
Workforce needs of Health Professionals in Kuwait

Part I - Physicians and Dentists

ABSTRACT

Background: The long-term health plan of the Ministry of Health for human resources development should meet the expected future demand for healthcare professionals. Periodic review of supply and demand for healthcare personnel should be undertaken in the light of emerging variables such as projected population, economic growth, and healthcare strategies.

Objectives: The aims of the study were to:

1. Describe the size of the workforce of physicians and dentists in Kuwait during 1994-2004;
2. Project the population size in Kuwait that could be expected during the years 2005 to 2020;
3. Project the future demand for physicians and dentists, with special reference to Kuwaiti nationals, for the years 2005 to 2020.

Methods: Local and international data on demand and supply of physicians and dentists were retrieved. Data on population and supply of physicians and dentists of the past decade (1994 to 2004) were used to project the future demand of physicians for the years 2005 to 2020. Population projections were derived using an exponential average annual population growth rate. The future need of physicians was projected using the average doctor: population ratio for the years 1994 to 2004, of one doctor to 541 population (equivalent to 1.85 physicians: 1000 population). Similarly, the need of dentists was estimated based on the average dentist: population ratio for the past decade, of one dentist to 2915 population (equivalent to 0.3431 dentist: 1000 population). The projected numbers of Kuwaiti physicians and dentists in any given year were calculated by incrementing the number of Kuwaiti physicians and dentists for the previous year by the average annual growth rates of Kuwaiti physicians and dentists (4.55% and 6.22% respectively) during the past decade. Projections for the demand of physicians were also computed based on the average in the High Income Group countries, which was 2.8 physicians per 1000

population (equivalent to one doctor to 357 population). In the case of dentists, the UK average of 0.403 dentist per 1000 population (equivalent to one dentist to 2481 population) was used as the basis of estimate.

Results: The average growth rate per annum of the workforce for Kuwaiti physicians was found to be 4.55% compared to 3.81% for non-Kuwaiti physicians. The average annual growth rate for Kuwaiti dentists was 6.22%, while for non-Kuwaiti dentists it was 2.54%. This indicates that the numbers of Kuwaiti physicians and dentists are growing at faster rates than for non-Kuwaiti physicians and dentists. The number of Kuwaiti physicians is projected to equal the number of non-Kuwaiti physicians by 2017, while the number of Kuwaiti dentists will equal that of the non-Kuwaiti dentists by 2007. The doctor to 1000 population ratio for Kuwait (1.81) in year 2004 is still below the ratio (2.8) in the other High Income Group countries. Additionally, the dentist to 1000 population ratio of 0.3374 in Kuwait is below the value that exists in many Western countries, with, for example UK having a value of 0.403. The disparity between the projected number of physicians needed and the number of Kuwaiti physicians that will be available is likely to decline from 63.1% in 2005 to 46.0% in 2020. Similarly, in the case of dentists the disparity could be expected to fall from 52.67% in 2005 to 12.17% in 2020.

Conclusion: It could be expected that the supply of Kuwaiti physicians and dentists will remain insufficient to meet the projected demand until the year 2020. Hence, it is highly unlikely that a surplus of Kuwaiti physicians or dentists will occur until 2020. However, the dentist to population ratio in Kuwait is low compared to most Western countries and requires to be improved. There is a need for the establishment of a Standing Advisory Committee for continuous monitoring of medical workforce policy and planning.

INTRODUCTION

The aim of medical workforce planning is to make available an adequate number of physicians who possess appropriate competencies to meet the healthcare needs of the population, and to ensure that physicians are distributed between geographical areas, establishments, and levels of care based on the service commitments. Healthcare policy action may include analysis of the projected supply of physicians, development of strategies to address total demand, scarce and surplus skills, and mechanisms to facilitate the redistribution of existing physicians where necessary. In turn, changes in medical education and training strategies can influence the supply of physicians. Medical workforce planners realize that any changes in healthcare policy can substantially affect the demand for physicians. Performance management encompasses a set of issues, including the organization and division of healthcare workforce, medical practice standards, payment methods, evaluation and accountability mechanisms.¹

Achieving desired changes in the delivery of healthcare in many countries will also necessitate innovations in working conditions, generally considered as key determinants of the motivation of physicians. There is growing evidence that physicians have become demotivated, with increasing rates of burnout, reflecting a failure of working conditions to keep pace with the increasing complexity of their work. Significant innovations may be needed to improve the methods of recruiting and retaining physicians, to adapt methods and levels of remuneration to the new requirements, to improve the mechanisms of medical career management and more generally to foster the motivation of staff.²

Medical workforce planning methods should take into account evidence in the areas of consumer expectations (e.g. consumer access and trends), demography (e.g. changes in and ageing of populations), economics (e.g. centralization of healthcare, developments in health insurance coverage and use), medical workforce (e.g. working

hours, career changes, gender distribution and entry of female physicians, changes in medical postgraduate training), epidemiology (e.g. changes in disease patterns), changes in healthcare system (e.g. changes in medical technology, impact of shortage of other healthcare professionals, particularly nurses, innovations in healthcare delivery, patients' expectations and demands), and international developments (e.g. migration policy, globalization).³ Having realized the value of medical workforce planning, developed countries have established Standing Advisory Committees to continuously assess the likely future growth in the supply of physicians⁴⁻⁸ and dentists.⁹⁻¹⁴

In Kuwait, there were 725 physicians in the private sector in 2004 as compared to 3833 in the government sector (Department of Manpower Planning and Statistics, Ministry of Health).¹⁵ The number of dentists in 2004 was 851. National medical education in Kuwait had an important role in the realization of sufficiency in medical workforce. The Kuwait University, Faculty of Medicine was established in 1973. Kuwait University, Faculty of Medicine remains the sole local source for graduating medical doctors for the state of Kuwait. The number of students enrolled in the Faculty of Medicine program annually has increased from 48 in 1976 to 95 at present, of whom 63% are expected to graduate.^{16,17} The pool of Kuwaiti physicians comprises graduates of Kuwait University, as well as those from universities abroad through the Ministry of Higher Education. The supply of Kuwaiti dentists is mainly dependent on graduates from universities abroad through the Ministry of Higher Education. The Faculty of Dentistry, Kuwait University has started to graduate dentists from June 2005.

The Kuwait Institute for Medical Specialization (KIMS) was established in 1984. The main aims of KIMS are to enhance the level of competence of health professionals enabling them to keep abreast of the developments in the medical specialties and patient management, prepare graduates in the health professions for specialization in different branches of medicine, provide facilities and oppor-

tunities for continuing professional development, and monitor progress and achievement.¹⁸

Until the mid-1980's, healthcare services within the public sector in Kuwait operated in a relatively stable environment. This is no longer the case. The context in which the system operates is characterized by rapid and widespread change, brought about by local, regional and international economics, and technological and sociocultural pressures.¹⁹ Because of the limited resources available, planning of the medical workforce should take into account the optimal use of such resources. Hence, health organizations must use business planning as a management tool. In the National Health Service (NHS) of the United Kingdom, various health subunits produce business plans that resemble the operation of commercial enterprises.²⁰

The demand for physicians and dentists in Kuwait should be based on the collective healthcare services provided by the public and private sectors, and not only on the availability of positions in the government sector (Civil Service Commission). Kuwait witnessed many social and economical transitional developments during the past four decades. Economic expansion and population growth had a strong influence on the demand and supply of physicians.²¹

Physician-to-population and dentist-to-population ratios have been used as indicators in planning demands for physicians and dentists. These ratios provide useful tools for comparison between various countries, especially with regard to relative access to health services.²²

Assessment of the strength of the medical workforce is a dynamic process that should be conducted on a continuing basis because of the rapid social, demographic and economic changes that occur in populations. It should, therefore, be an integral component of the national health plan. Health planning in Kuwait operates based on five-year cycles along with other sectors. The health sector receives priority in the Kuwait national budget. Assessment of the medical workforce provides answers to important questions concerning the optimal strategies that would lead to integration of health services, which

could be used by medical educators and health planners. In addition, it would enable the health authorities to identify deficiencies or overproduction in medical specialties, which if properly dealt with, would lead to the establishment of a balanced medical workforce.

