



# ISSUES FACING DENTAL EDUCATION AND HOW TO ADDRESS THEM

L. Jackson Brown, DDS, PhD, and Larry Meskin, DDS, PhD

**D**ental education currently faces several significant issues that must be addressed if it is to experience a healthy and vibrant future. And all concerned — practitioners, educators, researchers, and the public — have a vital stake in securing that bright future for dental education. Without a high quality, economically viable education system, the nation cannot replenish its supply of dental professionals. Without such a system, the public will not have continued access to the world's best oral health services. And without such a system, the chances of future scientific breakthroughs are diminished. Too much is at stake. We cannot afford to let dental education fail, even in part. Nor can we afford to let it decline in quality until it is considered more a trade than a learned profession.

The origin of these issues can be traced to the rapid changes that the profession has experienced. Dentistry's many advances have greatly expanded the capabilities of the individual dentist, as well as the entire practice of dentistry. As dentistry's capabilities have expanded, the scope of dental practice has broadened. Today's dentists must be better prepared and more competent than ever before.

As the profession has advanced, the nation's dental education system has responded. Indeed, dental schools have been in the forefront of dentistry's

many advances — conducting research, testing innovative practices and training students to practice effectively and efficiently. Dental schools continuously “raise the bar” for the profession, increasing the requirements that their programs must meet as each new challenge is achieved.

Today's dental educators are expected to provide classroom education and clinical training, to teach students to use new and emerging technologies and to instill professionalism and integrity in their students. Dental schools must invest in new technologies and modernize laboratories, expand course curriculum, recruit specialized faculty and enhance research and clinical capabilities.

As a consequence, the cost of dental education continues to increase. Every component of the dental program, from faculty and administrative staff salaries, to supplies, building maintenance, technological investments and clinic operations has been affected. At the same time that costs have been escalating, revenues have been difficult to expand. Public support, in particular, has slackened. Many schools have found it difficult to offset ebbing revenues with major cost economies without threatening important educational programs. This has created a financial hardship for dental schools and placed them under grave pressure to limit costs of operation and delay capital improvements.

Over the last four decades, con-

clusions from a variety of national reports on the state of dental education have indicated the need to focus on its high cost. Failure to do so, observers have warned, could undermine the entire future of the dental profession. Responses by educators have been largely on an individual school basis employing limited approaches, rather than a concerted effort engaged by the entire dental educational system. Skyrocketing tuition, high student debt, vacant faculty positions and aging physical facilities now have led many concerned and knowledgeable individuals to now believe we have approached the crisis stage in dental education. Others, while not choosing to use the word, “crisis,” agree that understanding the underlying issues impacting dental education is crucial to its eventual reform.

The limited approach to the reform of dental education may be partly attributed to a deficiency in available economic research and documenting and interpreting the economic issues facing dentistry.

---

**Authors** / L. Jackson Brown, DDS, PhD, is associate executive director, Health Policy Resources Center, American Dental Association.

Larry Meskin, DDS, PhD, is director of Continuing Education, University of Colorado School of Dentistry, where he also was past dean and former vice president. He is past editor of the *Journal of the American Dental Association*.

Brown LJ, Meskin LH, editors. *The Economics of Dental Education*. Chicago: American Dental Association, Health Policy Resources Center, 2004. © 2004. American Dental Association. Reprinted by permission.

Although several previous reports have described the underlying problems confronting dental education, little economic research has been conducted regarding these issues. Without the marshalling of the most appropriate and accurate data and without detailed investigation of these issues, solutions remain uncertain and elusive. Decision-makers, with inadequate information, understandably hesitate to make fundamental changes. This monograph begins to address the needed economic research.

### **An Economic Perspective on Dental Education**

The perspective taken in this monograph is that the difficulties facing dental education are fundamentally economic. While noneconomic issues do exist, and are important, unless a sound financial foundation can be secured for dental education, these other issues cannot be effectively addressed. Moreover, the economic issues facing dental education are systemic — that is, they go to the very structure of the enterprise. Sources of funding are changing. Public funds for dental education are diminishing. Operating costs of dental schools are increasing. Student debt is soaring. These financial developments have created the financial dilemma that dental schools are experiencing.

