision of institutional competencies: Coordinating committee on curricula reform

Developing a cultural competence curriculum for predoctoral dental students

Achievement of competencies: What's the endpoint?

Curriculum change at the University of Louisville School of Dentistry

Integration of biomedical and clinical sciences at LSUSD (Phase II)

Assessment of student performance in a comprehensive care team practice

Adapting preclinical curriculum to match students' abilities

Enhancing methods to evaluate students in their assessment of comprehensive patient care

Teaching with technology—Continuing the journey

Revision of the freshman curriculum

Enhancing critical and integrative thinking in the D1 basic sciences

Assessment of implementation of the REAL curriculum

Curricular conversion from a quarter to semester calendar

Implementing and refining the vertical group practice

Curriculum review at the University of Pittsburgh

General dentistry internship honors program

Transformation of a clinical assessment system: Involving all faculty as stakeholders

Consolidating educational domains in the dental curriculum

Evidence-based practice at Baylor College of Dentistry: A work in progress

Enhanced use of technology in teaching

Developing outcomes assessment protocol for curricular change

Professional portfolios for students

Creating an integrated learning-centered environment

Development of a capstone case-based review course for biomedical sciences

Curriculum revision

The design and implementation of a comprehensive OSCE to assess general competency

An integrated curriculum: Evolution, evaluation, and future direction

Overall curriculum redesign

Integrated problem sessions: Presentations by groups of students to integrate the biomedical sciences and case-based learning

Integration of biomedical sciences and internal medicine—A progress report

Critical thinking in pre-clinic

Pre-clinic to clinic calibration

goals of their projects. Twenty-one groups presented updates on their projects, which were grouped under the topical areas of "Curriculum evaluation and modification," "Clinical education/ evaluation," "Evidence-based dentistry and critical thinking," "Problem-based learning," "Competencies," "Portfolios," "Enhanced use of technology in teaching," "Electronic patient records/case-based teaching," and "Curriculum integration." Small group discussions followed the presentations led by each presenting team, allowing the liaisons time to further explore the work going on at other schools and to share their experiences as being "agents of change" at their own institutions.

Liaison groups have since been encouraged to broaden the audience for their work by taking advantage of other opportunities offered through ADEA. Following the meeting, participants were encouraged to submit their work as an abstract for presentation at the 2010 ADEA Annual Session & Exhibit, which was held in Washington, DC, on April 26–March 3. Nearly 20 liaison groups took advantage of this opportunity to share their work with the broader educational community. Liaison groups also have been encouraged to submit presentations summarizing their work for posting on the new ADEA CCI Web site. In keeping with the enhanced use of technology as a means of distributing information, liaison groups also have been encouraged to prepare short video clips in which they describe the goals of their project and to submit those clips for posting on the Web site. Both of these mechanisms to disseminate information have been used by the liaisons from Baylor College of Dentistry, the University of Puerto Rico School of Dentistry, and Marquette University School of Dentistry.

The liaison project at Baylor College of Dentistry, titled "Evidence-based practice at Baylor College of Dentistry: A work in progress," focuses on three aims: (a) to provide instruction and experiences throughout the DDS curriculum to train students in the principles and skills of scientific inquiry and clinical research, (b) to provide additional instruction and experiences for a select group of dental students who wish to engage in clinical or translational dental research as part of their dental academic research careers, and (c) to enhance the educational skills of all Baylor College of Dentistry faculty for teaching students the scientific rationale for the incorporation of new information and technologies into oral health care. Funded through an NIH R-25 "Research in Curriculum" grant, this project includes student and faculty evaluation of the literature, small group teaching activities, faculty development workshops, and teaching opportunities for students interested in academic careers—all focused around the central theme of evidence-based dentistry.

At the University of Puerto Rico (UPR) School of Dentistry, the liaison project is titled "Transformation of a clinical assessment system: Involving all faculty members as stakeholders." This process of transforming the UPR clinical assessment system to one better aligned with the school's competency-based curriculum has been organized according to Kotter's Eight Step Change Model (J. Kotter and H. Rathberger, *Our iceberg is melting,* St. Martin's Press, 2006). This liaison group has demonstrated the successful use of this model in organizing a change process and the importance of involving all faculty members as stakeholders in implementing sustainable institutional change.

"Professional student portfolios" is the topic for the ADEA CCI liaisons at Marquette University School of Dentistry.

The objectives of this initiative are to have students use portfolios to provide snapshots of clinical, research, and service experience, professional growth and development, and promotion of self-directed learning and to serve as a measurement of their growth and development as emerging oral health professionals. Challenges in setting the parameters for this initiative have included issues related to the use of paper versus electronic means of developing the portfolios, what information should be included in the portfolios, and who will provide assessment of the portfolios. The ultimate goal is to have work representing all school competencies as part of this comprehensive assessment tool.

Learning More

To learn more about the exciting work of ADEA CCI liaisons, the reader is encouraged to view both the PowerPoint presentations and the YouTube videos, featuring Dr. Robert Spears from Baylor College of Dentistry, (rspears@bcd.tamhsc.edu), Dr. Lidia Guerrero (lidia.guerrero@upr.edu) from the University of Puerto Rico School of Dentistry, and Dr. Gary Stafford (gary.stafford@marquette.edu) from Marquette University School of Dentistry, on the ADEA CCI Web site.

In addition to having access to the ADEA CCI Web site, the special programs at annual sessions, and the summer meetings, ADEA CCI liaisons have a listserv available specifically for their group. This serves as yet another way in which liaisons from different schools can communicate with each other. They are encouraged to raise questions, discuss issues and share ideas with their colleagues through the listserv. Recent topics of interest have included the development of electronic curriculum management tools and the establishment of peer groups for evaluation of teaching. The listserv also provides an easy way for ADEA staff to communicate with the liaisons, and it has led to enhanced communication for all involved.

During the next year the liaisons will have an opportunity to learn strategies for further enhancing the teaching and learning at their institution. Along with the ADEA CCI Oversight Committee, they will begin exploring the question of what will the dental profession and academic dentistry look like in ten years. This exploration will help develop a new set of strategies for helping to support and lead change and innovation in dental education. In addition to this future environmental scan, the liaisons will be assisted in working more with the academic leaders at their institutions; associate and academic deans. The next level of change requires moving leadership from support to action in a variety of ways. This will vary from institution to institution. Through the liaisons, the ADEA CCI can assist schools in analyzing and strategizing the change that is most appropriate. ∎

Keeping Up-to-Date

The San Antonio CATs Initiative

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Abstract

There is evidence from medicine that schools and practitioners are slow to adopt new and proven effective treatments while marketing efforts lead practitioners to too quickly adopt unproven modalities. To address these problems, the dental school at the University of Texas Health Sciences Center at San Antonio, has developed a program designed to teach students, faculty, and practitioners the skills of accessing the literature as an intrinsic part of treatment. The Critically Appraised Topics (CATs) program is described and evidence is presented showing that participants can be taught to prepare high-quality summaries of the literature pertinent to clinical problems.

One of the most significant challenges facing healthcare providers today is the problem of keeping up-to-date. Oral health knowledge is increasing exponentially (Figure 1), and although there is increased specialization, it is more and more difficult to keep up-to-date in any field. In addition, the useful half-life of bio-medical knowledge, the time until half the knowledge in a field becomes obsolete or disproven, is only a few years. The result is that a great percentage of the knowledge gained in dental school is out-dated after only a few years in practice.

The problem of keeping up-to-date has been studied extensively in medicine. The results raise serious concerns. A systematic review of research dealing with time in practice and quality of care (Choudhry et al, 2005) concluded, "Physicians who have been in practice for more years and older physicians possess less factual knowledge, are less likely to adhere to appropriate standards of care, and may also have poorer patient outcomes." Over one-half (52%) of the 62 studies reviewed found decreasing performance on all outcomes assessed. Similar trends are likely to be found in dentistry.

Estimates on the delay in adoption of new knowledge are also of concern. Balas and Boren (2000) reported in their review that the delay in adoption of new biomedical knowledge averaged 17 years. Ironically, some new technologies and procedures of questionable benefit to the patient are very rapidly adopted. The aggressive marketing of products and concepts not adequately tested magnifies the problem of keeping up-to-date.

The explosion of new knowledge and short half-life of existing biomedical knowledge also has serious implications for dental education. To keep up-to-date, we estimate that approximately one-half of the clinical curricula of a dental school would need to be changed every seven to ten years. There is evidence that dental schools are not keeping up. For example, Klasser and Greene (2007) reported that 23% of the 53 United States and Canadian dental schools surveyed continued to endorse occlusal adjustment for prevention and treatment of TMD despite opposing conclusions presented in three review articles and despite the conclusions of a 2003 *Cochrane Systematic Review* (Koh & Robinson, 2003) which stated, "Occlusal adjustment cannot be recommended for the management or prevention of TMD." Given the rapid development of new knowledge and short half-life in all areas of dentistry, it is likely that much of the curricula of many schools may not be current.

In summary, there is evidence that the explosion of new knowledge and the turnover of knowledge have exceeded the capacity of current science transfer mechanisms. Both practitioners and dental schools are facing serious challenges in their efforts to keep up-to-date. New models of education and science transfer must be explored to address the situation, which is projected to worsen with the continued exponential growth of new knowledge and products.

A Possible Solution

In response to the explosion of new knowledge and products, many practitioners have transitioned to an active, information-seeking approach to guide their continuing education. Rather than diligently reading three or four journals cover to cover each month, many use the needs of their patients to shape continuing education efforts. Written "problem lists" generated during patient contact are used to focus their limited self-improvement time to specific problems relevant to their unique patient population. This active searching for targeted information is in sharp contrast to the traditional passive reading of journals. Thus, keeping up-to-date involves a transition from a relatively passive updating of knowledge and skills to an active, learner-directed seeking of targeted information relevant to the practitioner's unique patient population, e.g., "just-in-time learning." This strategy is being incorporated in medicine as a solution to remaining current in light of

Figure 1. Increase in oral health knowledge is changing our ability to keep up-to-date

Articles retrieved by a PubMed search using the MeSH subject heading "dentistry" per decade from 1940 through 2009.
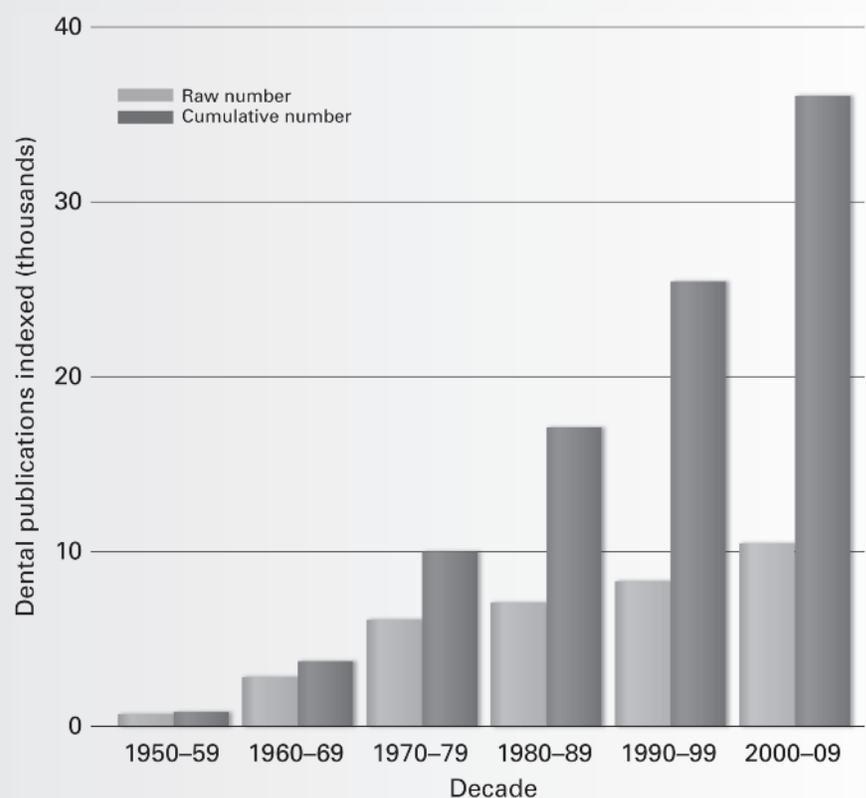
the explosion of new knowledge and products (Ebell & Shaughnessy, 2003; Harden, 2005). The "just-in-time learning" strategy is at the core of the new educational initiative at The University of Texas Health Science Center Dental School (UTHSCSA).

Figure 2. Elements of the UTHSCSA CATs initiative
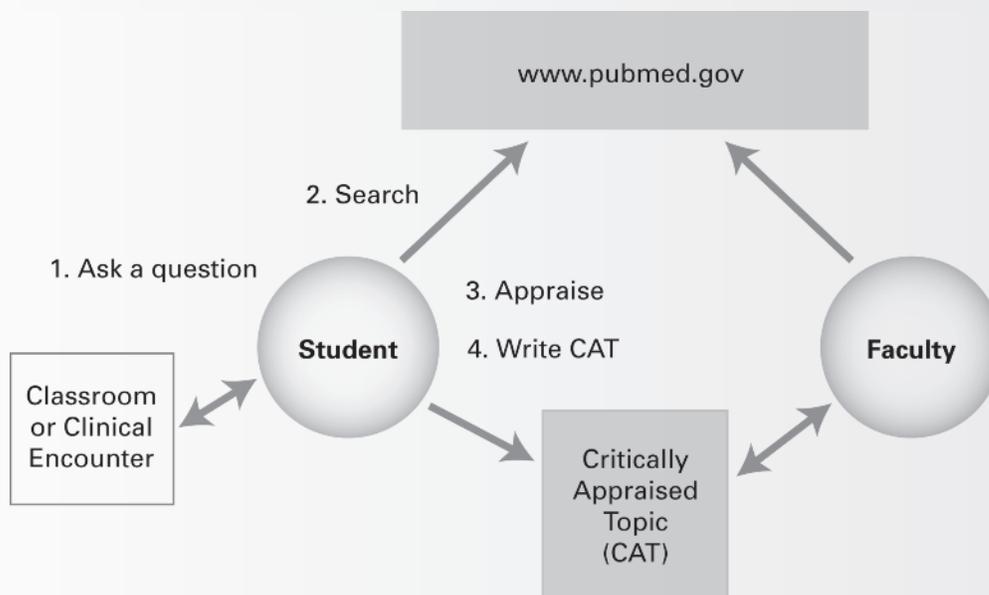
Figure 2. Elements of the UTHSCSA CATs initiative

The San Antonio CATs Initiative

The UTHSCSA recognized the need for new learning approaches and implemented an innovative education program to address the problem of keeping up-to-date. The overarching aim is to teach lifelong learning and critical thinking skills that students can apply during their 30-40 years of practice life. The approach involves the collaborative student and faculty preparation of Critically Appraised Topics (CATs) and the establishment of a searchable online database of these CATs (CATs Library). The approach was adapted from medical education where it has been used to foster evidence-based practice (Sackett et al, 2000). The strength of the approach is its practicality in the classroom and the clinic. The program is built upon well-established information technology and education research programs already in place at San Antonio. The implementation and systematic assessment of this program was made possible by a four-year NIH/NIDCR R25 Education Research Grant.

The key elements of our CATs initiative are diagrammed in Figure 2.

