

Evolution of Dental School Clinics as Patient Care Delivery Centers

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Abstract: Dental school clinics, originally envisioned as closely similar to private practice, evolved instead as teaching clinics. In the former, graduate and licensed dentists perform the treatment while undergraduate dental students are assigned treatment within their capabilities. In the latter, dental students provide the treatment under faculty supervision. It is generally recognized that the care provided by the teaching clinics is inefficient. However, in the last quarter of the twentieth century, dental school clinics began to pay much more attention to how treatment is rendered. The comprehensive care movement and quality assurance systems are leading towards more efficient patient-centered care. Case studies at the University of Maryland, Columbia University, and University of Louisville describe activities to make their clinic programs more efficient and patient-friendly. This article explores whether the potential exists for faculty to take a direct patient care delivery role in dental clinics in order for those clinics to become efficient patient care delivery systems as originally envisioned in the early part of the twentieth century.

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The dental education system in the United States is being urged to change by several different sources. The 1995 Institute of Medicine (IOM) report, *Dental Education at the Crossroads: Challenges and Change*, was a comprehensive review of dental education and made many recommendations for the future.¹ Today, both the American Dental Association (ADA) and the American Dental Education Association (ADEA) have initiatives under way to determine strategic changes that schools need to consider. The Pipeline, Profession, and Practice: Community-Based Dental Education program, under the leadership of the Robert Wood Johnson Foundation and with the collaboration of the California Endowment and the W.K. Kellogg Foundation, major

national foundations, is testing the value of off-site community-based clinical education and diversity in schools.² The Macy Study,³ funded by the Josiah Macy Jr. Foundation to assist in this process of determining new directions, is concentrating on assessment of the financial trends of dental schools and devising strategies that will strengthen their financial well-being and academic vitality. As one part of the Macy Study, the purpose of this article is to take a historical view of the dental clinics that schools operate and project in what directions they could change in the future. We selected the dental clinics as one of the areas of interest due to the fact that they provide a significant setting for the clinical education of students and because they are cost centers that require

considerable subsidy. The purpose of this study was to determine whether school clinics are on a pathway to become patient-centered and positive cost centers in the overall financing of dental schools.

Therefore, this article will 1) describe the slow evolution of dental school clinics to more efficient patient-centered care, 2) present case studies of three schools in their transition toward patient-centered clinics, and 3) discuss the benefits of reorganizing dental clinics even further to patient-centered care. For our purposes here, the term “patient-centered care” or “service-first” philosophy⁴ refers to a concept that places what’s best for the patient as the central focus of an organized system of care in contrast to a system set up to educate students. Properly organized, such a system can provide an excellent setting for the education of students.

Background History

Dental schools have operated clinics from their inception. The 1926 Gies report⁵ describes the clinics as follows:

Every dental school has an infirmary, which is the analogue of the hospital and dispensary in medical education. Direct chair-side treatment of patients, *under conditions closely similar in all significant respects to those of private practice* [emphasis added], has been a fundamental procedure in dental education since the establishment of the first dental infirmary in the Baltimore College of Dental Surgery in 1846.

When Gies conducted his extensive studies from 1919 through 1925, there were forty-three dental schools operating in the United States. In the same year, those forty-three schools derived 79 percent of

their revenue from tuition (51 percent) and patient care revenue (28 percent). Over the past eighty years, the percentage of revenue from patient care has not grown, and surprisingly in 2005, it was 25 percent less as a percent of revenue than it was in 1924-25.⁶ As demonstrated in Table 1, patient care revenue today is 21 percent of school revenue in contrast to 28 percent of revenue in 1924-25. Tuition in 2003-04 for all schools was 27 percent of revenue. For private schools it was 51 percent of all revenue, the same as in 1924-25. In 2003-04, tuition was 15 percent of the revenue for state schools; however, state and local funding picked up an additional 24 percent of state school funding.

In general, shrinking government support for educational and service delivery programs, in particular, has challenged higher education and academic health centers. Given the inability of government support to keep pace with inflation or to assist in undertaking necessary improvements,⁷ dental schools are under continuing pressure to reconsider their sources of revenue. Patient care revenue has the potential to contribute more to overall revenues and should be reexamined, especially since current data⁶ show that the expenses to operate school clinics are at least 21 percent (\$70 million greater) or more than the revenue derived from patient care. Closing the gap between revenues and expenses in the dental clinic and viewing the patient care programs as a net contributor become signal goals for the continued vitality of dental schools.

One of the reasons that clinic revenue has remained relatively constant and even declined as a percentage of total revenue since the Gies study relates to how dental schools have organized patient care programs. These programs did not develop, as Gies observed, under conditions closely similar in all significant respects to those of private practice. Instead, dental school clinic programs developed as

Table 1. Comparison of key revenue sources between 1924-25 and 2003-04 for all U.S. dental schools

	1924-25	% of Revenue, 1924-25	2003-04	% of Revenue, 2003-04
Revenue	\$5,810,045		\$1,923,449,517	
Expenses	\$5,558,472		\$1,914,495,739	
Difference between revenue and expenses	\$251,573		\$8,953,778	
Tuition and fees	\$2,858,602	51%	\$522,702,910	27%
Patient fees	\$1,538,394	28%	\$394,841,547	21%
State/local government			\$471,232,445	24%
Total % fees/income		79%		72%

teaching clinics in which students, rather than clinical practitioners, are typically the primary providers of care. It is generally recognized that these clinics are inefficient providers of care and dissimilar in most respects to private practice. It is not clear why dental schools did not continue to operate their clinics as Gies observed in his 1926 report; however, recruiting adequate numbers of full-time clinical faculty to take on both the instructional and patient care provider roles is one possible reason.

Is it possible for dental school clinics to become more efficient providers of care under conditions closely similar in all significant respects to those of private practice? Private practices could not exist if there were a 21 percent gap between expenses and revenues. The answer to this important question requires unraveling the complex relationship between the role of the dental school clinic as an educational setting for dental students/residents and its responsibility to provide high-quality patient care.

In the late 1920s, Alfred Owre, a prominent former dean of two dental schools (University of Minnesota and Columbia University), identified three principles for operating “service” clinics as part of dental schools.⁸ They were:

1. Highly qualified graduate and licensed dentists will perform the treatment, with undergraduates limited to providing only “as much treatment as they are prepared for at any given time and which they can do without difficulty or delay.”
2. The clinic will provide the highest quality of care by intelligent planning, in an expeditious manner and “in an environment which will make it highly desirable for people of discrimination to go there for their dental work.”
3. The clinic must be self-supporting in order to justify the cost of operation.

In contrast to Owre’s time, today all socioeconomic groups, not just “people of discrimination” (a term used in Owre’s time to connote wealth and social standing), expect the same high-quality environment for their care. Everyone realizes that technological advances in dentistry and our knowledge about disease permit a variety of different treatment plans, ranging from expensive to cost-effective treatments in order to achieve a healthy oral environment free of infections and pain and that permits good function and esthetics. However, appropriate and practical treatment planning requires the clinician to have at his or her disposal a full range of general dental procedures that can satisfy the requirements of quality care. In the dental school clinic, experienced dentists

acting as practitioners are required if the clinics are to operate as efficient providers of care.

