Community Dental Health (2010) **27,** 178–183
Received 5 November 2008; Accepted 20 April 2009

doi:10.1922/CDH_ 2481Moussa06

The dentist workforce in Kuwait to the year 2020.

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Aim To project the future demand for dentists in Kuwait for the years 2007 to 2020 based on the period 1994 to 2006. The study addresses the supply of and demand for dentists in Kuwait in the light of emerging variables such as increasing population, economic growth, changes in dental care, education strategies, and changes in demographics of dentists. ***Basic research design*** Population projections for the years 2007 to 2020 were derived using the average annual natural increase rate of the 1994-2006 populations. The future demand for dentists for the years 2007 to 2020 was projected using the average dentist to population ratios of the years 1994-2006. ***Results*** The average annual growth rate of indigenous Kuwaiti dentists during the period 1994-2006 was 5.58% compared to 31.9 % for non-native expatriot dentists. There is a gap between the numbers of native and foreign dentists. In 2006, native dentists constituted 44.4% of the dental workforce in Kuwait, this is likely to affect the quality of provided dental care owing to language, religious and sociocultural barriers between foreign dentists and patients. The disparity between the total number of dentists needed and the number of native dentists is expected to decline from 54.41% in 2007 to 24.67% in 2020. ***Conclusions*** The supply of native dentists is likely to remain insufficient to meet the projected demand until the year 2020. The supply of indigenous dentists should be increased through improvement in recruitment and retention of Kuwaiti national dentists and dental students.

Keywords: Dental care, dentists, Kuwait, supply and demand, workforce modeling.

Introduction

The aim of dentist workforce planning is to estimate the required number of dentists who possess appropriate competencies to meet future dental care needs of the population. Hence, the aim is to balance dentist workforce supply and demand (FDI Dental Practice Committee, 2005; School of Dentistry, 2006). Dentist workforce planning should include an understanding of the issues and policy strategies that can affect the workforce development, and be integrated with planning of dental education, dental care services and financing dental human resources (Brown, 2001).

The factors that can have an impact on dentist workforce in Kuwait include dental care delivery system, dental education and postgraduate training programmes, demographics of population and dentists, economic growth, and other potential determinants of demand for dental services.

Dental care delivery system in Kuwait

The dental care system in Kuwait comprises four types: general, specialized, preventive, and emergency dental services. The Ministry of Health (MOH) is the lead government agency, which is responsible for strategic planning, formulating health policies, supervising and monitoring all dental-related programmes and activities within Kuwait. MOH provides 70% of the dental care services, other governmental agencies and the private sector provide the remaining 30%. General dental care services are delivered through 191 dental clinics distributed among the primary healthcare centres of the six health regions in Kuwait. There are six specialized referral centres which provide dental services through 232 clinics. There are six preventive health programmes which provide their dental services to school children through 128 clinics. In addition to the MOH, the private sector also shares the provision of dental care. There are 10 dental clinics in 10 private hospitals, 11 private dental clinics, 20 dental clinics in specialized medical centres, and 38 dental clinics in specialized dental centers (Ministry of Health, 2006a).

Overall, the dental care delivery system has significantly changed in Kuwait affecting the environment in which dentists provide care. Economic growth had an impact on health needs and population health behaviour. Advances in technology and emphasis on cost-effectiveness have led to changes in structure, organization, and delivery of dental care services.

The Kuwait Dental Association (KDA) was established in 1974. KDA is the professional association committed to serving its members, be their national voice, and providing them with a variety of scientific, social programmes and a sense of unity. KDA also lives up to a code of ethics toward patients, the public, the profession and other health professionals.

Dental education and postgraduate training programmes in Kuwait

One basic dental educational programme is available in Kuwait. The Faculty of Dentistry (FoD) of Kuwait University which was established in 1996 is the sole

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source of graduating dentists in Kuwait. Before 1996, Kuwaiti students were sent for dental education to other countries such as Egypt, UK and USA. The first batch of 26 students was admitted to the dental programme in September 1998 and 14 of them were graduated in January 2005. The number enrolled annually is 24 students, mostly females. A 6.5-year dental curriculum was adopted. This curriculum incorporates current trends in medical and dental education such as evidence-based and community-based approaches, problem-solving methodology for outcome-based learning, and competency achieved through comprehensive patient care (Behbehani, 2003). FoD has 31 faculty members, half of them are natives. FoD is on its way to adopt the more modern curriculum based on student-centered approach and problem-based learning. The pool of indigenous dentists comprises graduates of FoD, in addition to graduates from universities abroad who returned from scholarships sponsored by the Kuwaiti government.