It provides a mechanism whereby the faculty, dental students, and specialty residents collaborate on the common task of establishing the best possible answers to clinically relevant questions. We revised the predoctoral and advanced education residency core curricula to include in-depth instruction on evidence-based practice (EBP) skills and competency in preparation of CATs. We teach the basic skills in the freshman and sophomore years and in the first year of our residency programs. Our 18-hour sophomore Evidence-Based Practice course provides students with the skills necessary to keep up-to-date and critically evaluate new knowledge, products, and procedures during their professional careers. These skills include the ability to (a) formulate focused questions; (b) search the literature; (c) critically read and evaluate various sources of evidence, including articles published in the dental and medical literature, advertisements, Internet sources, and information presented in continuing

education programs; and (d) make judgments about the applicability of the knowledge to one's patient or problem. These four skills are taught, practiced, and evaluated in the context of the students' primary objective in the course: learning how to write CATs.

We also established CATs exercises in several clinical didactic courses and in the junior and senior clinical care activities, as well as in the residency core courses. In their systematic review, Coomarasamy and Khan (2004) noted that a clear distinction could be drawn between successful and unsuccessful EBP programs in terms of whether the training is provided in a stand-alone, classroom-based format or is integrated into the clinic setting. Stand-alone programs led to short-term changes in knowledge but no change in attitudes, skills, or behavior. On the other hand, programs that integrated the instruction into the clinic routine were successful in achieving sustained effects. Based upon these findings, we designed our CATs initiative to be an integral part of the students' clinical experience.

Critical to the initiative is the training of clinical, basic, and behavioral science faculty in EBP and CAT preparation skills. Over 80% of the faculty has received training, and 60 faculty now supervise the development of CATs by students. Twenty course directors made commitments for CATs assignments in 26 clinical courses. Experienced educators will recognize that this level of commitment from so many clinical course directors is highly unusual and clearly demonstrates the widespread institutional commitment and enthusiasm for this innovative educational reform.

CATs Online

Library CATs with high clinical relevance are published in the online CATs library to promote the transfer of new knowledge to other students, faculty, private practitioners, and ultimately the public. This online library provides users with rapid up-to-date evidence-based answers to focused clinical questions. The library is searchable by keywords and is accessible in the clinics and classrooms. We anticipate that approximately 500 CATs will be created and believe that these will contain the most frequent and clinically relevant questions because they are based upon day-to-day clinical problems seen in the dental school and private practice clinics.

As new diagnostic and treatment modalities emerge, we will publish new CATs. The individual CATs will be continuously updated. CATs will be reassigned to students to be rewritten in light of recent publications and practice guidelines. The updated CATs will go through the same approval process as the original CATs to ensure that they are based on the best available and most recent evidence.

Our CATs Library is modeled after the online medical CAT libraries. Practitioners should be aware of and make use of the BestBETs emergency medicine CATs library (http://www.bestbets.org).

FAST CATs Academic Detailing Program

An exciting component of our CATs initiative is the Faculty, Alumni and Student Team (FAST CATs) program. This academic detailing program involves private practice dentists in the CATs program. Twenty dental students participate each summer in an elective course, which involves writing a CAT with a faculty mentor and then visiting five dental offices to discuss and obtain comments on the CAT. Practitioners are asked to comment on the practicality

There is evidence that the explosion of new knowledge and the turnover of knowledge have exceeded the capacity of current science transfer mechanisms.

and efficacy of the new diagnostic and treatment modalities that are the focus of the CATs. The practitioner receives one hour of CE credit for review and comments on the CAT. To date, 39 students have visited 147 dental offices. The program has received very enthusiastic ratings from both students and alumni. The dental students particularly enjoyed visiting dental offices in their hometowns.

Outcome Assessments

What is the evidence that the San Antonio CATs initiative will positively impact the students' patient care behaviors when they get into practice? There are ample self-report data to indicate that medical practitioners believe that facilitating access to clinical research influences their treatment decisions and impacts patient care in a positive way. For example, faculty physicians and medical students in an emergency medicine department who received training and easy access to online searches reported a change in 18% of their clinical decisions (Langdorf et al, 1995). In another study, faculty, and resident physicians who received training and easy access to GRATEFUL MED software dramatically increased their literature searches and cited references in their patients' charts. At the end of the study, the physicians reported that 47% of their searches affected their clinical decisions, 37% of the searches confirmed clinical decisions, 9% resulted in new clinical decisions, and 7% resulted in changed treatment decisions (Haynes et al, 1990). To determine how quickly information could be accessed and how useful it could be

on a busy general medicine unit, Sackett and Straus (1998) provided an "Evidence Cart" that could be accessed during rounds. The cart contained various sources of information including CATs. The investigators showed that the evidence could be accessed quickly (10–25 seconds) and put to good use. Of 71 successful searches during the study interval, 52% confirmed a diagnosis or treatment plan; 25% led to a new diagnostic skill, ordering an additional test, or a new patient management decision; and 23% led to correction of a previous clinical skill, diagnostic test selection, or treatment decision. Ten percent of the searches were unsuccessful; and these led to "educational prescriptions" for students to search the literature, appraise the evidence, and write a new CAT on the topic.

These studies support our hypothesis that learning to quickly access and evaluate clinical research is welcomed by clinicians and will have a positive impact on their patient care activities, even in a busy clinic. Based upon this finding, our CATs initiative provides our dental students with online access to the biomedical literature and searchable chairside CATs library in the clinic. As the CATs library is populated, students, dental faculty, and private practitioners will have ready access to an additional source of sound answers to clinical questions.

Although the ultimate outcome of the CATs initiative is the extent to which students use critically appraised evidence to guide patient care in practice, we developed several measures to assess how well EBP concepts are connecting with faculty and students. A primary measure is quality of the CATs written by students during the final exam for the EBP course and the EBP rotation. We compare students' CATs from year to year and have observed more sophistication as students and faculty gain experience. We developed a 35-item questionnaire to measure EBP knowledge,

attitudes, evidence accessing strategies, and confidence in critical appraisal before and after training. This instrument is the EBP KACE (Knowledge, Attitudes, Accessing, Confidence Evaluation). With the KACE, we learned that comprehension of EBP concepts, attitudes, and confidence improved substantially among students, residents, and faculty who received training. Our senior students also develop and present critically appraised patients in case conferences, which allows us to assess their capacity to search for and appraise research evidence.

Summary

The overarching goal of this new educational program is to enhance the oral health of the population by strengthening the integration of oral health sciences and scholarship in dental education and private practice. We believe that exposure of students, residents, faculty, and private practitioners to the scholarship and critical thinking skills involved in CATs preparations will provide the skills to facilitate keeping up-to-date with the massive amount of new information. The "just-in-time learning" strategy focusing on the needs of their patients is key to dealing with the explosion of new knowledge and products. We also believe that the CATs program may serve to recruit more trainees into our research training programs, which seek to generate new oral health academicians. ■

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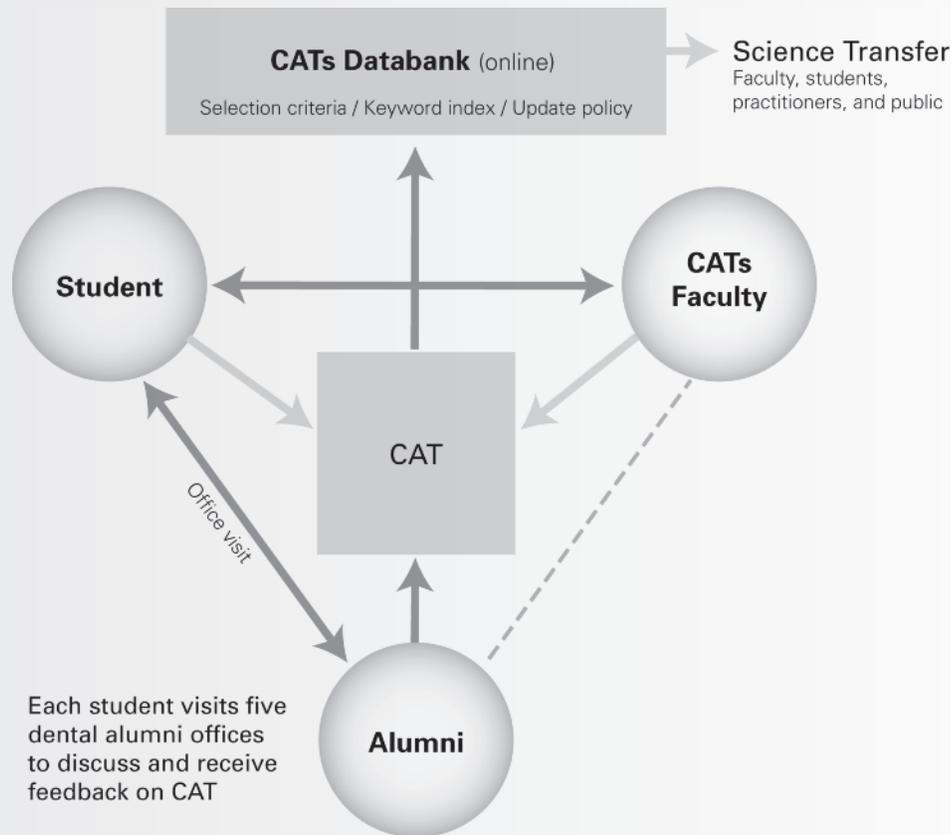
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Portfolio Assessment

An Assessment Strategy Whose Time Has Come for Documenting Competency in Dental Education and Beyond

Cynthia C. Gadbury-Amyot, MSDH, EdD

Abstract

The Institute of Medicine report on dental education in the mid-1990s called specific attention to the need for authentic assessment of student progress and outcomes. This corresponded with the advent of competency-based dental education, resulting in recognition of the need for new methods to assess dental students knowledge, skills, and values in the context of beginning independent dental practice. The portfolio approach to assessment uses a rich collection of cumulative evidence from multiple sources in ways that address this need. Because students take some responsibility for maintaining their portfolios, the competency of reflective critical thinking can also be assessed by means of portfolios.

Several reports written over the past two decades have called for a change in dental education (Field, 1995; Pyle et al, 2006; Tedesco, 1995). This paper will focus on the role of assessment in dental education and more specifically on the use of authentic assessment in the form of portfolios for documenting student competency. The author will start with a review of events that have lead dental education to think about nontraditional forms of assessment followed by an examination of how portfolio assessment, as one form of non-traditional assessment, could take dental education "beyond the crossroads" of change.

In 1995 the Institute of Medicine (IOM) published a report, *Dental Education at the Crossroads: Challenges and Change*. This landmark report was written following an independent evaluation of dental education and called for change in the way we educate oral healthcare providers. While there were several recommendations that flowed from this report, the one pertinent to this paper was the call for alternative models of education, practice, and especially assessment. Specifically, improvements in the methods of assessing educational outcomes and professional competence were identified as central to improving dental education and ensuring competency for licensure, assessment of continued competence, and institutional accreditation (Field & Jeffcoat, 1995). In light of this call for

change the report acknowledged there has been an overall historical resistance to change in dental education.

Dental education participates in professional accreditation through the American Dental Association Commission on Dental Accreditation (CODA). The stated goals of CODA are: (a) to foster educational excellence, (b) to support programmatic self-improvement, and (c) to assure the general public of the ongoing availability of quality dental care (Commission on Dental Accreditation, 2009). The commission receives its accreditation authority through recognition by the United States Department of Education (USDE). The USDE in turn establishes recognition requirements that an accrediting agency must meet in order to be recognized. Of particular importance to institutions of higher education is that eligibility for federal funding is linked to recognition by the USDE.

Looking back, the last decade of the twentieth century can be seen as the beginning of an era of assessment and accountability for higher education. In the fall of 1988, then Secretary of Education William Bennett issued an executive order requiring all federally approved accreditation organizations to include in their criteria for accreditation evidence of institutional outcomes. Secretary Bennett's executive order

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specifically held higher education institutions accountable to accrediting bodies for producing and documenting outcomes. Following Secretary Bennett's executive order states jumped into the assessment and accountability debate and by the mid-1990s there began to be shifts in state focus and formula funding from input (number of students, library holdings, etc.) to output (number of graduates, average time to graduation, etc.). One measure of outcome or output which received considerable attention in education was student competence.

Assessment of Competency

In response to the IOM report and in conjunction with the educational reform initiatives outlined above, CODA adopted standards for a competency-based curriculum for dentistry in 1998 and dental hygiene in 2000. The revised standards included the provision that competencies be developed for all aspects of the program as well as outcomes assessment that would track attainment of the competencies. The issue of competency and defining what competency means has been written about extensively. Specific to dentistry, a series of articles was published to define and unpack exactly what was meant by competency (Chambers, 1994; 1995; 1996; Glassman & Chambers, 1998) . These authors define competency as the skills, under-standing, and professional values of an individual ready for beginning inde-pendent dental or allied oral healthcare practice. Additionally, the competent individual is able to apply critical think-ing and problem-solving skills to today's complex healthcare environment. With this definition as a starting point it became apparent that educators would be accountable for effective teaching and learning strategies to encourage and develop critical-thinking and problem-solving skills. Not only must we incorporate teaching strategies to promote critical thinking and problem solving into the educational curricula but we also must find effective methods for evaluating critical thinking, problem solving, and ultimately competency. In the context of the previous outline of national initiatives pushing for change in higher education, the next portion of this paper will address a national response from within dental education for change.

Fast forward to 2005 when the American Dental Education Association (ADEA) formed the ADEA Commission on Change and Innovation in Dental Education (ADEA CCI). The formation of the ADEA CCI was in response to repeated calls for curricular reform and innovation in dental education that did not seem to be happening with any coordinated effort across the United States. A series of white papers was commissioned to address critical considerations in curric-ular innovation (American Dental Education Association, 2009). While eight core principles were proposed by ADEA CCI as integral to shaping the

> Portfolios based on programmatic competencies contain evidence that demonstrates the student's progress toward and attainment of competency.

> Student reflection is the ultimate demonstration of critical thinking and problem solving as students analyze and assess what these examples of evidence mean in terms of developing competency.

dental education environment, two are particularly pertinent to this paper: (a) the importance of dental education operating in an environment that promotes critical thinking and problem solving by developing "self-directed, self-disciplined, self-aware, and self-corrective learners" (Haden et al, 2006); and (b) the importance of dental education promoting self-assessment, as this has been shown to lead to critical thinking and problem solving.

Chambers (1995) states that one of the hallmark characteristics of a competent individual is the capacity for accurate self-assessment. Self-assessment requires students to take responsibility for their own learning by identifying what they know and do not know and solve problems in ways that address knowledge gaps. If we are to graduate competent dental and dental hygiene students, there should be opportunities throughout the curriculum for students to develop self-assessment. However, a paradigm shift will be required to achieve the kind of environment in dental education that is described above. To begin with, taking responsibility for one's own learning is largely atypical in American education today. Instead, students frequently do only what they need to get by to "pass the test" or "pass the course," while instructors coerce them with the threat of poor grades. Further, traditional pedagogy or teaching in dental education focuses on the ability of students to memorize facts, further reinforcing an environment of dependency—dependence on the teacher to impart information while deemphasizing the responsibility of the students to learn on their own.