OBJECTIVES

1. Describe the size of the workforce of physicians and dentists in Kuwait during 1994-2004;
2. Project the population size in Kuwait that could be expected during the years 2005 to 2020;
3. Project the future demand for physicians and dentists, with special reference to Kuwaiti nationals, for the years 2005 to 2020.

METHODS

Local and international data on demand and supply of physicians and dentists were retrieved. The local sources included Ministry of Health to represent the public health sector, Kuwait Institute for Medical Specialization (KIMS), Faculty of Medicine, private health sector and oil sector hospitals, Ministry of Planning, and Public Authority for Civil Information (PACI).¹⁵ International sources included World Health Organization, International Labour Organization¹⁻², Organization for Economic Co-operation and Development (OECD)¹⁹, United Nations Development Programme, World Bank, Center for Disease Control (CDC)²²⁻²⁴, Medical and Dental Workforce Standing Advisory Committees of UK, USA, Canada, New Zealand, and Australia.⁴⁻¹⁴

Data on population and supply of physicians and dentists for the period 1994 to 2004 were used for assessing the size of medical workforce, and projecting the future demand of physicians and dentists for the years 2005 to 2020. Projecting over such a long interval inevitably brings in elements of uncertainty as both supply and demand depend on unforeseen future trends in a number of different areas, many of which are unpredictable. Considerable changes are expected to occur in the Kuwait

healthcare delivery system in the future. Changes in healthcare policies or medical education strategies can grossly affect demand and supply of physicians and dentists, as well as the other categories of health professionals. Population projections of the years 2005 to 2020 were derived from the population of the year 2004 (Department of Manpower Planning and Statistics) using an exponential average annual population growth rate.

The average value for physician to 1000 population ratio for the period 1994 to 2004 was found to be 1.85 (Table 1). This ratio is equivalent to one physician to 541 population. Similarly, the average dentist: population ratio for the past decade was one dentist to 2915 population (equivalent to 0.3431 dentist: to 1000 population). We used these ratios to project the future needs since they were based on a review of the actual physician: population and dentist: population ratios for the past decade, and because the healthcare delivery system in Kuwait was

stable during this period, and every individual had a relatively adequate share of healthcare with no major health services deficiencies. In addition, the physician or dentist to population ratios adopted were found to be comparable to those of the other Gulf countries.

The number of physicians needed in any given year was estimated by dividing the estimated population of that year by the estimated one physician to population ratio (541) mentioned earlier. Thus the average number of physicians per 1000 population for the period 1994 to 2004 was 1.85 (Table 1). Similarly, the number of dentists needed at any given year was estimated by dividing the estimated population of that year by the estimated dentist: population ratio (2915), which produced a value of 0.3431 dentist: 1000 population (Table 2).

The estimates of numbers of Kuwaiti physicians and dentists at any given year were calculated by incrementing the number of Kuwaiti physicians and dentists

Table 1. Actual population and supply of physicians in Kuwait, 1994 – 2004

Year	Population			Natural increase (Fertility rate - death rate) per 1000 population			Actual number of physicians in service [†]			Physicians to 1000 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	911	2118	3029	1.87
1995	694,608	1,107,189	1,801,797	34.6	13.5	24.1	990	2175	3165	1.76
1996	720,651	1,173,711	1,894,362	33.9	15.9	24.9	1116	2223	3339	1.76
1997	747,093	1,232,596	1,979,689	32.2	14.0	23.1	1136	2279	3415	1.72
1998	776,383	1,250,720	2,027,103	30.2	11.0	20.6	1238	2283	3521	1.74
1999	803,945	1,303,250	2,107,195	29.0	10.5	19.8	1302	2271	3573	1.70
2000	831,681	1,357,987	2,189,668	28.9	10.0	19.5	1296	2331	3627	1.66
2001	859,958	1,415,022	2,274,980	28.0	9.3	18.7	1402	2346	3748	1.65
2002	884,550	1,478,775	2,363,325	29.0	9.1	19.1	1481	2478	3959	1.68
2003	913,500	1,570,834	2,484,334	28.6	8.5	18.6	1590	2654	4244	1.71
2004	938,987	1,583,464	2,522,451	28.5	8.5	18.5	1678	2880	4558	1.81

*K= Kuwaiti, NK= Non-Kuwaiti

[†]Source: Health Kuwait 2004, Edition 40, Health & Vital Statistics Division, Department of Statistics & Medical Records, Ministry of Health, Kuwait.

Table 2. Actual supply of dentists in Kuwait, 1994 – 2004

Year	Total population	Actual number of dentists in service*			Dentists to 1000 population ratio*
		K†	NK†	Total	
1994	1,620,086	124	330	454	0.2802
1995	1,801,797	134	343	477	0.2647
1996	1,894,362	138	364	502	0.2650
1997	1,979,689	109	357	466	0.2354
1998	2,027,103	112	369	481	0.2373
1999	2,107,195	173	378	551	0.2615
2000	2,189,668	178	393	571	0.2608
2001	2,274,980	235	392	627	0.2756
2002	2,363,325	264	390	654	0.2767
2003	2,484,334	316	467	783	0.3152
2004	2,522,451	393	458	851	0.3374

*Source: Health Kuwait 2004, Edition 40, Health & Vital Statistics Division, Department of Statistics & Medical Records, Ministry of Health, Kuwait.

†K= Kuwaiti, NK= Non-Kuwaiti

available during the previous year by the average annual growth rates in the population of Kuwaiti physicians (4.55%) and dentists (6.22%) respectively during the past decade (See Tables 1 and 2 footnotes). The disparity between the projected numbers of physicians and dentists needed and Kuwaiti physicians and dentists available were calculated together with their percentages for each year.

Similar projections for the demand of physicians were computed based on the ratio of 2.8 physicians per 1000 population (equivalent to one physician to 357 population) applicable to the High Income Group countries. In addition, projections for the demand of dentists were computed based on the UK ratio of 0.403 dentist per 1000 population (equivalent to one dentist per 2481 population).

