

The Future of American Dental Education and Research

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Making statements about the future of our profession, the education of future practitioners and oral health research is risky at its best, downright foolish at its worst. When asked to do this, my initial reaction was to remember one of New York Yankee Yogi Berra's famous quips. It was something like "It's tough to make predictions, particularly when it involves the future." So you lament privately "Why do people ask you these questions?" You know that most people discard your predictions because they know you are mainly guessing; or, they believe they know otherwise and cling to their own equally misguided guesses. You can find some comfort in knowing there is little risk at making bold predictions because of short memories. Furthermore, if by chance your predictions turn out correct, you can remind people how accurate your future thinking was. For those predictions you make that turn out to be bogus, well you keep too yourself. Another way of rationalizing this project is to claim it is scientific experiment and your predictions are really hypotheses you plan to test over time. Sound better.

Assumptions

So to approach this project, I am going to assume the future is not just something that will happen without some control by the participants. In science fiction stories about time travelers, the travelers are often careful not to do things that change history for fear they will no longer exist. Thus I believe our future profession will evolve based on the major influencers of today. Who are these influential people, groups, entities, and environments? My observations tell me they are the future students, the future faculty, organized dentistry, the governments, the economy, foreign countries, and science & technology. Clearly these seven factors are not independent variables and are each correlated to each other; however they arguably create a framework for predicting the future.

Future Students

Annually since 1998, Beloit College has published its Mindset List that describes the characteristics of incoming college freshmen. According to the website, "The Beloit College Mindset List was initially a witty way of saying 'watch your references,' and has turned into a globally reported and utilized guide to the intelligent but unprepared adolescent consciousness." The list tends to point out the uniqueness of the experiences of students from a frame of reference of more mature portions of our population. The most recent edition is for college freshmen in 2010, or the future college graduating class of 2014. Of the 75 statement on the Mindset List, twenty seemed of most interest to me in understanding the students we will see in the first year dental classes and dental hygiene programs in the next 5-7 years. The numbers preceding each statement is the Mindset List number. My musings of each statement are in *italics*.

1. Few in the class know how to write in cursive. *We should be prepared to administer essay tests using electronics instead of paper and pencil.*
2. Email is just too slow, and they seldom if ever use snail mail. *They all will have smart phones or some similar yet to beand expect to receive information instantly. Connectivity will be ubiquitous.*
8. With increasing numbers of ramps, Braille signs, and handicapped parking spaces, the world has always been trying harder to accommodate people with disabilities. *More students with disabilities, even severe disabilities, will be entering dental school.*
10. Entering college this fall in a country where a quarter of young people under 18 have at least one immigrant parent, they aren't afraid of immigration...unless it involves "real" aliens from another planet. *The dental school will become internationally oriented naturally. The majority of students will speak more than one language and will want to understand dentistry and health care beyond the borders of the US.*
19. They never twisted the coiled handset wire aimlessly around their wrists while chatting on the phone. *The expectation will be that nothing has to be plugged in. Even electrical power will come through the air or at least will be generated by movement of their bodies.*
20. DNA fingerprinting and maps of the human genome have always existed. *Students will expect: Diagnosing caries in teeth using crude methods like a sharp probe will be replaced by biological methods. Periodontal disease risk and personalized treatments will be accomplished with mucosal swabbing or saliva sampling.*
23. Leasing has always allowed the folks to upgrade their tastes in cars. *Expect that students will not find old and worn out equipment satisfactory. Old and worn out might be just six months old.*
26. Unless they found one in their grandparents' closet, they have never seen a carousel of Kodachrome slides. *Everything will be stored electronically from now on.*
28. They've never recognized that pointing to their wrists was a request for the time of day. *We need to know when to let go of old devices go.*
33. Second-hand smoke has always been an official carcinogen. *Intolerance for unhealthy conditions will grow, including people gathered in darkened classrooms.*
41. American companies have always done business in Vietnam. *Peace signs will not have the same meaning to future students.*
43. Russians and Americans have always been living together in space. *Students no longer believe the US has all the answers or the best of everything. They will expect that we expose them to knowledge generated by dental research from around the world.*
44. The dominance of television news by the three networks passed while they were still in their cribs. *Students will expect to learn from many sources and be able to select the source they prefer.*
50. Toothpaste tubes have always stood up on their caps. *It must have some meaning to the future of dental education. I just have not figured this one out yet.*
61. Presidential appointees have always been required to be more precise about paying their nannies' withholding tax, or else. *Let us hope this means we are ushering in a higher level of ethical consciousness.*
62. Having hundreds of cable channels but nothing to watch has always been routine. *Having hundreds of lecture hours but nothing presented in an interesting enough format to learn.*