Most dental school clinics did not evolve along the three principles espoused by Owre. Instead of following the first principle—“highly qualified graduate and licensed dentists will perform the treatment”—the providers of care became the novice predoctoral students who, under the Owre model, were to be limited to providing only “as much treatment as they are prepared for at any given time and which they can do without difficulty or delay.” The Owre model was controversial at the time because it was perceived that schools’ clinics would be in competition with private practitioners. Owre held both M.D. and D.D.S. degrees, and he based the model on the attending system of care in teaching hospitals. With the exception of oral surgery clinics that mostly followed the Owre model, most undergraduate dental school clinics strayed from Owre’s principles and, instead, organized teaching and patient care around a system that permits students to meet departmental procedural requirements. Patient care became the secondary by-product of education. As a result, care from school clinics generally became recognized as inefficient with a lack of treatment continuity as patients were passed from year to year and from one student provider to another. Such inefficiency has led to subsidization of dental school clinics in order for them to remain solvent. A study reported to the 2004 meeting of the ADEA Sections on Business and Financial Administration and Clinic Administration⁹ showed that it cost approximately \$50,000 per year to operate a dental student operatory, while national data demonstrated that average dental student charges in 2003-04 were approximately \$11,000 per year,⁶ leaving a gap of approximately \$39,000 (78 percent) between revenues and expenses.

Over the last twenty-five years, dental schools have realized that student requirement systems based on individual dental procedures rather than overall patient treatment did not provide the best approach to student learning,¹⁰ nor was it in the best interest of the patient. The rallying call for this shift was the goal for the new school in 1962 at the University of Kentucky to prepare graduates who are “biologically oriented, technically capable, socially sensitive dental practitioners.”¹¹ Schools needed to be concerned with humanistic values in patient care, and professional behavior became of equal importance to technical competence as a result of this movement. Over the decades of the 1960s, 1970s, and 1980s, the comprehensive care movement became the means by

which schools paid attention to these new values. As a result, there was a reorganization of the clinical education program that has coincidentally benefited patient care. A 1984 study¹² concluded that comprehensive care programs provided students with a broader education and improved the efficiency and quality of patient care. In an extensive review of the literature on the comprehensive care movement in dental schools, Tedesco¹³ summarized the benefits of these programs as follows:

Continuity of care, decrease in patient time in the clinic, broad distribution of clinical problems for learning, clinical problem solving, and treatment provided in an integrated fashion, as well as accessibility and maintenance of a patient treatment base, have been widely described as benefits deriving from comprehensive care programs.

As of 1993 it was estimated that there were forty dental schools operating comprehensive care programs.¹⁴ The comprehensive care movement has led to an understanding that emphasizing the care of patients rather than the performance of individual procedures enhances student learning and that patients have benefited as a result. However, there still remains tension between numerical requirement-driven and comprehensive care systems. While several studies¹⁴⁻¹⁷ have concluded that both systems provide students with similar clinical experience in completing specific procedures, a recent survey of 665 students attending twenty-one U.S. and Canadian dental schools elicited consistent student¹⁸ comments that they neglected patient needs to satisfy procedural requirements.

During the early 1980s, the Pennsylvania Experiment¹⁹ took the comprehensive care movement closer to the concept of considering a system that was best for patient care. In this experiment, the University of Pennsylvania compared two models of patient-centered care to the traditional dental school clinic. The first model, Model A, was a “transitional group practice stressing comprehensive care and increased faculty participation in care”; and the second, Model B, was “a faculty-based group practice in which faculty both treated patients and educated students.” A master clinician track was developed for Model B faculty, which provided the clinical education for a team of postgraduate general dentistry residents (AEGD students) and dental students in the first through the fourth years. In Model B, the faculty took on direct patient care treatment while

mentoring student clinical education. This model is closer to what might be called the patient care model described by Owre. Extensive data were collected to evaluate the outcome of this complex change. When both models were compared to the traditional model, both experimental groups were more successful in educating dental students with a generalist orientation than the traditional model. In Model B, students performed more clinical activity in half the time than students in the traditional program. Pertinent to our study, however, was the finding that Model B produced a financially successful faculty-based practice/educational unit and a self-sustaining general dentistry postdoctoral program. Model B covered all of its costs and had a small surplus, whereas Model A did not. The Pennsylvania study noted that one of the major challenges for this preceptor model was finding and recruiting master clinicians willing to make a commitment to a clinical education approach that combined teaching and practice. It was postulated that schools would most likely need to “grow” their own such faculty. Few schools, if any, have reproduced Model B, presumably because of a lack of highly qualified master clinician faculty able or willing to take on the role of active clinician and teacher.

A decade later the extensive 1995 IOM report, *Dental Education at the Crossroads*, recommended that dental schools consider an alternate approach to student provider clinics: one that has student participation with faculty and postgraduate students in a private practice-like setting. The IOM report concluded that “the patients benefit from this approach and the learning process for the students is structured differently.” The IOM study further noted that the typical dental school clinic “is not patient-friendly” and the focus needs to shift from procedures to patient care accountability. The IOM study understood that reshaping patient care programs would be difficult. The internal culture and traditional view of dental clinics as simply the means to provide clinical education for students were major barriers to overcome.

When viewed in broad terms, there has been a slow evolutionary movement toward patient-centered clinics where the system aims to provide for efficient, quality patient care as a first order of good practice management. However, this movement has not been well described in the literature. There are some examples of systems changes that attempted to accomplish this goal. Because schools are under increasing financial pressures, it is reasonable to assume that one of the few sources of greater revenue

can be found in the clinics. It is further assumed that a movement toward more efficient care will enhance clinic revenues. Descriptions of schools that have evolved toward a system of efficient patient-centered care can be instructive to schools that are looking to increase their clinic revenue as well as enhance their patient care programs.

To select schools for our study, we invited two dental schools that derived at least 20 percent of their total revenue from their school clinics in 2003 to submit case studies. One private school, Columbia, and one public school, Louisville, agreed to submit case studies. We selected another public school, Maryland, to participate in order to capture information regarding its establishment of a corporation to operate clinics. We asked each school to answer the following four questions: 1) whether it had put into place a new clinic system that emphasized efficient patient care as the central focus for a reorganization; 2) what was the system change; 3) what were the benefits of the change in relation to efficiency of patient-centered care, student learning, and revenue production; and 4) what were the challenges they faced in implementing the change. A written case study responding to these questions was prepared by coauthors at Maryland (JH, in collaboration with the Clinical Operations Board), at Columbia (RM), and at Louisville (MP), then was edited by the senior author (AJF) and returned to the coauthors for approval. We do recognize that many other dental schools have moved in similar directions; however, these three school case studies are probably reflective of others and are used here to document strategies leading toward patient-centered delivery systems.

The University of Maryland: Creating a 501(c)(3) Corporation to Manage the Clinics

Background and Framework

To respond more quickly to patient needs and changes in the health care environment and to obtain supplies and materials under a more flexible procurement system, the University of Maryland Dental School recognized the need for more effective management. In the early 1980s, following the lead

established by the medical school, the dental school proposed to senior campus administration that a corporate structure be formed to manage the student clinics more efficiently. This organizational change was proposed to better manage personnel and fiscal matters and to improve control over operational costs. With the help of an attorney who had developed a similar corporation for the medical school, the dental school filed articles of incorporation and bylaws for its initial professional association.