This monograph reviews the economic forces that drive the dental education system. It also presents a variety of innovative strategies undertaken by dental programs across the country that attempt to enhance revenues, reduce clinical costs, and improve operational efficiency. For example, many schools have increased student tuition to previously unimagined high levels. Contributing authors caution that the rising level of student tuition is likely to impact the diversity of program applicants and discourage debt-laden graduates from practicing in low-income communities or less financially rewarding specialties and practices. Some dental programs

are entertaining proposals to enter into relationships with noneducational organizations, affiliations that could significantly impact the philosophy and structure of dental education. Some schools have delayed building maintenance and deferred technological investments, steps that may impair future training. Despite such actions, many programs are in difficult financial straits.

Dental education has always been costly to provide, in large part due to the expense involved in maintaining clinical training programs. Considerable agreement among leaders of dentistry exists regarding the nature of the problems and the need to address them successfully, and soon. The consequences of inaction are clear: If the financial position of dental schools continues to deteriorate, fewer programs will be available that offer high-quality education, the nation's access to quality care will be jeopardized, research and innovation will decline, and both the public and profession will suffer.

As emphasized by contributing authors, underlying economic forces shape the markets for dental education and dentistry in the United States. Economic forces influence the location of schools, the availability of teaching faculty, the level of student tuitions and fees, the financial viability of the nation's dental education programs, and the number of student enrollment opportunities. This monograph provides in-depth analysis of key economic factors that drive dental education and the challenges facing the dental education system.

### **Economic Issues and Options**

The first six chapters of the monograph describe the economic trends unfolding in dental education and analyze the major economic issues challenging dental education. The last six chapters discuss promising programs to address these issues.

Setting a framework for the monograph, Chapter 1 presents an historical overview of the dental education

system. Comparing dentistry's clinical training arrangements with those of medical education, the authors note that dental programs absorb high per student clinical expenses while medical programs are able to pass such costs on to hospitals, which are reimbursed, at least in part, for patient care provided.

The economic attractiveness of dentistry as a profession is addressed first because all else depends upon it. The first prerequisite for a vibrant dental education program is the ability to attract talented students into the profession. Without a talented student body, the entire enterprise is compromised. Since a talented and dedicated faculty is an essential component of a successful educational program, a second and related requisite is the ability to entice talented professionals to a career in dental education. From an economic perspective, neither of these crucial requirements can be satisfactorily accomplished unless dentistry, as a career, remains financially attractive compared to other career options available. Similar reasoning applies to maintaining a talented dental school faculty. That career option must be attractive compared to other options, such as private practice, that are available to graduate dentists. While financial reward is not the only factor involved in both of these decisions, it is an important element and can often tip the decision one way or another.

Once a dental school enrolls a talented student body to be taught by a well-qualified faculty, a school must secure the revenue to operate its education programs and to maintain its facilities and invest in new technologies. How much revenue will be required depends on the costs of operating the school. Costs, in turn, depend strongly on the size and efficiency of the operation. A predominant portion of those costs is the expense required to maintain a talented staff. Economics teaches that all of these issues are interrelated,

affecting one another in an integrated system of continuous feedback.

In order to address the attractiveness of dentistry, one must first understand the characteristics of its labor market. In Chapter 2, the labor market for dental schools is described from an economic perspective. In this chapter, the basic elements of economic markets are applied to determine whether a shortage of dental faculty exists. If a labor market is functioning, economists do not use the term "shortage" to define transient shortfalls in faculty. Indeed,

financial attractiveness of a faculty career, the results are not as encouraging. Using trends in the level and growth of dental school faculty salaries, ROR for a career in dental school faculty based on faculty salaries is estimated. ROR estimates vary based on type of faculty. For example, total compensation ROR for nonadministrative faculty (clinical, basic science, and research faculty) ranged from 14.2 percent to 17.1 percent for full-time clinical faculty. Chapter 3 reveals that dental schools can effectively compete in the market

and are likely to continue to do so. This has forced dental schools to rely more on private sources of funds, such as tuition, clinic income, and philanthropy. Chapter 4 provides a number of strategies to improve financial viability, including improvements in clinical efficiency and productivity. A potential change in clinical education that promises to reduce costs is partnering with organized dentistry to move portions of high-cost clinical education into the community.