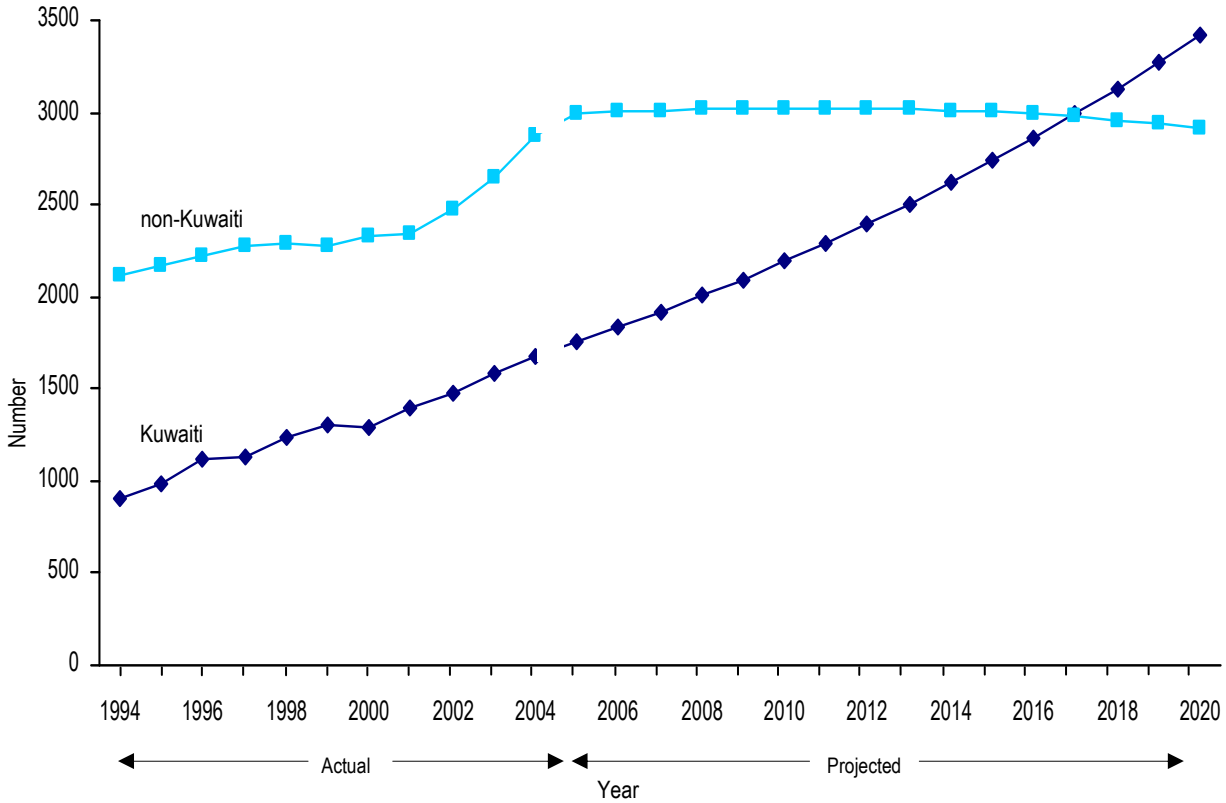
RESULTS

Table 1 depicts the actual population and supply of physicians in Kuwait during 1994 to 2004 for Kuwaitis and non-Kuwaitis. It also presents the natural increase (growth rate), which is defined as the difference between fertility and mortality rates per 1000 population.

Growth rates of Kuwaitis were almost 3 times higher than those of non-Kuwaitis. Table 1 also shows the physician to 1000 population ratios, calculated as the number of physicians in service divided by the respective population and then multiplied by 1000. The average physician to 1000 population ratio per annum was 1.85, equivalent to one physician to 541 population. The average growth rate per annum with respect to Kuwaiti physicians was 4.55%, while for non-Kuwaiti physicians it was 3.81%, which indicates that the number of Kuwaiti physicians is growing at a faster rate than that of non-Kuwaiti physicians. Figure 1 displays the growth in the supply of physicians in Kuwait. It is clear that the gap between Kuwaiti and non-Kuwaiti physicians during the past decade (1994 to 2004) was substantial. Based on the projections, the number of Kuwaiti physicians is expected to equal that of non-Kuwaiti physicians in 2017. It could be predicted that Kuwaiti physicians are then likely to outnumber the non-Kuwaiti physicians (Figure 1).

In 2004, the Ministry of Health was the main employer of physicians (84.1%), while the private sector employed 15.9%. New healthcare services either have been implemented or are being planned in response to population growth and pressure for more health services as a consequence of economic expansion. The Ministry of Health is planning to establish a general hospital at South Surra. Furthermore, planning for three medical insurance hospitals is underway (personal communication, Department of Planning and Follow-up, Ministry of Health, Nov. 2004). In addition, the Al-Sabah Medical Complex has undergone recent expansion of a number of tertiary specialized healthcare centres that will demand more physicians. Along with these developments, there was a notable increase in the number of primary care and family medicine centres, some of which had recently started to provide a 24 hour service, which therefore will require an increase in the medical workforce. Kuwait University started the planning for University general hospital in the new university campus in Shedadiya'a. At the private health sector

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



level, healthcare was provided by 5 hospitals, in addition to 3 hospitals managed by oil companies. The Kuwait Defense Forces Hospital, too, demands medical manpower. Meanwhile, the private health sector is planning to build additional hospitals to meet the service needs of the expansion of the medical insurance scheme. This will further increase the demand for medical personnel.

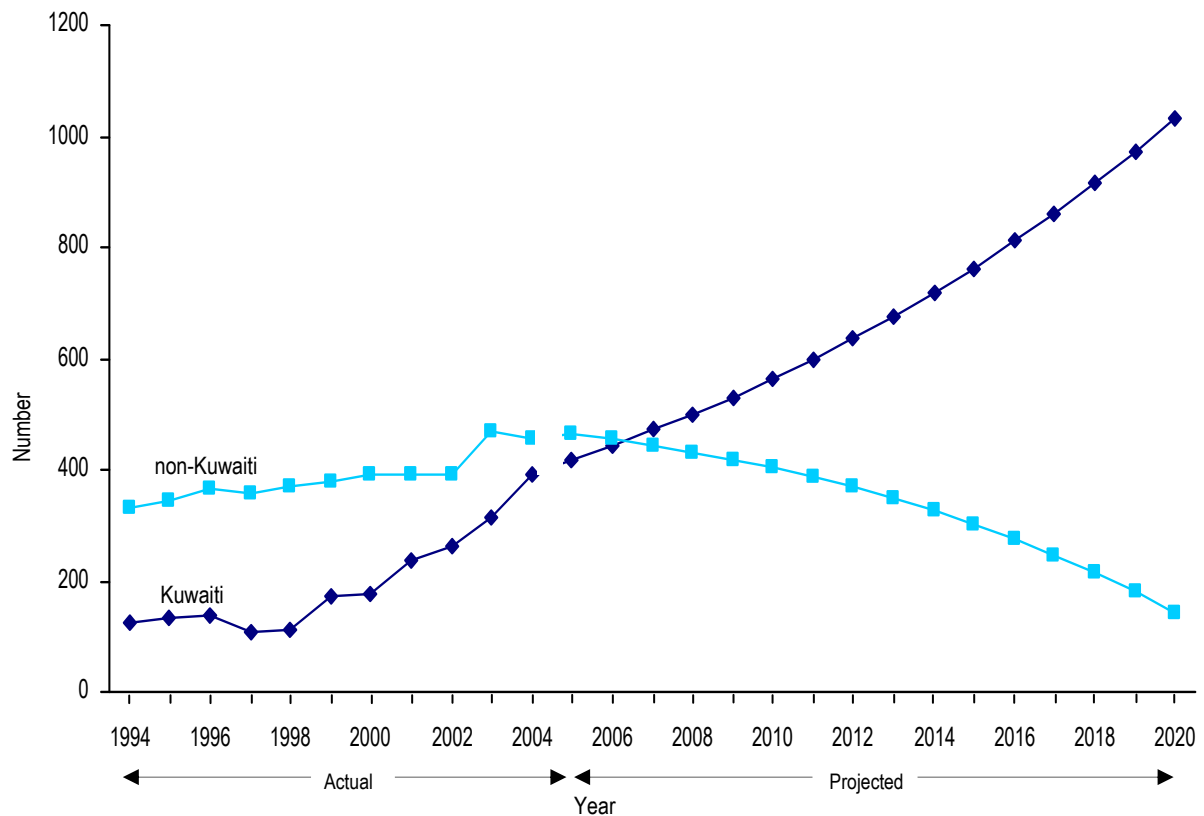
Table 2 presents the actual supply of dentists and the dentist to 1000 population ratios in Kuwait during 1994 to 2004. The average dentist to 1000 population ratio per annum was 0.3431, equivalent to one dentist to 2915 population. The average growth rate per annum with respect to Kuwaiti dentists was 6.22%, while for non-Kuwaiti dentists it was 2.54%, a sign that the number of Kuwaiti dentists is growing at a much faster rate than that of the non-Kuwaiti dentists. Figure 2 shows the growth in the supply of dentists in Kuwait. There was a gap between Kuwaiti and non-Kuwaiti dentists during the past decade (1994 to 2004). However, the number of

Kuwaiti dentists is expected to equal that of the non-Kuwaiti dentists by year 2007, with the likelihood that Kuwaiti dentists will outnumber the non-Kuwaiti dentists from then on. Based on the projected number of dentists, it could be expected that Kuwait will achieve self-reliance by year 2020, provided the growth rates in the supply of dentists and dentist to population ratio remain at the same levels (Figure 2).

