The manpower issue in pediatric dental education: Our job is not finished!

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Increasing number of children and an evolving population

The Bureau of the Census[1] projects that during the next 25 years the number of children less than 15 years of age will increase by eight million youngsters. However, as a result of constant media emphasis on the marked expanding share of the population represented by the number of older persons, the tendency is to assume that the number of children is diminishing.

The increasing numbers of children will not be uniform throughout the nation. The greatest numerical increases will be in the Pacific Region (particularly in California) and in Texas (Fig 1).

Minority children (particularly Hispanic youngsters [who may be of any race]) will account for the major increase, with actual decreases in the number of White children (Table 1).

Similarly, the distribution of the general population will not be uniform. By 2020, Florida will have the greatest number of African-Americans, Arizona the greatest number of Native Americans, and California will have the greatest number of Asian-Americans, Hispanics and Whites.

In addition, the continuing number of immigrants (both legal and illegal) from countries, which in the past provided limited additions to our population, will require practitioners and their staff to reconsider their knowledge and comprehension of vastly different cultures. The orientation of these new population groups to health care services may be quite different from that which most practitioners consider commonplace.[2]

Special patient populations

In addition to the increase in the overall number of youngsters, during the next two decades there may be added numbers of youngsters beyond the four million disabled, eleven million with developmental, learning and emotional disorders, and twenty million with chronic illnesses, many of whom would benefit from the particular expertise of trained pediatric dentists.[3-5]

Need for dental services

Results from the Third National Health and Nutrition Survey[6] indicate that minority children are in greater need of dental services than their White counterparts. The primary dentition of more than half (53%) of Native American children is NOT caries free (compared to the finding of one-third for non-Hispanic White children). More than 90% of African-American and Mexican-American children have no sealants on their permanent teeth (compared to 77% of non-Hispanic White children) (Table 2).

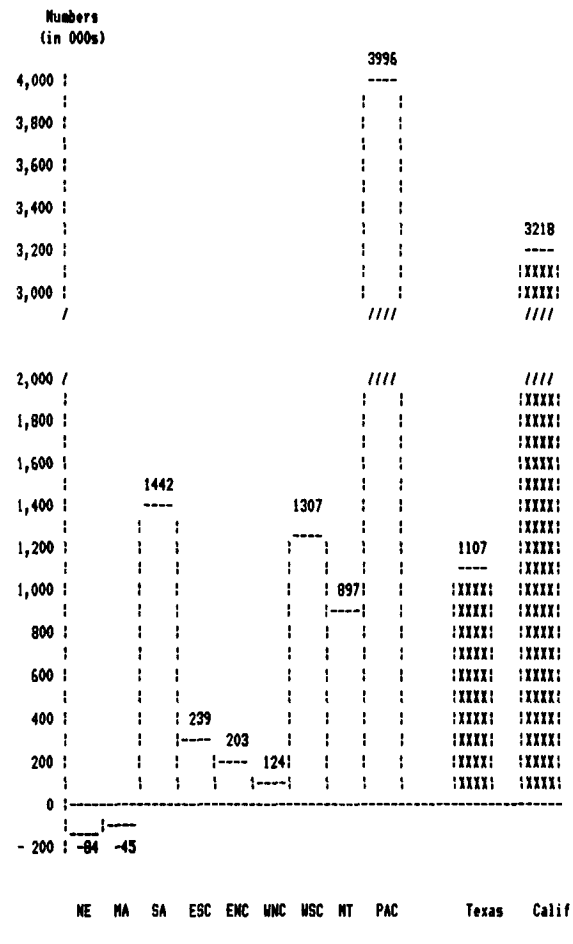

Fig 1. Increase in the number of children <15 years by 2020.[1]

"Are we that certain of the economic viability of pediatric dentistry that we may overlook the needs of minority children?"[7,8]

Number of dentists

As a result of the more than one-third decrease (between the late 1970s and the 1990s) in the annual number of students entering dental school, beginning in the late 1990s, there will be an actual decrease in the number of dentists.[9] Since the late-1980s, the dentist-to-population ratio has plummeted and will reach levels in the first decades of the next century that have not been seen since the early years of this century. In a period of changed practitioner availability, will general practitioners have time or be interested in the care of youngsters?

