DOCUMENT RESUME

ED 260 660 HE 018 655

TITLE	Declining Dental School Enrollments: Influencing an Orderly Retrenchment.
INSTITUTION	Southern Regional Education Board, Atlanta, Ga.
PUB DATE	Jun 85
NOTE	13p.
AVAILABLE FROM	Southern Regional Education Board, 1340 Spring Street, N.W., Atlanta, GA 30309.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	College Applicants; *Declining Enrollment; *Dental Schools; Dental Students; *Dentists; *Economic Factors; Enrollment Trends; *Geographic Regions; Higher Education; *Labor Supply; Population Trends; Public Policy; Retrenchment; Student Costs.
IDENTIFIERS	*United States (South)

ABSTRACT

Dental school enrollments and the supply and demand of dentists in the United States and the south are examined. The growth in the supply of dentists in the South is related to an improved economy in this region and a rapid population increase. In addition to producing a large number of dental school graduates, the South is attracting graduates of schools outside the South. A reduced demand for dental services is linked to improved oral hygiene, the wide use of flourides, and the fact that dental care is often deferred because dental expenses usually are paid by the consumer. Between 1980 and 1984, first-year dental school enrollments declined 16.3 percent in the United States and 20.3 percent in the South. The number of applicants has decreased from 14,807 in 1975-1976 to 6,200 for 1985-1986. In 1976, dental schools accepted only 40 percent of applicants, while 77 percent were accepted in 1984. Reasons for declining application rates include: rapid increases in dental school costs; high debt among dental school graduates; and reduced earning potential in dentistry. Since dental school enrollments are likely to continue to decline, options that might be helpful to states with public dental schools are identified. Data on 1980-1984 first-year and total dental school enrollments in 14 southern states and the United States are included, along with data on cost-per-student. (SW)

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June 1985

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As enrollments in most colleges and universities began to decline in the 1970s, health professions schools seemed immune to the effects of fewer traditional college-age students and reduced state funding. Federal funds for the support of dental and medical education programs continued throughout the 1960s and 1970s. Federal and state efforts created a dramatic increase in the supply of all health professionals, but in the late 1970s a declining economy and the national effort to reduce or at least contain the growing cost of health care began to slow the demand for health services. The first health professionals to experience the effect of a receding economy and reduced demand for services were dentists, primarily because 75 percent of all dental care is an out-of-pocket expense that can be deferred when incomes decline or the breadwinner is unemployed.

In addition, advanced dental technologies and the wide use of flourides in water supplies have greatly reduced the incidence of dental caries, particularly among younger persons. This has decreased the need for restorative dental services. There has been an increase in periodontal disease as the population has aged, but many people seem to accept this as a natural consequence of aging and, therefore, do not seek treatment.

Because of these factors, the demand for dental services has not kept pace with the growth in the population. By the time dental school enrollments peaked at 22,842 in 1980, many practicing dentists indicated that they were less than satisfied with the volume of patients they were seeing. There were public calls for reductions in dental school enrollments; and, in at least one state, the dental society called for the closing of a public dental school. Recently, a private dental school of long-standing, Emory University School of Dentistry, announced its closure because of a shortage of qualified applicants.

The South expanded dental education more than any other region by developing over half of the nation's new public dental schools between 1960 and 1975. Moreover, the 15 public dental schools in the South represent 43 percent of all public dental schools in the nation. In addition, the three private dental schools--Emory University, Baylor University, and Meharry Medical College--have received substantial public subsidies either through direct state and federal funding or through interstate contract arrangements. The success of the dental education initiatives over the past two decades has contributed to the current decline in dental school enrollments by creating an oversupply of dentists. If the decline in the number of dental school applicants has precipitated the closure of the first dental school in over two decades, what are the general implications for the supply of dentists and dental education in the South?

Supply and Demand

The supply of active civilian dentists increased 33 percent between 1970 and 1982--a larger increase than during the previous two decades. The ratio of civilian dentists to the civilian population increased in the U.S. from 47.4 per 100,000 population in 1970 to 55.1 in 1982; in the South the increase was from 37.7 to 43.9, respectively. However, large variations in dentist to population ratios continue to exist among regions, states, and even counties within states.