If the privatization of dental school funding continues, the revenue sources of public schools will converge toward the revenue pattern exhibited by private schools. This is likely to cause public schools to behave more like private schools in their overall operating policies and in their admissions criteria. Tuition and clinic income will grow more important as sources of revenue. One might also expect that public school staffing patterns will change to more resemble those of private schools.

Given that economic factors are critical issues, the structure and efficiency of dental schools are crucial to their survival. Dental schools utilize various resources at different rates to train dentists. Total annual expenditures per DDS equivalent averaged \$78,763 in fiscal year 2002, but ranged from \$39,739 to \$142,871. This variation is too wide to be solely explained by variation in regional input prices (i.e., variations in the cost of doing business). Variation in structural and operational efficiency as well as in the intensity and quality of training across dental schools may be additional reasons.

In Chapter 5, the focus is on the structure and efficiency of dental schools. The authors found that private schools, on average, registered lower costs than public schools. Private schools maintained this cost advantage, even after adjustment for regional cost of living, size of school and other factors. Chapter 5 shows also that the intensity of training is an important contributor to cost, and that the quality of the student body

INDIVIDUAL DENTAL SCHOOLS FACE UNIQUE  
PROBLEMS in ATTRACTING and EMPLOYING  
FACULTY BECAUSE DENTAL SCHOOLS ARE IN COMPETITION  
WITH PRIVATE PRACTICE OPPORTUNITIES in  
THEIR SEARCH for FACULTY.

the labor market for dental faculty seems to be functioning but faculty supply lags behind increases in applications and enrollment. Although the situation may be one of market lag, individual dental schools face unique problems in attracting and employing faculty because dental schools are in competition with private practice opportunities in their search for faculty.

In Chapter 3, the focus turns to the rate of return earned by dental students that choose faculty positions. ROR encapsulates in one summary measure the financial attractiveness of dentistry and is critical to understanding the likelihood of the profession to compete with other learned professions for the bright young individuals choosing a career. The authors conclude that dentistry exhibits a very high ROR. This is a sanguine indicator that dentistry remains a very financially attractive career and that dental schools will continue be able to attract a talented student body.

Switching to the analysis of the

for dentists who want employed positions in dentistry. However, because of the large disparity between faculty compensation and private practice income, especially among specialists, the ability of dental schools to compete with private practice is very limited. This situation is likely to continue into the future and force dental schools to rely on faculty recruitment through dentists retiring from other salaried positions or faculty from foreign dental schools.

The changing sources of revenue represent another economic issue facing dental education. Chapter 4 provides a comparison of trends in dental schools' revenue streams with their operating expenses to examine financial strength. The financial situation of individual schools varies significantly. In 2000, for example, 24 dental schools reported total revenue exceeding expenses by as much as 55 percent, while 16 schools reported deficits reaching up to 30 percent of total expenses. The analysis shows that public sources of revenue have declined

(measured by DAT scores) is inversely related to cost — the more talented the student body, the less the cost per student. The analysis clearly indicates that school size is important to the costs of dental education, and that the current sizes of U.S. dental schools, as a group, are systematically too small to realize all of the potential cost savings that might accrue from a larger size.