Dr. Vimla Patel (2009) has studied clinical reasoning and decision-making processes in health professions education for over 25 years. Patel's findings inform us about best practices for education that promote critical thinking and problem solving which include:

- In-class activity such as writing notes, analyzing problems, or reviewing cases that provide opportunities to apply information being learned
- Use of questions by instructors that require students to analyze problem etiology, compare alternative approaches, provide rationales for plans of action, and predict outcomes
- Frequent in-class quizzing with immediate feedback on response correctness
- Prospective simulations in which students perform decision making for structured and ill-structured problems
- Retrospective critique of cases in which decisions are reviewed to identify errors as well as exemplary performance
- Writing assignments that request students to analyze problems and discuss alternative theories about etiology, compare solutions, and defend decisions about proposed actions
- Analyzing work products to compare how outcomes correspond to the best practice standards, including comparisons of the results of students' reasoning about problems to those of experts

So how do we capture and document these examples of critical thinking, problem solving, and self-directed learning that ultimately demonstrate competence at the end of dental education? In competency-based education, appraisal of competency has been outlined as assessing students' overall competence, or the capacity to "put it all together," defined as "general competence," versus focusing on individual skills, known as component competencies, which are often taught and evaluated in isolation in the disciplinary silos of the curriculum; and employing multiple data

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sources based on the principle of triangulation (Lockyer, 2003; Pottinger, 1975). Students' performance can therefore best be assessed as they produce work of their own in an environment that resembles real life, using a repertoire of knowledge and skills. Research has affirmed that the evaluation of competency is best attained through the use of authentic evaluation/assessment (Chambers & Glassman, 1997; Wiggins, 1993) .

Portfolios for Cumulative Assessment of Critical Reflection

The use of portfolios is an example of an authentic assessment measure where students are required to document their learning by providing evidence to support claims of skill acquisition.

Portfolios are focused, purposeful collections of student work that document evidence of student learning, progress, and achievement over time. Because they contain longitudinal information, portfolios can be evaluated for degree of improvement (formative assessment) as well as for overall quality (summative assessment). Eraut, in *Professional Knowledge and Competence* (1994), states "Professional competence is more than a demonstration of isolated competencies. When we see the whole, we see its parts differently than when we see them in isolation." Miller (1990), who also has written extensively about assessment in the health sciences, asserts that the collective wisdom of the faculty members who have consistent opportunities to observe and interact with the student is the essential core of performance assessment. Portfolios can provide the venue for capturing this "collective wisdom." Portfolios based on programmatic competencies contain evidence that demonstrates the student's progress toward and attainment of

competency, including longitudinal documentation of patient care, performance on competency exams, case presentations, literature reviews, reports, formative evaluations, and formal performance reviews by supervising faculty. Most importantly, the student's own appraisal, self assessment, and reflection on their performance including needed improvements, lessons learned, and insights about dentistry or the learning process makes known the effectiveness of educational principles and pedagogical practices within dental education. Student reflection is the ultimate demonstration of critical thinking and problem solving as students analyze and assess what these examples of evidence mean in terms of developing competency. Self-reflection requires analysis and synthesis of thought and action, encouraging active involvement and a sense of ownership in the development of the portfolio and of one's own learning.

Although portfolio use dates back to the 1940s in the field of education, the use of portfolios in health science education is a relatively recent phenomenon. Increasingly, health science education and professions have recognized the utility of portfolios for documenting overall general competency. The 2006 accreditation standards for U.S. professional programs in pharmacy stipulate use of portfolios as a principal technique to measure students' attainment of competencies for the doctor of pharmacy degree. Doctoral programs are increasingly turning to portfolios to replace qualifying exams (Wasley, 2008). Even in dentistry, the idea of replacing clinical licensure exams with portfolios has been advocated due to the many ethical dilemmas surrounding clinical licensure exams (Chambers et al, 2004; Gadbury-Amyot et al, 2005; Ranney et al, 2004) .

The preceding narrative has provided background as to the rationale for adoption of portfolios as an assessment measure whose time has come in

dentistry. To date, the dental education literature is devoid of research on portfolio assessment of competency other than that published by this author. Gadbury-Amyot's body of research has been able to demonstrate the validity and reliability of portfolio assessment of competency in a dental hygiene education environment (Gadbury-Amyot et al, 2004). In concert with research related to portfolio and performance assessment outside of dentistry, it was found that dental hygiene educators could obtain high inter-rater reliability when it comes to the grading and evaluation of portfolios. Using Messick's unified framework of construct validity to validate performance assessment in the form of portfolios, a strong case for validity was described through both theoretical and empirical evidence.

Thus far, clinical licensure exams have not been shown to be a reliable or valid measure of student success. Yet in spite of the evidence, dentistry continues to support this unscientific approach for gaining entry into the profession. In a study conducted by this author, a disconcerting lack of concordance was found between four validated measures of dental hygiene student competency (overall GPA, Clinic GPA, National Board Exams, and portfolios) and clinical licensure examination scores (Gadbury-Amyot et al, 2005).

Portfolio assessment today also has the advantage of advances in technology. Several methods for developing electronic portfolios, more commonly referred to as "e-portfolios," are present. It is not surprising that the major obstacle to successful implementation of Web-based electronic portfolios is not student readiness, rather the unwillingness of faculty to participate (Gathercoal et al, 2002).

"We have met the enemy…and he is us!" The e-portfolio allows for incorporation of all types of files and formats, including graphics, sound, digital video, text, and other presentation media. The possibilities are virtually limitless when it comes to ways for documenting competency that fit with the way in which the "net generation," the generation that comprises the majority of our student population today, expresses themselves through technology.

Change is a difficult thing and dental education has not been known as an agent for change. However, in the complex healthcare environment where students and graduates now find themselves working, they must develop and rely on critical thinking and problem solving skills in order to successfully navigate and secure their place in the overall healthcare arena. The one thing that is certain in life is change. We can choose to change or become obsolete. It is this author's hope that dental education is paying attention to the national initiatives outlined in this paper. ∎

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Changes in Dental School Curricula, 2003-2009

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Abstract

This 2009 study of dental school curricula follows a similar one conducted in 2002-2003. Through a Web-based survey, the authors gathered information from dental schools about: (a) trends in curricular change over seven years; (b) changes underway in dental school curricula; (c) significant challenges to curricular innovation; and (d) projected trends in curricular change and innovation. In a significant change from the 2002-2003 study, a high proportion (91%) of the responding schools require community-based patient care by all students, with just over one-half ot them requiring five or more weeks of such experience. Respondents reported that priorities for future curriculum modification included: creating interdisciplinary curricula that are organized around themes, blending the basic and clinical sciences, provision of some elements of core curriculum in an online format, developing new techniques for assessing competency, and increasing collaborations with other health professions schools. Respondents identified training for new faculty members in teaching skills, curriculum design, and assessment methods as the most critical need to support future innovation.

The first decade of the new millennium has included a number of changes to the way dental schools educate students to enter the practice of general dentistry. At the same time, many aspects of dental curricula have remained relatively unchanged for decades. In the spring of 2009, the American Dental Education Association (ADEA), in collaboration with the Academy for Academic Leadership (AAL), conducted the Dental School Curriculum Format and Innovations Survey in an effort to ascertain trends in curricular change. The survey was based on a comprehensive study of dental school curriculum in 2002-03 conducted by a subset of the authors of this paper and supported by ADEA and the Fund for Improvement of Post-Secondary Education (Kassebaum et al, 2004). This article is an abridged report of the survey findings. A more extensive report is forthcoming in the August 2010 *Journal of Dental Education.*

Methods

The authors used a 25-item survey about the format and characteristics of the dental school curriculum at North American dental schools to collect the data reported in this paper. In April 2009, one of the authors (NKH) sent an e-mail request to all associate deans for academic affairs in dental schools in the United States and Canada asking them to complete the survey. The survey collected the following background information from the respondents: name of school, title or position held by the respondent, and the option to submit one's name. In addition to background information, the survey requested information in four areas: (a) curriculum format; (b) curriculum assessment; (c) curriculum innovation; and (d) resources needed for curriculum enhancement. Fifty-five schools returned answers to the survey for a response rate of 86%. Of those, 50 were United States dental schools and five were Canadian dental schools.

Key Findings

Curriculum Format

The initial series of questions asked respondents to characterize the organizational structure of their school's curriculum. Forty-nine percent of the respondents defined their curriculum format as primarily organized according to disciplinary boundaries, with a few courses taught by interdisciplinary

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Figure 1. Extent of overall predoctoral curriculum integration

Percent of responses, N = 55 dental schools

Curriculum is organized according to basic science and clinical disciplines with no interdisciplinary courses

A few courses are taught in an interdisciplinary format but most of the curriculum is organized according to disciplinary boundaries

At least on major section of the curriculum is organized around a theme of interrelated topics taught by interdisciplinary faculty teams

Entire curriculum is organized around themes (tracks) of interrelated topics taught by interdisciplinary faculty teams

0 10 20 30 40 50 60

Figure 2. Extent of basic science curriculum integration

Percent of responses, N = 55 dental schools

Primarily interdisciplinary with a few purely discipline-based courses

Equally divided between discipline-based and interdisciplinary courses

Primarily discipline-based with a few interdisciplinary components

Primarily discipline-based (i.e., departmentally-based)

0 5 10 15 20 25 30 35 40 45 50

Figure 3. Organization of the clinical sciences curriculum

Percent of responses, N = 55 dental schools

Almost completely interdisciplinary

Equally divided between discipline-based and interdisciplinary

Primarily discipline-based with a few interdisciplinary components

Entirely discipline-based

0 10 20 30 40 50 60
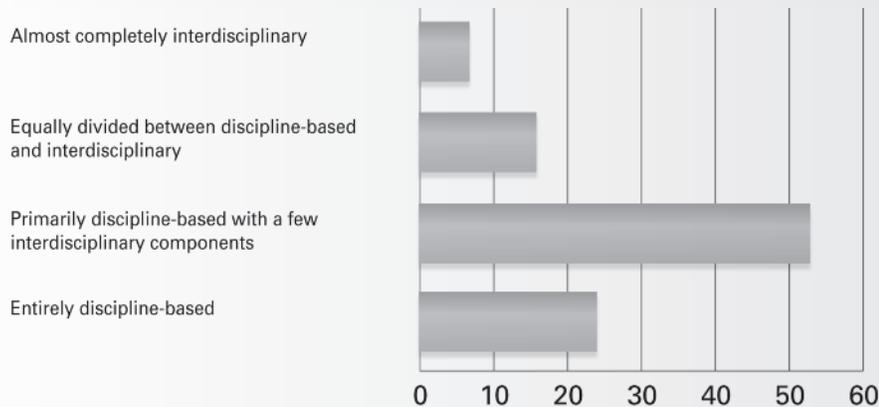
teams (Figure 1). Similarly, 47% indicated that their basic science curriculum was primarily discipline-based with a few interdisciplinary components (Figure 2). The majority of schools (53%) responded that the clinical sciences curriculum was primarily discipline-based with a few interdisciplinary components (Figure 3). Nonetheless, in just over half of the responding schools, the learning experiences in their clinics were based on a general dentistry concept, with competencies in the discipl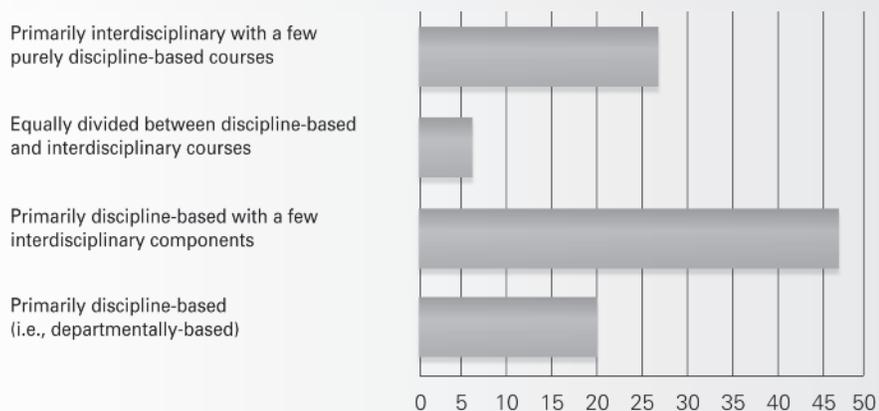ines being acquired in the context of comprehensive patient care (Figure 4). A high proportion (91%) of the responding schools require community-based patient care by all students, with just over half (51%) requiring five or more weeks of such experience. Only one school reported no community-based patient care.

Thirty-five percent of the responding schools indicated that their students participate with other health professions education programs for various portions of their educational experience. A notable exception was that 62% had joint clinical experiences between dental and dental hygiene students. Fewer than one-half of schools have students providing clinical care in community settings in collaboration with other health professions education students.

Respondents were asked for their perspectives on the reasons why their curricula are in their current format, i.e., what factors have been principal influences on the design of the curriculum. The following factors were ranked as "very important" or "important" by more than 55% of respondents: "capacity," the curriculum is perceived to be "do-able" given existing resources (80%); "success," the curriculum "works," graduates do well, and the school's reputation in the community is good (79%); "comfort," of the faculty with the curriculum (76%); "compatibility" with research and service missions (76%); "resources," the curriculum is consistent with available

resources (75%); "tradition," the curriculum reflects long-standing values of the school (70%); "evidence," modeling the curriculum after evidence-based best practices (68%); "fit," the curriculum matches the type of teaching preferred by faculty (59%); "harmony," the current curriculum keeps most departments and faculty happy (57%); and, "familiarity," faculty are experienced with current curriculum and not familiar with other educational models (55%).

Curriculum Assessment Methods

From a list of 20 different data sources, at least 40% of respondents identified five items as "highly important" as methods for assessing the quality of the curriculum: students' performance on final exams and competency exams (68%), educational standards of the Commission on Dental Accreditation (57%), findings of an institutional self-study conducted by the school (56%), pass rates on licensure examinations (53%), and faculty evaluations of the curriculum, i.e., peer review (42%). (Table 1.) Respondents were asked to indicate how students are involved in curriculum evaluation and how data from student evaluations are disseminated and used in the overall assessment process. Most of the responding schools rely heavily on student evaluations. Ninety-one percent of respondents reported that students evaluate all courses, 90% indicated that seniors provide an overall evaluation of the entire curriculum before they graduate, and 89% reported that students evaluate the performance of course directors.

The survey inquired about the most recent "broad-based," comprehensive assessment of the curriculum. Forty-two percent of respondents indicated that their most recent comprehensive curriculum review was conducted in 2009 or is currently underway. Twenty-three percent indicated that curriculum review was most recently performed in 2008.