There is a direct relationship between a state's number of dentists per 100,000 population and that state's per capita income. States with high per capita incomes tend to have higher dentist to population ratios; and, dental school graduates tend to locate in wealthy areas within states where opportunities are the most promising. Thus, each state seems to attract as many new graduates as the demand for dental care will support, regardless of the number of dental school graduates that a state produces. For example, between 1975 and 1980 the number of dentists increased in Florida by 1,384, yet that state's dental school graduated only 199 dentists. During the same period, Kentucky's two public dental schools produced 826 new dentists, while the number of dentists in the state increased by only 321.

As the economy of the "Sunbelt South" has improved, so has the supply of dentists--a trend that can be expected to continue, with the supply of dentists in the South increasing at a faster rate than in the rest of the nation. Two factors account for the growth--an improved economy in the South and a rapid increase in the population. Not only is the South producing a large number of dental school graduates, but evidence suggests that the South is attracting graduates of schools from outside the South. For the period from 1975 to 1980, the region's increase in active civilian dentists represented 45.9 percent of the total increase in active civilian dentists in the U.S., yet, the region produced only 26.3 percent of the dental school graduates. In-migration of dentists and other health professionals into the region is consistent with the overall growth of the South, but the increases are concentrated in the urbanized states. For example, in 1980, Maryland, a predominantly urban state, ranked tenth among the 50 states and the District of Columbia in per capita income and had 57.8 dentists per 100,000 population, compared to predominantly rural Mississippi's 32.6 ratio and ranking of 51 in per capita income. Many of the South's rural areas are low income areas where the demand for dental care is insufficient to attract dentists.

Because the purchase of dental care is a discretionary expenditure, demand for care is highly sensitive to changes in the economy. Three-fourths of dental services are not covered by private or public insurance. Thus, for most Americans the cost of dental care is an out-of-pocket expense that can be deferred, even though dental services may be needed.

The increasing number of dentists and the competition for patients has encouraged more dentists to establish their practices in smaller towns--some have even settled in communities that are too small or too poor to support a dental practice. In the past few years, some young dentists, already in debt for their dental education, have assumed large debts to establish practices only to find that they could not earn a living and have had to declare bankruptcy. As this news has reached moneylenders, fewer dentists have been able to obtain loans to purchase equipment to establish a private practice. Consequently, more new dental school graduates are accepting salaried positions or seeking an association with established dentists.

Some experts predict that the demand for dental care will continue to decline as a result of improved oral hygiene and the wide use of fluorides to prevent tooth decay. Others predict that the demand for dental care, particularly among the aging population who will experience a higher incidence of periodontal disease, will show a slow but steady increase into the 1990s. There is no question that the amount of dental disease in the population could keep all dentists busy. Yet, the reduced demand has caused a growing concern among practicing dentists. Many general practice dentists are doing routine periodontal procedures and uncomplicated extractions that a few years ago would have been referred to specialists. Also, some dentists report that they no longer employ dental hygienists because they have more than adequate time to provide cleaning and other prophylactic procedures for their patients. Indeed, the

overall number of dental auxiliaries per 100 dentists has remained essentially the same since 1980, in spite of the continued rapid growth in the number of dentists. In less than a decade, waiting time for dental appointments has decreased from eight weeks to one week or less, particularly among younger, less established dentists. All of these trends indicate that there is a substantial drop in the demand for dental services which persists even though the economy is improving. The prospect of graduating with more than $25,000 of debt and then not being able to make a living is causing major declines in the applications and enrollments in dental schools.

Enrollment Trends

First-year dental school enrollments in the U.S. peaked with 6,301 students in 1978. In the South a similar pattern occurred, with first-year enrollments reaching 1,680 in 1978. Then, first-year enrollments declined at a rate of approximately two percent per year for the U.S. between 1978 and 1980, but at a rate of less than one percent per year for the South. The rate of decline began to increase after 1980; between 1980 and 1981, first-year enrollments in the South declined by 10.0 percent, compared to 6.1 percent for the U.S. There was a steady but less drastic annual decline through 1984--between 1980 and 1984, the South averaged 26.6 percent of the first-year enrollments in the U.S., but for the same period the South accounted for 39.5 percent of the decline in first-year students.