The Kuwait Institute for Medical Specialization (KIMS) was established in 1984. It is responsible for organizing all aspects of postgraduate training of health professionals including dentists in Kuwait. A recent step that has been taken was the collaborative link between KIMS and the Royal College of Surgeons in Ireland for postgraduate training in dentistry. This programme started in 2003 and leads to membership of the General Dental Surgery of the Royal College of Surgeons in Irelands (Kuwait Institute for Medical Specialization, 2008).

An intermediate educational programme on oral and dental health is provided by the College of Health Sciences, Public Authority for Applied Education and Training in Kuwait. It is a 2-year duration programme, and it offers a diploma in oral and dental health.

Demographics of the population in Kuwait

In 1994, the mid-year population in Kuwait was 1,620,086 (41.4% natives, 58.6% foreigners). In 2005, the mid-year population reached 2,886,888 (33.9% natives, 66.1% foreigners, Table 1). During the past decade, the population in Kuwait increased 77%. Among the one-third Kuwaiti population, the male:female ratio was 1:1.04, while the male:female ratio among the two-thirds migrants was 2.27:1. The preponderance of male migrants is due to the fact that they come at working age without their families. In 2005, natives constituted a young population. Children (14 years or below) represented 40.2% and retired subjects (60 years and above) represented only 4.6% of the Kuwaiti population. The Kuwaiti population pyramid is typical of "low mortality-high fertility" countries with a wide base and almost perfect symmetry between the two sexes. The non-Kuwaiti population pyramid, on the other hand, has a narrow base and wide middle (i.e. working age groups) and is completely asymmetrical between the sexes. The expected increase in the proportion of elderly native Kuwaitis coupled with higher life expectancy will increase the burden on health sectors (Ministry of Health, 2006b).

Demographics of dentists in Kuwait

In 1994, the number of dentists in Kuwait was 454 (27.3% natives). In 2005, the number of dentists increased to 918 (41.6% natives, Table 1). Of the 918 dentists, 283 (30.8%) were females, and 239 (26%) were employed in the private sector. Among Kuwaiti dentists, females constituted 43.6%, and among non-native expatriate dentists, females constituted 21.8%. Dentists demographics have important supply indications. Currently, one in two dentists in Kuwait is female. The growth in female dentists is due to social and cultural changes in Kuwait. The gender ratio among the dental students of the Kuwait FoD is very skewed with preponderance of females (Faculty of Dentistry, 2007).

The expansion of the number of women in dentistry has been one of the major dentist workforce trends. Such a fundamental demographic shift raises questions regarding the effect of that shift on workforce requirements. The higher part-time distribution among female dentists less than 40 years of age can be related to childbearing and/or childrearing responsibilities. Also, because practice characteristics and retirement patterns differ among male and female dentists, the increasing proportion of female dentists affects the supply of dentist services.

Kuwait is a rich country with a relatively open economy. Economic growth, modernization and globalization in Kuwait have significant impact upon health-related behaviors. As the population in Kuwait has become more affluent and educated as a result of growing economy, the value placed on oral health has increased.

Changes in technology, use of other allied dental workers, public expectations and government policies all can alter dental care patterns and the way they are delivered. Some new technologies may create additional demand for dental services.

Public expectations of dental care are different today than they were as a result of increased income due to economic growth. The changing strategies of the government may also exert a significant impact on demand for dental services. Also, trends in dentists' productivity are important determinants to consider when projecting supply of dental services. In addition, it is important to assess how to deliver dental services more effectively and the future roles of the dentist and other allied dental personnel. Dental care is delivered by a dental team composed of dentists, dental hygienists, dental assistants, and dental laboratory technicians.

There are many changes taking place in many of the determinants of dental workforce supply and demand. Some of these – such as the increasing number of women in the workforce, changing lifestyle expectations, and globalization – are being identified and monitored. But other important factors are not routinely measured. These include dental productivity and supply and demand of allied dental personnel. In an increasingly complex environment, new dental workforce planning issues are emerging, such as reallocation of tasks to other health professionals and reskilling of dental workforce for changed roles. To date, dental workforce planning has not taken into account the full range of dynamic variables that are involved, nor accounted for their inherent uncertainty and complex interactions (Sprod and Boyles, 2002).