A board of directors and officers were elected to organize the corporation. The board consisted of elected and appointed members representing the predoctoral and dental hygiene student clinics, the advanced dental education clinics, and a reorganized faculty practice. Each clinical department chair was an appointed member, along with the dean, senior associate dean, associate dean for clinical affairs, and assistant dean for fiscal and personnel affairs. In addition, the board included two elected faculty members-at-large. All participants in the faculty practice were stockholders and eligible for election.

An executive committee, the basic operational component of the corporation, met monthly and for special meetings. The executive committee consisted of the president (associate dean for clinical affairs), dean, senior associate dean, assistant dean of fiscal and personnel affairs, executive director, and four elected stockholders (routinely, these were department chairs) that served fixed terms. The annual stockholders meeting was a forum for faculty and staff input; presentation of annual reports (including an audit of corporation records); election of officers and appointees; and changes to the bylaws, as appropriate. Each year the corporation's outside accountant conducted an audit of the financial records, and state auditors reviewed and approved the audit report. Annually, the corporation would propose a contract/budget and forward it to the university president for review and approval. This contract became the basis upon which the clinics were evaluated to have income that met or exceeded expenses. In reality, the clinic revenue had to meet expenses to function and expand the educational programs.

In 1985, to better conform to the university mission, and at the direction of senior campus administration and the University of Maryland Board of Regents, the corporation was converted to a tax-exempt 501(c)(3) entity. This not-for-profit entity was modeled after approaches in other university health care facilities, which mandated that clinical practices be managed through tax-exempt organiza-

tions. From an operational aspect, this change did not require any significant changes in daily corporate activities and was a more appropriate format for an educational entity.

Challenges

Creating this new structure naturally presented a number of challenges—some more difficult than others. A major challenge was managing the dichotomy of employees: corporate staff and others who were state employees. Work week length, vacation days, general personnel policies, payroll, and the benefits package for the corporate employees, for example, needed to be managed with sensitivity to state benefits and work policies.

Out of necessity, an administrative structure was required for the corporation. It was a challenge to achieve a positive bottom line in the predoctoral clinics, where the fee schedule was only about 50 percent of the usual, customary, and reasonable (UCR) fees. In the advanced dental education clinics, the fees were about 70 percent of the UCR. Even when productivity is maximized, students are inherently slower, and because their fee schedules are lower, it added to the difficulty of generating sufficient revenue to meet identified expenses. Low Medicaid fees only add to the challenge of sustaining a revenue-positive operation. Medicaid is an important service component of our institution; however, the low fees (reimbursement percentage) add to the challenge of sustaining a revenue-positive operation.

Concurrent with the implementation of the corporation, the predoctoral clinics were reorganized into patient-centered group practices, with full-time dentist managers responsible for each team of third- and fourth-year students. This nontraditional approach had many critics, primarily among the faculty, and it was perceived as a challenge to departmental autonomy. Vacant faculty positions were used to create new faculty managers for operational start-up. Maryland, like most dental schools, did not allocate all true expenses to the clinics, and therefore to the corporation, underwriting some of the largest costs (such as most faculty salaries, utilities, and fixed school charge-backs to the university). This helped the corporation to succeed and created the impression that the budget was being met or exceeded, but if all the fixed and some variable costs were included, there would not have been a year-end “Fund Balance,” as such. When all of the costs are included, as is the case in community-based clinics, it is very difficult to

meet the budget necessary to maintain the operation *if students are the only providers.*

Overall Benefits

Looking back at the beginning of the corporation, the benefits have outweighed the liabilities. The corporation gave the school the flexibility to adjust to changes in the educational and administrative environment, provided a framework to increase overall student productivity (and learning), and facilitated better working conditions in the patient-centered clinics. But, as long as the primary providers are dental and dental hygiene students, it is nearly impossible to operate a dental clinic (in-house or extramurally) as a “profit center.” Therefore, consideration was given to the use of financial incentives to students and staff to improve productivity. The use of incentives for advanced dental education residents in their last year, based on performance to production goals, was of limited success in increasing revenue. In the early 1990s, clinical productivity incentives were proposed to fourth-year dental students. With input from the student government officers, incentives in the form of partial waivers of clinic use and clinical board examination fees were introduced. Students became eligible for such incentives when they completed their clinical requirements. It was thought that the incentive program would increase overall student productivity and learning, but while there was general faculty support for this approach, the incentive program was not successful in materially increasing student productivity. Incentives to corporate staff were not considered because of concern that side-by-side state employees were not eligible for such consideration.

What follows are six key benefits that were achieved by forming and operating a 501(c)(3) corporation to manage all clinics of the school:

1. By forming a Central Materials Services unit, the corporation was better able to manage the procurement and distribution of supplies, equipment, and materials and to control costs. Using the 80/20 rule (80 percent of your supplies are obtained from 20 percent of your suppliers), the corporation entered into purchasing agreements with several national dental supply companies on a cost-plus basis or purchased directly from the manufacturer in bulk for a better price.
2. The corporation was better able to manage personnel matters, including hiring and terminating employees, as dictated by changes in the health care environment.

3. Using cost centers, the corporation was better able to track true overhead costs and monitor the goal that each center had to meet its financial obligations.
4. Cost centers permitted more efficient assignment of employees, and modifying work schedules and hours, to meet emerging needs.
5. The corporate administrative structure and use of information technology (advanced business software applications) better facilitated monitoring cash flow and performing required audits.

Overall, the development of cost centers increased financial accountability and responsibility.

Lessons Learned

Four lessons emerged from forming the corporation. They are:

1. Forming a corporation to manage dental clinics is worth the considerable effort, but forming a corporation will not by itself ensure financial success. Many more factors (productivity, fee structure, accountability, collections success, controlling expenses, and hours of operation) are involved in attaining a clinic profit center.
2. Clinics in dental schools (or those in community-based settings) that use dental and dental hygiene students as primary providers cannot be called “profit centers” when all costs are factored. Having a mix of students, dental residents, and contract or faculty providers will help to achieve budgetary goals. If the patient population includes indigent care and care of the uninsured, the fee schedule must be able to compensate for the gap created by the traditional Medicaid rates of most states.
3. On-site management by dedicated faculty, students, and staff is necessary to achieve any level of success. “Management by Walking Around” (MBWA) is essential.
4. If all faculty, staff, and students don’t work toward the same team goals, success will be limited or compromised.

Although considerable effort must be directed to fostering a patient- and student-centered clinic environment, constant effort is required to keep the enterprise from reverting back to more traditional department-centered programs.

A New Era for Education and Service

One of the most important lessons learned was the necessity to continue to evolve and respond to the

changing dynamics of providing excellent patient care in an academic environment. The framework that was established in 1985 allowed the dental school to make critical observations that would shape its direction for the future.

The corporate model enabled the school to fully appreciate the dichotomy that existed between the academic administration and the clinic operations. Academic departments faced the rigorous demands of teaching, research, and professional development of faculty and junior faculty, while simultaneously facing the often conflicting demands of managing clinics.

