Geographic Distribution of Pediatric Dentists in Private Practice in the United States

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Abstract

Purpose: The objectives of this study were to: (1) determine the geographic distribution of pediatric dentists in private practice across the United States; and (2) compare state-based pediatric dental practitioner-to-children ratios.

Methods: Enumeration of pediatric dental practitioners was derived from the American Academy of Pediatric Dentistry's 2000-01 *Membership Directory* by including all active and fellow members who were in private practice in the United States. Population information for the 50 states and District of Columbia was obtained from Census 2000 data available on the US Census Bureau's Web site.

Results: A total of 2,913 pediatric dentists were in private practice in the United States, with the largest number located in California (333), Texas (238), and New York (202), and the smallest number located in Maine (3) and North Dakota (4). There were 4.03 pediatric dental practitioners for every 100,000 US children younger than 18 years of age. Connecticut and Massachusetts had almost twice (7.7) as many pediatric dental practitioners per 100,000 children as the national average. On the other hand, Maine had only one fourth (1) the number of pediatric dental practitioners per 100,000 children as the national average.

Conclusions: Marked differences exist between the various states in their pediatric dental practitioner-to-children ratio. (*Pediatr Dent.* 2004;26:526-529)

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The US dentist-to-population ratio has been declining since 1995 and is projected to continue decreasing over the next 2 decades.[1] During this ongoing attrition in the dentist workforce, twice as many dentists are likely to retire as are joining the dental workforce.[2] This trend appears to be paralleled in the specialty of pediatric dentistry. The American Academy of Pediatric Dentistry's (AAPD) Task Force on Work Force Issues has observed that the pediatric dentist "shortage is reaching crisis proportions at the end of the millennium."[3]

Reviewing one aspect of the dentist workforce situation, the American Dental Association's (ADA) 2001 Future of Dentistry Report noted that "there are rather pronounced geographic imbalances in the dental work force," with specific areas "either currently experiencing or predicting declines in the number of practicing dentists."[4] Therefore, dentist workforce assessments that might hold true for Michigan, with its 4% decline in dentist-to-population ratio during the 1993-1999 period, cannot be extrapolated for Massachusetts, which experienced a 4% increase in its dentist-to-population ratio over the same time interval.[4]

The objectives of this study, therefore, were to:

1. determine the geographic distribution of pediatric dentists engaged in private practice across the US;
2. compare state-based pediatric dental practitioner-to-children ratios in the 50 states and District of Columbia.

Methods

The list of US pediatric dentists in private practice was derived from the AAPD's 2000-01 *Membership Directory*. Pediatric dentists listed as being active or fellow members in the 50 states and District of Columbia were included in the data set. The refined data set of pediatric dental

Table 1. Ratios of Pediatric Dental Practitioner (PDP) per 100,000 Children in Descending Order

State	PDP ratio for children <18 years of age	No. of PDPs	No. of children <18 years of age*
Massachusetts	7.73	116	1,500,064
Connecticut	7.72	65	841,688
Alaska	7.34	14	190,717
Vermont	6.10	9	147,523
Hawaii	5.75	17	295,767
New Jersey	5.37	112	2,087,558
Oregon	5.32	45	846,526
District of Columbia	5.22	6	114,992
New Hampshire	5.17	16	309,562
Colorado	5.09	56	1,100,795
Maryland	4.87	66	1,356,172
Wyoming	4.66	6	128,873
Alabama	4.54	51	1,123,422
Kentucky	4.52	45	994,818
Florida	4.47	163	3,646,340
Pennsylvania	4.45	130	2,922,221
Utah	4.45	32	718,698
Tennessee	4.43	62	1,398,521
Indiana	4.38	69	1,574,396
Washington	4.36	66	1,513,843
New York	4.31	202	4,690,107
South Carolina	4.26	43	1,009,641
Virginia	4.20	73	1,738,262
Georgia	4.15	90	2,169,234

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*Census 2000, US Census Bureau.

practitioners were obtained by excluding AAPD members with the following exclusion criteria:

1. student, life, retired, and life-retired membership categories;
2. affiliate, associate, and honorary membership categories;
3. institutional pediatric dentists (eg, university-based, hospital-based, industrial-based, armed forces, and Indian health service).

Population data on the number of children under 18 years of age for each of the 50 states and District of Columbia were obtained from Census 2000 information posted online at the US Census Bureau Web site.[5]

Descriptive data analysis was performed to include state-specific assessments of the pediatric dental practitioner-to-children ratio.