The aim of this study was to describe the size of the dentist workforce in Kuwait between 1994 and 2006, and to project the future demand for dentists, and supply of Kuwaiti dentists for the years 2007-2020.

Method

Local and international sources on the demand for and supply of dentists were retrieved. The local sources included Dentist Licensing Department, Department of Statistics and Medical Records, Ministry of Health (Ministry of Health, 2006b), Kuwait Institute for Medical Specialization (Kuwait Institute for Medical Specialization, 2008), Faculty of Dentistry, Kuwait University (Faculty of Dentistry, 2007), Ministry of Planning (Ministry of Planning, 2006), private and oil dental sectors (Ministry of Health, 2006a). International sources included reports from the World Health Organization (Dubois et al., 2006), Dental Workforce Advisory Committees reports of UK (National Dental Advisory Committee for Scotland, 2001; Standing Dental Advisory Committee, London, 2004), and USA (Beazoglou et al., 2002).

Population projections for the years 2007-2020 were derived from the populations of the years 1994-2006 using an average annual population natural increase rate. The natural increase rate in a year is the difference between the fertility rate and the mortality rate per 1000 population at that year. Prediction of the Kuwaiti national population for the years 2007-2020 was based on the average population natural increase for the period 1994-2006, which was 2.82%. Prediction of the non-Kuwaiti expatriate population was based on an average population natural increase of 0.89% (Ministry of Health, 2006b).

Dentist-to-population ratios have been used as useful indicators for planning demand for dentists. These ratios provide tools for comparison between various countries, especially with regard to relative access to dental services (Goodman and Weyant,1990; School of Dentistry, 2006). The dentist to 1000 population ratio for the year 2006 was found to be 0.3326 (Table 1). We added 0.0044, the average increment in ratios for the period 1994-2006, to the 2006 dentist to 1000 population ratio (0.3326) and obtained 0.3370 as the adjusted ratio. This ratio is equivalent to one dentist to 2967 population. The number of dentists needed at any given year was estimated by dividing the estimated population of that year by the estimated one dentist to population ratio of 2967. The projected number of Kuwaiti national dentists at a given year was calculated by incrementing the number of Kuwaiti dentists at the previous year by the average annual growth rate of the Kuwaiti dentists during the years 1994-2006 (5.58%). The disparity between the projected number of dentists needed and Kuwaiti dentists available was calculated together with its percentage for each year (Table 1).

Results

The population and supply of dentists in Kuwait during the period 1994-2006 are presented (Table 1). It appears that the natural increase rates of Kuwaiti nationals were almost three times higher than those of non-Kuwaitis. The average dentist to 1000 population ratio per annum during the period 1994-2006 was 0.3370, equivalent to one dentist to 2967 total population. The average growth rate per annum for Kuwaiti dentists during the period 1994-2006 was 5.58% while for non-Kuwaiti dentists was 3.19%. This result indicates that the number of Kuwaiti dentists is growing faster than that of non-Kuwaiti dentists.

Table 1. Population and supply of dentists in Kuwait, 1994 – 2006

Year	*Population*			*Rate of natural increase per 1000 population*			*Actual number of dentists in service*			*Dentists to 1,000 population ratio*
	K	*NK*	*Total*	*K*	*NK*	*Total*	*K*	*NK*	*Total*	
1994	671,344	948,742	1,620,086	34.9	12.6	23.8	124	330	454	0.2802
1995	694,608	1,107,189	1,801,797	34.6	13.5	24.1	134	343	477	0.2647
1996	720,651	1,173,711	1,894,362	33.9	15.9	24.9	138	364	502	0.2650
1997	747,093	1,232,596	1,979,689	32.2	14.0	23.1	109	357	466	0.2354
1998	776,383	1,250,720	2,027,103	30.2	11.0	20.6	112	369	481	0.2373
1999	803,945	1,303,250	2,107,195	29.0	10.5	19.8	173	378	551	0.2615
2000	831,681	1,357,987	2,189,668	28.9	10.0	19.5	178	393	571	0.2608
2001	859,958	1,415,022	2,274,980	28.0	9.3	16.5	235	392	627	0.2756
2002	884,550	1,478,775	2,363,325	29.0	9.1	16.6	264	390	654	0.2767
2003	913,500	1,570,834	2,484,334	28.6	8.5	15.9	316	467	783	0.3152
2004	938,987	1,583,464	2,522,451	28.7	9.1	16.1	346	489	835	0.3310
2005	973,286	1,893,602	2,866,888	29.5	9.3	16.1	382	536	918	0.3202
2006	1,008,090	2,043,755	3,051,845	28.7	9.1	15.6	451	564	1015	0.3326