Table 3 shows the physician to 1000 population ratio, and population to one physician ratio in various countries. The physician to 1000 population ratio for Kuwait (1.81) is comparable to those of other Gulf Countries, yet is below the ratio (2.80) for the High Income Group countries, which, according to the World Bank, includes Kuwait.²³

Similarly, Table 4 shows the dentist: 1000 population ratio, and population: one dentist ratio in various countries. Although the dentist: 1000 population ratio for Kuwait (0.3374 in 2004) is comparable to the figure for the other Gulf countries, it

Figure 2. Growth in supply of dentists in Kuwait, 1994-2020



still falls below the ratio for the developed countries, such as the UK (0.403).

Table 5 shows the projected numbers of physicians that will be needed during the period 2005 to 2020. Based on the physician: population ratio 1.85, the projected total demand of physicians will increase from 4750 in year 2005 to 6333 in year 2020, while the projected number of Kuwaiti physicians available will increase from 1754 in 2005 to 3420 in year 2020 with the annual growth rate considered as 4.55%.

It is estimated that the disparity between the projected number of physicians needed and projected number of Kuwaiti physicians available will decline as the corresponding ratios will fall from 63.07% in 2005 to 46.0% in 2020 (Table 5 and Figure 3). This gap between total demand and number of Kuwaiti physicians available is expected to persist if the growth rate of the supply of Kuwaiti physicians continues at the same rate. Naturally, this deficit between total demand of physicians and the supply of Kuwaiti physicians will be compensated by the recruitment of non-

Kuwaiti physicians.

Table 6 presents the projected numbers of dentists needed during the period 2005 to 2020. Based on the dentist: population ratio of 1: 2915, the projected total demand of dentists will increase from 881 in year 2005 to 1175 in 2020, while the projected number of Kuwaiti dentists will increase from 417 in 2005 to 1032 in 2020 considering their annual growth rate of 6.22%. It is anticipated that the disparity between the projected number of dentists needed and the projected number of Kuwaiti dentists available will decline from 52.67% in year 2005 to 12.17% in 2020 (Table 6 and Figure 4).

Table 7 presents the projected number of physicians needed, based on the physician: population ratio (2.8) in the High Income Group countries, which is equivalent to one physician: 357 population (Table 3). According to this ratio, the numbers of physicians needed are projected to be 7198 in year 2005 and 9598 in 2020, while the projected numbers of Kuwaiti physicians are 1754 in year 2005 increasing to 3420 in

Table 3. Physician to 1000 population ratio and population to one physician ratio in various countries

Country	Physician: 1000 population	Population: one physician	Year of publication	Source*
Gulf Countries				
Kuwait	1.81	552	2004	Health Kuwait
Saudi Arabia	1.40	715	2001	WHO
United Arab Emirates	2.02	495	2001	WHO
Bahrain	1.59	629	2001	WHO
Qatar	2.21	452	2001	WHO
Oman	1.26	794	2001	WHO
Middle East Countries				
Egypt	2.12	472	2000	WHO
Syrian Arab Republic	1.40	714	2001	WHO
Jordan	2.04	490	2001	WHO
Iran	1.05	953	1998	WHO
European Countries				
Sweden	3.05	328	2000	WHO
Switzerland	3.51	284	2000	WHO
Denmark	3.66	273	2002	WHO
Netherlands	3.29	304	2001	WHO
Belgium	4.18	239	2001	WHO
France	3.29	304	2001	WHO
Germany	3.61	276	2001	WHO
Italy	4.30	233	2001	World Bank
Russian Federation	4.17	240	2001	WHO
United Kingdom	2.00	500	2000	World Bank
Japan	2.01	497	2000	WHO
Australia	3.20	312	2001	World Bank
Canada	2.10	476	2001	World Bank
United States	5.49	182	2000	WHO
Europe and Central Asia	3.06	327	2001	World Bank
High Income Group countries	2.80	357	2001	World Bank

*WHO, <http://globalatlas.who.int/GlobalAtlas/DataQuery>
World Bank, <http://devdata.worldbank.org/hnpstats/query>
Health Kuwait 2004, Edition 40, Health & Vital Statistics Division, Department of Statistics & Medical Records, Ministry of Health, Kuwait.

2020. The disparity between total demand and the available number of Kuwaiti physicians is expected to decrease from 75.63% in 2005 to 64.37% in 2020 (Figure 5).

Table 8 shows the projected number of dentists needed, based on the dentist: population ratio of the UK (0.403), which is equivalent to one dentist: 2481 population

Table 4. Dentists to 1000 population ratio and population to one dentist ratio in various countries

Country	Dentists: 1000 population	Population: one dentist	Year of publication	Source*
Gulf Countries				
Kuwait	0.3374	2,964	2004	Health Kuwait
Saudi Arabia	0.1658	3,031	2001	WHO
United Arab Emirates	0.3315	3,017	2001	WHO
Bahrain	0.2077	4,814	2001	WHO
Qatar	0.3724	2,688	2001	WHO
Oman	0.1105	9,049	2001	WHO
Middle East Countries				
Egypt	0.2720	3,676	2000	WHO
Syrian Arab Republic	0.7193	1,390	2001	WHO
Jordan	0.5499	1,818	2001	WHO
Iran	0.1907	5,243	1998	WHO
European Countries				
Switzerland	0.4835	2,068	2000	WHO
Denmark	0.9033	1,107	2002	WHO
Netherlands	0.4698	2,128	2001	WHO
Belgium	0.6960	1,436	1998	WHO
France	0.6786	1,473	2001	WHO
Germany	0.7754	1,289	2001	WHO
Italy	0.5913	1,691	2001	WHO
Russian Federation	0.3189	3,135	2001	WHO
United Kingdom	0.4030	2,481	1993	WHO
Japan	0.7152	1,398	2000	WHO
Australia	0.4237	2,360	2001	WHO
Canada	0.5618	1,779	2000	WHO
United States	0.5894	1,696	2000	WHO

*WHO, <http://globalatlas.who.int/GlobalAtlas/DataQuery>
Health Kuwait 2004, Edition 40, Health & Vital Statistics Division, Department of Statistics & Medical Records, Ministry of Health, Kuwait.

(Table 4). Based on this ratio, the numbers of dentists needed are projected to be 1036 in year 2005 and 1381 in 2020, while the projected numbers of Kuwaiti dentists are 417 in year 2005 and 1032 in 2020. The disparity between total demand and the available number of Kuwaiti dentists is expected to decrease from 59.75% in 2005 to 25.27% in 2020 (Figure 6).

DISCUSSION/CONCLUSIONS

This study was carried out with the objective of examining the supply and demand of physicians and dentists in Kuwait. The demand was based on a

Table 5. Projected number of physicians needed in Kuwait for the years 2005-2020

Year	Estimated total population ¹	Projected number of physicians needed ²	Projected number of Kuwaiti physicians ³	Disparity between total demand and Kuwaiti physicians ⁴	
				Number	%
2005	2,569,516	4750	1754	2996	63.07
2006	2,617,685	4839	1834	3005	62.10
2007	2,666,986	4930	1918	3012	61.10
2008	2,717,450	5023	2005	3018	60.08
2009	2,769,109	5119	2096	3023	59.05
2010	2,821,997	5216	2191	3025	57.99
2011	2,876,145	5316	2291	3025	56.90
2012	2,931,591	5419	2395	3024	55.80
2013	2,988,369	5524	2504	3020	54.67
2014	3,046,515	5631	2618	3013	53.51
2015	3,106,069	5741	2738	3003	52.31
2016	3,167,069	5854	2862	2992	51.11
2017	3,229,555	5970	2992	2978	49.88
2018	3,293,567	6088	3128	2960	48.62
2019	3,359,150	6209	3271	2938	47.32
2020	3,426,347	6333	3420	2913	46.00

^{1,2,3,4} Refer to appendix (page 16) for the formula used in calculation

physician to population ratio of 1: 541 (equivalent to 1:85 physicians per 1000 population, which was the average ratio for the period 1994 to 2004), while the demand was based on a dentist to population ratio of 1: 2915 equivalent to 0.3431 dentist for 1000 population. These ratios were adopted as the basis for the estimates as the healthcare delivery system in Kuwait was stable throughout this period, and every citizen and resident had adequate access to healthcare services.