Figure 4. Organization of students' learning in the clinic
Percent of responses, N = 55 dental schools
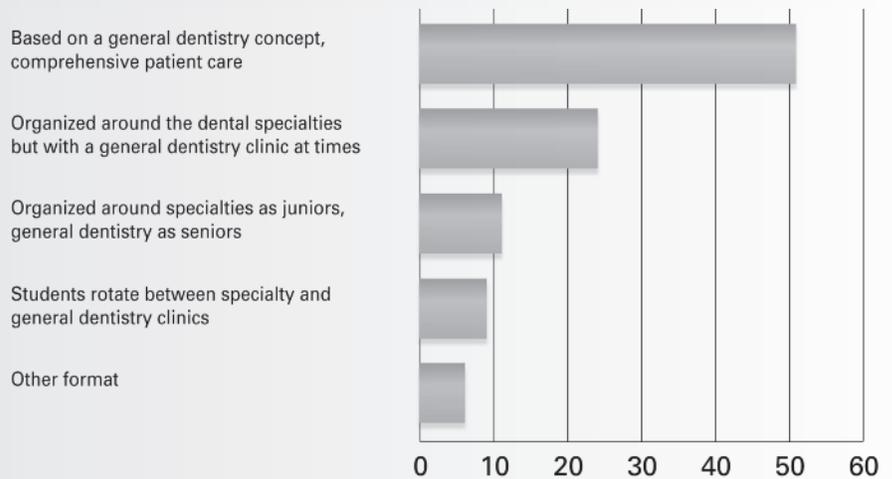
Table 1. Importance of data sources for evaluation of the curriculum
Percent of responses, N = 53 dental schools

Data Source	Highly Important	Important	Marginally Important	Not Important/ Not Used
Student Performance on Exams	68	28	4	0
CODA Educational Standards	57	32	9	2
Institutional Self-Study	56	36	0	8
Licensure Pass Rates	53	34	9	4
Faculty Evaluations	42	40	15	4
National Board Results	38	38	15	9
Students' Evaluations of Courses and Instructors	38	51	9	2
Faculty Opinions	33	60	8	0
Student Performance on Mock Boards	28	43	19	9
Alumni Opinions	26	55	17	2
Student Attrition Rates	25	40	12	23
Community Practitioners' Views	21	57	17	6
Career Choices of Graduates	19	49	17	15
ADEA CCI White Papers	17	38	26	19
% Graduates Admitted to Other Prestigious PG Programs	15	42	26	17
External Consultants	11	43	32	13
% Graduates Admitted to Our Postgraduate Programs	9	47	28	15
Comparison of Courses to NBDE Subject Outlines	9	47	26	17
Comparison to Data in ADA Survey of Dental Education	9	38	40	13
Comparison to Recommendations of National Organizations/Panels	8	50	33	10

Figure 5. Year of most recent comprehensive curriculum review

N dental schools out of 53 responding
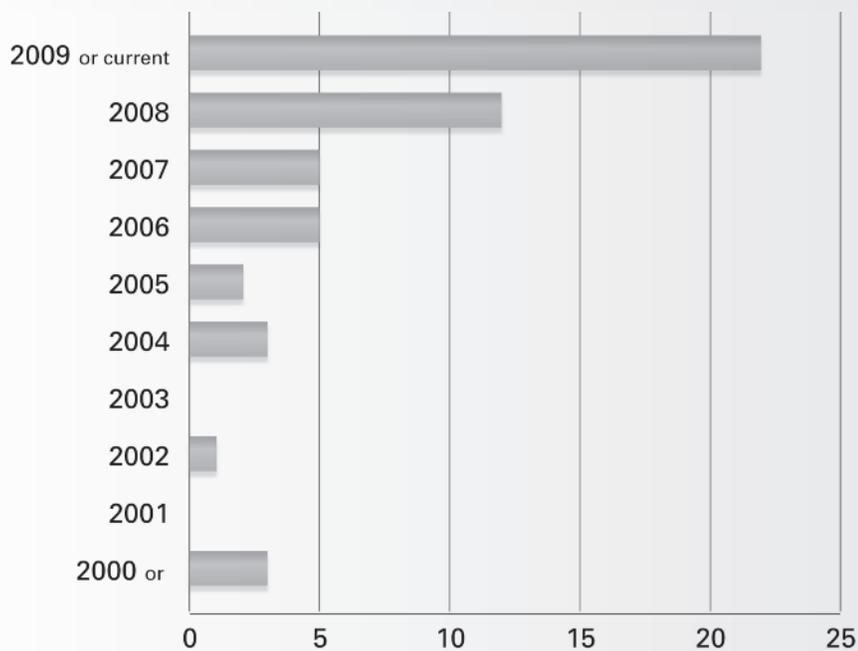
Only four schools indicated that curriculum review had occurred more than five years ago (Figure 5).

Curriculum Innovation

Table 2 displays dental schools' self-reported implementation of various curricular innovations. Among innovations frequently advocated in the dental education literature, the one reported by respondents as most frequently incorporated (64%) was "establishing clinical group practice teams to provide continuity in faculty-student relationships." The second most frequently implemented innovation was "increasing student interaction with patients in the first and second years (51%)," with an additional 42% indicating that this change was currently in planning and soon to be implemented. The innovation selected as "not in our plans" by the highest percentage of respondents (89%) was "establishing articulation agreements where dental students can take designated courses at other schools and transfer credits to our program." Other items that were low priorities for many schools

were: "create an in-school internship of one semester duration to replicate general dentistry environment and assess students' capacity to 'put it all together'" (71%); "implement problem-based learning in substantial sections of the curriculum" (60%); and, "create a readiness-based versus time-based educational program where students move at their own pace through the curriculum based on individual competency" (60%).

Respondents were requested to indicate the factors that triggered curriculum change at their schools. The catalysts for curricular change that were most often selected as "highly important" or "important" were: "findings of a curriculum review we conducted ourselves" (86%); "students' feedback about curriculum" (83%); "educational best practices reported in the literature" (80%); "scientific evidence that needs to be incorporated nto the curriculum" (77%); "expansion of research or service missions which influenced educational mission" (74%); "administration dissatisfaction with curriculum" (72%); and, "faculty dissatisfaction with curriculum" (70%).

Resources Needed for Curriculum Enhancement

Respondents were asked to identify resources necessary to support curriculum innovation at their schools. Professional development for both new and established faculty related to curriculum design, teaching strategies, and assessment methods were identified as "highly important" or "important" by approximately 92% of respondents. Next was expansion of capacity in information technology, with 90% indicating it was "highly important" or "important." At least 70% rated the following resources as "highly important" or "important": budget for planning and testing of curriculum innovations, examples of

innovative curriculum formats from other dental schools, and protected time for faculty to plan curriculum innovations.

Discussion

In the seven years since the 2002-2003 survey, dental schools have been very active in conducting comprehensive curriculum reviews, with all but four of the responding schools indicating that such reviews had occurred since the earlier survey. The time period between the 2002-2003 and 2009 surveys parallels two phenomenon in dental educational nationally: (a) the publication of numerous position and advocacy papers in the literature arguing for curricular reforms and (b) the creation and work of the ADEA Commission on Change and Innovation (2006). The high level of curriculum review in recent years could be a byproduct of these two phenomena, but there is no way to make a causal association. However, one could reasonably anticipate that the 2009 survey would reveal that a fair amount of curriculum change had occurred as a consequence of this review process at dental schools.

Overall, the most striking change was a substantial increase in the proportion of schools (91%, up from 64%) that require some community-based clinical experience. One-half of the responding schools (51%) now require five or more weeks in the community sites. Whereas 41% of responding schools in 2002-2003 either had elective or no community-based experiences, that proportion was down to 6% (three schools) in 2009. This change is consistent with the fact that 53% of the schools reported in 2002-2003 that they intended to increase patient care provided by students at community sites.

Also, there was a decline from 66% to 49% in the proportion of schools that reported a primarily discipline-based curriculum with just a few interdisciplinary courses. While the majority of schools reported a basic science curriculum that was primarily discipline-based

Table 2. Implementation of curriculum innovations

Percent of responses

Innovation	Completed	In Progress	3-Year Priority	Not in Plans	N
Curriculum decompression	28	43	24	4	53
Increase community-based patient care	46	33	19	2	52
Interdisciplinary curriculum around themes	21	19	27	33	52
Blend basic and clinical sciences (diseases then biological principles)	19	17	32	32	53
Organ system model for basic sciences	21	17	11	51	53
Increase interaction with patients in first and second years	51	42	8	0	53
Online core curriculum	18	18	39	25	51
PBL for substantial portions	17	15	8	60	53
Articulation agreements with transfer of credits	2	4	6	89	53
In-school general dentistry internship of one semester	14	6	10	71	52
New techniques for assessing competency, e.g., OSCEs, triple jump, portfolio	30	24	32	13	53
Students move at own pace through the curriculum	9	13	17	60	53
Create dual degree tracks	38	11	15	36	53
More opportunities for student research	47	32	17	4	53
Collaborations with other HPE schools	23	28	26	23	53
Emphasize interactions of oral and systemic disease	43	37	21	0	53
Expand learning of evidence-based practice and critical appraisal of evidence	24	53	21	2	53
Clinical student-faculty group practice teams	64	19	6	12	52
Curricular track selectives	8	9	30	53	53
Increased exposure to academic careers	32	30	26	11	53
Designate courses in basic biological principles as admission requirements	36	9	17	38	53
Develop and assess capacity for critical thinking	28	45	23	4	53

Table 3. Comparison of curricular innovations reported as "already incorporated" in 2002-2003 to 2009 responses as "completed" or "in progress"

Percent of responses: 2002–2003, N = 56 dental schools; 2009, N = 51–53 dental schools

Innovation	2002–03*	2009	Change
Decompress curriculum	79	71	Uncertain
Increase community-based care	50	79	Increased
Increased interaction with patients in first and second years	84	93	Some increase
Articulation agreements	7	6	No change
Better methods for assessing competency	84	54	Uncertain
Students move through curriculum at own pace	36	22	Uncertain
Create dual-degree tracks	27	49	Increased
More opportunity for student research	71	79	Some increase
Collaborations with other HPE schools	55	51	Nothing additional
PBL for substantial portions of curriculum	23	32	Some increase
Evidence-based practice	75	77	No change
Group practice teams	52	64	Some increase

*Kassebaum et al, 2004

(either independent departmental courses with either no or some topic coordination or discipline-based courses followed by organ system pathophysiology), a majority (53%) of the respondents favored an organ system approach. The change from departmental "silo" instruction to interdisciplinary learning experiences has been less marked in the clinical disciplines, apparently both didactically and clinically. Dental specialties remain major factors in the organization of students' learning in the clinic.

Seven years ago, 55% of respondents indicated they had already increased educational collaborations with other health professions schools on their campus. In the 2009 survey, respondents answered in a similar manner with 52%

indicating that such collaborations had already been completed or were in progress. These data suggest that more than half of dental schools have made a commitment to interprofessional education and that this commitment has been in place for a number of years. Forty-three percent of 2009 respondents indicated that their students share patient care in community settings with other health professions education students, and about three-fourths have taken at least some courses with other such students.

Data sources for evaluation of the curriculum remained largely the same and relatively of the same magnitude of importance between the two surveys. The 2009 data indicate that dental schools rely on traditional measures of educational outcomes: student exam performance, CODA standards for educational programs, school-administered self-studies, licensure exam pass rates, national board pass rates, and student and faculty evaluations of the curriculum. Schools place less value, and less frequently use, on a number of other external data sources including the subject matter (topic specification) outlines for the national board examinations, the national curriculum database reported in the *ADA Survey of Dental Education,* and recommendations published by national organizations and educational panels and commissions.

Students' evaluations of courses and teachers were not addressed in the 2002-03 survey, but the current survey revealed that 90% of schools have students evaluate all courses as they move through the predoctoral program and ask seniors to evaluate the overall curriculum prior to their graduation. The extent to which these evaluations influence curricular change could not be assessed in the survey, but 89% of respondents indicated that student evaluations are critical data sources for curriculum assessment, so one can assume that they are important.

Table 3 summarizes findings of curricular innovations "already incorporated" in 2002-03 to "completed" or "in progress" in 2009. One might argue that the innovations addressed in this and the earlier survey represent process issues more than fundamental reform. For instance the following components have been core features of predoctoral dental education for nearly 90 years: a four-year time frame; students attend full-time; students are primarily educated in one on-campus facility typically located at an urban university or academic health center; virtually all dental students complete an 800-hour basic science curriculum without individualization based on their predental school education; students receive the bulk of the clinical education in an on-campus dental clinic; and all students proceed through a lock-step progression completing the same courses in the same sequence without individualization. Sixty-percent of respondents do not plan to allow students to move through the curriculum at an individualized pace, based on readiness, although this is a fundamental principle of competency-based education.

Several factors seemed to be much more important as catalysts for changing the curriculum in 2009 than they were in 2002-03. These included: an internal curriculum review, student feedback, administrative dissatisfaction with the curriculum, and similar faculty dissatisfaction. Not mentioned in the 2002-03 survey, new scientific evidence was also an important catalyst for curricular innovation. Also, half of the schools reported the new ADEA competencies (American Dental Education Association, 2007), which had not been published prior to the earlier survey, as an important catalyst. Notably, the primary reasons cited for the nature of current curriculum were related to "compatibility with faculty preferences," "faculty comfort," and "capacity/feasibility."

For the future, responding schools indicated the following activities as the highest priorities for the next three years: to create interdisciplinary curriculum around themes; to blend basic and clinical sciences, implement an online core curriculum; to develop new techniques for assessing competency; to collaborate with other health professions education schools; and to establish selective course offerings to augment the curriculum. Essentially all of the resources and actions that were listed in both surveys were identified as important by a higher percentage of respondents in 2009 than in 2002-03 (professional development, information technology, increased budgets for planning and testing curricular change, examples of curricular changes, and protected time for faculty). This may be due in part to reductions in both faculty size and budget that schools have experienced in recent years (Okwuje et al, 2009). It may also reflect greater perceived urgency for curricular change. The respondents viewed faculty development and expansion of information technology capability as the greatest resource needs to support curriculum change.

Conclusions

- In the past seven years, dental schools have been very active in reviewing and modifying their curricula.
- The largest change was the increased proportion of schools requiring community-based experiences for students.
- There was an increase in interdisciplinary courses, especially in the basic sciences.
- Evaluation of curricula and their components by students is widely practiced in dental schools.

- The top priorities for future curriculum modification, at schools that have not already implemented these changes, are: interdisciplinary curriculum around themes, blending of basic and clinical sciences, online core curriculum, new techniques for assessing competency, and collaborations with other health professions education schools.
- The greatest resource need for additional curriculum revision is development of faculty skills in teaching strategies, curriculum design and assessment techniques.

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Fast Forward Five Years: Has Dental Education Changed?

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Abstract

Five years ago, the American Dental Education Association created the Commission on Change and Innovation in Dental Education (ADEA CCI). Much positive movement in dental education has occurred since the CCI's inception. This paper reviews some of the initial change motivation and assesses the progress to date, taking note of unresolved issues that remain.

In 2005, at the initiation of leadership in the American Dental Education Association, a visionary project began to examine the future of dental educational processes. The Commission on Change and Innovation in Dental Education (ADEA CCI) was created to consider the landscape of dental education and how it should progress for the future (Kalkwarf et al, 2005). A strategy was outlined for initiating "meaningful, systemic change in dental education."

Thoughtful reflection on why the profession should consider this project and why the time was right to do it led to the first in a series of papers, the *ADEA CCI Series* (Hendricson, 2009). At the outset and over the last five years, the rationale for imperatives to consider changes needed in dental education were articulated and bound by ADEA in the monograph, *Beyond the Crossroads: Change and Innovation in Dental Education* (American Dental Education Association, 2009). The title refers to the important 1995 Institute of Medicine report, *Dental Education at the Crossroads*, which reported the need to encourage progress toward curriculum goals long endorsed in dental education and the preparation of future practitioners (Field, 1995). It is time to consider what, if anything, has changed in the ensuing five years.

In the second article in the CCI series, the case for change in dental education was discussed (Pyle et al, 2006). Important questions were asked: Is there a crisis that needs immediate attention? What will drive a change effort? Have educational needs changed? Do curricula represent current educational theory, evidence, and contemporary practice for today and the future? The significant lack of progress in addressing decades of suggestions by authorities, think tanks, and foundations arguing a more global perspective of the profession and dental education is so apparent and yet would appear to be virtually nonexistent by measures of change in the last 90 years.