Table 1. Changing numbers of children by 2020[1] (in millions)

	1990	<5 years 2010	2020	Percent change 1990–2020
White	14.9	13.1	13.0	-12.8%
African-American	2.8	2.8	2.9	3.5%
Hispanic	2.3	2.9	3.2	39.1%
Other	0.7	1.0	1.2	71.4%
		5–17 Years		
White	36.5	35.3	34.7	-4.9%
African-American	7.2	7.8	7.9	9.7%
Hispanic	4.9	6.8	7.7	57.1%
Other	1.9	2.7	3.0	57.8%

Table 2. Third National Health and Nutrition Survey 1988–91[6]

Children who are NOT caries free	*Primary dentition 2–9 years* / *Permanent dentition 5–17 years*
NonHispanic White	34% / 45%
African-American	39% / 39%
Mexican-American	53% / 49%
Decay score component of DMFS	*Age 5–17 years*
NonHispanic White	14.6%
African-American	37.9%
Mexican-American	36.4%
Children with NO sealants in permanent teeth	*Age 5–17 years*
NonHispanic White	77%
African-American	92%
Mexican-American	93%

Despite a decrease in the number of dental school graduates since the early 1980s (from almost 4600 in 1988 to less than 3900 in the mid 1990s[10]), there has been a general increase in the numbers of senior dental students planning for training in a pediatric dental program (Fig 2). However, during the past twenty years, there were decreases in the number of pediatric dental training programs and graduates. In 1995, there were some increases in the number of programs and graduates, but these were still below the levels of the earlier period (Tables 3 & 4).

Need for new pediatric dentists

For many current practitioners, the idea of planning for the dental services for the next 25 years may seem far beyond their professional horizons. The reality, however, is that the increase in the number of children (and the evolving numbers of practitioners) will not occur suddenly at the end of the second decade of the next century. If we are to maintain the current pediatric dentist-to-child ratios, we must estimate the number of new practitioners needed over time to replace current practitioners and those necessary to meet the needs of the increasing number of children. Changing the "production" of pediatric dentists, however, is not analogous to turning a water spigot on and off. Long lead times are necessary to produce graduate pediatric dentists. In addition, developing manpower projection needs necessitates determining the inter-relationship between:

1. Evolving dentist-to-population ratios
2. Evolving dental disease patterns
3. Demand for dental services
4. Evolving third party payment mechanisms and the overall impact of the effects of "managed

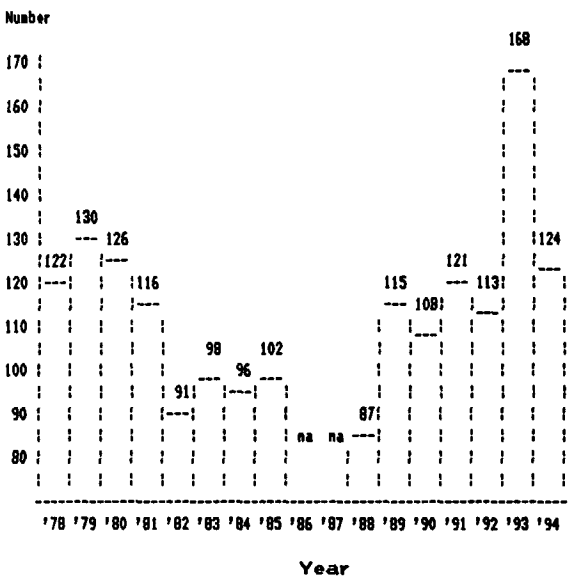

Fig 2. Senior dental students planning pediatric dental training: 1978–1994 (11)

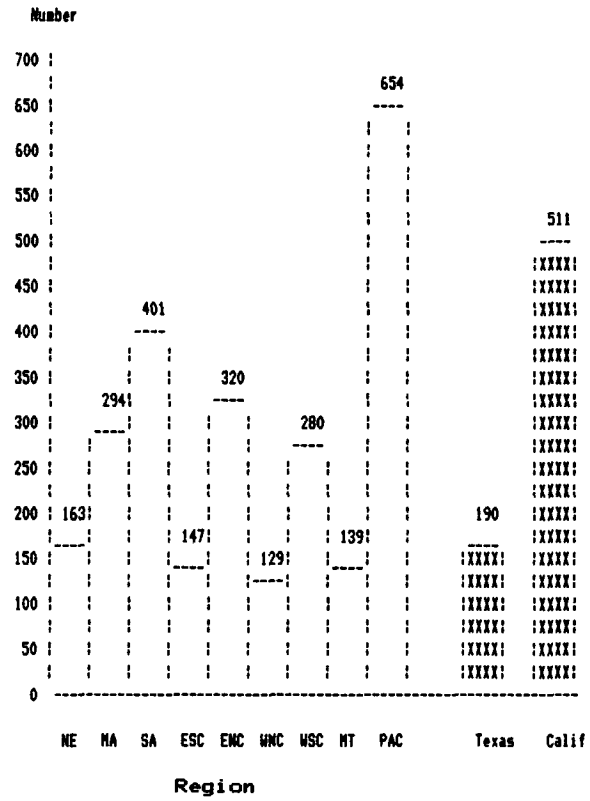

Fig 3. New private practice pediatric dentists needed by 2020 to maintain current ratios.[13]

care" (actually managed economics) programs
5. Evolving cultural and social character of the population.[13]

An earlier study by this author considered the need to maintain current pediatric dentist-to-child ratios in each state and region in the nation.[13] (The review was based solely on the need to maintain current ratios, with no effort to control for other evolving factors.) In an effort to develop a conservative estimate of the number of new pediatric dentists needed by the year 2020, a series of assumptions was made, including:

1. The need to replace all pediatric dentists age 45 and over.
2. The need to increase practitioners to serve the increasing numbers of children.
3. All pediatric dentists less than 40 years of age would work full-time for the next 25 years, none would retire early and none would die during the next 25 years.