Analysis of the current workforce and projected supply of graduates during the period 2005 to 2020 indicated that the supply of Kuwaiti physicians and dentists until the year 2020 will not be sufficient to meet the projected demand. By 2020, Kuwaiti physicians are predicted to satisfy 54.0% of the demand for physicians. The shortfall of 46.0% of the supply will have to be compensated by the recruitment of non-Kuwaiti physicians. Hence, it is highly unlikely that there will be an oversupply of

Table 6. Projected number of dentists needed in Kuwait for the years 2005-2020

Year	Estimated total population ¹	Projected number of dentists needed ²	Projected number of Kuwaiti dentists ³	Disparity between total demand and Kuwaiti dentists ⁴	
				Number	%
2005	2,569,516	881	417	464	52.67
2006	2,617,685	898	443	455	50.67
2007	2,666,986	915	471	444	48.52
2008	2,717,450	932	500	432	46.35
2009	2,769,109	950	531	419	44.11
2010	2,821,997	968	564	404	41.74
2011	2,876,145	987	600	387	39.21
2012	2,931,591	1006	637	369	36.00
2013	2,988,369	1025	676	349	33.40
2014	3,046,515	1045	719	326	30.58
2015	3,106,069	1066	763	303	27.90
2016	3,167,069	1086	811	275	25.32
2017	3,229,555	1108	861	247	22.29
2018	3,293,567	1130	915	215	19.03
2019	3,359,150	1152	972	180	15.63
2020	3,426,347	1175	1032	143	12.17

^{1,2,3,4} Refer to appendix (page 16) for the formula used in calculation

Kuwaiti physicians until the year 2020. Similarly, by the year 2020, Kuwaitis will provide 87.83% of the demand for dentists, and the balance 12.17% of the demand needs to be compensated by non-Kuwaiti dentists if the dentist: population ratio remains at the current low level.

If the health policy planners wish to improve the physician: population ratio to the level of the High Income Group countries, of one physician per 357 population (equivalent to 2.8 physicians per 1000 population) as proposed by the World Bank,²³ the deficit between demand for physicians and the supply of Kuwaiti physicians will widen further. This shortfall is estimated to reach 64.37% by 2020. Similarly, if the dentist: population ratio were to be improved to the one dentist per 2481 population ratio existing in the UK, the deficit will increase, reaching 25.27% by 2020. Other factors that would increase the demand for physicians and dentists are the new healthcare services which are either

Figure 3. Actual and projected demand and supply of Kuwaiti physicians in Kuwait, 1994-2020

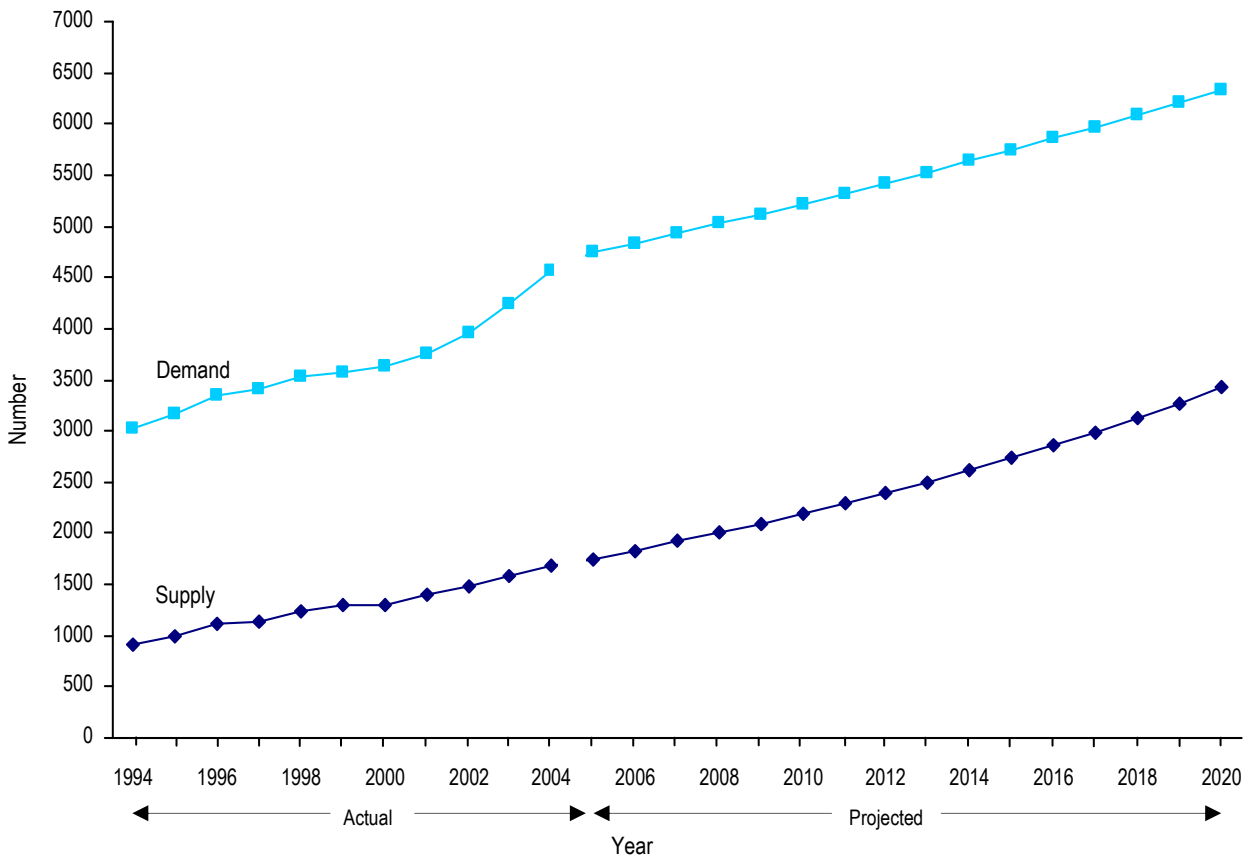


Figure 4. Actual and projected demand and supply of Kuwaiti dentists in Kuwait, 1994-2020