The 1995 Institute of Medicine report discussed needed changes in dental education (Field, 1995). The report called for a research agenda, the need for use of scientific evidence, progress in curriculum reform which was long endorsed, integrated basic and clinical science content, medically based modes of oral health care, and rethinking of basic models of dental education, among others. Similarly, the Macy Study report and myriad others noted needed fundamental changes that provided guiding principles for reform in dental education over a number of years (DePaola & Slavkin, 2004; Formicola et al., 2008; Institute of Medicine, 2001). Sadly, few changes had been instituted, and some of the suggestions in the landmark 1926 Gies Report remained as current issues in dental education (Formicola, 2002; Gies, 1926).

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Among the arguments for the case for change, the financing of higher education and student indebtedness were acknowledged. The educational system's dependency on state budgets (in state affiliated institutions) and a high student debt load continue to put stress on programs and students, especially in the current national economic climate. This so-called barrier potentially serves to further affect student choices to consider the profession of dentistry, choices for practice after program completion, and choices to serve public needs for oral health care. The environment of higher education and health care, then, provide a potential rationale for change (and barriers, as well) (Pyle et al, 2006). The need for preservation of the profession as a "learned" one emphasized challenges to institutional research missions, now even more prominent with the creation of new dental schools across the country that are not affiliated with research institutions.

A second major impetus for change has been the need for contemporary curricula, new educational formats, and innovation. The literature is replete with evidence of failure of the profession to consider long-time recommendations for changes in educational practice. From the theories of Piaget to more contemporary evidence and curriculum decompression, the active, experiential learning modalities have been espoused to provide opportunities for deeper, long-term retention of information and learning (Bain, 2004; Bruner, 1966;

Kolb, 1984). The notion that much of our traditional curricula and processes can be de-motivating to students is borne out of frequent faculty conversations about "test-file" approaches to learning that encourage memorization of facts rather than integration of multiple scientific concepts in the context of patient care. The value of critical thinking as a necessary skill for competency as a dental practitioner, and importantly, the educational opportunities to develop such skills, may be enhanced by expecting greater student accountability for learning as a result of novel curriculum design (Haden et al, 2006). Curricula that included integrative perspectives of experience, perception, cognition, and behavior have been advocated for decades (Bruner, 1966).

Additionally, leadership capacity to move significant change forward and workforce—work-life issues were cited as challenges facing faculty and administrators alike (Cohen & Tedesco, 2009; Haden et al, 2008). Indeed, the needed change requires new approaches. If we continue to do things as is traditionally done, then we will continue to see little progress or change in the status quo, and we can expect the same types of irrelevant outcomes. Cohen and Tedesco advocated for new leadership that possesses adaptive skills to creatively solve contemporary issues that dental education faces (Cohen & Tedesco, 2009). Usual strategies for solving the problems in dental education

> Usual strategies to solving the problems in dental education will likely not suffice. These factors and others describe the milieu faced by dental education in creating meaningful, sustainable change movements.

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Progress in Changing Dental Education

Five years later, have we created new levels of curiosity in our students? Have we required critical thinking rather than memorization of facts and are these efforts institutionalized across dental education? Are financial issues different and better? Yes and no!

The impetus of the ADEA CCI has made significant contributions to the change movements occurring across dental education. Across the nation, faculty are contemplating change and have made conscious decisions about what to change and what not to change. Some made little change, while others instituted major revisions to their own educational systems. Each institutional circumstance is unique with respect to desire, capacity, and resources available for curriculum change projects. The value that ADEA CCI has contributed, in what will likely be viewed as a positive historical moment in dental education, is its capacity to organize an inclusive group of stakeholders at the table of educational change. Engaging representatives from dental education, organized dentistry, the licensure community, the Joint Commission on National Dental Board Examinations, the Commission on Dental Accreditation, and other health professions, including medicine and pharmacy, at a pivotal moment in time likely enabled movement. Multiple conversations and motivated stakeholders, unabashed by those challenging the necessity of change or citing change as "dumbing down the curriculum," have created the opportunity for implementation of new ideas.

The ADEA CCI movement has also provided ongoing support and resources for the movement. For example, three important task forces worked to refine aspects of dental education critical to change. The ADEA Council of Sections provided early work to create a contemporary set of competencies for the new general dentist graduate. A second focused on new standards important to the accreditation self-study process in a contemporary education. A number of modifications currently under consideration were succinctly articulated in the CCI paper, "Reforming dental health professions education: A white paper" (DePaola & Slavkin, 2004). The ADEA made considerable resources available to oversee multiple tasks essential to the change movement. Most recently, another task force considered assessment issues as well as critical thinking measurement strategies that may be required as new curricula and programs emerge. An outcome evolving from this effort was an assessment toolkit for dental educators which is accessible via the ADEA Web site. The ADEA CCI activities and products have been coordinated, well communicated, interrelated, and focused on systematic approaches to the complex nature of dental education.

The conversation has been promulgated via a network of faculty at each dental school who serve as ADEA CCI liaisons that meets twice yearly for programs and discussions about active ongoing projects at the individual institutions. The liaison group has been instrumental in assisting each other with change projects, reporting on progress, and learning new approaches. One of ADEA's recent annual sessions highlighted curriculum innovation with its theme, "Curriculum change; it's time." Interim ADEA council group meetings have also had a number of change initiatives on the agendas. There is no doubt that the environment for change was

well-prepared by ADEA and that the environmental timing was precise.

A literature search of PubMed, using the search terms "dental education" and "curriculum change" as far back as 2006, resulted in 177 returns of which 69 were relevant articles. A similar search in the four and one-half previous years resulted in a total of 178 citations with a cursory review of articles netting 31 on the relevant topics of concepts in curriculum change in dental education. After nearly five years of discussions facilitated by the ADEA CCI, as Table 1 shows, there have been various types of curriculum change topics that have been reported by early adopters. It appears that there have been significant change efforts that have resulted in peer-reviewed publications on the topic of change in dental education during the time of the ADEA CCI work.

Early reports of major curriculum change in dental education summarize a rationale for change based in modern theories of learning and evidence that supports flexibility, multiple forms of active learning strategies, collaborative team developments, reports of projects integrating basic science, clinical and behavioral sciences in new ways, and content related to skills necessary for patient care. These reports of transformative change at both private and public institutions that were early adopters serve to inform dental education about individual experiences as well as to plant the seeds of motivation for those considering or embarking upon change at other institutions. The reports outline different experiences, in different programs, that help others envision what is possible. There are also references to the creative spirit with which these institutions revitalized their programs.

Some Issues Yet to Be Addressed

That is the good news. However, the profession still struggles to find different ways to address important issues that have, as of yet, remained unaddressed or ones where significant progress is yet to be realized.

The major unresolved issues in dental education today include:

1. Financing of dental education
2. Total quality improvement
3. Regionalization of dental education/ new models
4. Development, recruitment, and retention of faculty

The first issue, financial challenges facing dental education, was highlighted by Walker and others (2008). The lack of progress in the financial modeling likely impacts multiple areas of dental education including student recruitment, especially in attracting diverse student bodies; in the recruitment and retention of high-quality faculty members; in balancing the needs for dental health professionals across demographic and geographic schemes, both rural and urban; and in the very core of sustaining the mission of dental educational institutions. The ongoing fiscal struggle of the economy significantly affects funding of state affiliated dental schools now and into the foreseeable future. The 2008 paper discussed the impact of simply increasing tuition and fees to meet the increasing demands for fiscal viability in the face of declining national economics. Tuition and fee increases ultimately affect increasing student indebtedness and contribute to difficulty in the development, recruitment, and retention of faculty. The paper outlines a gap between faculty salaries and private practice earning potential that is expected to widen in the future. The paper also addresses the dental education infrastructure issue of aging school facilities and an inability to advance programs due to budgets that cannot support

Table 1. Results of PubMed Search of "curriculum change" and "dental education"

2006–2010

Topic	Number
Integration of curricula	1
Technology in education/contemporary education	7
Change process	2
Change concepts	20
Report of major change at school of dentistry	3
Perceptions of change	3
Financing of dental education	1
Assessment/outcomes	5
Leadership	4
Work-life	2
Faculty development	5
Curriculum concepts/content related projects	5
Educational strategies	5
Workforce/access	6
Total	69

advancing technology in education and needed physical revitalization.

It appears that the restructuring of higher education financing, and specifically dental education financing, is perhaps a small, unrecognized blip on the radar screen. The financial resources issue may be the future "perfect storm." Perhaps this is the future crisis that will catapult a new breed of creative solutions. The question is: When? However, little assistance with demonstration projects regarding the financing of dental education since 2005 directly offer much perspective into sustainable solutions.

The second issue yet to be adequately addressed is total quality improvement. While the changes implemented by the CODA in the late 1980s have made significant improvement in the predoctoral accreditation process moving from

Engaging representatives from dental education, organized dentistry, the licensure community, the Joint Commission on National Dental Board Examinations, the Commission on Dental Accreditation, and other health professions, including medicine and pharmacy at a pivotal moment in time likely enabled movement.

descriptions of process to competency and outcome evaluation, there is little evidence of the "30,000 foot view" of continuous institutional improvement (American Dental Association, 1998). Academician leaders must ask the following questions: How is the program aligned with university goals and core values? And, what do we really want to accomplish? Are we doing what matters? The usual program strategic plans include the mission areas of teaching, research, service, and patient care. Have many institutions delineated a mission area of institutional improvement? Do programs intend to improve oral health of the community, or society? As of yet these are unanswered questions.

Institutional improvement movements such as the Baldrige National Quality Program, a government-sponsored program that promotes total quality improvement and efficiency, have found little interest in dental education despite criteria outlined for health care institutions. It is a program that recognizes "leadership; strategic planning; customer and market focus; measurement, analysis, and knowledge management; workforce focus; process management; and results" in business, education, and health care. Only one dental school, the University of the Pacific in San Francisco, has participated in the Baldrige process (Chambers, 2002). The Institute of Medicine's 2003 report called for applications of quality improvement in terms of "structure, process, and outcomes in relation to patient and community needs." This construct was developed as one of five essential core competencies for all health

care clinicians. Although much has been written about quality assurance data and outcomes on a micro level, the level of expectation for systems approaches to quality improvement of dental education have remained static or unidentified. Organizations such as the Institute for Healthcare Improvement are principled in collaborations that improve system efficiency and effectiveness.

A third issue needing attention is the regionalization of dental education and implementation of new models of education. While several new dental schools have implemented new organizational structures to deliver their programs, there remain questions of long-term sustainability of the models. Public health approaches aimed at improving access to care have been designed and implemented and community-based clinical education is a component of some of the new tactics. The long-term efficiency and effectiveness of the new program outcomes are anticipated. Additional concern has been raised arguing that some new institutions not affiliated with research universities may lose the focus and opportunity for the scholarly work that distinguishes dentistry as a learned profession (Bertolami, 2002). Likewise, new paradigms for regionalization of programs and curricula have yet to be implemented on a large scale. Use of technology to extend educational capabilities at distant sites has significant potential for creating efficiencies in programs with challenges in recruiting and retaining qualified faculty in specific content areas. Significant human resources (expertise) and infrastructure supporting technology will be required to launch such initiatives.

Lastly, the recruitment and retention of dental faculty relates to the most significant issue, that of the financing of dental education. Additional pressure

has been placed on the educational system with the emergence of new dental schools and those currently in the planning stages with regard to recruiting faculty. Effective programs that attract greater numbers of dentists into academic careers have not been developed. With the financial disincentives to enter academia and the large number of new programs either planned or implemented, difficulty in recruiting new faculty will remain a challenge for dental education.

Summary

In the last four years, much has changed to advance our educational processes in dental education, yet many challenges remain and new pressures have emerged. Multiple individual efforts locally may move our profession forward, but continuing systematic approaches to broad changes need resources and support to sustain the profession. In a recent editorial, the *Good to Great* author, Jim Collins was quoted. His words ring true in a changing world in higher education: "And for those of you who dislike change, you are going to really hate being irrelevant" (Hupp, 2009). Educational change is here to stay, perhaps the question we must now contemplate is "What will it take to solve the next difficult unresolved questions?" ■

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Ethical Considerations in the Use of Nitrous Oxide in Pediatric Dentistry

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Abstract

Nitrous oxide (N_2O) has become a routine intervention in contemporary American dental practice, especially in the management of children. However, routines translate to confidence which in turn may lead to overconfidence, such that possible risks and misuses are insufficiently acknowledged. This article ethically evaluates the use of nitrous oxide as a practice routine in treating children. Nitrous oxide administration is analyzed in reference to three internationally acknowledged principles of dental ethics: nonmaleficence, beneficence, and patient autonomy. In reference to the principle of nonmaleficence, the potential for adverse effects of N_2O is discussed, particularly when it is administered in conjunction with other sedatives and anesthetics. The importance of abiding by clinical protocols is emphasized. Next, in reference to the principle of beneficence, the authors address the problematic application of N_2O for the benefit of individuals other than the patient (e.g., dentists and parents). Finally, the importance of respecting patient autonomy is discussed, specifically the need to obtain explicit consent for N_2O. The article supports the continued use of nitrous oxide but advises greater attention to how and why it is administered. Four recommendations are offered for an ethically sound usage.

Ethical analyses in health care tend to focus on complex, critical, and contentious practices. And yet, all medical, and likewise, all dental interventions are subject to the ethical principles that guide the practice of health care, even those routinely administered–or maybe especially those routinely administered. For confidence in safe and established routines can easily turn into overconfidence. A case in point is the administration of nitrous oxide gas (N_2O).

In the final quarter of the last century, the use of nitrous oxide gas attained the status of a routine intervention in American dental practice (Levering & Welie, 2010). The kinds of reports about undesirable side-effects and even deaths that had still appeared with some frequency in the first quarter of the twentieth century, had virtually disappeared with the development of improved drug regimens and methods of administration. However, the current usage of nitrous oxide as a routine may be accompanied by ethical complacency such that potential harms and possible misuses are insufficiently acknowledged. Despite its excellent safety record, N_2O still poses risks and, hence, ethical challenges.

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For example, the ethical principle of nonmaleficence demands that dentists protect their patients against harm. N_2O, though a weak dental sedative, is nevertheless a medication and like all medications possesses the potential for adverse effects, particularly when administered inappropriately or with other medications. This, in turn, underscores the importance of development of and adherence to practice guidelines on sedation. Second, the ethical principle of beneficence demands that dentists develop treatment plans with the patients' best interests in mind. But the current N_2O usage appears to be driven in part by the interest of parties other than the patient, such as dentists and parents who seek expedience. Third, the ethical principle of respect for patient autonomy demands that patients are full partners in their treatment and empowered to ultimately reject unwanted interventions. But research suggests that many dentists do not obtain a written consent for the administration of N_2O and some do not obtain any consent at all.

In this article, we show that even routine interventions demand and merit ethical reflection. We analyze the administration of N_2O in reference to the aforementioned three principles of ethics. The article concludes with four specific recommendations for an ethically sound usage of N_2O.

The Principle of Nonmaleficence

The popularity of N_2O is due in large part to its excellent safety record. When used alone, in the absence of any contraindications, and in carefully calculated and titrated dosages, patients suffer no permanent harm and the most likely side-effect is modest nausea. However, N_2O is a drug and as all drugs, including those with track records of safety, can become harmful, even lethal, when clinicians become a bit too complacent and overlook the adverse drug effects that are still possible.