68. They have never worried about a Russian missile strike on the U.S. *Students realize our enemies are not well defined and trust in government to protect them is held with skepticism. This results in students less likely to take our word on things just because we represent the institutional authority.*

71. The nation has never approved of the job Congress is doing. *There will be little tolerance for poor teaching performance. Students may start to ask for tuition refunds.*

72. One way or another, "It's the economy, stupid" and always has been. *Tell me the bottom line! How good will my education be and what will it cost me? Student will ask these questions. As tuition becomes a larger and larger portion of dental school budgets, even state supported schools will start to look like private schools. For the brightest and most talented students, they may no longer see much advantage to being a "resident applicant" and instead seek the best bang for their buck at any dental school.*

A video made by a class of students in cooperation with their instructor at Kansas State University examines how students spend their time and the relevance of the traditional classroom to learning. This 2007 video has nearly 4,000,000 viewers on YouTube. The video has many messages but it clearly highlights the multitasking nature of most students. As part of the project the students surveyed themselves on how they spend their time.

| Activity | Hours |
|-----------------------|--------------|
| Sleep | 7 |
| TV watching | 1.5 |
| Online | 3.5 |
| Listening to music | 2.5 |
| Talking on cell phone | 2 |
| Attending class | 3 |
| Eating | 2 |
| Studying | 3 |
| Working | 2 |
| | |
| Total | 26.5 |

If you sum these average hours they total 26.5 hours, a sign of multitasking for sure or perhaps a symptom of the poor math skills in our country. Most interesting is they only spend 6 hours per day in traditional learning activities – 3 hours attending class and 3 hours studying. How much of their learning is happening in the 3.5 hours online, the 2 hours talking on the cell phone, the 2.5 hours listening to music, and the 2 hours eating? These total 9 hours. I believe we need to accept that our organized and structure learning activities are not their only source of information. Have you looked on You Tube lately? Perhaps we as faculty should spend more time defining learning

expectations, creating better assessment methods, more time mentoring, and less time trying to teach. Technology and financial incentives will drive the creation of consortiums to create shared instructional resources.

Future Faculty

Dental school faculties have become less competitive scientifically for funding from the NIH and other federal sponsors. When the National Institute for Dental and Craniofacial Research (NIDCR) was called the National Institute for Dental Research (NIDR), the NIDR funded mainly research in schools of dentistry. Now the NIDCR funds grants from medical schools and other health or biomedical science schools. Dental schools no longer can count on being awarded the funds from NIDCR. In the past few years, NIDCR and ADEA have collaborated to develop strategies to enhance the competitiveness of dental faculty. A quote from a recent NIDCR program announcement entitled "Planning Awards for Research Infrastructure and Capacity Building in Dental Schools" point out where dental schools need to head.

"NIDCR has expanded its research support portfolio to address these complex interactions in the genesis of oral, dental and craniofacial diseases and disorders. The growth in the scientific areas of interest has been accompanied by a parallel shift in research emphasis from traditional disciplines to new approaches involving molecular medicine and other tools of modern biomedical research. The areas of scientific opportunity include genomics, proteomics, stem cell biology, biomimetics and bioengineering, pharmacogenetics, gene transfer and gene therapy, clinical genetics and molecular epidemiology, cell engineering and bioinformatics. These areas of scientific opportunity require not only an appropriate research infrastructure, but also cross-disciplinary interactions between investigators with solid skills and competencies in new and expanding areas of science."

Very few of the US dental schools are able to compete in these science areas. The majority of new dental schools that have opened or are planned are not associated with research intensive universities. Thus we will have even more schools and faculty that lack research competitiveness. For many years the focus of NIDR funding was specific to the diseases of caries and periodontal disease and on materials engineering. These were the purview of dentistry. No longer will dental researchers be successful by staying within these narrow focus areas. Collaboration is cool, isolation is deadly!