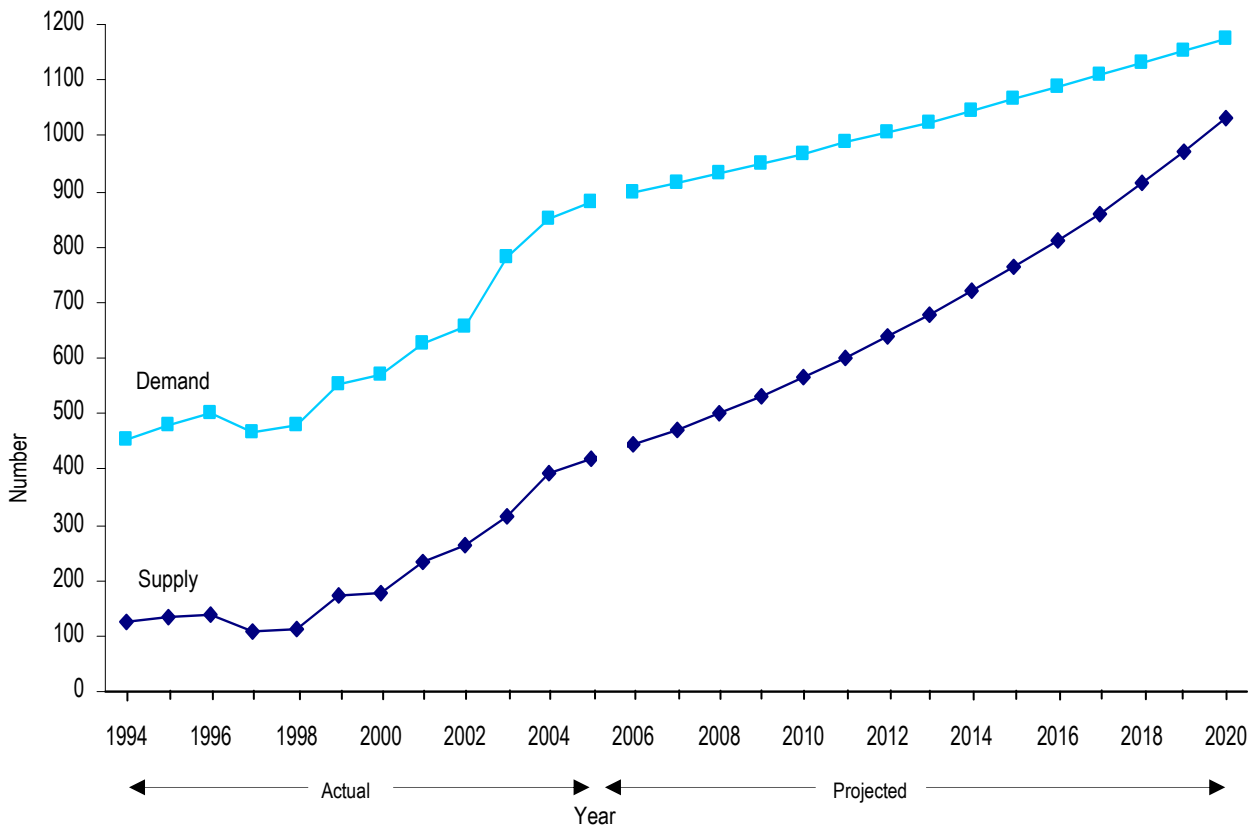


Table 7. Projected number of physicians needed in Kuwait based on the high income group countries physician: population ratio, for the years 2005-2020

Year	Estimated total population ¹	Projected number of physicians needed ²	Projected number of Kuwaiti physicians ³	Disparity between total needed and Kuwaiti physicians ⁴	
				Number	%
2005	2,569,516	7198	1754	5444	75.63
2006	2,617,685	7332	1834	5498	74.99
2007	2,666,986	7471	1918	5553	74.33
2008	2,717,450	7612	2005	5607	73.66
2009	2,769,109	7757	2096	5661	72.98
2010	2,821,997	7905	2191	5714	72.28
2011	2,876,145	8056	2291	5765	71.56
2012	2,931,591	8212	2395	5817	70.84
2013	2,988,369	8371	2504	5867	70.09
2014	3,046,515	8534	2618	5916	69.32
2015	3,106,069	8700	2738	5962	68.53
2016	3,167,069	8871	2862	6009	67.74
2017	3,229,555	9046	2992	6054	66.92
2018	3,293,567	9226	3128	6098	66.10
2019	3,359,150	9409	3271	6138	65.24
2020	3,426,347	9598	3420	6178	64.37

^{1,2,3,4} Refer to appendix (page 16) for the formula used in calculation

Table 8. Projected number of dentists needed in Kuwait based on the United Kingdom dentists: population ratio, for the years 2005-2020

Year	Estimated total population ¹	Projected number of dentists needed ²	Projected number of Kuwaiti dentists ³	Disparity between total needed and Kuwaiti dentists ⁴	
				Number	%
2005	2,569,516	1036	417	619	59.75
2006	2,617,685	1055	443	612	58.01
2007	2,666,986	1075	471	604	56.19
2008	2,717,450	1095	500	595	54.34
2009	2,769,109	1116	531	585	52.42
2010	2,821,997	1137	564	573	50.40
2011	2,876,145	1159	600	559	48.23
2012	2,931,591	1182	637	545	46.11
2013	2,988,369	1205	676	529	43.90
2014	3,046,515	1228	719	509	41.45
2015	3,106,069	1252	763	489	39.06
2016	3,167,069	1277	811	466	36.49
2017	3,229,555	1302	861	441	33.87
2018	3,293,567	1328	915	413	31.10
2019	3,359,150	1354	972	382	28.21
2020	3,426,347	1381	1032	349	25.27

^{1,2,3,4} Refer to appendix (page 16) for the formula used in calculation

being implemented or planned in response to the population growth, and the ambitious plans of the private health sector.

Considerable changes in the healthcare delivery system in Kuwait have occurred during the past decade, and are likely to continue for the foreseeable future. There is, inevitably, uncertainty when planning on a long-term basis. While we regard our assumptions as tenable in the present context, we realize that it is important to keep the interactions between the health policy environment and the factors which influence the supply and demand for physicians and dentists under review, taking into account the Government's current initiatives in relation to the healthcare delivery system of the country. Our analyses were influenced by views about the future demand for physicians, outflow and retirement from the medical profession. These factors, which are subject to uncertainty, have been combined via the

workforce model (Figure 7) showing the share of the Kuwaiti medical workforce in year 2004. This may help in arriving at decisions pertaining to the future intake to the Kuwait University, Health Science Center, policies of the Ministry of Health, and medical education strategies which will be influenced by the annual growth in demand for physicians, dropout rate of medical students, and annual outflow of Kuwaiti physicians.

Based on the data available during the past decade and on the assumptions used as the basis for projecting medical and dental workforce, it is highly unlikely that a surplus of Kuwaiti physicians and dentists will occur until the year 2020. Our analyses indicated that the supply of Kuwaiti physicians and dentists will not be sufficient to maintain the average ratio of one physician per 541 population (1.85 physicians per 1000 population) of the past decade. It is estimated that the numbers of new Kuwaiti

Figure 5. Actual and projected demand and supply of Kuwaiti physicians in Kuwait based on the high income group countries physician: population ratio, 1994-2020

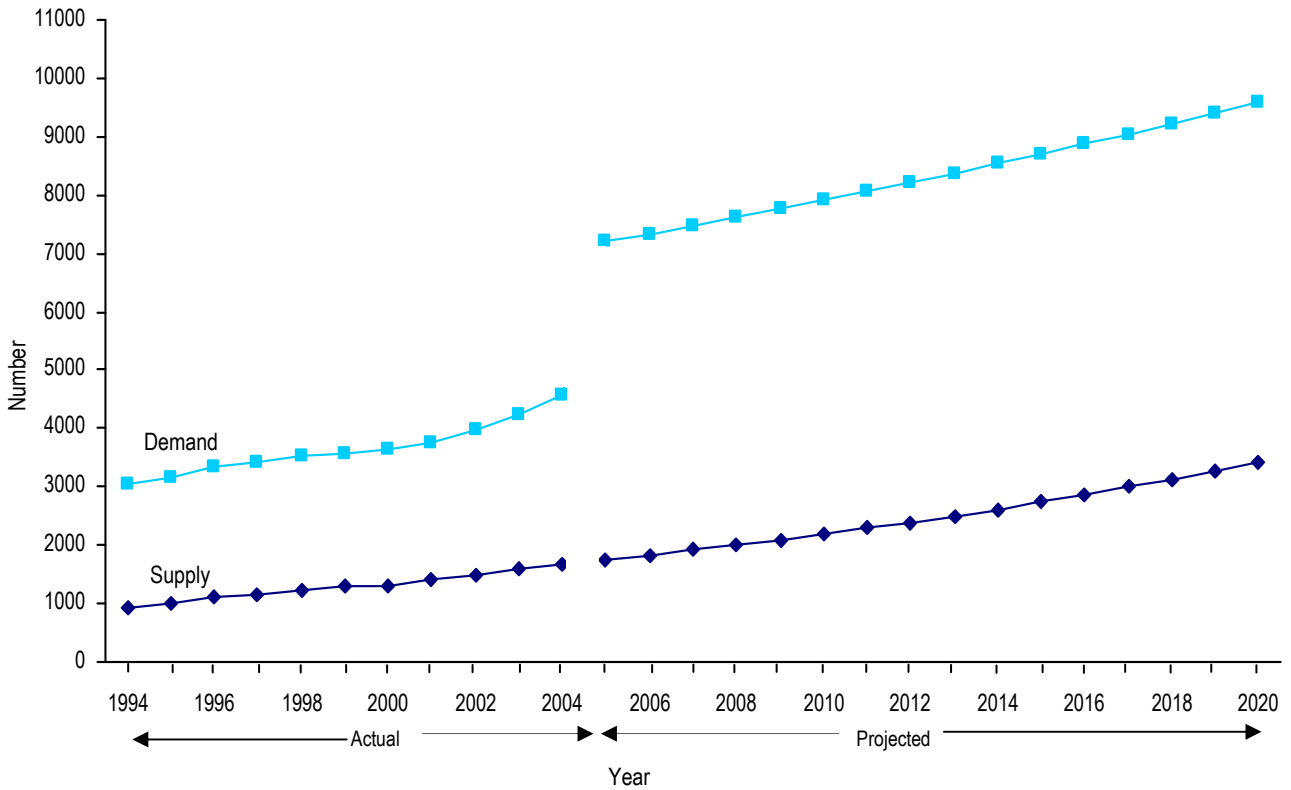


Figure 6. Actual and projected demand and supply of Kuwaiti dentists in Kuwait based on the United Kingdom dentists population ratio, 1994-2020