K = Kuwaiti
NK = Non Kuwaiti
Source: Ministry of Health (2006a, b); Ministry of Planning (2006).

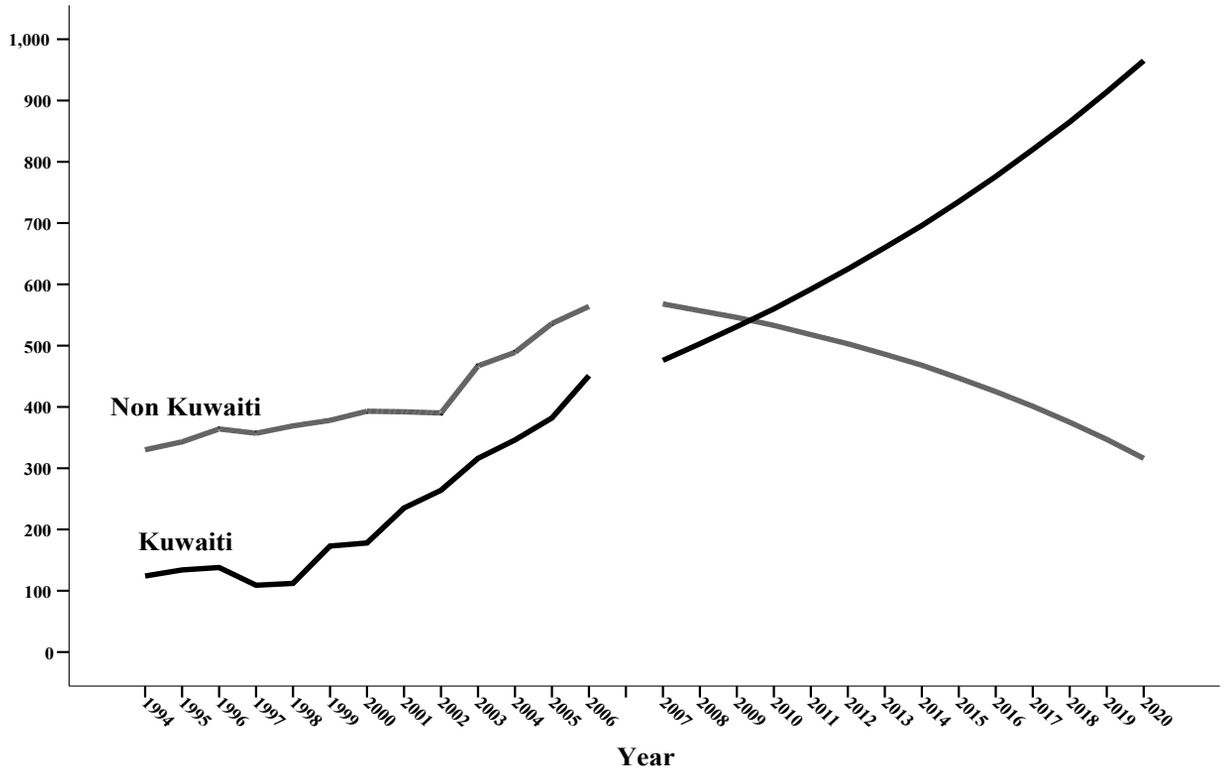

Figure 1. *Growth in supply of dentists in Kuwait, 1994-2020*

The supply of dentists that existed up to 2006 and the projected supply until 2020 in Kuwait are illustrated (Figure 1). There was a gap between the numbers of Kuwaiti and non-Kuwaiti dentists during the period 1994-2006. Based on the projections, the number of Kuwaiti dentists is expected to become equal to the number of non-Kuwaiti dentists by the year 2009, and then the Kuwaiti dentists are likely to outnumber the non-Kuwaiti dentists. In year 2005, the public sector represented by the Ministry of Health was the main employer for 679 dentists (74%), while the private sector employed 26% of dentists. Realization of the ambitious plans for development in both public and private healthcare sectors would further increase the demand for dentists.