To ensure that neither patient care nor education was compromised, it became clear that an alternative to clinic management by the academic departments was the best solution. Students, patients, faculty, and staff would benefit most by separate academic and clinic governing bodies.

The starting point in resolving the dichotomy came on January 1, 2005, when the dental school officially announced the creation of the Clinical Operations Board (COB). The five-member group assumed overall responsibility for all clinical patient care operations within the dental school. The COB does not issue student grades and has no academic oversight. Like the academic departments and administrative deans, the COB reports directly to the dean, with the associate dean for finance, institutional operations, and planning as the dean’s office liaison.

Since its inception, the COB has been working to improve the overall quality of oral health care and create a patient-centered approach within the dental school. All board members meet at least weekly (often daily) to clarify clinical issues and develop meaningful, practical approaches to the challenges of delivering patient care within an educational setting. COB members have been assigned specific responsibilities based on their professional background, experience, and expertise. These include direct responsibility for all clinical operations, including the urgent care program, continuous quality assurance and biosafety, risk management and patient information security, and community service programs. Additionally, all clinical staff report directly to a member of the COB. Two board members lead the implementation of total digital imaging and the development of the total electronic patient record.

The ultimate goal of the dental school is to create an optimal environment for all of its stakeholders. As the school continues to advance and evolve in oral health care and education, it is likely that this dental

school-dental hospital model will adapt to reflect the needs of its internal and external environment. The COB has improved the management and operations of all clinical activities in the school. Some early successes include the establishment of a service-oriented urgent care program that has more than doubled the volume of care provided in the last year and the implementation of a formal market-based corporate employee compensation plan, with specified salary ranges and salary increase guidelines.

Columbia University: A New Provider Paradigm, A Patient-Centered Quality Assurance Program, and Maximization of Clinic Utilization

Columbia University introduced three major initiatives over a ten-year period to improve the efficiency of patient care in its clinics. The first initiative was to introduce a new provider program in combination with the predoctoral patient care program through the establishment of a large Advanced Education in General Dentistry (AEGD) program. The second initiative was to establish a quality assurance program emphasizing the importance of patient-centered care, and the third was to maximize clinic utilization. These initiatives were undertaken to enhance both clinical education and clinical revenue, while simultaneously improving services to patients.

A New Provider Paradigm: AEGD and Predoctoral Education

The AEGD program was integrated directly with the predoctoral dental clinic. The clinic was reorganized to accommodate approximately twenty-five AEGD students in clinical chairs previously devoted to third-year predoctoral students. One reason for the reorganization was the recognition that third-year dental students were unable to efficiently use assigned clinical chairs because of their inexperience in managing a patient pool. Previously, clinic chairs were underutilized, resulting in inefficient care delivery. Third-year students were reassigned to other

activities, and AEGD students were then able to use the previously empty clinic chairs. By assigning predoctoral students to clinical groups with AEGD students, they could be mentored in their transition to full-time patient care by the end of the year. One responsibility of these groups was to assign those patients' treatment planned by AEGD students to novice third-year predoctoral students. This step allowed less complex services to be done by predoctoral students and more complex services to be done by AEGD residents. As expected, this conversion of a clinic previously used exclusively by third-year students resulted in a 47 percent increase in the number of patient visits (Figure 1). The AEGD students provided major teaching assistance to predoctoral students in gaining their initial clinical competency. Student evaluations indicated significant improvement in their overall perception of clinical experiences and interaction with their AEGD teaching mentors.

Patient-Centered Quality Assurance (QA)

The central core of a quality assurance program is development of standards of care with thresholds by which they are measured. An important standard in the patient-centered paradigm is patient satisfaction. Data from patient satisfaction surveys reflected a positive change in clinic atmosphere. For example, those unsatisfied or very unsatisfied with the registration process dropped from 20.6 percent to 3.4 percent in the four-year period between 2001 and 2004 (see Figure 2). The overall patient satisfaction rate rose from 60 percent to 87 percent between 2001 and 2004 (see Figure 3).

Another important measure of a patient-centered quality assurance (QA) standard used in assessing the clinical program is timeliness of care. The QA program established "service" measures to monitor whether patients were receiving efficient and timely care. For example, one measure included the number of visits required to complete a single full gold crown. The standard set for the full gold crown was completion in no more than three visits. Data was retrieved from the clinic information system, charts were reviewed, and the QA committee then made recommendations.

In the first year of data collection, the QA system found a number of cases where the three-visit standard for full gold crowns was exceeded, with a range between four and eleven visits to complete the procedure. Each case that exceeded the standard

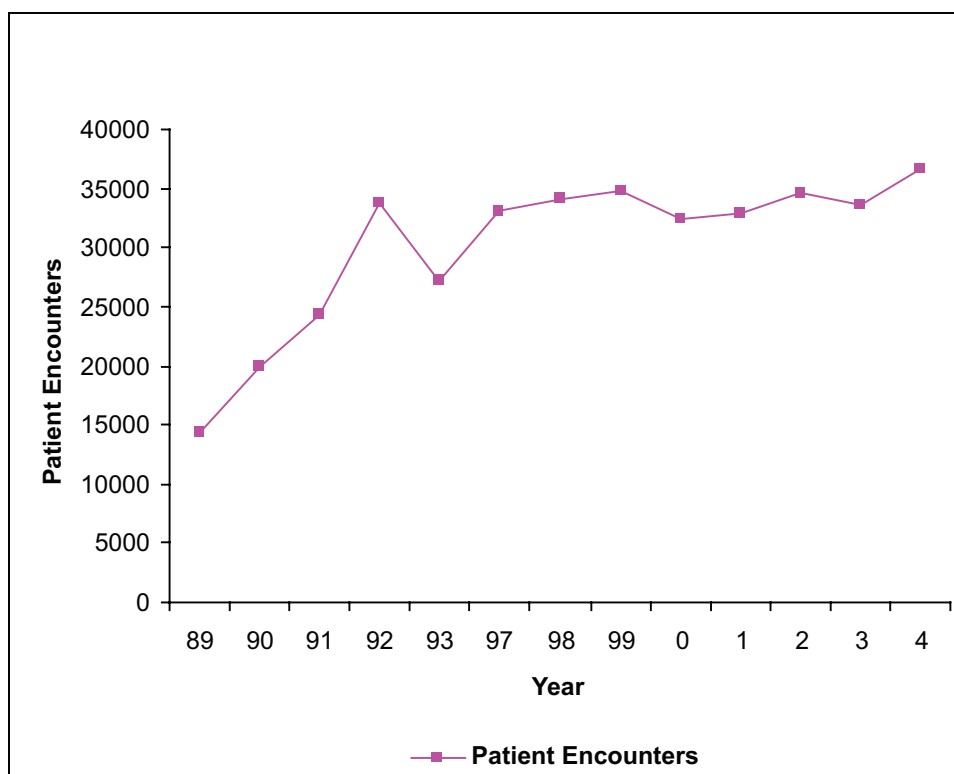


Figure 1. Predoctoral and AEGD patient encounters at Columbia University College of Dental Medicine

Note: The graph shows the transition to a more patient-centered clinical program at Columbia over the critical first five years of implementation when the number of AEGD residents in the clinic increased. From the resulting efficiencies gained as a patient-centered program, it can be seen that the number of visits increased. The drop in encounters in 1993 was due to a loss of data as a result of converting from one computer system to another.

was reviewed, and remedial action taken when appropriate. The committee analyzed steps the Division of Prosthodontics required and found that it was unnecessary to mount full casts on an adjustable articulator to construct a single full crown. The committee further required closer faculty monitoring and encouraged faculty to intervene and complete a procedure if students were exceeding the standard. Two years after implementing these policy changes, the range had narrowed. The majority of full crown cases were completed in two or three appointments, although there were still some cases taking up to seven appointments (see Figure 4).