One of the oldest ethical principles guiding the practice of medicine is the principle of nonmaleficence, requiring that clinicians do not harm their patients. Dating back at least to the oath attributed to Hippocrates, it is one of five principles (the other four are beneficence, autonomy, justice, and veracity) around which the current *Principles of Ethics and Code of Professional Conduct of the American Dental Association* is organized.

Warnings about the possible dangers of N_2O surfaced as early as the mid-1800s when dentists experimented with different delivery methods of the drug in their practices of dentistry. Since N_2O was originally used alone as a general anesthetic, patient deaths occurred with some frequency until oxygen was administered with nitrous oxide and dual delivery systems became standardized at the turn of the century (Lancet Commission on Anaesthetics, 1893; Lymann, 1881). Moreover, their number appears to have been small compared to deaths attributed to chloroform in the same time period (Buxton, 1895). In the 1960s, dentists changed the application

> The patient's right of consent is essentially a negative right, a right not to be forced into dental treatment. It is not a positive claim, for a patient cannot demand certain interventions.

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of N_2O from general anesthesia to analgesia only, changing again in the 1980s to sedation use, which allows for even lower dosages and higher levels of safety, particularly when used alone.

Despite the increasing success and acceptance of nitrous oxide, it remains limited by its weak potency. Some clinicians seek to deepen the sedation by adding additional sedatives, analgesics, and anesthetics. Unfortunately, such "polypharmacy" has occasionally resulted in serious adverse side-effects, including fatalities, thereby tarnishing the safety record of nitrous oxide. An example is the death of a five-year old girl in Chicago in 2006 (State of Illinois, 2007) who received, in addition to N_2O/O_2 (5-0%/ 50%), Lidocaine with epinephrine, Diazepam, Midazolam, atropine, and Talwin. The Illinois Legislature subsequently passed a law tightening the requirements for administering sedatives such as those used by dentists, including N_2O.

In his handbook *The Dentist's Legal Advisor,* Morris admonishes dentists not to administer N_2O without giving due consideration to the risks associated with it, and to consider whether the benefits gained from the sedation outweigh the possible harms (Morris, 1995). Morris's admonishment underscores the importance of full informed consent, which will be addressed in a later section. But the consent of patients–or in the case of minors, the consent of parents– releases practitioners neither of their own ethical responsibility nor of their legal liability. The dentist retains the responsibility to justify recommended treatments irrespective of the patient's consent; indeed, only scientifically sound treatments should be presented to the patient for his or her consent. Professional guidelines and protocols can be a major help to dentists by providing

advice on (contra)indications for drugs such as N_2O, effective means of administration, and effective monitoring. They also help, incidentally, to later defend one's recommendations and actions if challenged in court.

Once selected, treatments should be administered with due diligence. Routines tend to produce complacency with inadequate appreciation of the reasons and circumstances for which guidelines and protocols were initially intended. Krippaehne and Montgomery (1992) found that most of the deaths following pharmacosedation and general anesthesia in the dental office were probably due to inadequate monitoring of patients and failure to provide adequate resuscitation when the calamity occurred. Such would be the case of aspirated vomitus for the over-sedated pediatric patient. Diligent adherence to best practice standards can help prevent untoward side-effects.

Assuring Optimal Care: The Evaluation of Guidelines for Nitrous Oxide

The first guideline on pediatric sedation was published in 1985 as a joint venture by the American Academy of Pediatrics and the American Academy of Pediatric Dentistry (AAPD, 1985). The guideline was initiated in response to adverse reactions to the sedative agent Nisentil and the concern for potential litigation based on its misuse by uninformed practitioners (Wilson et al, 1996).

Interestingly, the 1985 guideline mentions "conscious sedation" but does not specifically address N_2O even though this sedative was already widely used by this time. With the exception of very light sedation–leaving the reader wondering what exactly constitutes "very light"–heart and respiratory rates were to be monitored and recorded repeatedly at specific intervals with a precordial stethoscope as the minimum equipment for obtaining this information.

Clinical observation was also required, including continuous visual monitoring of nail beds and mucosa, checks of immobilization devices to prevent airway obstruction and any other restrictions of limb perfusion.

The next edition of the guideline for sedation (AAPD, 1993) entailed no change, but in the 1996 edition (AAPD, 1996), N_2O was explicitly mentioned for the first time and classified at the lowest (level 1: mild sedation/anxiolysis) of three newly established levels of conscious sedation. At the same time, the requirements for continuous monitoring of oxygen saturation, heart and respiratory rates were dropped for sedation with N_2O. The 1998 edition once again contained no change regarding N_2O, but in 2004 yet another classification of all pediatric sedation was established in which the level 1 conscious sedation from the 1996 edition was now designated as "minimal sedation." Upon receiving such sedation, patients should continue to respond normally to verbal commands, might have somewhat impaired cognitive function and coordination, but ventilator and cardiovascular function should remain unaffected. Clinical observation was the only monitoring required unless the patient became moderately sedated, in which case additional monitoring guidelines would take effect. It is noteworthy that N_2O was only mentioned specifically once in the new guidelines and only in reference to equipment.

But one year later, a specific guideline was established for N_2O as a distinct form of anxiolytic and analgesic sedation, separate from all other forms of sedation (AAPD, 2005a; 2005b). Patients' responsiveness to commands during N_2O sedation should serve as the primary indicator of the level of consciousness, but the dentist should also continue to observe the patient's color and respi-

ratory rate and rhythm. If any other pharmacologic agent were to be used in addition to N_2O and local anesthetic, monitoring guidelines for the appropriate level of deeper sedation would then have to be followed. The most recent version of the guidelines, which dates from 2009, reiterates the relevant points contained in the 2005 edition with no significant changes (AAPD, 2009)

As this brief summary of successive guidelines makes clear, the primary focus has been and continues to be preventive management of the patient's physiologic status, in accordance with the principle of nonmaleficence. However, what is lacking is a discussion of basic behavior guidance as prerequisite to the need and decision to administer N_2O. Anecdotal reports of practitioners administering N_2O as their first line of behavior management, or even administering N_2O on every patient, child and adult, are not uncommon. Similarly, there is little guidance for the management of that child when N_2O is unsuccessful and is then combined with other sedative agents. For such circumstances the AAPD guidelines merely offer a cautionary note.

Finally, we point out that the British Society of Paediatric Dentistry issued national clinical guidelines in 2002 entitled "Managing anxious children: The use of conscious sedation in paediatric dentistry" (Hosey, 2002) that addressed sedation in a totally different light than those of the American Academy of Pediatric Dentistry (2006). The British guidelines enumerate graded levels of evidence-based practices for varying aspects of sedation (Grade A, consistent high-quality evidence; Grade B, inconsistent or limited evidence; and Grade C, lacking direct evidence). The intent is to encourage improvement in clinical practice and to stimulate research and clinical audits in areas where scientific evidence is inadequate.

The Principle of Beneficence

Ancient oaths, early codes of professional conduct ethics, and modern declarations on dental ethics tend to assign priority to the healthcare interests of the patient. Their interests generally trump those of third parties and even those of the providers themselves. Since those competing interests are often compelling and indeed legitimate, it is not always easy to give priority to the patient's healthcare interests

Sedation with N_2O is a case in point. Parenting occurs within the context of society, is informed by it, and inevitably reflects it as well. Current lifestyles are hurried; the "typical" family unit of the past no longer exists; competition for quality time has become burdensome; and parents are frequently fatigued, feel guilty, and lament the lack of role models for their children. At the same time, some dentists have lamented the failure of many parents to set limits for their children, to discipline them effectively, and to invest time in their children's education and care (Casamassimo et al., 2002; Long, 2004). These changes are paralleled and complemented by an ever greater consumption of drugs that are intended to solve all kinds of medical and nonmedical challenges more readily, requiring less patience, persistence, or tolerance (Ambrose, 2004; Cakic, 2009; Russo, 2007). The issue is not that these drugs are unsafe or lack treatment value, but that the circumstances do not always necessitate, justify, or warrant their use.

There is a general acceptance that societal changes have affected the way dentists manage children in their dental office. Even if dentists themselves do not personally approve of these changes, they nevertheless feel compelled to adopt those behavior management techniques that are better aligned with current

> Even if dentists themselves do not personally approve of these changes, they nevertheless feel compelled to adopt those behavior management techniques that are better aligned with current parenting styles.

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parenting styles. Parents are quicker to embrace and indeed insist on pharmacologic techniques instead of more traditional interactive methods (Pinkham, 1993; 2001). "Tell-Show-Do" is increasingly replaced by "Do-and-Do-It-Fast." Dentists may fear that if they are unable to meet the demands of their patients' parents, the parents will take their child to a dentist who will not hesitate to use N$_2$O.

In addition to a perceived advantage for parents, N$_2$O sedation has some evident benefits for the providing dentists as well. A less anxious and more cooperative child is easier to work on and less likely to create "infectious anxiety" in other children (and parents) in the waiting room or in a nearby clinical area. And in a dental school setting, students gain the additional benefit of prolonged behavior "good-time," which enables them to master their dental skills.

The question now arises whether the administration of N$_2$O for the sake of parent or provider constitutes a violation of the ethical principle of beneficence, which demands that care providers give priority to the healthcare interests of the child. Since N$_2$O calms the agitated child, suppresses anxiety, and diminishes unpleasant dental treatment memories, the patient is always a direct beneficiary. Furthermore, the child benefits from the fact that the dentist can work quickly and in a more focused manner, reducing the chance of mechanical error and enhancing the quality of treatment. Fewer dental appointments are not only convenient for the parents but also translate to fewer missed school days for the child. It would therefore appear that N$_2$O fosters the patient's best interest, even if it also benefits third persons at the same time.

But this line of reasoning fails to consider two important factors. First, as we have already seen, the excellent safety

record of N$_2$O can become compromised when it is managed in a routine manner. Preoccupation with treatment may come at the exclusion of anesthesia oversight; reliance upon untrained auxiliaries for the administration, monitoring, and documentation of the procedure increases the odds of error. These problems are compounded when other medications are added to the N$_2$O. Common misjudgments include failure to adjust dosages for children (versus adults) and failure to consider the additive effects of all medications used. All of these risks are borne by the child, not the dentist or parent.

The second factor is the rush to administer N$_2$O without first considering non-pharmacologic means of management, often followed by a continued use of N$_2$O even though it is no longer needed. There is something amiss when a parent states "My child always has nitrous." Chairside patience on the part of the provider, step-by-step learning and development of coping skills by the child, and improved communication with parents regarding their child's evolving maturity are unquestionably in the best interest of the child and will likely increase the child's own appreciation of dental care into adulthood.

Principle of Respect for Autonomy

It is generally recognized, underscored by codes of dental ethics, and reinforced through law that the rights and responsibilities of healthcare decisions are shared by provider and patient. No longer can a dentist paternalistically determine and initiate the treatment that is "best" for a patient without the latter's input and informed consent. The patient's right of consent is essentially a negative right, a right not to be forced into dental treatment. It is not a positive claim, for a patient cannot demand certain interventions. As the term indicates, "consent" reflects "with-agreement," that is, agreement with an intervention that the dentist, upon a comprehensive diagnostic examination and thoughtful deliberation,

considers to be a potentially effective remedy for the patient's complaint or condition.

Although patients may arrive at the dental office with preconceived thoughts regarding their treatment, and these thoughts should be considered in treatment planning, they can never be decisive. It is the dentist who possesses the training, knowledge, and experience enabling him or her to develop a treatment plan, and it is the dentist who ultimately bears the responsibility for the treatment. Conversely, the dentist can never justify his or her actions by merely stating that it was what the patient or parents wanted. By the same token, the dentist cannot justify the treatment plan in terms of "this is what I always do." The treatment plan must be justified in reference to the patient's best interests, assessed by objective, scientific standards. Once such a treatment plan has been developed and explained to the patient, the patient must grant consent. Only then can treatment be initiated.

Pediatric Consent

Respect for autonomy of the pediatric dental patient is no different from that of the adult patient, except that the patient is legally incapable of granting consent. And since consent is a necessary condition for treatment, no treatment (other than emergency treatment) can be given unless a surrogate decision-maker grants consent on behalf of the minor. In most instances, the parent has the legal right and responsibility to make such decisions. Again, the parents' right to grant parental consent does not entail the right to demand treatment. Though the dentist must consult the parents in order to determine exactly what the expected treatment outcomes are, what means are acceptable, and what harmful side-effects might be tolerable, it is the dentist who designs and proposes one or

more alternative treatment plans, which the parents in turn consent to or reject.

In addition to emergency dental care on patients who are incompetent to consent, there is another category of interventions for which informed consent is not a necessary requirement. These are interventions that are part and parcel of more encompassing treatment plans. A dentist may reasonably assume that patients who consent to an amalgam restoration know this restoration will involve various steps, including injection of a local anesthetic, placement of a rubber dam, cavity preparation, etc. While it is a token of chairside professionalism to inform the patient of procedural steps, the dentist is not legally required to obtain explicit consent for each of those steps separately. Consent is implied in the patient's informed and explicit consent to the overall procedure.

Whether consent for a particular intervention must be explicit or may be assumed to be implied is not always easy to determine, in which case the dentist should fall back on an explicit consent. But factors that justify assuming implied consent for an intervention include the conclusions that: (a) the overall treatment plan cannot be realized without this intervention; (b) there are no alternatives for the intervention; and (c) the intervention does not pose significant additional risks or disadvantages for the patient beyond those already entailed by the overall treatment plan.

Bearing in mind these ethical considerations that apply to all of dental care, we can next examine the specific example of nitrous oxide. Since N_2O is a drug, consent by the patient or the patient's legal surrogate is a necessary requirement. This does not mean children or even their parents have the legal right to demand N_2O. Administering N_2O to every child coming into the office, or even presenting that option to all parents as scientifically sound and necessary, is ethically problematic. If a

patient's anxiety can probably be managed adequately using means that are less invasive, the dentist ought to recommend such nonchemical behavior management instead. The same is true if the behavior of the patient is such that N_2O is unlikely to be effective or the child suffers from conditions that render N_2O contraindicated. Again, the dentist should recommend other means of managing the child's behavior.

If the dentist concludes that the administration of N_2O can objectively be justified and is therefore indicated, the question arises whether parental consent must be explicit or may be implied. Considering the three cumulative criteria listed above, it appears that in almost all instances in which N_2O is indicated, at least one of these criteria cannot be met. In case of mild apprehension, the alternative of traditional nonpharmacologic behavior management is generally available and should at least be considered. In case of severe anxiety, other sedatives may have to be added to the N_2O, which combination significantly increases the chance of adverse effects. And if the source of the apprehension is actually the parent, it is not the patient who needs to be sedated. We thus conclude that an explicit consent is necessary in all instances in which N_2O will be administered (other than true emergency care when no legally valid source of consent is available).

The most recent guideline from the AAPD (2009) specifically requires consent for all pharmacologic techniques, including N_2O. The guideline requires documentation of the consent but not that the consent itself must be written. A 2004 survey by the AAPD revealed that 42% of the responding dentists obtained written consent for N_2O, 51% of respondents obtained oral consent, and 8% no

consent. In contrast, almost 100% of the respondents obtained written consent for sedation other than with N_2O and a full 100% for general anesthesia (Adair et al., 2004).