Decline in first-year enrollments varies by dental school. For example, between 1980 and 1984, first-year enrollments declined by as few as three at Meharry Medical College to as many as 44 at the University of Texas at San Antonio. For the same period, the other two dental schools in Texas--Baylor University School of Dentistry and the University of Texas at Houston School of Dentistry--declined by 20 and 13 respectively, which was less than half of the decline experienced by the University of Texas at San Antonio. Overall the decline in first-year enrollments in the U.S. was

16.3 percent, while the decline in the South was 20.3 percent. Only one school in the region, the University of Florida School of Dentistry, experienced an increase in first-year enrollments between 1980 and 1984 (see Table 1); this was primarily because it was the last new school to be opened in the South and was still in the expansion phase. Even this school has experienced a decline recently--from 81 first-year students in 1982 to 76 in 1984.

With total U.S. first-year enrollments dropping to 5,047 in 1984, a level not seen for more than a decade, there is speculation about how much further enrollments will or should decline. Dental schools predict that first-year enrollments will stabilize at the present level through 1988; however, preliminary data for 1985 suggest that further decline can be expected.

Applicant Pool and Attrition

The reduction in first-year enrollments since 1978 is directly attributable to the steady decline in the number of individuals who are applying to dental schools. In 10 years, the number of applicants has decreased by 58 percent--from 14,807 in 1975-76 to 6,200 for the 1985-86 academic year. Of greater concern to many is the decline in the ratio of applicants to first-year enrollments--from 2.49 applicants for every enrollee in 1976 to 1.3 in 1984. This means that in 1976 dental schools accepted only 40 percent of all applicants, while 77 percent were accepted in 1984. To date, this has not appreciably affected attrition for academic reasons, but some persons fear that less qualified students may be accepted in order for schools to maintain enrollment levels. The reasons most frequently cited for the declining number of dental school applicants are:

- Rapid increases in the cost of attending dental school;
- Increasing amount of debt among dental school graduates;

Table 1

FIRST-YEAR AND TOTAL ENROLLMENTS IN DENTAL SCHOOLS; NUMBER AND PERCENT CHANGE, 1980 THROUGH 1984; UNITED STATES AND SREB STATES

	First-Year Enrollments				Total Enrollments			
	1980	1984	1980-1984		1980	1984	1980-1984	
			Number	Percent Change			Number	Percent Change
United States	6,030	5,047	-983	-16.3%	22,842	20,588	-2,254	-9.9%
SREB States	1,658	1,322	-336	-20.3	6,312	5,422	-890	-14.1
South as a Percent Of U.S.	27.5	26.2	-34.2	-	27.6	26.3	-39.5	-
Alabama								
University of Alabama	72	56	-16	-22.2	297	205	-92	-31.0
Arkansas	-	-	-	-	-	-	-	-
Florida								
University of Florida	66	76	+10	+15.2	256	308	+52	+20.3
Georgia								
Emory University	106	90	-16	-15.1	420	341	-79	-18.8
Medical College of Georgia	62	51	-11	-17.7	246	205	-41	-16.6
Kentucky								
University of Kentucky	60	47	-13	-21.6	235	178	-57	-24.3
University of Louisville	86	60	-26	-30.2	337	254	-83	-24.6
Louisiana								
Louisiana State University	101	61	-40	-39.6	358	267	-91	-25.4
Maryland								
University of Maryland	138	113	-25	-18.1	530	443	-87	-16.4
Mississippi								
University of Mississippi	48	32	-16	-33.3	159	148	-11	-6.9
North Carolina								
University of North Carolina	86	77	-9	-10.5	317	304	-13	-4.1
South Carolina								
Medical University of South Carolina	57	48	-9	-15.8	223	199	-24	-10.8
Tennessee								
Meharry Medical College	54	51	-3	-5.5	218	183	-35	-16.1
University of Tennessee	130	90	-40	-30.7	570	390	-180	-31.6
Texas								
Baylor College of Medicine	141	121	-20	-14.2	418	490	+72	+17.2
University of Texas-Houston	122	109	-13	-10.7	487	448	-39	-8.0
University of Texas-San Antonio	152	108	-44	-28.9	572	469	-103	-18.0
Virginia								
Virginia Commonwealth University	113	94	-19	-16.8	434	391	-43	-9.9
West Virginia								
University of West Virginia	64	39	-25	-39.6	245	199	-46	-18.8