Maximization of Clinic Utilization

A number of reforms in clinic management subsequent to the change in the AEGD/predoctoral

provider mix also improved the productivity of D.D.S. students and clinic utilization. Reforms included revising and staggering predoctoral vacation schedules so that the clinics stayed open twelve months of the year, establishing twelve-month calendars for all postdoctoral programs, managing students by patient encounters in comprehensive care programs, and adding additional dental assistants. Through computer scheduling, appointment blocks were shortened to one three-hour appointment and two two-hour appointments as opposed to two clinic sessions. Evening clinic hours were made available three times per week, and support staff training programs were implemented to improve the friendliness to patients of the clinics. Students were now tracked against patient encounter rates based on their clinic appointment schedule and comprehensive case completions.

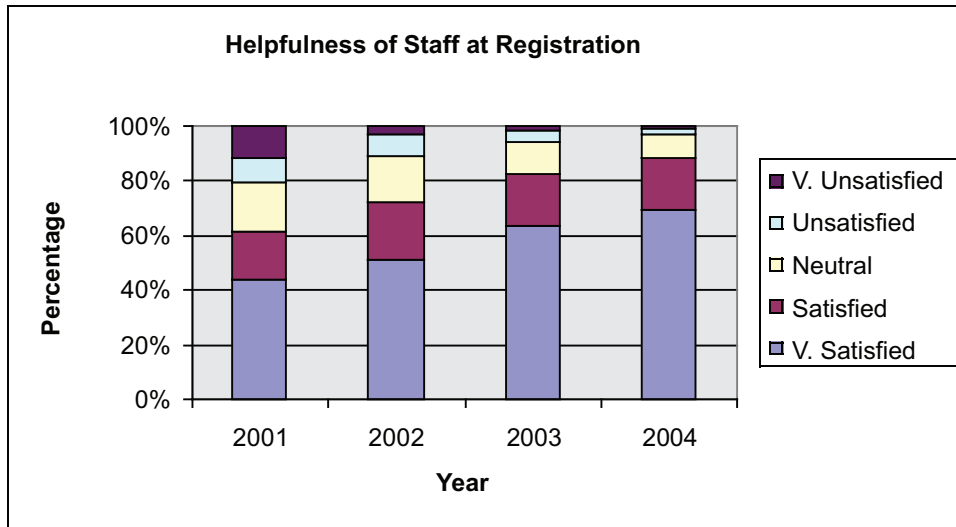


Figure 2. Positive reaction of patients as a result of implemented changes at Columbia University College of Dental Medicine

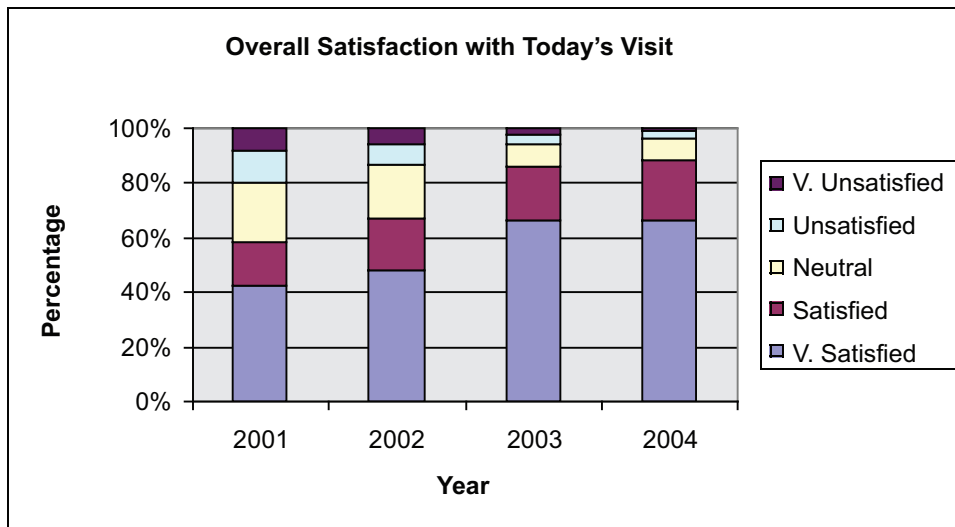


Figure 3. Patient satisfaction improvement as a result of shifts in provider mix and other efficiency changes at Columbia University College of Dental Medicine

Data have been reported¹⁵ showing that students at Columbia experienced more patient care and increased procedural experiences when the requirement system shifted to case completions rather than a unit procedural requirements system. To support

this initiative, auxiliary staff schedules were staggered so that required services are always covered. For example, these included central sterilization and record room changes to improve the availability of instruments and patient records. In short, a systematic

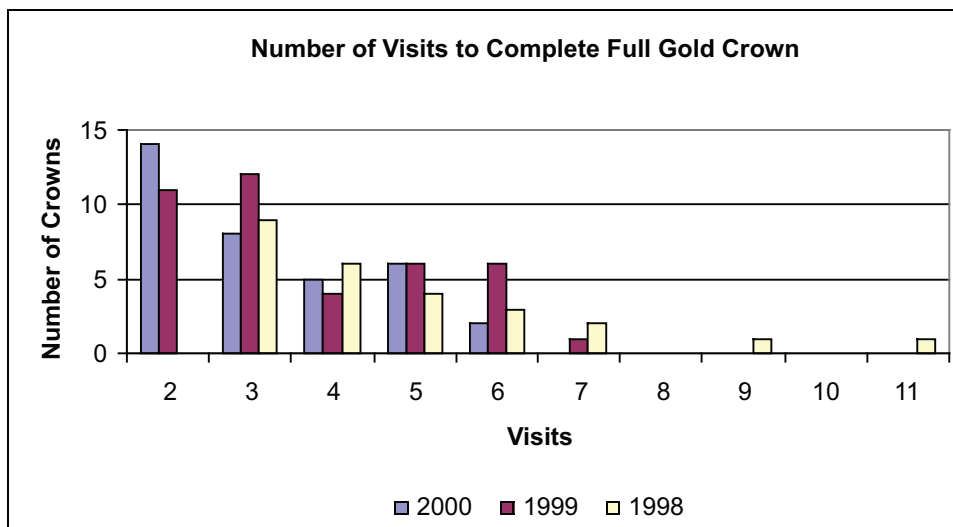


Figure 4. A quality assurance system at Columbia University College of Dental Medicine leads to greater efficiency in care

approach was taken to examine opportunities for greater efficiency, productivity, and placement of patients at the center of the operation.

Challenges in Accomplishing Changes

These major changes disrupted long-held traditions as to how the clinics were operated. Critics of the changes included both faculty and students. The following examples indicate the challenges that were confronted. In combining AEGD and predoctoral education, the old method of a single patient for a single student shifted to one of sharing patients between AEGD and dental students. Dental students did not wish to share patients for fear of losing “good” patients, and it was difficult to obtain faculty support for these changes.