So where will we find research faculty for dental schools? They will need to come from other health sciences, engineering, public health, and information science programs. We will need to recruit more broadly than ever imagined to hire successful research faculty.

I think I am a rare example of someone who finished dental school and went right into teaching. Certainly we need to do a better job of developing dental faculty from our

students, but the reality is few of our students will complete dental school or dental residency and enter academia. I do think we can influence this if we commit to loan repayment assistance programs and offer competitive clinical practice earning potential. We can also improve our recruitment of new graduates into teaching if we improve the dental school educational experience. Remember, the student on the Beloit Mindset List of 2014 will be educationally qualified for faculty positions starting in 2022. That gives us 12 years to make dental school so educationally thrilling that many graduates will want to stay after graduation – if we can help them repay their loans. Despite our great intentions, I feel we will still fall short. To improve our chances, dental schools will need to brand themselves as faculty incubators.

Now enters the private practitioner who has been successful, is looking for a change, still wants to work, has taken good care of themselves and remains healthy. These people have much to offer us in providing practical experience, understanding the business aspects of dental practice, and connecting students to organized dentistry. There are many of these dentists out there because in the 1970 and 1980s there were over 5000 graduates per year and now there are just under 4000 per year. An ADA survey in 2006 found nearly 40% of practice owner were over 55 years of age. As these practitioners look at their options, they are finding fewer dentists to purchase their practices. Thus if they still would like to retire from private practice, they may be faced with closing their practice rather than selling it. A full-time faculty position, or a 40-80% faculty position, might look very attractive to them. In looking at the demographics, we may be fortunate to have more dentists looking for teaching positions than we have positions. This would be very good for our clinical programs.

A major challenge for dental schools will be to integrate the researchers who will be coming from non-dental areas with clinical faculty who went to dental school under the old science. The key will be to retool the dental curriculum with much greater integrated basic and clinical sciences. Thus the new science researchers and the old science clinical faculty will learn from each other.

Influence of Organized Dentistry

What the American Dental Association, and its components, do (or perhaps more importantly what they do not do or is not able to do) stands to influence dental education greater than anything else. Organized dentistry can control scope of practice and the integration or lack of integration of dentistry into the larger health care system. As dentist, we have enjoyed being part of the health care system when we wanted this benefit, and not part of the health care system when we did not want the downside. Specifically, dentistry has been able to stand outside the health care system when it comes to insurance reimbursement and have been far more successful than our medical counterparts in not losing control of our fees to third parties. The reason for this is because the American Dental Association speaks for all dentists and about 70% of dentists are members of the ADA. As a profession, we are about 80% general dentist and 20% specialist and this has remained relatively constant. In medicine, the numbers are reversed and most physicians are more closely tied to their specialty organization

rather than to the American Medical Association. The old saying "divide and conquer" is applicable to what has happened to the medical profession. Medicine made it easy for external groups to exert control because they divided themselves. Maintaining market share of membership in the ADA will be a challenge for us and the ADA leadership is worried about it. Loss of this powerful market share is critical to the well being of dental education. Below are some quotes taken from the ADA website that highlights the concern.

The ADA Membership Outreach Team offers the Top 10 Reasons to be an ADA Member in 2010:

1. More than 157,000 ADA members make it possible for dentistry to be heard in Washington, which is vital since more than 1,300 pieces of legislation directly affected the oral health industry in 2009.
 2. Help potential patients find your practice with the enhanced Find-a-Dentist feature launching in early April on the new ADA.org.
 3. Access tools and tips to help you practice more effectively with the new Dental Practice Hub.
 4. Enhance your patient communications with the new member logo, member specialty logos and ADA.org web button.
 5. Make informed decisions with the ADA Professional Product Review and with free survey research.
 6. Take advantage of reliable continuing education at ADA annual session or online (www.adaceonline.org and JADA Online CE at <http://jada.ada.org>).
 7. Stay informed with respected print and electronic publications like The Journal of the American Dental Association, JADA Online and ADA News.
 8. Find support and financial security with ADA Insurance Plans, ADA Members Retirement Program and ADA Business Resources.
 9. Apply relevant science and research for your patients with the ADA Center for Evidence-Based Dentistry.
 10. Support programs that make a difference in peoples' lives through the ADA Foundation, Give Kids A Smile and Oral Longevity.
- For more reasons to be an ADA member, visit www.ada.org/goto/150reasons.