Sources: American Dental Association, Annual Report on Dental Education 1984/85, 1985. Also Prior reports.

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-- Reduced earning potential in dentistry;

-- Increased attractiveness of other career fields in terms of return on investment of time and money spent for an education.

While attrition for academic reasons has increased only slightly, there has been increased attrition for other reasons. The rate of attrition for dental school freshmen began to climb in 1980-81--4.3 percent in 1980-81, 4.95 percent in 1981-82, and 5.6 percent in 1982-83. From 1981 to 1982, the number of freshmen withdrawing from dental schools increased from 290 to 306. Of those reporting reasons for withdrawal in 1982, 53.9 percent cited personal reasons, while 46.1 percent reported academic reasons. The majority of those withdrawing for personal reasons indicated that they did so on the basis of changed career objectives. In addition, there has been a slight but steady decline in the average Dental Aptitude Test (DAT) scores for entering dental students. Clearly, an increasing number of individuals who at one time would have considered dentistry are now opting for other careers. At the same time, more of those who have entered dental schools are revising their career plans. The overall attrition rate for all four years for a class of students is approximately 10 percent--near the all time high of 11.6 percent for the 1966 entering class. The number of dental school applicants is expected to drop further over the next five to ten years; the four-year attrition rate will probably level off at about 11 or 12 percent.

These conditions were cited by Emory University School of Dentistry as factors influencing the decision to close the school. Emory reported that by February 1985 only 25 qualified applicants were committed to enter the 1985 freshman class--60 short of the 85 first-year students normally admitted. In addition, the school had been experiencing a financial deficit that was expected to increase. Tuition and fees for the four-year dental program at Emory would cost a student over $53,000; as loans and grant funds decline, fewer students are able to enroll in private schools.

Retrenchment

There are three reasons why enrollments are likely to continue to decline: (1) there are fewer young people who are 18 to 25 years of age; (2) the supply of dentists is more than adequate to meet the demand for dental services which causes young dentists to have difficulties in establishing practices; and (3) the high cost of dental education coupled with a reduced earning potential increases the attractiveness of other career choices.

As enrollments decline in dental schools, states should be cognizant of the impact that any major change will make on the cost and effectiveness of operating a dental school. Cost-per-undergraduate (predoctoral) dental student in 1982 was estimated to range from $13,500 to $35,100; the average being $19,850. It is generally acknowledged that smaller dental schools have a higher cost-per-student. Few states could afford the richness enjoyed by the Harvard Dental School, which enrolls 20 undergraduate students per year with reported expenditures in 1981-82 of slightly over $5 million. In the 1981-82 academic year, Harvard had 78 undergraduate and 58 graduate dental students, for an average expenditure per student of $36,764. However, for the same year, the University of Mississippi Dental School reported expenditures of $6,190,865; 165 undergraduate and 3 graduate students were enrolled, for an average expenditure per student of $36,858. Although expenditures per student are easily calculated, these data can be misleading and should not be equated to cost-per-student. Costs-per-student are the costs attributable to the education of an undergraduate dental student--while expenditures may include funds allocated to undergraduate and graduate dental student education as well as research and patient care.