When the QA system was established to evaluate the provision of care, it was viewed by faculty as a punitive approach rather than a way to identify bottlenecks in the system and provide improved patient care. The introduction of the QA system was perceived as an intrusion on the educational programs. Changing the steps required to complete a clinical procedure in prosthodontics was considered to be an invasion of academic freedom.

Staff education programs are difficult to implement because they must often be scheduled during clinical time. This creates a conflict between department autonomy and clinic administration as departments may not see the value in the training programs. While clinic utilization improved by changing the calendar from ten to twelve months, it became difficult to staff the clinics on this basis because both volunteer and paid faculty were accustomed to a slower pace in the summer. This calendar change also proved to be a challenge for support staff since they were no longer able to take vacation at the same time.

The greatest challenge in implementing these changes has been for the comprehensive care group practice model to incorporate the generalist concept in moving patient care forward. The notion that the students can complete the care of their patients under the guidance of general dentistry faculty is still in conflict with the discipline-specific model of supervision. The conflict arises for both policy and cultural reasons. Long-standing policy required treatment planning approval and oversight of care by specialists. This reflects an institutional history of strong specialty divisions (departments). Changing that policy has required and continues to require constant negotiations between specialty and generalist departments to agree upon delegation of responsibilities

for treatment planning and oversight of care. Now, most patient care takes place in the general dentistry clinics; however, specialty faculty are still required in many instances to oversee what they perceive to be their domain.

While implementing these changes has been a challenge, the clinic system has become more patient-centered. Integration of AEGD students with predoctoral students has created an educational experience with greater emphasis on comprehensive general dentistry.

University of Louisville: Creating a General Dentistry Clinic for Better Patient Care

Prior to 1999, the University of Louisville School of Dentistry clinical program was operated on a discipline-based approach, that is, student patients were treated in specialty clinics rather than in a general dentistry clinic. In response in part to the 1995 IOM study that challenged dental schools to place more emphasis on patient-centered care, Louisville organized a general dentistry model that would provide quality dental care for patients and provide education for students. Some other precipitating factors for this shift were to 1) expedite patient treatment, 2) reduce delays in graduation because of student failure to complete clinical activities on time, 3) reduce delays in initiation of patient treatment due to an unwieldy treatment planning process, and 4) eliminate inappropriate patient care by students concerned with completing clinical requirements. The reorganization has led to improvement in all of these areas as well as revenue enhancement.

The school initially conceptualized its approach to a general dentistry model as a 3+1 curriculum in which the fourth year was a general dentistry year. Later, it was decided to move away from the 3+1 approach to provide an enhanced clinical education program based on more patient-centered care for both third- and fourth-year students. The school reorganized the clinic program into six student groups: three groups of third-year students and three groups of fourth-year students.

The school organized comprehensive care general dentistry group practices. Each group was

assigned a general dentist faculty group manager. The faculty managers were selected on the basis of their abilities as private practice generalists and their ability to mentor students. Groups are supported with an office manager, a scheduler, and a dental assistant. The scheduling of patients was taken out of the hands of students and assumed by staff schedulers. Patient management and clinical behavioral factors such as attendance, professionalism, and infection control are assessed. Each office manager is responsible for one third-year group and one fourth-year group and oversees such matters as patient treatment progress and quality assurance. Groups have weekly meetings to review and discuss treatment planning, case presentations, and quality assurance and to facilitate communication. With few exceptions, primary care for each patient is managed in the general dentistry care units, including triage and some treatment of emergency patients.

Prior to schoolwide implementation of the group system, a two-year pilot project was conducted to compare the group system to the traditional system. Students volunteered for the pilot program; however, two students who were not progressing in the discipline-specific clinics were assigned to the pilot group program. There were eleven and twelve students respectively in the two pilot groups. All students in the pilot graduated on time and passed clinical boards the first time with the exception of one student who failed one section of the exam. A student survey revealed superior satisfaction of the students in the group system as compared to those in the traditional system. Students became advocates for the program, and it was implemented schoolwide as a way to provide more patient-centered care in the school clinics. There was a positive increase in D.M.D. students' clinical productivity. Figure 5 shows that, over the past seven years since the new system was put into place in the 1999-2000 year, average student collections have grown by 87 percent over the baseline year (1998-99). Further note that, over those seven years, the average yearly increase in student collections due to fee increases was 6.4 percent, whereas the average yearly increase due to increased student productivity was 21.5 percent.

Implementing a new clinic system presented many challenges, the major one being the adjustment of long-standing discipline-based faculty to a comprehensive clinic system that encompassed all the disciplines. Commonly expressed faculty concerns included the following:

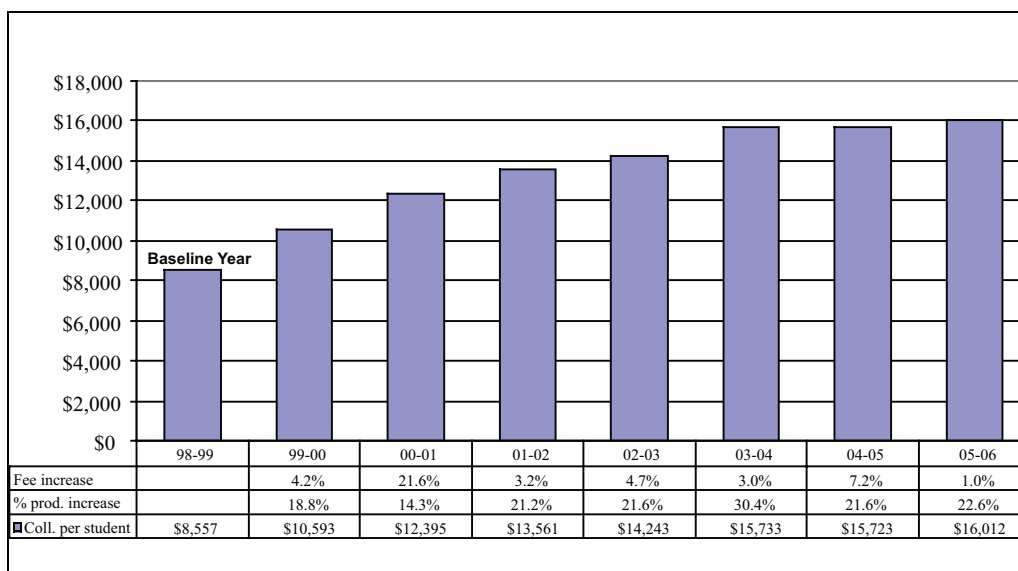


Figure 5. University of Louisville D.M.D. clinic collections per student, 1998-99 through 2005-06, adjusted for fee increase

Note: Over the past seven years, the average collections per student have grown by 87 percent and reflect a yearly productivity increase averaging 21.5 percent per year from the baseline year (1998-99) prior to schoolwide implementation of the new system. Shown also is the increase in student collections due to fee increases, which averaged 6.4 percent over the past seven years.

- faculty calibration,
- consistency between preclinical and clinical teaching,
- emphasis on production and efficiency vs. education,
- shortage of generalist faculty, and
- loss of discipline control.