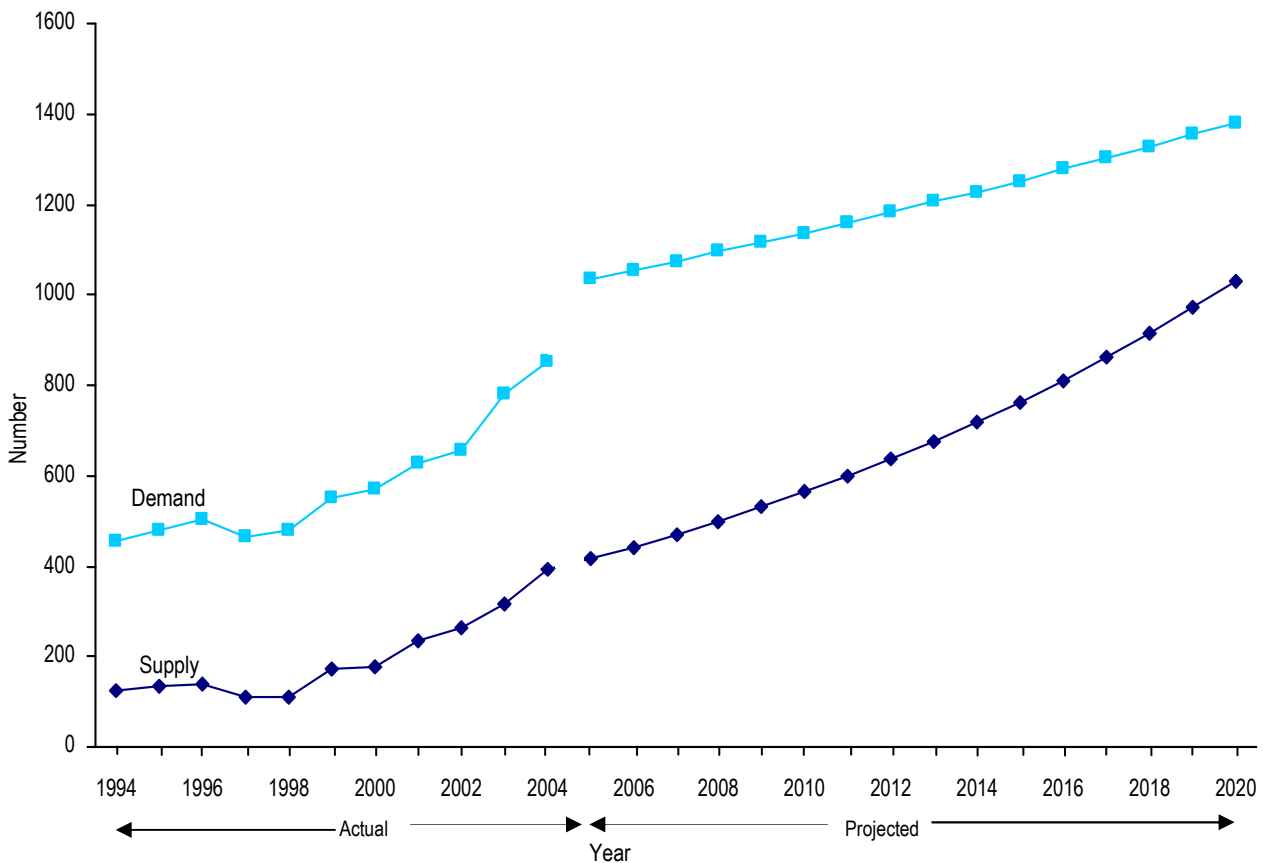
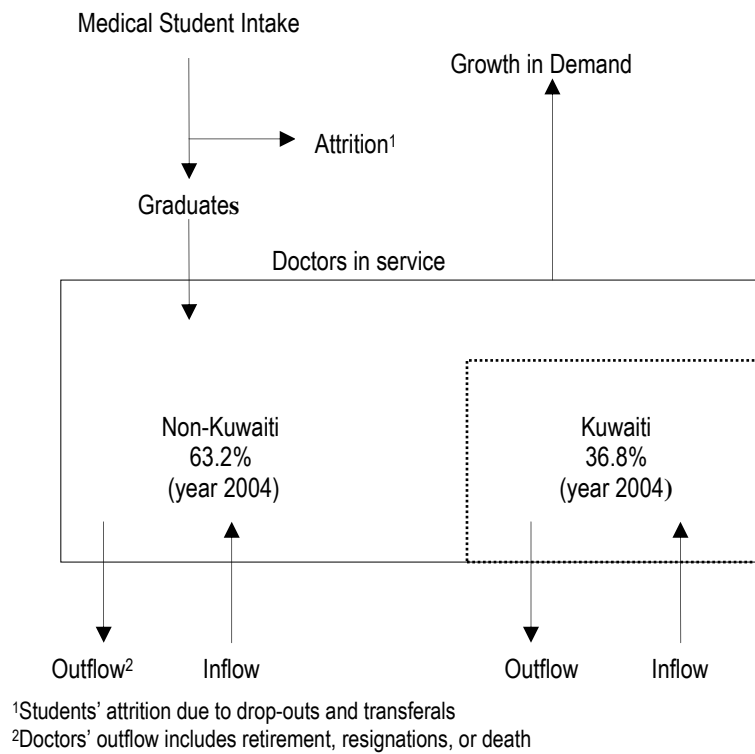


Figure 7. Medical workforce model in Kuwait



physicians and dentists required to maintain such ratios will reduce the gap between supply and demand, but will not close it for a considerable number of years, particularly if the physician and dentist: population ratios were to be improved to the levels that exist in the developed countries.

This study emphasized the importance of continuous monitoring of plans and programs for medical human resources development. Additionally, unless the situation that is likely to arise in the future is considered well in advance, the health services in Kuwait may not be ready to respond to long-term healthcare needs of its population.

RECOMMENDATIONS

The current medical workforce in Kuwait comprises Kuwaiti and non-Kuwaiti physicians. Kuwaitis constitute approximately 36.8% of the physicians and 46.2% of the dentists. There has been a gradual increase in these figures in recent years. Our analysis suggests that the gap between demand and supply for Kuwaiti physicians will persist unless concrete measures are taken to bridge it. In the light of the findings

of this study, we wish to make the following recommendations. Given the changes that the authorities responsible for healthcare services and medical education are likely to face during the coming decades and the uncertainties inherent in predicting the situation over long periods, our recommendations are designed to provide a flexible and cost-effective approach, which should be subject to reappraisal in the future as necessary.

1. The proportion of Kuwaitis in the medical workforce needs to be increased through an increase in the intake of medical students, taking into account the ability of the educational sector to manage the expansion and the importance of maintaining educational standards. An increase in the dental student intake is recommended if there are plans to improve the current dentist: population ratio.
2. It is desirable to consider the feasibility of establishing a second medical college.
3. The Health Science Center, Kuwait University should redouble its efforts to minimize the level of student attrition

from courses, and thereby increase the proportion of entrants that qualify as physicians.