Many factors affect the cost-per-student, such as the number of undergraduate dental students enrolled, the size and types of graduate dental programs, and the use of part-time or volunteer faculty. As enrollments decline, states should reassess their

dental programs. When the total undergraduate enrollment of a school falls below 240, efficiency is prone to decline. With appropriate adjustments in number of faculty, a school can operate efficiently with less than 240 students, perhaps with as few as 180 students. However, below the point at which the critical mass of essential faculty cannot be reduced further, cost-per-student escalates at a rate that calls for considering alternatives to operating a dental school. Because of the rapid decline in first-year enrollments, some schools are currently operating with an excess capacity of dental faculty; as enrollments decline further, this problem will be exacerbated. As the data in Table 1 indicate, several schools in the SREB region have reached enrollment levels that suggest a current or pending reduced efficiency.

Meharry Medical College, a predominantly black institution and one of the three private dental schools in the region, continues to enroll the majority of black dental students in the region. Meharry's dental school has also experienced enrollment declines--from 218 students in 1978 to 183 in 1984. Some of the enrollment decline at Meharry is caused by the decline in applicants which all schools are experiencing; some is the result of other dental schools actively recruiting minority applicants. The effect of these two pressures on future enrollment levels at Meharry is difficult to predict. For now, Meharry's enrollment appears to have stabilized, since first-year enrollments have been about the same since 1980.

The South has made a concerted effort to increase the number of black dentists. Several states, through contract arrangements administered by SREB, assist their black residents with access to Meharry's dental school. The exact number of black dentists in the South is not known, however, blacks comprise roughly 6 percent of all dental students in the region compared to 19 percent of the total population of the region. Special efforts, including the interstate contracts, will be necessary to assure continued dental education opportunities for minorities.

States with public dental schools that have marginal to low enrollments should monitor their dental school's efficiency and effectiveness. Options that may be considered are:

-- Determine if enrollment declines have created excess dental education capacity that can be reduced while maintaining the critical mass of faculty specialties required for quality dental education.

-- Explore possibilities for cooperative arrangements, such as shared faculty and administration with dental schools in the same or neighboring states.

-- Determine if enrollment declines have increased the cost-per-student to a level that is no longer cost effective.

-- Consider closing a dental school if dental education for residents can be obtained through interstate contract arrangements at substantial savings to the state.

Some persons believe that retrenchment at this time will lead to shortages of dentists after the year 2000. It should be remembered that the practice of dentistry and the demand for dental care have changed considerably. Through the use of dental auxiliaries who can be prepared in one- or two-year programs, dentists could substantially expand their productivity should the demand for dental care increase appreciably. At the present, and for most of the next decade, there will be more dentists than there is demand for dental services. Whether the demand for dental services will increase sufficiently to stimulate an increased demand for dental education is impossible to predict--much will depend on the economy and the public's perception about the importance of dental care.

Manpower projections for the year 2000, particularly dental manpower, are speculative at best. DeFriese and Bacher (1983) summarized the state of the art for predicting dental manpower needs in this manner: "We are no closer today to knowing how to determine the ideal number of dentists (and auxiliary workers) required to meet the dental care needs of a defined population than we were a decade ago."

This has been a chronic nemesis for health manpower planners--first, because need for dental services does not necessarily translate into comparable demand, and second, because the productivity of dentists can vary substantially if more dental auxiliaries are employed by dentists. Granted that predicting future demand for dental services is risky, some trends are evident. Fluoridation of drinking water has caused a significant reduction in dental caries, which will continue to reduce the need for dentists. In addition, the population is better educated and is practicing better oral hygiene. These two changes have reduced the need for restorative dentistry. This may be offset by an increasing incidence of periodontal disease in an aging population, but the demand for dental services for periodontal disease is impossible to predict. It is likely that as a result of the relatively large numbers of dentists being graduated in the South and dentists migrating to the region, through the year 2000 there will be more than enough dentists to take care of whatever demand occurs.

In spite of what many would define as substantial unmet dental needs, the demand for dental services has declined, and the number of individuals who may have considered dentistry as a career has also declined. Young people are selecting other fields because dentistry appears to be less rewarding in terms of potential return on their investment of time and money in a dental education. States with public dental schools should assess their dental education programs from that perspective to determine whether alternative arrangements might provide a more rational approach to their dental manpower needs.

For further information, contact E. L. Hebbeler, Associate Director for Health Programs, (404)875-9211.

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