The consistency between preclinical and clinical teaching and faculty calibration have been issues in both discipline-specific systems that carried over into the comprehensive care general dentistry model. The five full-time generalist faculty hired for the groups have over time become involved in other activities such as grants, faculty practice, and preclinical teaching, thus limiting their availability to be with their groups in the clinic. Compounding this problem, some of the long-standing discipline faculty assigned to the general dentistry group clinics cover only their designated discipline, thereby limiting efficiencies in patient care the general dentistry group model was intended to correct. Because there are too few full-time faculty who are comfortable practicing

as generalists, part-time faculty fill in the gap, making it difficult to maintain continuity in patient care. The faculty issue compromises the integrity of the general dentistry group program envisioned. As a result, it is difficult to maintain the quality of patient care for especially complex treatment plans in which an experienced generalist faculty member develops consistent long-term relationships with students and patients and is able to expedite treatment. The lack of a sufficient number of full-time generalist faculty members places undue stress on those few who are in the group program as they assume a disproportionate share of the teaching load and responsibilities for ensuring the efficiency of patient care.

In spite of these obstacles, Louisville has continued to pursue and improve this group model. Continuous efforts are made to recruit additional full-time generalist faculty. Dental hygiene students and a dental auxiliary utilization (DAU) program have been integrated with the groups. More clinical activities, such as emergency care, initial screening, and patient work-up, take place through the groups. Each junior

and senior dental student is paired, so that patient transition, either to or from the junior or senior, is facilitated to improve continuity of care. Staffing patterns are continually reviewed, and systems such as the cashier function will soon be decentralized to the groups for greater efficiency and patient convenience. Many educational benefits have accrued from this shift, and attending to such matters as scheduling, quality assurance, and focusing on patient-centered care has increased student productivity and had a major financial payoff as shown in Figure 5.

Discussion

Change is difficult to achieve in most academic institutions; however, change is necessary if dental schools are to remain vital units in research-intensive universities. The operation of dental clinics is one of the major cost centers for the dental school. Dental clinics do not cover their costs and require subsidy from other revenue sources such as tuition and state funds. Dental students spend a significant number of their curricular hours, about a mean of 2,000, assigned to the dental clinic.²⁰ It is generally recognized that a significant amount of that time is nonproductive clinical activity due to such limitations as lengthy waits for instructors and materials, lack of auxiliary staff, poor scheduling systems, and general “red tape” built into the teaching system. Patients enter a system of care that often lacks continuity of care, with long appointments where little treatment is accomplished due to protracted and prolonged treatment plans. This is not what was envisioned for dental school clinics. Gies noted that the clinics were the equivalent of the hospital in medical education, but they instead operate very differently, as “teaching” clinics with systems set up to supervise student-driven care. Owre argued that faculty should be the main providers of care, with students participating on a modulated basis as their skills and knowledge grew. Instead, students are the major providers of care. Faculty are rarely seen treating a patient as their role has turned out to be a checker of student-delivered care.

In the latter part of the twentieth century, beginning with the comprehensive care movement, there was a new realization that the way school clinics operated needed to change to improve patient care and to better educate students with broadened abilities in general dentistry. The change process has been slow and difficult because changing the manner in which dental clinics operate touches all parts of the

school. Ideally, dental school clinics should operate as service clinics or patient care centers that provide educational opportunities for the D.D.S. students similar to the way hospitals and ambulatory care settings serve M.D. students. According to Owre, the clinics should be self-supporting. Model B of the Pennsylvania experiment demonstrated that a faculty-practice group system does provide a proper setting for educating students while covering its costs. While the University of Pennsylvania was unable to extend Model B schoolwide, today they operate three off-site Model B-like practices, all covering their costs.²¹ It would be a major benefit to dental schools if they could convert their clinics from ones requiring subsidy to ones that could cover the costs and educate students at the same time. Schools could reallocate funds used for subsidizing the clinics to supporting the academic enterprise and moderating increases in tuition. But are schools moving in the direction of patient-centered care?

The philosophical base for the comprehensive care movement begun in the 1960s has resulted in a long process to reorganize clinics and place emphasis on both clinical education and patient care issues. These three case studies demonstrate that dental schools are evolving toward patient-centered care. The three schools, Maryland, Columbia, and Louisville, have two common characteristics that have improved the operation of their clinics: 1) modern management systems to improve efficiency in the provision of care, and 2) group systems where general dentistry is provided for patients in a comprehensive manner. Two of the schools, Columbia and Maryland, point to the integration of AEGD programs into the clinics. Attention to scheduling of patients, operating clinics year-round similar to private practices, and implementing evening hours suggest those in clinic administration and school leaders understand that clinics must operate efficiently. The important role that management staff, such as care coordinators, play in improving the flow and efficiency of the system through patient admission, patient advocacy, quality assurance, and other administrative tasks was recognized in the 1980s.²² The case studies show that the increased use of such individuals to perform such tasks as part of the management structure does pay off. Using quality assurance measures to monitor timeliness of care and utilizing patient satisfaction surveys show that schools are paying attention to quality issues that matter to patients. At Columbia, patient satisfaction (very satisfied and satisfied) rose from approximately 60 percent to almost 90 percent after implementing

a quality assurance system. It is important to point out that underlying much of this progress has been the growth of information technology. Most dental schools have large pools of patients and complex systems. The wise use of computer systems enables clinic managers to oversee the progress of individual patients while collecting necessary data to operate quality assurance programs to improve efficiency.

The three schools had to overcome obstacles or challenges to moving towards patient-centered care. All three indicated that faculty attitudes and willingness to go along with the changes became a major challenge to the establishment of new patient care systems. Shifting into care provided in general dentistry clinics from care provided in specialty clinics became another challenge, along with organizational structure and responsibilities for groups with different levels of students and residents.

Another strategy the three case studies demonstrate is the benefits accrued from assigning students to groups with postdoctoral students in general dentistry (Columbia and Maryland) and headed by experienced general dentists (Louisville). The productivity in clinical encounters at Columbia doubled with the introduction of postdoctoral students and management reforms. The dental student average collection due to productivity improvement in the group program at Louisville grew an average each year by 21.5 percent. These measures clearly indicate that predoctoral students are more productive when organized in groups with experienced managers and/or care coordinators and general dentists able to oversee a broad range of treatment.

An important matter raised by the case studies is the fact that experienced general dentists are in charge of the clinical groups instead of specialty faculty. The group manager's role appears to be critical in the evolution toward patient-centered care. Experienced general practitioners easily recognize those clinical situations that require specialty referral and are able to manage the majority of care as most general practitioners do in their practices. The fact that most patient treatment is rendered within these groups means that schools have moved away from shuttling patients from one specialty department to another for care and that efficiency of care for patients has gained in priority. But there must be an adequate number of generalists to operate the group programs, and they must be provided sufficient time by the school to oversee the majority of care (Louisville).

Maryland now has clearly separated the functioning of its dental clinic from the responsibilities

of academic departments and put in charge a group specifically devoted to oversight of patient care. Such clear separation of responsibilities is another important step in moving toward patient-centered service clinics.