Notice that dental education, except continuing education, is not even addressed in this list of top 10 reasons to be an ADA member. Supporting the infrastructure for the future of the profession is not listed as a top ten reason to be an ADA member. I suspect most ADA members do not think about why it is important to them as dentists to have robust dental education. The day to day experiences of the private practitioner does not provide them any reminders of why it is important to worry about dental education. After all, they have their education already. Some way we need to change this.

The American Dental Education Association (ADEA) on the other hand is a clear advocate for dental education and research. However, its membership can never approach the market share of the entire profession of dentistry and thus will always have limited influence on the profession. Now do not take me the wrong way on this, I am not saying that ADEA is not important to dental education because for dental educators, it does provide far more support than the ADA provides. Politicians and policy makers are far more likely to pay attention to what the ADA lobbies for rather than what ADEA lobbies for. So my premise is what happens to the future of dental education will be influenced by the degree to which the ADA decides to become further engaged in the educational systems. Furthermore, the overall influence of the ADA will be controlled by its market-share of dentist membership.

The ADA website goes on to include concerns about loss of market share and concern about membership among some key groups, including dental school faculty. This a good thing because it could mean increased interest by the ADA in the dental faculty and in our dental schools.

Also in 2009:

- The Association's market share decreased 1.1 percentage points from 70.2 percent in 2008 to 69.1 percent.
- The total market of active licensed dentists increased by 2,965 compared to an increase in market size of 1,618 from 2007-08. Since 2001, the market has increased by 19,978 active licensed dentists—an average of 2,497 the last eight years.

"It's a challenging time in today's economy for all associations," said Dr. Buckenheimer. "While we are growing our membership, the market is growing even faster. We're holding steady near 70 percent and identifying ways to keep pace."

The National Recruitment and Retention Report also tracks ADA membership in target markets (e.g., women dentists, dental school faculty, general practitioners, specialists, federal dental services, foreign-trained dentists, minority dentists and new dentists)—almost all of which saw growth in 2009. The Council on Membership is already developing ways to enhance membership for target markets such as dental faculty.

"Faced with budget cuts at universities, these are tough times for faculty members," said Dr. Buckenheimer. "Faculty are important when it comes to advising students on professionalism, so we are considering membership incentives for this group."

Women dentists are another high profile target market, said Dr. Buckenheimer.

"Dental school enrollment for women is considerably higher than it was in the past, and we are researching their needs to find out what is most meaningful to them to keep them as members," he said.

Recall the fight in the General Assembly this past winter regarding the legislation to prevent dental insurance companies from being able to control fees dentist charge on non-covered services. If this legislation had not passed, a dental insurance company could include in their contract with participating dentists that the dentists would have to limit the fees they charge on services that are not covered under the insurance plan. A scenario would emerge like this. The insurance plan does not cover implants and the patient has no benefit for those services, however, the dentist cannot charge more than \$x for the implant service. The Virginia Dental Association was recently awarded an ADA Golden Apple Award for their work in getting the legislation passed in Virginia to stop insurance companies from being able write such contracts. In fact our dental students were a major part of the lobbying. Can you envision the VDA going to the mat with the General Assembly over ensuring competitive salaries for dental faculty? Or, for money to support dental research? Are not these vital to educating students and keeping the curriculum on the cutting edge? We need to work with organized dentistry to help them understand how to help dental education and dental research because it is in the best interest of the entire profession.

We also need to pay more attention to private practice dentistry and model training more like private practice. It is interesting that dental education is the only health profession that does not use community-based or hospital-based clinical experiences for essentially 100% of student's clinical experience. I am not suggesting we move to that model and it is not possible anyway. I am suggesting we bring private practice modeling into dental school clinics. Should we stop calling our facilities clinics? Why not call them dental offices? I believe if we do not move in this direction, organized dentistry, perhaps more locally than nationally will exert more accountability on dental education.