Documentation of consent, whether via a form or a detailed note in the record, allows the dentist to keep track of what was covered in previous discussions and can also make it easier to defend against patients who charge that the dentist failed to inform them prior to treatment. But from an ethical perspective, there is no principle difference between an oral and a written consent. If procedures are complex and there is a fear that the patient or parents may not be able to digest all of the information provided orally, a written form can foster understanding such that the subsequent consent is truly informed. A written form can also elicit, facilitate, and streamline discussion between parent and provider. However, the reverse is not true. That is, a signed form does not necessarily constitute an informed consent. This is most evidently the case if the form is in a language the patient does not understand adequately or the language used in the form is far beyond the educational level of the consenter. But problems also arise if a "blanket" form is used, a single form used to obtain consent for a variety of dissimilar interventions. The survey cited above found that 45% of the respondents used such a "blanket" consent form (Adair et al, 2004). Unless "blanket" forms are accompanied by a more specific oral

consent process, one cannot ethically assume them to represent a valid informed consent.

In other words, providing information does not necessarily result in an informed parent. Parents may not know the difference between sedation and anesthesia, let alone the difference between oral sedation, inhalation sedation, "twilight" sedation, and general anesthesia. It is important that providers do not use these terms loosely (thereby adding to parental confusion) and verify in each instance that parents do not assume the proposed administration of, for example, N_2O to be analogous to previously received anesthesia, and vice versa.

In addition to information about the benefits and risks of a specific management technique, parents must also be informed about all alternative modes of accomplishing the same goal. Informed consent discussions must occur in a setting, manner, and language that assure the relevant information is truly communicated, the likelihood of misunderstandings is reduced as much as possible, and parents feel at ease to ask questions and discuss options.

It is important to remember that the validity of a patient's (or parental) consent hinges on the consenter being informed and not coerced. It is the ethical responsibility of the dentist to make sure that the consent is actually an informed consent. With ever more jurisdictions shifting from the "professional community standard" to the "reasonable patient standard," it no longer suffices to go about the informed consent process as every other dentist in town appears to do it. Instead, it is imperative that dentists assure that every patient—or in the case of minors, every parent—is adequately informed and free to consent, even if the intervention proposed has evident benefits and very few side effects.

Conclusions

Nitrous oxide will and should continue to play a significant role in the management of the pediatric dental patient. However, ethical challenges arise when the administration of N_2O becomes so routine that clinicians fail to recognize the small but real possibility of serious risk or when it becomes merely a tool of expedience. To make sure that N_2O serves to truly benefit and protect the child, we propose the following four practical recommendations.

1. **Nonmaleficence**. Sustain diligent awareness when administering N_2O. When used as a routine without the consideration of benefits, risks, and alternatives, the likelihood increases of inappropriate application, erroneous administrations, harmful side-effects, and a false sense of pharmacologic need.

2. **Beneficence**. Focus on the patient's interests. Treatment recommendations should be based on solid evidence and without the bias of provider and parental expedience. The clinical guidelines from the British Society of Paediatric Dentistry are an example of a protocol providing evidence-based directives for sedation, including nitrous oxide.

3. **Respect for Autonomy**. Treatment decisions for the pediatric dental patient must include corroborative discussion and education between the provider and parent. Although it is important to pay close attention to the parents' expectations, many parents want the dentist to prevent any and all fear or even discomfort for their child, using either N_2O or other drugs. They do not expect the child to assist or cooperate in his or her own dental care. This may well

be a disservice to the child who is not encouraged and taught to better cope with an unknown situation. Any pharmacologic approach, including N_2O, to behavior management should not be considered until nonpharmacologic behavior management tools have proven to be of little or no promise.

4. **Informed Pediatric Consent**. Consent signifies disclosure, clarification, discussion, and deliberation with an ultimate agreement to proceed with a planned treatment. The consent to use N_2O in the course of treatment should be explicit, because N_2O is an intervention distinct from the restorative or surgical treatment, with its own purpose and possible side-effects. In the literature, different views are voiced regarding the need to obtain written (as opposed to oral only) consent. However, we have argued that written consent is imperative in virtually all situations. ∎

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Marketing

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Abstract

There is not enough marketing of dentistry; but there certainly is too much selling of poor quality service that is being passed off as dentistry. The marketing concept makes the patient and the patients' needs the ultimate criteria of marketing efforts. Myths and good practices for effective marketing that will promote oral health are described under the traditional four "Ps" categories of "product" (best dental care), "place" (availability), "promotion" (advertising and other forms of making patients aware of available services and how to use them), and "price" (the total cost to patients of receiving care).

Should marketing be encouraged or even allowed in dentistry? You bet your bib clips it should. There should be more of it, lots more.

None of that price comparison or "best dentist in town" stuff, though.

No separate waiting rooms for the spa patients. No guarantees. No market segmentation to limit practice to those with a high need to spend money instead of those with a high need for oral health. No let's treat up to your insurance limit. No bait and switch involving "free examinations." No Dr. Wonderful's Web page. These are examples of marketing, but not marketing the dentistry the profession and the public expects. They are examples of marketing shoddy (a noun meaning inferior imitation or goods made with inferior materials), instead of marketing real dentistry. Dentistry should be well and thoroughly marketed; but counterfeit dentistry is wrong, whether marketed or not.

The Marketing Concept

Any MBA graduate can cite the marketing concept by heart: the customer defines quality and the customer keeps score. There's really not much more to it than that. By contrast, the "selling concept" holds that the producer seeks to maximize profit by telling the customer what he or she wants and letting them

know when they have received it. Marketing by definition abhors creating false demand and manipulating other's perceptions. Fortunately, in dentistry there is almost no need for selling since most of the public value oral health and know in a general way when they are enjoying it. The selling perspective distorts this fact by trying to give the public something else, and doing so for the practitioner's and not the public's benefit. That is not marketing; it is also, to my way of thinking, inherently ethically suspicious.

To be certain, there is a difference between marketing oral health and marketing wide-screen TVs. Sometimes individuals become confused over which one they want and which one they need. That is a marketing challenge, but dentistry must accept the verdict of its various marketing approaches. It cannot ethically push the public beyond what the public defines as quality and how the public measures whether it has been received. This is the undertreatment issue, a problem that marketing can help address.

On the other side is the problem of what to do about patients who want to bleach teeth with mobilities of 2 or higher. Practitioners who exploit the want-compared-to-need gap for their own benefit are engaged in overtreatment. When they are engaged in influencing this gap, they are not marketing, they are selling.

It may appear that the marketing concept—recognizing the patient as

king or queen—runs contrary to the Hippocratic tradition of grounding professional care on the needs of patients. Patients are almost never fully equipped to recognize quality. This observation has been used often to justify a kind of paternalism where the person providing the care decides whether the person receiving it should want it and then deciding whether it was well done. Surely paternalism is as much a departure from the marketing concept as is selling.

There is a school of thought that is willing enough to surrender the notion that the provider of goods and services is the one who determines what others need and how well it is delivered, but are still adamant that customers not have this role. This is the position that quality can be defined in technical, objective terms. Patients should go to the dentist twice a year and, as the insurance consultant reminds practitioners, there are scientific criteria for crowns rather than large amalgams. Dentistry belongs to science, not the markets. Those who are enthusiastic about EBD embrace such objective standards, via "best evidence," for quality. If dentists are prone to argue that general guidelines might be useful but "quality depends on the circumstances," imagine how much more reluctant patients are to let others decide what they should value. Science might help clarify the relationships among actions and outcomes, but it cannot define quality.

We can, however, retain the marketing concept with the help of two ideas. First, the concept of informed consent, besides being part of the legal relationship

between practitioners and patients, is a requirement that the information asymmetry between patient and practitioner be bridged (by the practitioner) to a degree sufficient for patients to exercise their opportunity to choose quality on their own terms. Second, we should understand that professionals have a duty to offer only goods and services that are good for others. Although we may talk this way, it really doesn't make sense to speak of marketing a brothel or contract-killing services. The American quality guru W. Edwards Deming famously insisted that the only goods and services on offer to the public must be good for them, and from that set they alone decide that they want. The dental profession, as a collective, has the obligation to define what should be offered to the public. Individual charlatans profit by providing what they know is not needed. Individual quacks profit by providing what they mistakenly believe is needed. The strongest reason that can be framed for integrity in the profession is precisely so that what is good for the oral health of the public can be offered to the public for individual selection. The fragmentation that is beginning to appear in American dentistry—some dentists offering what patients do not need and calling it dentistry—is little more than a breakdown in the marketing concept. Dentists are free to offer nontraditional services; they are not free to represent them as substitutes for oral health care.

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Hence, the marketing concept can be applied directly, and as I will show below, fruitfully to the provision on oral health care, provided that individuals are given sufficient information to understand their needs and they are not prevented from having the needs they choose to be fulfilled.

There are four elements in marketing, perhaps ironically each beginning with the letter "P": (a) "product," (b) "place," (c) "price," and (d) "promotion." The latter two are somewhat familiar to many in business; the first two are defining for dentistry.

Product

The first P is product, and it dwarfs the others in significance. There is almost nothing a dentist can do by way of delivery systems, price, or advertizing that will compensate for poor treatment. Really poor dentists have to move from state to state when quality is substandard. Any practitioner who is serious about marketing will look first to improving the quality of dentistry provided.

Patients Can Judge Quality

There is a myth that patients cannot distinguish good from poor dentistry. That is wrong on two counts: first, it only matters that patients believe they can recognize quality; and second, they actually can.

Some years ago, a colleague and I conducted research involving students who had just completed their preclinical operative technique course, students who were ready for graduation, and faculty members cutting a Class II on a mannequin head. We videotaped the procedures and learned a great deal about differences in how novices and experts approach the same task. (Faculty members do not actually perform the procedure the same way they tell students to do it.) We also showed the videotapes to lay individuals and asked them who

they would want for their own dentist. Almost always, they picked the best dentists, despite the fact that some of our faculty members are young-looking and some of our first-year students are mature, second-career individuals. The camera was positioned far enough away so that no "patient" could see the restorations, let alone identify which tooth was being worked on.

How did they know? Simple: good dentists act like they know what they are doing. Skill causes confidence and other signs; so confidence is a sign of skill, and patients care about these sorts of things so they learn (often subconsciously) to pay attention to these reliable clues. If that is insufficient, they ask questions and they ask friends. Dentists make the mistake of assuming that patients cannot judge quality dental care because they do not judge it the way practitioners do.

Of course, charlatans and quacks are a problem because they study the confidence-building mannerisms of legitimate dentists. In fact, that is what they practice (mannerisms); they do not actually practice dentistry. So it is up to the profession, not the public, to shut these folks down.

Defining the Product

Let's look deeper at what it means to call dentistry a product. I am using the term in the broadest sense possible to include the service aspects of diagnosis and the office experience, customization to individual circumstances, care and professionalism. In this sense, "product" just serves as the name the patient gives to the benefit they get from going to the dentist. So considered, there are three levels of product. They can be thought of as concentric circles, with something extra added as one moves toward the periphery.

In the center one finds the core or generic product. This is the minimum necessary for the process to be called dentistry. It is the stripped down version; it is dentistry that does not rise above the standard of care. It might also be thought of as procedure-based treatment or CDT dentistry. One is operating at the generic level when the following conversation is heard: "I guess that is adequate treatment. It isn't malpractice, but I was hoping for something more."

The next level of quality in a product is referred to as the expanded product. This means that features are added to the product that patients want, that increase value, and that differentiate the product from other generics. Anesthesia and rubber dam are in the core for root canal therapy (we should wince when we hear of this kind of treatment without them). But a painless and natural infiltration and full explanation of patient safety precautions are often what separate one practice from another. If a patient tells a friend, "I go to Dr. X because...," the reason is never "because he or she does dentistry." It is always a description of the expanded product. It is flat out unethical to charge the same fee for a generic product as what is charged for an expanded one.

The highest level of product is an augmented one. Expansion of a product involves differentiation of the product from other generics; augmentation involves customizing expanded products to individual customers. This level of care is almost synonymous with quality dentistry. Certainly, any practitioner who engages patients in determining their care (rather than simply deciding for them) is providing an augmented product. The level of treatment provided by specialists is sometimes confused on this point. The augmented product that specialists provide is not always evident in the objective product. What matters is that the specialist can perform this level of quality consistently and in less

than ideal circumstances. Patients are aware of this and are normally willing to pay extra for the "just in case" augmented product.

One of the scariest trends in contemporary dentistry is the rush to provide augmented products that have no generic core. This is the sizzle without the steak. It is what I call oral care as opposed to oral health care. It never worked in dental school to polish a denture setup with misaligned teeth. There is no reason to believe it will work in practice either.

The Product as Benefit

It bears emphasis that patients define the dental product—whether generic, expanded, or augmented—in terms of benefits. Dentists tend to see their products in terms of features. This can cause confusion. The difference between features and benefits can be illustrated with a story. Every Saturday morning in America hundreds of men drive to home improvement stores and purchase 5/8-inch drill bits. But not a single one actually wants a 5/8-inch drill bit. What they seek is 5/8-inch holes in various materials in various locations. The drill bit is just a convenient way of achieving their goal. A benefit is the good and satisfaction one seeks; a feature is an objective characteristic of something that might produce that benefit. For the most part, patients are indifferent to marginal integrity (a feature); they want the benefit of a long-serving restoration. Patients are not especially picky about dental materials either; the benefit of good appearance does matter, however. By training, dentists talk features but personally they seek benefits. Take a look at the advertizing that is directed toward practitioners in the high-gloss publications. If ease of use, speed, and patient acceptance are not among the claims, there is no point in showing the MPa of shear strength. CE gurus have

also mastered the skill of marketing benefits rather than features. There is no option that follows directly from the marketing concept.

Recall that the customer defines quality and is the ultimate judge of whether it has been delivered. With the background that has been developed to this point, we can now talk about how it is done. The equation below represents this schematically.

Quality = (Benefits Received – Benefits Expected) / Cost

To see how the quality equation works, consider a dentist who delivers a porcelain crown on an incisor whose features meet every objective criterion for this type of restoration. In dental school, this is an A restoration. The first patient looks at this and is please, "I am so relieved; I was afraid there would be metal showing." The benefit received exceeds expectations and, provided the cost in is line, this patient will enjoy a quality product. The same crown on a patient who sees exactly what they expected but nothing more will be less pleased. If the procedure took longer than expects or the staff were rude, the expectation will exceed the delivered product and the patient will judge the product to be of inferior quality. In all three cases, the features of the crown are identical, but the judgment of quality differs. The role of cost in this equation will be discussed below.

Dentists tend to underestimate the importance of treatment presentation with regard to quality. Overpromising to get sales automatically lowers quality. That statement is true regardless of the objective level of treatment a dentists is capable of delivering. Quality, augmented

products are the essence of marketing. One should be cautious not to make the first step a misstep by attempting to manipulate patients' expectations.

Place

Other than the first one, product, all of the other Ps are poorly named. That is certainly the case with "place," which really means channels of distribution or ways of making contact with customs and making products available to them. Nevertheless, place has a much stronger effect on dentistry than does either price or promotion.