While the authors call for increased efficiencies, they find that the small size of some schools generally limits their potential to realize as much efficiency as could be achieved with a larger size. An analysis of dental curriculum and its costs is then presented in Chapter 6. Here, the authors examined three issues: 1) the structure of the curriculum and variation in curriculum hours among schools; 2) the relationship between basic medical science and clinical curriculum hours and the cost of education; and 3) the associations among basic medical science and clinical curriculum hours and performance on national board examinations. The authors noted that over the past two decades, the number of basic science hours has declined among the curricula of U.S. dental schools. The concern voiced is that the commitment to basic science has become perilously low, compared to the preparation needed for dentists to practice effectively in an environment of increasingly complicated co-morbidities and complex therapeutic regimens. The dental practice of the future will require a sound foundation in the basic sciences to allow dentists to integrate a variety of clinical and laboratory information and to effectively collaborate with the entire health care team.

In addition, the authors of Chapter 6 found that several factors were associated with lower total expenditures per student. On average, these expenditures were less among private schools compared to public schools. They were also lower among schools that had larger classes, gener-

ated less revenue from intramural faculty practice and from extramural research activities, and had fewer basic medical science hours. Finding a positive and significant relationship between hours of basic medical science curriculum and Part I of the National Board scores, but not between hours of curriculum and Part II scores, the authors recommend strengthening the accreditation and certification systems used to regulate dental schools to differentiate among schools and students with widely different educational programs.

The remaining chapters of the monographs describe some of the options that have the potential to increase efficiency and reduce the cost per student. Any

U.S. DENTAL SCHOOLS, AS A GROUP, ARE SYSTEMATICALLY TOO SMALL TO REALIZE ALL OF THE POTENTIAL COST SAVINGS THAT MIGHT ACCRUE FROM A LARGER SIZE.

reform that aims to accomplish these objectives must be able to deliver one of two payoffs. Either, the program must reduce the cost per student, or it must move the student through the education process more quickly so that a student's preparation is completed in a shorter time. Since staffing expense, especially faculty budget, is the predominant source of expenditure for dental schools, new approaches must efficiently utilize that costly resource and ultimately permit a reduction in staffing per student ratios. Staffing efficiency can potentially be realized by using technology to reduce staffing requirements.

One option is the use of simulation in preclinical teaching. This reform offers the prospect of moving students more rapidly to the dental clinic while requiring less space and fewer staff. If this payoff can be realized, students could become more productive sooner, and the

option of extramural experience could be commenced earlier. Both eventualities hold the prospect of reducing costs.

Chapter 7 examines clinical program costs. Changes in curriculum, infection control concerns and, advances in technology have forced dental schools to modernize preclinical facilities. Based on the University of Louisville's experience as an example, dental schools are encouraged to consider simulation clinics. Dental school simulation clinics promote better communications between disciplines, use state-of-the-art technology and provide clinic-like operating conditions. Moreover, in the University of Louisville example, using half of the lab space of the previous

preclinical lab, the simulation clinic contributes about \$ 1 million dollars in cost savings. Additional savings were also achieved by replacing discipline-specific clinics with general practice clinics for third- and fourth-year students. At the University of Louisville, the general practice clinics increased productivity by 39 percent and contributed to higher national rankings on the National Board Part II.

Is research a partial answer to the financial crunch facing dental education? Certainly, research programs can provide a school with an infusion of financial support, but the important issue to consider is whether research programs can generate net revenue with which to support other educational endeavors. To assess this issue, Chapter 8 describes one the most successful research programs among U.S. dental schools. The University of California at

---

San Francisco is among the leaders in the amount of research conducted and the amount of research funds received.

The author concludes that a research program is not a major solution to the financial issues facing the didactic and clinical portions of dental education because research programs do not generate a large amount of discretionary income. Nevertheless, research offers many benefits including, for example, the ability to hire additional staff and faculty, purchase advanced equipment and modernize laboratory facilities. Research programs can generate external as well as internal prestige for a dental program, helping to establish that program as a key element in the intellectual mainstream of its university and making the dental program more attractive to prospective faculty and students.

The author cautions that building a sponsored research program requires an organizational commitment of resources and administrative expertise, and may not be the best organizational option for many excellent dental programs. Nevertheless, a vibrant research program within the nation's dental schools is critical for the enterprise to maintain its recognition as a high quality academic undertaking.