The dentist to 1000 population ratio varies among different countries. The dentist to 1000 population ratio in Kuwait (0.3326 in 2006) is similar to the ratios in other Gulf States, but is below the ratios of any of the developed countries (World Bank, 2006).

The projected numbers of dentists that will be needed during the period 2007-2020 are shown (Table 2). Based on the dentist: population ratio of 1:2967, the projected demand for dentists will increase from 1044 in year 2007 to 1281 in year 2020, while the projected number of Kuwaiti dentists will increase from 476 in 2007 to 965 in 2020. It is estimated that the disparity between the projected number of dentists needed and projected number of native dentists will decrease from 54.41% in year 2007 to 24.67% in 2020 (Table 2, Figure 2). This gap between demand and the available number of Kuwaiti dentists is expected to remain if the supply of Kuwaiti dentists continues to be at the same rate. This deficit between demand for dentists and supply of Kuwaiti dentists will presumably be compensated for by the recruitment of foreign dentists.

Discussion

This study was carried out with the aim of examining the supply and demand of dentists in Kuwait. The demand was based on a dentist-to-population ratio of 1:2967 (equivalent to 0.3370 dentist per 1000 population, which was the adjusted ratio for the period 1994-2006). Analysis of the current dentist workforce and the projected supply of new graduates during the period 2007-2020 indicated that the supply of Kuwaiti dentists until the year 2020 will not be sufficient to meet the projected demand. By the year 2020, Kuwaiti dentists are expected to meet 75.3% of the total demand for dentists.

This study has its limitations. First, the amount and quality of data available on dental practice characteristics and dentists' productivity are limited. Second, we recognize that the dentist-to-population ratio used in projections does not reflect all the factors that must be considered to develop an effective dentist workforce policy. The ratio implicitly holds constant the factors that affect both the population's need and desire for dental care as well as dentists' ability to produce those services (Brown, 1999). In addition, the dentist : population ratio does not take into consideration dentists who work part-time, the need for specialized dentists, the likelihood that many foreign dentists will not remain in Kuwait for more than a certain number of years which is hard to predict. Third, projecting the demand for dentists over a long period inevitably brings in elements of uncertainty as both supply and demand depend on unpredictable unforeseen future trends in a number of different areas. Fourth, due to unavailability of data, it was not feasible to study the age structure of dentists and its effect on their supply and demand. Age is associated with retirement probability and productivity.

Table 2. Projected number of dentists needed in Kuwait for the years 2007-2020

Year	*Estimated total population*	*Projected total number of dentists needed*	*Projected actual number of Kuwaiti dentists*	*Disparity between total needed and Kuwaiti dentists*	
				Number	*%*
2007	3,098,462	1044	476	568	54.41
2008	3,146,044	1060	503	557	52.55
2009	3,194,612	1077	531	546	50.70
2010	3,244,194	1093	560	533	48.76
2011	3,294,812	1110	592	518	46.67
2012	3,346,495	1128	625	503	43.89
2013	3,399,267	1146	660	486	41.75
2014	3,453,159	1164	696	468	39.59
2015	3,508,195	1182	735	447	37.22
2016	3,564,408	1201	776	425	35.39
2017	3,621,825	1221	820	401	32.84
2018	3,680,478	1240	865	375	30.24
2019	3,740,398	1261	914	347	27.52
2020	3,801,617	1281	965	316	24.67