Results

There were 2,913 US pediatric dentists engaged in private practice during 2000. California had the largest number of pediatric dental practitioners (333), followed by Texas (238), New York (202), Florida (163), and Pennsylvania (130). Maine had the lowest number of pediatric dental practitioners (3), with North Dakota (4), Delaware (6), District of Columbia (6), Wyoming (6), South Dakota (8), Montana (9), Rhode Island (9), and Vermont (9) also numbering pediatric dental practitioners in the single digits (Table 1).

There were 4.03 pediatric dental practitioners for every 100,000 US children under 18 years of age. The ratio of pediatric dental practitioners to children under 18 years of age was highest for Connecticut and Massachusetts at 7.7 per 100,000 children, while Maine had the lowest ratio with just 1 pediatric dental practitioner for every 100,000 children. Across the nation, the state-based median ratio of the number of pediatric dental practitioners for every 100,000 children under 18 years of age was 3.95 (Table 1).

Discussion

This study enumerated the number of pediatric dental practitioners and assessed their ratio to children across the United States. In 2000, there were approximately 3,000 US pediatric dentists in private practice. The ADA's *Survey Center Report* "Distribution of Dentists" reported that there were 152,151 active US private practitioners in 1999.[1] The proportion of pediatric dental practitioners, therefore, represents less than 2% of the dentist workforce in the US.

The largest numbers of pediatric dental practitioners were located in states such as California, Texas, and New York, which had the largest number of residents in the United States, according to Census 2000 data.[5] Pediatric dental practitioners numbered in the single digits in small states such as Delaware and the District of Columbia, as well as in some of the New England states (Maine, Rhode Island, and Vermont) and the Mountain states (Montana, North Dakota, South Dakota, and Wyoming).

There were 4.03 pediatric dental practitioners for every 100,000 US children under 18 years of age. Individual

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State	PDP ratio for children <18 years of age	No. of PDPs	No. of children <18 years of age*
Texas	4.04	238	5,886,759
USA (average)	4.03	2,913	72,293,812
South Dakota	3.95	8	202,649
Montana	3.91	9	230,062
Wisconsin	3.87	53	1,368,756
Illinois	3.70	120	3,245,451
Rhode Island	3.63	9	247,822
California	3.60	333	9,249,829
New Mexico	3.54	18	508,574
Idaho	3.52	13	369,030
Louisiana	3.44	42	1,219,799
Ohio	3.36	97	2,888,339
North Carolina	3.31	65	1,964,047
Arizona	3.29	45	1,366,947
Iowa	3.27	24	733,638
Oklahoma	3.25	29	892,360
Mississippi	3.23	25	775,187
Arkansas	3.09	21	680,369
Delaware	3.08	6	194,587
Nevada	2.93	15	511,799
Minnesota	2.88	37	1,286,894
Missouri	2.87	41	1,427,692
Kansas	2.81	20	712,993
North Dakota	2.49	4	160,849
West Virginia	2.49	10	402,393
Nebraska	2.44	11	450,242
Michigan	2.43	63	2,595,767
Maine	1.00	3	301,238

*Census 2000, US Census Bureau.

states showed a wide variation in the ratio of pediatric dental practitioners to children, with South Dakota having the median ratio of 3.95 pediatric dental practitioners for every 100,000 children. The ratio of pediatric dental practitioners to children was highest in Connecticut and Massachusetts, with a ratio almost twice the national average. One plausible reason that might partly explain the high concentration of pediatric dentists in these 2 states may be the historically greater caries activity seen in the New England region.[6] For instance, the National Survey of Dental Caries in US School Children: 1986-1987 reported that New England children had the highest regional caries experience in the nation.[7]

The ratio of pediatric dental practitioners to children was lowest in the states which had a larger proportion of their population residing in rural areas, as compared to the national average of 21%.[5] These states (with the proportion of their population residing in the rural areas in parentheses) include Kansas (29%), Maine (60%), Michigan (25%), Minnesota (29%), Missouri (31%), Nebraska (30%), North Dakota (44%), and West Virginia (54%).[5] This finding of lower availability of pediatric dentists in the rural areas is in concordance with the report that rural children have less access to and utilization of dental care as compared to urban children.[8]

Another aspect of the distribution of the pediatric dentist workforce that merits consideration is the distribution of pediatric dentists within individual states. For example, the overall state ratio of pediatric dental practitioners to children may be favorable, but the distribution within the state may leave major disparities in access to dental services for children. This will be particularly true in states with large square mile areas. Data from Ohio has shown that statewide disparities exist in the distribution of dentists, with dentists being more likely to practice "in the most densely populated areas rather than where dental care is needed most."[9] Therefore, it remains noteworthy to examine in detail the dispersion of pediatric dentists within individual states.