Intramural practice has been mentioned as another possible relief for dental schools dealing with a financial crunch. Medical education has been able to incorporate the teaching model within an extensive intramural faculty practice program. With this model, health care and education are jointly produced. A substantial portion of medical school education has been shifted to hospital and outpatient settings. Moreover, medical education has been able to support a notable proportion of its educational expenses with funds that are targeted to provide medical services. Dental education has yet to develop a comparable model of similar scope.

To explore the revenue generating potential of this strategy, Chapter 9 provides an overview of key aspects of intra-

mural faculty practice plans, including organizational issues, governance issues, revenue management and operational issues at the University of North Carolina Dental School, which has one of the largest intramural practice programs. Chapter 9 describes potential benefits that can be realized from intramural practice. An effective intramural program can enhance faculty commitment and loyalty. It permits new faculty to more easily establish an ongoing group practice, and it can improve administrative management (e.g., peer review, infection control, HIPAA compliance). In addition, intramural practice can help with faculty recruitment by helping to make total faculty compensation more competitive with private practice. Finally, an intramural program can provide some discretionary funds for the school.

However, to have a major impact on the cost of dental education, an important characteristic of intramural practice in dental schools must be changed. Traditionally, intramural practice has not been well integrated into the teaching mission of the school. Unless education and faculty practice can be integrated similar to the medical model, faculty practice will continue to be separated from the education of students and will reduce the time for educational activities of those faculty that participate. This lost educational activity will have to be provided by other faculty. The net result may not be improved staffing ratios.

It has often been noted that, unlike medical schools, dental schools must run their own clinic operations, instead of transferring this responsibility to hospitals. Clinic operations in dental schools have typically not generated net revenue. Even the most efficient programs find it difficult to break even with their clinic operations. One promising solution to this economic issue is to transfer a portion of the clinical education experience outside of the dental schools to extramural sites. In principle, this could reduce clinical operat-

ing expenses, provide additional care to some segment of the community, and provide the receiving clinical site with additional dental staff.

The University of Colorado School of Dentistry has one the most extensive and longest running extramural programs, and as such, is the topic of Chapter 10.

Community-based dental education's potential to reduce the cost of predoctoral education has captured much attention. The most critical issue will be applying sound strategies for implementing pre-competency CBDE and for developing competency within CBDE. As extramural programs play an increasing role in undergraduate education, savings in clinic expenses must be realized by reductions in clinic staff and other expensive clinic inputs.

Finally, to fully understand the economics of dental education, it is important to appreciate the extent to which the demand for, and supply of, dental education is influenced by the nation's economy, societal trends and developments within dental science and technology. Economics teaches that the demand for dental health professionals derives from a demand for dental services. In turn, the need for dental schools and dental educators derives from the demand for practicing dentists. Clearly, the entire system is interrelated. Changes in society that impact the demand for dental services will, given time, influence the size and distribution of the dentist work force, as well as the capacity and structure of the dental educational enterprise.

Chapter 11 looks at the market for dental education in the country as a whole. While evidence indicates that there is adequate dental capacity at the national level, some regions of the country are underserved, partly due to recent population trends. Though market forces will address this issue, supply side responses take time and several strategies are suggested to speed the process and train more

students who are likely to practice in areas that require greater dental capacity.

Regional market coordination should be strengthened for several reasons. First, each region and state confronts somewhat different demographic and economic trends that influence dentist work force requirements. National averages obscure these regional and state differences. The lagged work force response to changes in population engenders short-term regional and state work force imbal-

ances. Given time, these imbalances will be redressed by the natural flow of dentists in response to economic opportunity. However, if the U.S. population continues rapid migration, the market adjustment mechanism could be playing “catch up” for an extended period.