Here are some dental "places." A practice exists in a small rural town, a lower-middle-class bedroom community, a wealthy suburb, or downtown in the finance district; the perception of quality will differ in each place. Immediately, an experienced dentist can frame hypotheses about what kind of dentistry will be offered, how many staff members are employed, and even how long the typical appointment will last. Or consider this one: on an Army base, recruits are ordered to attend the dental clinic. But it will be different from the clinics, sometimes called "mills," that cluster in the poor parts of towns, especially where immigrants live. Place also includes the network of providers. Marketing of services differs when several general dentists are supported by an array of specialists and especially when there are long-standing connections between general practitioners and specialists such as diagnostic radiographic centers. At the other extreme, there really are folks who have "something like a dental degree" who might see you Thursday evening in their garage.

The concept of comprehensive dental care must certainly be stretched and twisted if it is to fit all the ways oral health care is provided. There is no one dental market: there is a large range and the elements coexist.

In a city such as San Francisco, 35% of dental practices are marketed with a fictitious business name. Patients no longer go to see Dr. Brown, the guy who coaches kids' soccer and married your cousin. They make an appointment at Happy Smile Dental Care and take an appointment with whoever happens to be on duty the afternoon they come in. Forty-three percent of these are unregistered with the state board of dentistry as required. About one-quarter of phonebook listings that mention characteristics of the practice claim to have a Web site. I am never certain whether that statuesque beauty with the knockout smile is the young owner of the practice or a patient or just a model. The dentistry "place" is changing.

Another aspect of the delivery channel is the use of auxiliaries to leverage care. Average staff sizes have grown continuously since the 1960s and are now almost four per dentist. Orthodontics is in the forefront of the virtualization of dental care delivery. The fastest growing form of practice among licensed dentists is as an employee for another dentist. The attention of organized dentistry is currently, and appropriately, fixated on changes in "place" outside dentist-controlled practices which represent alternative channels of delivery. As such, these are marketing forces that are not well understood and potentially could be enormously disruptive. What we have failed to recognize because it has been steadily and gradually creeping up on us is the changes within dentist-owned practices in the way care is marketed.

The pivotal role of place in professional service organizations such as medicine, dentistry, law, and accounting was identified by David Meister. He noted that, unlike other businesses, professional organizations cannot really increase profits by working harder or adding top professionals. In the dental office, the dentist is the chief economic engine and the dentist's time is fixed. Two dentists seldom generate even twice the business, but they require twice the income.

There are two options available to professional service organizations for increasing profits. First is leveraging work by delegating it to less highly compensated employees. Dentistry figured this out and is doing wonderfully. Second is getting better customers. Dentistry has also identified this strategy. Replacing Medicaid patients with those on good private insurance plans is a sure way to increase revenues per hour. Going to all fee-for-service or boutique models is even better. The single simplest way to select better patients is by means of practice location. Place of practice may be the largest ethical decision any dentist ever makes. Those who say that we do not have an access problem, we have a problem with distribution of dentists, fail to realize that these are the same thing.

Promotion

Most of promotion is advertising, but the concept also includes discounts, rebates, newsletters, public relations, gifts, and finders' fees. Joining the Rotary Club to increase one's visibility in the community would count as promotion. Sales pitches for add-on services such as whitening and tissue rehydration are advertising, even when presented within the office. Promotions are any appeal intended to influence consumer behavior.

J.C. Penney had a problem with advertising, and he expressed it this way: "I know four dollars out of every seven I spend on advertising are wasted. I just wish I knew which four they were." What Mr. Penny was trying to figure out was

the complex challenge of promotion, which involves matching a target audience with a message and medium for the sake of a desired behavior.

Market Segmentation and Message

Penney would certainly have been wasting his dollars if he failed to have a clear idea of who he wanted to reach. "Anyone and everyone" is too vague and includes such diversity that an effective appeal to one segment will be ignored by another or even found to be offensive. Most dentists do not want more charity cases. When organizations mix their customer bases it is called "cannibalizing"—sales to one group erode sales to another rather than adding to the overall customer base. Tiffany cannot have sales; Disney cannot do kickboxing; some attorneys defend dentists while others prosecute them. Effective locks on a market segment preclude migration to other segments.

The critical questions to ask regarding market segments are how well the segment matches the strengths of the practice and how large the segment is. Dentists who like routine and efficiency and dislike picky and demanding patients had better stay away from boutique practices. Many are attracted to the idea of cash-only practices, but the market turns out to be too small where they practice to make this practical. A few innovative practitioners have attempted to match the segmentation in small markets by segmenting their practices. Monday and Tuesday they see the high end; Thursday and Friday they see the rest.

The second part of the marketing puzzle is determining what response is hoped for. There is a natural progression in customer response to any product or program. It begins with awareness. These ads are easy to spot: "Introducing...," "Technological breakthrough in...," and "New office location..." The next level is interest. This type of ad relies heavily on touting benefits: "More miles per gallon," "Look and feel younger in two weeks..."

or "A beautiful smile, guaranteed." A higher level of advertizing involves the call to action: "Come in for a test drive this weekend," "Operators are standing by..." and "Convenient appointments available." Finally, there are ads designed to maintain customer loyalty. For the most part these make few claims and promote name recognition and overall positive feeling. "Thousands of people just like you stop at the sign of the WhatEver every day in Prairie Country." A lot of Penney's money was likely wasted by trying to call for action on products his customers did not even know existed or continuing to promote features and benefits without ever converting that into action. Typically, dentists are more forgiving of ads from their colleagues if they stress awareness or loyalty, and they find the ones that call for action to be most offensive.

The message must match the target audience and the intended response. It should dictate the media. Television advertises in the newspaper and radio advertises on billboards because the first two activities are managed predominantly in the kitchen and the latter two in your car. General real estate agents advertise on groceries shopping carts and high-end agents advertise in glossy local travel magazines, often next to boutique dentists. Commercial real estate agents join the Chamber of Commerce. Dentists have long known that the most effective medium is making suggestions to one's best patients that the dentist would be happy to see the friends of these patients.

Branding

A currently fashionable term in PR is "branding." But the idea is not well understood and tends to be confused

There is almost nothing a dentist can do by way of delivery systems, price, or advertizing that will compensate for poor treatment.

with name recognition. Achieving a consistent look and feel is very useful, but that is not a brand. What do you think of when you imagine Penney? Convenient, inexpensive, generics,... that was the Penney's brand for years and the firm is struggling to reinvent (rebrand) itself as attractive to mid-income customers. Have someone ask some patients on your behalf what one or two words come to mind when your name is mentioned. That is your brand. You may want to stick with it or you may want to get an extreme makeover. We have a dentist near where I live who has a distinct brand among community members and colleagues: "He's the guy with all those big billboard ads!"

The American College of Dentists has a brand, although we have never done anything other than internal marketing: We stand for ethics in dentistry. Some other organizations in the profession are struggling to brand themselves. This is a difficult proposition and the twin traps to being vague ("We are the leaders in what matters") and presenting a conflicting image ("We have a single-minded commitment to the follow six ideals") can consume any organization's PR budget.

Combining what has been said about the target market segment, the expected response, and the message and medium, the logical conclusion is that any marketing beyond building a good reputation by focusing on the product (good dentistry) is likely a waste of time and money for dental practitioners. Individuals who are not patients don't go to the dentist because of an ad—they go because of pain. Patients who would switch from one dentist to another in

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response to an ad are going to be the most marginal kind of customers. They are not the ones a practitioner wants to attract; among other reasons, they are the ones who will leave the practice soonest for another advertiser.

There really are few advertisers among dentists. I recently built a database for all practices placing a listing in the San Francisco Yellow Pages. Twenty-five percent of the members of the San Francisco Dental Society have no Yellow Pages listing. Fewer than 5% of practices had what is called a display ad: something a column inch or larger that contains information other than name, address, phone number, and ADA recognized specialty. It was true, however, that those with display ads were more likely to have fictitious business names to shield the identity of the practitioner and to have had suspended or disciplined licenses.

Direct-to-Customer Advertising

Patients are being exposed to a kind of advertising that did not exist fifteen years ago. In 1997 the Federal Trade Commission (FTC) approved direct-to-customer ads on television. The only other country that allows this is New Zealand.

The latter half of the nineteenth century was the heyday of patent medicine. The name derives from the fact that it was allowed to be marketed by the government if a drug had a patent. The patent certified that it was unique, but there was no requirement that it should demonstrate either efficacy or safety. The American Medical Association at the turn of the century confronted the "pharmaceutical" industry and offered this deal: physicians would prescribe only drugs marketed through physicians and not directly to patients. It took a few years, but we all know that the drug companies sacked their copy writers and hired detail men and women. Of course, there were and still remain abuses in

that system, but the FTC relented to lobbying from Big Pharma a little more than a decade ago and opened up direct-to-customer marketing. The result has been a boon from rerun channels on TV and the creation of a new group of conditions American did not know they suffered from until a pill was created to cure it. There are relatively few direct-to-customer ads or infomercials in dentistry, but the Web is a blooming source of confusion.

The Food and Drug Administration regulates labeling of therapeutic claims (the ones with the full page of fine print) and cosmetic ones which do not involve prevention or treatment of diseases or other health problems. Cosmetic claims are easy to spot. They contain untestable assertions like "I feel younger" and "My friends say my teeth look whiter." What the FDA does not regulate is "natural" products, which include herbs and other products made from natural ingredients. Some of these can be dangerous.

Price

Dentists and oral healthcare policy experts make the mistake of equating the cost of dental care with fees charged. This is a holdover from the misperception that health behavior follows economic rules such as supply and demand. It does not. Supply is fixed but demand is nearly unlimited, so prices are enormously elastic—demand does not track price well. The point has sometimes been made that an appreciable proportion of Americans would not seek dental care if they were paid to go. The connection between fees as a measure of price and care-seeking behavior is further complicated by the fact that only about half of dental treatment is paid for out of pocket. Five percent comes from the gov-

ernment, and 45% is pumped in as new money by insurance companies, largely as transfers from companies, to dentists in a fashion that is artificially holding up the profits for practitioners, including those who see no insurance patients.

All of this price insensitivity makes price a very weak lever in dental marketing. Certainly, product and place matter much more. In fact, patients are not strictly price sensitive at all; they are cost sensitive. Think of it this way. Dentist X practices in Winnemucca, Nevada, and charges about $800 for a crown. One patient is a woman who works at a manufacturing firm in town with a generous insurance program and a liberal time off and child care system. Another patient with an identical condition indicating the need for a crown is a farmer with no insurance who is trying the get the harvest in without help and lives three hours from Winnemucca. In this case, the fee (price) substantially overestimates the impact on the woman and just as substantially underestimates the impact on the farmer.

Patients consider oral health care from the perspective of total cost. This is not even best measured in terms of dollars. The driver of health action is what else could be done with the money, time, and personal self-image instead of going to the dentist.

The quality equation was introduced in the section on the oral health care product. It was explained that patients judge quality as the surplus of received benefit over expected benefit divided by cost. Now it is possible to complete this analysis. It has already been noted that practitioners can improve quality by both adding value to their product and by creating realistic expectations in the informed consent and treatment planning phases. (It can be added parenthetically that a risk for backlash exists if advertising is a substantial part of the marketing

package since ads tend to inflate expectations.) The quality equation clearly focuses the role of cost: judged quality goes up when cost goes down.

But dentists should be cautioned not to confuse cost with price. Price should be set by the requirements of maintaining the practice and not the desire to attract patients. Fees should not be lowered in an effort to attract patients: price competition generally works to undermine whole industries and is singularly inappropriate in the professions. What dentists can do is lower costs for patients. More convenient hours and locations, better patient scheduling, avoidance of unbundling that causes patients to be sent many places many times, help with insurance, and even training on the behavior expected of a good patient all reduce patient cost. Whether this is regarded as "super augmentation of the product" or reasonable cost control, anything that can be done to make it easier for patients to play their part in the oral health experience is good marketing.

Recommended Reading

Books on marketing are legion, and they sell because they are well marketed. The selections below offer something special to dental practice. Each summary is about three pages long and conveys both the tone and content of the original source through extensive quotations. These summaries are designed for busy readers who want the essence of these references in 20 minutes rather than five hours. Summaries are available from the ACD Executive Offices in Gaithersburg. A donation to the ACD Foundation of $15 is suggested for the set of summaries on service marketing; a donation of $50 will bring summaries of all the 2010 leadership topics.

Hinton, Tom, & Schaeffer, Wini (1994).
Customer-Focused Quality: What to Do on Monday Morning.*
Prentice Hall: Englewood Cliffs, NJ. ISBN 0-13-189630-x; 272 pages; about $22.

"Throughout this book, we have emphasized three recurring themes: first, the importance of having an unshakable faith and commitment to a quality process; second, the importance of truly understanding your customers' requirements and assessing your ability to meet those requirements; and third, the continuing need to communicate and educate your employees in the ways of quality excellence and reward them for their progress and results."

Gale, Bradley T. (1994).
Managing Customer Value: Creating Quality & Service that Customers Can See.*
New York, NY: The Free Press. ISBN 0-02-911045-9; 424 pages; about $33.

Research using PIMS: Profit Impact of Market Strategy data. "Quality as perceived by the customer is the most important single long-run determinant of market share and profitability." "Market-perceived quality is the customer's opinion of your products (or services) compared to those of your competitors'. Customer value is market-perceived quality adjusted for the relative price of your product."

Leebov, Wendy, Afriat, Susan, & Presha, Jeanne (1998)
Service Savvy Health Care One Goal at a Time.*
Chicago, IL: American Hospital Publishing. ISBN 1-55648-225-6; 276 pages; cost unknown.

This book is a description of a culture improvement exercise at Albert Einstein Healthcare Network in Philadelphia, including a rich supply of exercises, handouts, announcements, and check-lists. Illustrated extensively with the three service issues of making good first impressions, giving explanations, and handling complaints. "The idea was to select one important values objective and have every team and every individual—at every level and in every job—work toward that same objective at the same time in a synchronized fashion."

Maister, David H. (1993).
Managing the Professional Service Firm.*
New York: The Free Press. ISBN 0-02-919782-1; 375 pages; about $40.

Maister is a former Harvard Business School professor who now consults exclusively to professional service firms. These are groups such as lawyers, accountants, consulting firms, and physicians who provide intangible services, normally on a retainer or repeated per project basis where the essential ingredient is professional knowledge and skill. The book is a mixture of short chapters and modified previously published journal articles. It is relatively free of theory and long on insight and even contains outlines of practical activities for direct use in professional service firms. Maister's basic point is know your business, know your clients, and work for long-term results—and, because professional service firms are unlike other forms of organization, the general management literature must be customized.

Schneider, Benjamin, & Bowen, David E. (1995)
Winning the Service Game.*
Boston, MA: Harvard Business School Press. ISBN 0-87584-570-3, 295 pages, about $25.

Despite its "beg or tricks" title, this is a thoroughgoing management text on creating and operating an organization competing in a service industry. The suggestions are practice and comprehensive. They are also grounded in research and classical management theory such as marketing, human resources, and operations. Its 300 pages are easy reading, free of both the extremes of faddish popularism and academic jargon. The fundamental messages are: (a) customers are part of your service firm, (b) select, train, and reward point-of-contact employees to deliver service quality, (c) support the contact employees with back room information and resources, (d) integrate all functions in the firm to deliver seamless service, (e) create a total service culture.
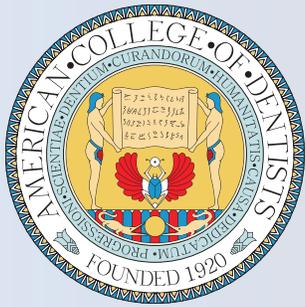
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