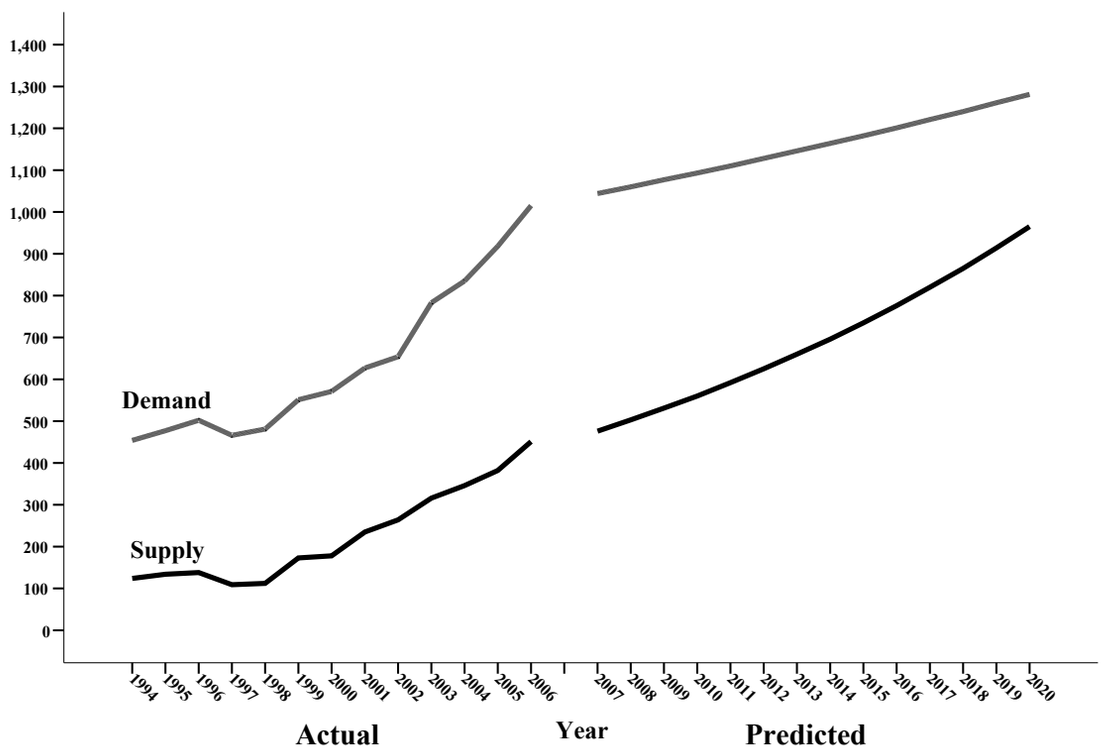

Figure 2. *Actual and projected demand and supply of Kuwaiti dentists, 1994-2020*

Among the factors that would increase the demand for dentists further in Kuwait is the expansion of dental care services in response to the growth of the population and economy. Economic growth, as well as an increasingly educated population, is likely to provide a stimulus to dental demand (Brown, 1999). In addition, there are other factors that may not be under the control of health policymakers such as dentists' productivity and their practice patterns, the ageing of the dentist workforce or population, changes in technology, use of allied dental personnel, public expectations, and changes in government policies. The supply of dental services is likely to increase because of enhanced dentists' productivity. Moreover, there is potential to increase dental output by increasing the number of allied dental personnel (Sprod and Boyles, 2002). Dentist workforce planning should take into account the full range of dynamic variables that are likely to be involved in projecting demand and supply (School of Dentistry, 2006).

Considerable changes in the dental care delivery system in Kuwait have occurred during the past decade. These changes are likely to continue for the foreseeable future, although the factors that would come into play in the long-term are unpredictable at present. No matter how much we improve the methods of workforce planning, projecting future supply and demand for dentists will always be difficult. This is partly because of the inherent uncertainties in forecasting. Future dentist workforce strategies should strive for short-term responsiveness while avoiding long-term inflexibility. Trends in the dental workforce must be continually monitored and action should be taken when necessary.

As a health policy issue, Kuwait should be self-reliant with respect to the supply of dentists. It may appear more economic to recruit foreign dentists rather than finance the education of indigenous dentists, but in the long-term it is more efficient and cost-effective to educate and employ native Kuwaiti dentists. It is important to increase the proportion of indigenous dentists in Kuwait, as well as in other Gulf states because of the commonalties shared by these countries and their people.

Conclusions

The supply of Kuwaiti dentists is likely to remain insufficient to meet the projected demand until the year 2020. Dental care authorities should continuously review dental-related policies so that a balance between the demand and supply of dentists is achieved. In particular, greater emphasis should be placed on the need to review dentist workforce numbers annually and to encourage dental care planners to adjust the numbers of dentists and other dental clinicians in training accordingly. A national database and a standing advisory committee need to be established for review and planning dental workforce. In addition, research is required to address the factors contributing to dentists' supply and demand projections such as retirement patterns, modeling specialty choices, productivity, and skill-mix through using dental allied personnel.

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