Numerical assessment of pediatric dentist distribution across the US, as undertaken in this study, has significance for formulating dental workforce policy in the various states. It has been noted that, in 1998, more than half of all US pediatric dentists were 50 years of age and older.[10] Based on the geographic variation in pediatric dentist distribution which was observed in this study, it is plausible that pediatric dentist availability in some states may soon reach significantly low levels, given the observation that most dentists retire between 60 to 69 years of age.[11] States with a low pediatric dental practitioner-to-children ratio, in particular, may be adversely affected by practitioner retirement in the upcoming years. Further, states with low

absolute numbers of pediatric dentists are potentially at risk for sudden negative shifts in pediatric dentist availability. Such states need to be proactive in recruiting pediatric dentists to replace retiring practitioners.

The data set used for this present study is a near approximation of the pediatric dentist workforce in private practice in the United States. The data set has the following limitations regarding the enumeration of pediatric dentists. First is the potential for classification error if any AAPD member had listed his/her residence address in the AAPD *Membership Directory*. This might lead to an erroneous count if the member is working in an institution, etc. and, therefore, would not have been otherwise included in the refined data set according to the defined exclusion criteria. Also, if a member listed his/her residence address in one state but otherwise practiced in another state, this may contribute to improper state-based counts of pediatric dentists.

Another limitation of this study is that AAPD membership penetration may not be consistent across all states. Therefore, this variation in AAPD membership penetration could lead to over- or underestimation of state-by-state counts of pediatric dental practitioners in the present study.

Finally, the pediatric dentist counts are an estimate, with the assumption being made that AAPD membership is representative of US pediatric dentists. This estimation is, however, unlikely to diminish the data set's validity since AAPD membership is estimated to represent almost 95% of all US pediatric dentists.[12]

Conclusions

Wide variation exists in the state-based ratio of pediatric dental practitioners to children across the United States.

References

1. Brown LJ. Dental work force strategies during a period of change and uncertainty. *J Dent Educ*. 2001;65:1404-1416.
2. Beazoglou T, Bailit H, Brown LJ. Selling your practice at retirement–are there problems ahead? *J Am Dent Assoc*. 2000;131:1693-1698.
3. Davis MJ. Pediatric dentistry workforce issues: A task force white paper. *Pediatr Dent*. 2000;22:331-335.
4. Seldin LW. The future of dentistry: An overview of a new report. *J Am Dent Assoc*. 2001;132:1667-1677.
5. US Census Bureau. United States Census 2000. Available at: http://www.census.gov. Accessed October 8, 2003.
6. Mandel ID. Dental caries–another extinct disease? In: Bowen WH, Tabak LA, eds. *Cariology for the Nineties*. Rochester, NY: University of Rochester Press; 1993:4.
7. National Institute of Dental Research. Oral health of United States children–The National Survey of Dental Caries in US School Children: 1986-1987. US Department of Health and Human Services, Public Health Service, National Institutes of Health: NIH Publication no. 89-2247; September, 1989.
8. Vargas CM, Ronzio CR, Hayes KL. Oral health status of children and adolescents by rural residence, United States. *J Rural Health*. 2003;19:260-268.
9. Susi L, Mascarenhas AK. Using a geographical information system to map the distribution of dentists in Ohio. *J Am Dent Assoc*. 2002;133:636-642.
10. American Dental Association. The 1999 survey of dental practice: Pediatric dentists in private practice, January, 2001. Chicago, Ill.
11. Jackson JB, Kart CS, Wagner KS, Rowe AR. A survey of retired dentists in the United States. *J Am Dent Assoc*. 1985;110:386-389.
12. Houpt MI. Pediatric dentistry–the third generation (editorial). *Pediatr Dent*. 1999;21:401-402.

Abstract of the Scientific Literature

Fixed Appliance Removal-induced Bacteremia

The purpose of this prospective clinical study was to determine the prevalence of bacteremia caused by the removal of fixed orthodontic appliances. Pre- and post debanding and debracketing venous blood samples were obtained from 30 orthodontic patients. The 13% prevalence of band/bracket removal-induced bacteremia was found to be unrelated to the patients' gingival or plaque scores.

Comments: Guidelines for SBE prophylaxis cover the placement of orthodontic bands, but say nothing about their removal. This study's results would suggest that appliance removal represents a significant risk of bacteremia. Presumably, this occurs during band removal and not bracket removal. Unfortunately, the study design did not allow for this distinction. **ALS**

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Burden DJ, Coulter WA, Johnston CD, Mulally B. The prevalence of bacteremia on removal of fixed orthodontic appliances. *Eur J Orthod*. 2004;6:443-447.

22 references