The debate is raging in organized dentistry over the so called "mid-level" provider. The final endpoint of this debate is unclear. Alaska and Minnesota have adopted these providers and large foundations such as the Pew and Kellogg foundation are supporting these concepts to improve access to oral health care for the underserved population. If the scope of dental practice changes with the creation of alternative providers, it will certainly shape dental education. If the profession (meaning organized dentistry) limits the expansion of alternative providers, there will be little need to substantially alter dental education because the scope what dentist do will remain the same. On the other hand, if the profession fully embraces alternative providers, many of the procedural skills that only dentists may perform will be provided by alternative providers. Dentist will provide higher level assessment and diagnosis, and provider management. The alternative providers will execute procedures. This will provide opportunities for change in dental schools. Change in what dental students have to be competent to assess and diagnose. Change by providing education for alternative providers. The financial implications for training alternative providers are unclear but will be costly, just as

training dentists is costly. It is important to note that in Virginia, there is a limited pilot program in the Lenowisco and Cumberland Plateau Health Districts in Southwest Virginia being evaluated to allow dental hygienist to see high risk children without a dentist for the purpose of assessing problems, family education on oral health, and the arranging for the children to see a dentist. So the mid-level provider concept is already active in Virginia.

Influence of Government

The actions of government that will have the largest impact on dental education and research are health care reform type legislation (including the mid-level provider issues), NIH budget setting, accountability and regulations, and higher education reform and support.

Last week the first changes to health care from the legislation passed six months ago went into effect but will have little impact on dentistry. They include not denying children for preexisting conditions, keeping children on parent's policies until age 26, and lifetime limits on coverage. We will have to wait what, if any, changes the legislation will affect access dental coverage but it does not appear this landmark health care reform bill will not have much influence on dental coverage. Children and people in institutional settings would seem to take priority. The latter would mostly be the aged and this group will increase dramatically. Mounting political pressure and noted cases of patient deaths from untreated dental disease, will force the government to eventually get involved and mandate some basic level of dental care. For children, it is mainly finding the money to pay of the care. If the money was there, private dental practices and dental schools could step up and meet the demand for care. Additional provider training would be needed. The aged population is far more complex because of their location. Let us assume there is money to pay for geriatric dental care for non-ambulatory patients, the bigger question is how do you deliver the care? Do you use mobile systems to go where the patients are? Do you develop transportation plans to dental offices? Who will be qualified to treat these patients with the overlying complex medical histories and reduced ability to follow directions? This will impact research and education in dental schools to try to find solutions that are efficient and effective. There will also be legal and policy issues to consider with this group such as risk management and consent for care.

The government will fund the development and implementation of electronic health records. There is a program available now called the Medicaid and Medicare EHR Incentive Program to encourage dental offices to adopt electronic health records. The VCU Health System is planning to make application with the CERNER system in the hospital. We have started to investigate how to apply for this funding for axiUm but axiUm is not yet on the government certified list. We have been in contact with the software vendor to try to get them moving on this. It is complex to say the least. This trend will likely continue as having interchangeable electronic health records is considered a health care cost saving strategy and should lead to better health outcomes. It will also open the door for population health studies and evidence-based

medicine studies since long-term follow up of patients will be possible. Dental schools need to stay in the forefront of EHR development. This must be priority for budgets of dental schools.

I have already commented on the mid-level provider debate but in the end, what is decided will be decided by governments through a tug-a-war public policy debate. Government itself knows little about oral health care so the elected leaders will make legislation based on who tells the most compelling story. However in the end, it will be decided based on cost to deliver satisfactory care. If the mid-level provider concepts can be shown to deliver quality care at a lower cost of training and delivery, then it will become a reality. People will demand the quality. The real question is the cost. Will it actually be less expensive than just paying for dentist to deliver the care is the important question?

In the 1970's the federal government funded expansion of dental schools and dental school enrollments. In 1971, there were 3,775 graduates from US dental schools. By 1983 the number of graduates from dental schools had increased to 5,756. By 1990 the number of graduates dropped below 4,000 as schools closed and other schools downsized their enrollments. Recently the number of graduates has risen by a few hundred. In the year 2000, the last school closed and the first new school opened at Nova Southeastern University in Fort Lauderdale. In the past ten years more new schools have opened, mostly private schools. The new dental school near to VCU is at Eastern Carolina University in North Carolina. With the new schools that have opened since 2000, and with those under consideration or discussion, by 2020 we may have 20 additional dental schools compared with the number we had in 2000. I believe it is unlikely state and federal government will make any major financial commitments to higher education in the next ten years. The exception to this would be promote greater interprofessional or interdisciplinary training and this will only be one-time project money and not permanent budget support. New enrollment will come from higher tuition rates and state supported schools will more and more look like private dental schools. The differential between resident and non-resident tuition and fee rates will shrink over time.