encourage dental students to consider locations that most need their services. While each chapter addresses a different topic relevant to the economics of dental education, almost every contributor raised the issue of efficiency and suggested that dental education programs consider strategies to become more efficient. In Chapter 12, empirical data based on a 2003 online survey of dental school deans are provided to guide program changes. Most of the survey’s 47 respon-

encourage dental students to consider locations that most need their services. While each chapter addresses a different topic relevant to the economics of dental education, almost every contributor raised the issue of efficiency and suggested that dental education programs consider strategies to become more efficient. In Chapter 12, empirical data based on a 2003 online survey of dental school deans are provided to guide program changes. Most of the survey’s 47 respon-

riencing fundamental stresses on both the revenue and cost sides of the enterprise. One of the main findings of this monograph is that dental education has experienced a financial hardship. Public support, in particular, has slackened. This trend has resulted in the increasing privatization of the funding of dental education. With this shift in funding, public schools will begin to behave more like private schools. Costs have increased substantially at the same time that revenues have been difficult to expand. These trends are likely to continue. As a result, dental schools will continue to be under severe pressure to control costs. These economic forces driving dental education are likely to continue and the full community of practitioners, educators, researchers, and the public must jointly engage in responding to their effects.

## DENTAL EDUCATION is EXPERIENCING FUNDAMENTAL STRESSES ON BOTH THE REVENUE and COST SIDES of the ENTERPRISE.

Better regional coordination also offers several benefits to dental education. Over time, regional planning for dental education can begin to analyze the interregional movement of students, graduates and practitioners. Well-designed regional programs have the potential to improve the efficiency of dental education and to control costs. Regional programs create opportunities to sharing of faculty and resources among schools, expand distance-learning programs, and explore novel approaches to dental education. One promising approach is for students to receive some of their basic science education at a local academic center, and then receive intensive clinical preparation at the dental school, before returning to their local communities for further clinical experience. The potential cost savings of such an arrangement can be considerable, and such strategies may

dents indicated that they had undertaken an efficiency-enhancing program during the past five years. Clinical initiatives addressed off-site clinics and outreach programs, curriculum, patient care, and productivity. Deans also reported many other efforts as well, including improvements in information technologies, laboratory procedures, and use of space.

### Next Steps

As demonstrated in this monograph, dental education functions within an economic framework. Most dental care provided in the U.S. is financed privately. Patients, businesses, and third-party carriers financially support private market dental services through their purchasing and payment decision-making. As a result, the dental delivery system, functions, by and large, as a nationwide arrangement of interrelated dental practice and dental education markets. These markets have national, regional, state and local dimensions, and they respond to economic factors from both the demand and the supply sides of the market.

The chapters in this monograph analyze the key economic issues facing dental education. Dental education is experi-

encing fundamental stresses on both the revenue and cost sides of the enterprise. One of the main findings of this monograph is that dental education has experienced a financial hardship. Public support, in particular, has slackened. This trend has resulted in the increasing privatization of the funding of dental education. With this shift in funding, public schools will begin to behave more like private schools. Costs have increased substantially at the same time that revenues have been difficult to expand. These trends are likely to continue. As a result, dental schools will continue to be under severe pressure to control costs. These economic forces driving dental education are likely to continue and the full community of practitioners, educators, researchers, and the public must jointly engage in responding to their effects.

While this monograph analyzes the major economic issues in dental education, it cannot provide a full blueprint to solve all of these problems. That blueprint will have to be designed along the way. Fundamental changes in the structure and management of dental education will be required. Sound management and business principles will need to be implemented. The monograph describes several promising options for addressing these issues. These need to be expanded. New and novel strategies will need to be developed. As these options develop, different models should be piloted. Initial steps should be incremental to allow unforeseen complexities and unintended consequences to become apparent. Moreover, the political consensus for fundamental change in dental education does not currently exist. It will have to be carefully and prudently built. Before more dramatic initiatives are undertaken, smaller steps should be attempted. While all of these potential pitfalls will cause the prudent to be cautious, one thing is clear — dental education is experiencing severe systemic difficulties. These difficulties are unlikely to disappear on their own. **CDA**