Approximately 3000 new pediatric dentists (including private practitioners, educators, administrators and government employees) would be needed to maintain current ratios, with major needs in Texas, California and the general Pacific Region (Figure 3).

"Production" of pediatric dentists

Estimates were developed (based upon current numbers of program graduates) for the number of pediatric dentists that could be "produced" during the next 25 years. Although it was projected that there would be more than 4100 graduates, the reality is that more than 30% of current pediatric dentistry trainees are foreign students with limited expectations that they will continue to practice in this country.[14] In terms of future projections this could translate into more than 1200 foreign student graduates during the next two and one-half decades. As a result (considering only the need to maintain the current practitioner-to-child ratios) it was estimated that the current rate of "production" would not meet the next generational national need for pediatric dentists in this country.

Female practitioners

More than two-thirds of pediatric dentistry program graduates are women. Some studies raise the question of the comparability of work production by male and female practitioners.[15] How does one factor in the increasing numbers of women entering pediatric dentistry in projections for manpower ratios?

Who provides care

There has been a progressive increase in the percent of children treated by pediatric dentists. Nevertheless, in the early 1990s, the majority of dental care for children is provided by nonpediatric dentists (approximately 60% for preschool children and 75% of school age children).[16] How do we continue to develop and maintain general practitioner interest and ability in caring for younger patients when increasing emphasis in dental school and in practice is placed on the needs of the expanding population of the elderly?

Our job is not finished

In the coming decades:

1. There will be a continuing increase in the numbers of underserved children.

TABLE 3. NUMBER OF PEDIATRIC DENTAL PROGRAMS: 1980–1995[12]

	1980	*1985*	*1990*	*1994*	*1995*
Dental school	41	42	37	38	37
Nondental school	23	22	18	17	20
Total	64	64	55	55	57

TABLE 4. PEDIATRIC DENTAL PROGRAM GRADUATES: 1975–1995[12]

	1975	*1980*	*1985*	*1990*	*1994*	*1995*
Dental school	127	122	112	104	121	124
Nondental school	52	52	36	38	38	42
Total	179	174	148	142	159	166

2. There will be a continuing increase in the numbers of special patient populations.
3. There will be a continuing decrease in the numbers of dentists, a decrease in the dentist-to-population ratio.
4. A continuing need for pediatric dental practitioners.

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1. U.S, Bureau of the Census: Population projections for states, by age, sex, race and Hispanic origin: 1993 to 2020. Current Population Reports, P25-1111. Washington, DC: Government Printing Office, 1994.
2. Jacobsen PL, Fredekind R: A multiple language health history for dental practice. J Calif Dent Assoc 21:25-38, May 1993.
3. Waldman HB: Almost four million children with disabilities. J Dent Child 62:205–9, 1995.
4. Waldman HB: Almost eleven million special children. J Dent Child 58:237–40, 1991.
5. Waldman HB: Almost twenty million chronically ill children. J Dent Child 61:129–33, 1994.
6. Brown LJ, Kaste LM, Selwitz RH, Furman LJ: Dental caries and sealant usage in U.S. children, 1988-1991. J Amer Dent Assoc 127:335–43, 1996.
7. Waldman HB: Hispanic children: an increasing reality in pediatric dental practice. J Dent Child 59:221–24, 1992.
8. Waldman HB: Asian American and Pacific Islander children: they will become an increasing reality in your practice. J Dent Child 62:136–40, 1995.
9. Waldman HB: Marked increases in the general population and decreasing numbers of dentists in the 21st century. Illinois Dent J 63:99–102, 1994.
10. Survey Center: 1985/86 through 1994/95 Annual Report on Dental Education: Trend Analysis. Chicago: American Dental Association, 1986-1995.
11. 1988 through 1994 Survey of Dental Seniors. Washington, DC: American Association of Dental Schools, 1989-1995.
12. Survey Center: 1975/76 through 1994/95 Survey of Advanced Dental Education. Chicago: American Dental Association, 1976, 1995.
13. Waldman HB: Planning for the children of your current pediatric dental patients. J Dent Child 62:418–25, 1995.
14. DES Data Update. Chicago: American Dental Association, April 8, 1993.
15. Council on Dental Practice. A comparative study of male and female dental practice patterns. Chicago: American Dental Association, 1989.
16. Nowak AJ, Johnsen D, Waldman HB, McTigue DJ, Casamassimo P: Pediatric oral health. In Child Health Supervision, MR Solloway, PP Budetti EDS. Arlington, VA: National Center for Education in Maternal and Child Health, 1995, pp 325–62.