The future of dental research will be driven primarily by the money available from the federal government and industry. The NIH budget expanded rapidly from 1995 to 2005 in the so called doubling of the NIH budget campaign. Predictions indicate staying level at best. The past two years of the American Recovery and Reinvestment Act funding added \$10B but that was only one-time funding. Given the federal deficit and new expenses likely from health care reform, it is not likely that the NIH budget will grow in real terms in the next decade. Plans to grow research enterprises in dental schools will be challenging assuming a basically flat NIH budget. Only schools that make aggressive plans to create highly competitive interdisciplinary research programs will be successful. Significant resources from the school will be needed to recruit scientists who can compete for the existing pool of funds. In other words, for every funded grant proposal to your dental school, there has to be a non-funded proposal somewhere else.

| Funding Appropriation to NIH in Billions of Dollars | | | |
|--|---------------|-------------|--------------|
| Year | Appropriation | 5-yr Change | Total Change |
| 1995 | 11.3 | | |
| 2000 | 17.8 | 6.5 | 6.5 |
| 2005 | 28.5 | 10.7 | 17.2 |
| 2010 | 31.0 | 2.5 | 19.7 |

We can count on increased governmental regulations and oversight of universities, health care facilities, and research institutes. For dental schools, the relationships with industry will be scrutinized as well as how they manage grants and contracts. The administration of schools will need to add expertise to stay ahead of changes and to ensure employee and student training. I hate to bring this up but there will more required training, like HIPAA, effort reporting for grants, and risk management. I would predict that for large dental clinical facilities, like those in dental schools, we will see some type of health care accreditation similar to the Joint Commission that accredits hospitals. Currently the quality of clinical care in dental schools is assessed during the program accreditation reviews that take place every seven years (every five for Oral and Maxillofacial Surgery). These are scheduled visits with plenty of advance warning that the review team is coming. A system of spot checks without warning against standards will eventually come to dentistry. Since the use of sedation and general anesthesia for dental procedures will continue to increase, this will be a driving factor for some type of periodic, unannounced reviews. Like dental program accreditation, the schools will have to bear the cost of funding these patient care quality reviews by paying an annual fee to the accrediting organization. Environmental protection regulations will also increase and large facilities will be scrutinized more. Mercury use will remain a focus. Dental amalgam will eventually disappear from use which will have significant curriculum and faculty preparedness implications.

Influence of International Partners

Despite the challenges to US higher education, it is still considered a desirable product internationally. Governments of developing nations will increasingly turn to the US for higher education assistance. Schools of dentistry will have opportunities to educate more international students. These will be students at all levels from pre-dental through advanced dental education. There will also be a demand for dentists to come for intensive continuing education programs or curricula in areas such as implants, surgery, anesthesia and sedation. This provides a great opportunity to create post DDS curricula. Continuing education will move from random courses offered by isolated experts to well defined curricula that build on the DDS training. When students graduate, they could be provided with a five-year continuing education plan. The use of distance and online educational formats combined with onsite hands-on training are opportunities dental schools should use to their advantage. Lastly, more foreign governments in developing countries will be seeking help to develop dental programs in their countries.

The Economy and Financing Dental Education

I mentioned earlier that we need to plan for no additional funding from state governments for the next ten years. Except for incentive payments for reform of health care delivery or education, we cannot expect any additional recurring funding from the federal government. We are fortunate that dental residency slots are not capped under Graduate Medical Education. This does offer the opportunity to initiate new residency programs affiliated with hospitals to train advanced dental education students. In these scenarios, the hospital can receive direct and indirect GME funding to cover the educational costs for the residents and salary for the residents. For dentistry, new programs in pediatric dentistry and dental anesthesiology would be the best areas to consider for new hospital-based training programs. At VCU we have both of these opportunities available to explore.