While the case studies demonstrate that schools have progressed in clinic management, it is clear that if dental students remain the major providers of care, school clinics will not be able to cover costs. Without integrating experienced faculty who treat patients into their student dental clinics, dental schools will continue to be required to subsidize their clinic operations. Integrating practicing faculty into large clinics is a difficult and complex task that will require major change. The Pennsylvania Experiment showed that, while a faculty-based group practice system provided the desired result—that is, good education while covering costs—there were inherent difficulties in implementing such a system schoolwide at Pennsylvania.¹⁹ A major barrier was that the system required a new type of faculty member who could manage a practice, provide care, and also be an educator. The Pennsylvania Experiment in the 1980s demonstrated that the lack of adequate numbers of this type of experienced general dentist clinician/educator was the primary obstacle to converting the entire school clinic to a patient-centered care model based on a group practice structure with a general dentist in a team leadership role. However, over the past twenty-five years, the growth of AEGD programs has provided a new source of such faculty. Many graduates from AEGD programs have participated in the group programs, and they should be able to make the leap to faculty practitioner/educator. However, a challenge to the conversion to a student group system led by generalist faculty remains. Evidently, recruiting a sufficient number of qualified full-time experienced general dentistry faculty still remains a problem today (Louisville) as it did during the time of the Pennsylvania study.

It will not be easy for dental schools to convert their large on-site student clinics to a private practice-like environment. Bailit et al.²³ have calculated that if an entire school could convert to a faculty-practice clinic educational model, schools could cover the costs of operating the clinics including a substantial faculty salary component. By a faculty-practice clinic educational model, we mean a clinic in which faculty treat patients while mentoring students in the fashion described in the Pennsylvania Model B experiment and as envisioned by Owre. Such an evolution may be the next strategic direction that dental schools will

need to consider as they juggle the need to further operate their clinics as patient-centered enterprises and create the necessary resources to maintain the vitality of their schools.

While there are obvious major challenges to conversion of school clinics to a faculty-practice educational setting, there are obvious ways schools could begin to phase in such a system. The specialty program clinics would convert more easily than the general dentistry clinics because they are smaller in size and in most schools already function somewhat separately from the main general dentistry clinics. As noted earlier, many oral surgery clinics are currently run on such a basis. As illustrated by the case studies, schools have made progress in managing group programs using techniques from weekly conferences to discuss cases and for communications purposes to employing staff to monitor case progress and quality and from a generalist approach to care to referral for needed specialties. Prior to the comprehensive care movement, these strategies were not employed in dental school clinics. The experiences schools have gained from the evolution so far should make it possible for them to take the next even bolder step towards faculty becoming providers/mentors instead of supervisors of student care. Yes, it will be necessary for the field to become deeply involved in such details as proper group size and composition, student to faculty ratios, and new compensation systems for faculty as well as how faculty advance academically in their new roles. But, because of the progress made to date, schools can, *if they deem this next step as important*, evolve toward an integration of faculty treating patients within the clinic education program.

It is clear that one of the reasons for success of the Model B general dentistry clinic program at Pennsylvania is that it was placed off-site and incorporated faculty treating patients. Today the three successful models at Pennsylvania are all off-site. Establishing off-site private practices for the purpose of education will meet with considerable resistance from private practitioners, so schools need to look to other venues unless they can create such educational centers in a harmonious way with the private practice system. There is another approach available to schools for providing patient-centered clinical education to students. There are now many more off-site clinics serving underserved populations. These clinics operate as patient-centered service clinics. The dental schools participating in the Pipeline, Profession, and

Practice: Community-Based Dental Education program are showing that a significant component of the senior year clinical training program or twelve weeks of education can be obtained by affiliations with patient-centered off-site clinics.²⁴ So, if schools wish to move beyond the important steps that the three case studies have implemented, there are ways they can provide good education in patient-centered service clinics, by gradually converting their existing clinics into faculty practice educational centers and by also rotating students to off-site patient-centered clinics.

The cost of operating a dental operator for a predoctoral student is high as noted above, and certainly student billings do not cover those costs. Although the case study schools show that they have been able to improve revenues significantly, they also indicate that with dental students as providers they cannot cover costs; therefore, it makes good sense to provide part of the education in more cost-effective off-site patient care centers.

These case study schools have moved in some of the directions that Bohannon predicted in 1984.²⁵ He predicted that schools in the 1990s would operate “highly efficient patient care delivery centers where patient needs and comfort receive primary emphasis,” and it appears that the case study schools are fulfilling this prediction. However, it does not appear yet that any schools have allowed patient needs to take “precedence over student needs or faculty interests” as Bohannon also predicted. It does appear that the case study schools have shown the willingness to tread on long-held faculty traditions to change the way clinics operate. Moving to providing most care in general dentistry clinics rather than by moving patients around from one specialty clinic to another is a big step towards patient comfort. Recognizing that clinic operation requires a separate management system from the academic departments is a key evolutionary movement toward a highly efficient patient care delivery center. Measuring the timeliness of care through quality assurance sends a clear message to departments that efficiency of care and patient comfort are equal to student learning. It is worrisome that, even today, according to students who provide care in the current clinic system, clinic time is still wasted on non-patient tasks and waiting in line for instructors and the clinics do not operate smoothly for efficient patient care.¹⁸ Having a system in which patient needs take precedence will most likely make it necessary for faculty to take on a new role as providers of care, but taking on that new role doesn't

necessarily mean that it can't be done with the best interests of faculty and students taken into account. It has already been shown that an excellent setting for teaching can be in a faculty-based group practice for pre- and postdoctoral students. While the precise definition of what is meant by a faculty-based group practice system may vary from school to school, what needs to be examined is how schools organize their separate faculty practice systems and their clinic programs in the context of their responsibilities for the clinical training of pre- and postdoctoral students. Unless faculty assume a direct patient care role in the teaching clinics, patient care will remain inefficient. Without reconsidering the role of the faculty in the provision of care, it will be difficult if not impossible to evolve a truly patient-centered system of care from the current teaching clinic model. This may mean breaking down the wall between the traditional faculty practice systems, in which faculty treat patients in isolation of students, to a system in which there is integration of faculty into the actual treatment of clinic patients *with* students.

The Macy study will in its next phase calculate the financial implications for the system of dental education to move various levels of the clinical education program to patient-centered service clinics on- and off-site, where faculty are the major providers of care. The study team recognizes that schools can evolve in this manner albeit with many challenges and the next step—engaging the faculty into this new role as master clinician-educator—is a critical decision that each school will need to assess. So too will the decision to affiliate with the off-site facilities for educational purposes. The challenges will include the willingness of faculty to recognize the educational benefit from these changes and the flexibility of the institutions to provide an encouraging environment for it to happen. Accreditation standards will necessarily need to be reviewed to see if they are consistent and supportive of this type of change. All of these issues will be explored in the Macy study and reported in the consensus conference to be scheduled in 2007.

Finally, although the present student-driven systems in dental education have become the traditional model over the past century, the environment in health care, society, and government regulation has radically changed, further necessitating a patient-centered system. By moving on a path to merge faculty practice systems into the student clinics, a more compliant supervisory program would develop. One

system of care would emerge, and the care provided by dental school clinics would resemble the private practice environment foreseen by Gies while adhering to the standards set by Owre.

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