The estimated cost to educate a dental student is \$80K to \$90 per year per student. I do not believe any dental school charges tuition and fees at this level, but private schools are approaching this level. We are in a perfect-storm period of declining taxpayer support and large student debt levels. Tuition will have to rise to continue to offer quality education and keep pace with technology. Quality education will be primarily dependent on recruiting and retaining excellent faculty. To be successful, dental schools will have to improve in offering competitive compensation packages for faculty. A recent ADA News report showed the average dentist income in the South Atlantic region was \$241,270. Recruitment of high quality clinical faculty is dependent on keeping pace with private practice salary levels. Dental schools have generally failed at this over the past 20 years. The pace at which tuition and fees rise will increase will depend on how successful dental schools are at enhancing clinical revenues and controlling educational costs. Many medical schools have implemented so called Mission Based Management systems to examine and appropriately allocate resources. Dental school budgets and accounting systems are extremely complex. Schools will need to be able to better understand what it cost to deliver the components of its educational programs, research and patient care to use it funds wisely and to answer accountability inquiries. A large component of MBM is transparency of budgets because real improvement in efficiency will come from little things members of the entire institution do on a day to day basis rather than any single thing administration does. To quote the noted business writer and speaker Tom Peters, "What you measure improves." Regular review of performance metrics by everyone in the school is crucial to success. When people better understand that what they do individually makes a big difference, they change their behavior toward improved performance.

The recent announcement that 25 year old Facebook CEO Mark Zuckerberg of Facebook gave \$100 million dollars to Newark Public Schools to improve the infrastructure and education has people wondering. He is being applauded for his philanthropy but also criticized for trying to counter his image in the recent Facebook movie that portrays he stole the Facebook concept. In corporate America, companies are amassing cash because they are not hiring. Now is a good time to try to get a game

changing donation like this for dental education. Certainly children's dental health would be an appealing purpose. Short of this type of donation, fund raising will become scientific and metric driven so that donor interactions are aimed at the best prospects. Wealth screening for finding potential donors and quality donor stewardship are critical tools for dental schools and their parent universities to have in place.

Predictions

- 1 - "50 in 5" meaning 50% less lecture hours in five years.
- 2 - Learning will happen everywhere from preferred sources which will not always be the local faculty.
- 3 - More students with disabilities entering dental school.
- 4 - Students will have little tolerance for poor quality education at high prices; schools will need to partner to provide the best teaching that exists (instructional consortiums).
- 5 - Dental schools will seek research faculty from other health sciences, engineering, public health, and information sciences.
- 6 - Without significant incentives, dental schools will continue to be challenged in recruiting new graduates to faculty positions unless the private practice world becomes less attractive.
- 7 - The age of the clinical faculty will continue to increase as second career private practitioners enter the faculty ranks.
- 8 - Integration of the "new science" research faculty and clinical faculty should improve dental curricula by better integration of basic and clinical sciences.
- 9 - We will have a new type of mid-level provider working under direct dentist supervision completing procedures that formally only a dentist could do.
- 10 - We will have a greatly expanded public health program for oral health that includes use of a mid-level provider for screening of oral disease and facilitating access to dental office or clinics.
- 11 - These new providers will not lower the cost of delivering high quality oral health care, but will create market forces to contain costs. Organized dentistry will pay more attention to dental education.
- 12 - Dentistry will continue to be pressured by the insurance industry to cut costs. Dental schools clinical facilities will be called dental offices rather than clinics. Some will be outside the main school buildings and into the community.
- 13 - Dentistry will continue to be pulled into the overall health care system.
- 14 - Curriculum will change by exposure of students to other health professions training; simulation is a great venue for this.
- 15 - Research in dental schools will involve many non-dental people.
- 16 - Accountability and regulations will increase particularly for clinical facilities and environment impact; dental amalgam will disappear.
- 17 - Governments of developing countries will continue to seek expertise of US higher education. This will lead to a continuum of dental education: pre-dental; dental, advanced education; and continuing education in structured curricula. US dental schools will assist with establishment of dental programs in developing countries.
- 18 - State supported dental schools will look more like private dental schools relative to tuition and donors.

19 – To control costs, dental schools will use principals of mission based management to create incentives to improve efficiency.

20 – Dental schools will increase revenue from clinical service, international contracts, and continuing education curricula.