4. A Standing Advisory Committee for continuous monitoring of medical workforce policy and planning needs to be established. Changes in healthcare policy of the Ministry of Health as well as other government sectors substantially affect the demand and supply of physicians and dentists. The Standing Advisory Committee will identify and propose appropriate measures to the health authorities so that a desirable balance between supply and demand of health manpower could be achieved.
5. The higher education authorities and councils of the various specialties in the Ministry of Health should collaborate on a continuing basis to develop the strategies of medical education and training that would secure a fair and relevant scholarship system for undergraduate and postgraduate medical and dental education. Changes in strategies of medical education and postgraduate training influence the demand for healthcare personnel and healthcare services they provide. Such collaboration will facilitate the identification of trends in the demand in the medium-term and the long-term so that planning for adequate measures to be implemented could be recommended.
6. The Ministry of Health and other employers of physicians should take additional measures to improve the recruitment and retention of physicians and dentists via enhancement in training, career planning, counseling and development, and increasing the use of flexible working patterns.

In addition to the above we are of opinion that the following measures would lead to an improvement in the quality and quantity of the workforce of physicians and dentists in Kuwait in the future:

- The Ministry of Health should adopt a strategic workforce need assessment plan and a selective recruitment policy for

expatriate medical workforce taking into consideration the actual workforce needs and maintain the quality of healthcare .

- Ministry of Health and other health professional recruitment bodies who have a stake in the health services planning should carry further research workshop, training and professional development programs which will address the future medical workforce need of the State of Kuwait.
- Further attention should be given to mechanisms and facilities for obtaining comprehensive information about the current status and future needs of the medical workforce in Kuwait. In addition, research is required on levels of outflow (particularly attrition from the Faculty of Medicine and from the Ministry of Health), productivity, and working environment in order to assist future planning. As a first step, a national database about the medical workforce should be established.

Given that the healthcare environment is continually changing, further consideration should be given to the likely effects, policy changes, demography, working patterns and economic factors on the demand for health professionals in the future so that the approach to the selection for training and recruitment could be refined.

REFERENCES

1. Dubois CA, Nolte E, McKee M (2003). Human resources of health in Europe. <http://www.euro.who.int>.
2. International Labour Organization. *Terms of employment and working conditions in health sector reforms*. Geneva, International Labour Organisation, 1998.
3. Brooks PM, Lapsley HM, Butt DB. Medical workforce issues in Australia: "tomorrow's physicians-too few, too far". *Med J Aust* 2003;179:206-8.
4. Campbell C. *Planning the Medical Workforce: Third Report*. London: UK Medical Workforce Standing Advisory Committee, 1997.
5. Temple JG. *Proposals of an Advisory Group. Commissioned by the Scottish Executive to*

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- Review the Scottish Medical Workforce.* Edinburgh, 2002.
6. Calman N, Hauser D. *U.S. Policies to Address Physician Maldistribution.* Washington D.C. October 2004. <http://www.Institute2000.com>.
 7. Chan BTB. *From Perceived Surplus to Perceived Shortage: What Happened to Canada's Physician Workforce in the 1990s?* Ottawa, Ontario: Canadian Institute for Health Information, 2002.
 8. Health Workforce Advisory Committee. *The New Zealand Health Workforce. Future Directions –Recommendations to the Minister of Health. 2003.* Wellington: Health Workforce Advisory Committee, 2003.
 9. Report to the Chief Dental Officer for England of an Expert Group. *A Review of the Dentally Based Specialties and Specialist Lists.* London: UK Standing Dental Standing Advisory Committee, 2004.
 10. *Workforce Planning for Dentistry in Scotland: A Strategic Review: Interim report and Recommendations.* <http://www.scotland.gov.uk/library3/health/sacd-06.asp>.
 11. *Clinical Governance in Dental Primary Care.* Scotland, UK: National Dental Advisory Committee, 2001.
 12. *Annual Report for the Year Ended 31 March 2004.* New Zealand: Dental Council of New Zealand, 2004.
 13. Maupome G, Hann HJ, Ray JM. Is There a Sound Basis for Deciding How Many Dentists Should Be Trained to Meet the Dental Needs of the Canadian Population? Systematic Review of Literature (1968-1999). *J Can Dent Assoc* 2001;67:87-91.
 14. Illinois Center for Health Workforce Studies. *Access to Oral Health Care for Medicaid/CHIP Children in Illinois: A focus on Rural Illinois.* Chicago, USA: University of Illinois at Chicago, 2001.
 15. Ministry of Health. *Health Kuwait*, 40th ed. Kuwait: Health and Vital Statistics, Department of Statistics and Medical Records, 2003.
 16. Health Sciences Centre. *Faculty of Medicine Undergraduate Handbook 2004/2005.* Kuwait: Kuwait University Press, 2004.
 17. Moussa MAA. *Projection of medical graduates in Kuwait.* Report to the Vice-President for Planning, Kuwait University, 2004.
 18. Ministry of Health. *Kuwait Institute for Medical Specialization (KIMS): Booklet of Information.* Kuwait: KIMS, 2000.
 19. *Organization for Economic Co-operation and Development health data (OECD), CREDES, Software (Eco-Sante)*, 1996.
 20. Jones P, Bates J. *Business planning in the health services.* Oxford: Oxford University Press, 1996.
 21. Cooper RA, Getzen TE, Laud P. Economic expansion is a major determinant of doctor supply and utilization. *Health Services Research* 2003;38:675.
 22. United Nations Development Programme. *Human development report.* Oxford: Oxford University Press, 1993.
 23. World Bank (2005). Classification of Economics. <http://worldbank.org>.
 24. Center for Disease Control (2001). A Compendium of NIOSH Health Care Worker Research 2001. <http://www.cdc.gov/niosh/docs/2003-108/2003108pd.html>.
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Appendix

Table 5

¹Estimated population = [Kuwaiti population in the previous year x 1027.9/1000 for Kuwaitis (growth rate 2.79%)] + [non Kuwaiti population in the previous year x 1008.1/1000 for non Kuwaitis (growth rate 0.81%)], [27.9 = 28.5 (natural increase in Kuwaiti population per 1000 for the year 2004) – 0.6 (the average decrement in natural increase per 1000 in Kuwaiti population for the period of 1994 - 2004), 8.1 = 8.5 (natural increase per 1000 in non Kuwaiti population for the year 2004) – 0.4 (the average decrement in natural increase in non Kuwaiti population for the period of 1994 - 2004), Health Kuwait, 2004.

²Projected total number of physicians needed at a year = Estimated population at that year divided by 541 (population to one physician ratio which is equivalent to 1.85), 1.85 = the number of physicians per 1000 population for the year 2004 (1.81) + the average increment in the ratios for the period of 2000 to 2004 (+0.04).

³Projected number of Kuwaiti physicians at a year = Number of Kuwaiti physicians in the previous year x 104.55/100. The Average annual growth rate of Kuwaiti physicians of the period 2000 to 2004 = 4.55%, is calculated as $\{[(1678-1296)/1678] \times 100\} \div 5$.

⁴Disparity number = Projected total number of physicians needed (column 2) – Projected number of Kuwaiti physicians (column 3). Disparity % = [Disparity number ÷ Projected number of physicians needed (column 2)] x 100.

Table 6

^{1,4}As described in Table 5.

²Projected total number of dentists needed at a year = Estimated population at that year divided by 2915 (population to one dentist ratio which is equivalent to 0.3431), 0.3431 = the number of dentists per 1000 population for the year 2004 (0.3374) + the average increment in the ratios for the period of 2000 to 2004 (+0.0057).

³Projected number of Kuwaiti dentists at a year = Number of Kuwaiti dentists in the previous year x 106.22/100. The Average annual growth rate of Kuwaiti dentists of the period 1994 to 2004 = 6.22%, is calculated as $\{[(393-124)/393] \times 100\} \div 11$.

Table 7

^{1,3,4}As described in Table 5.

²Projected number of physicians needed at a year = Estimated population at a year divided by 357 (population to one physician ratio in the high income group countries which is equivalent to 2.8 : the average number of physicians per 1000 population in the high income group countries, World Bank^{2,3}).

Table 8

^{1,3,4}As described in Table 6.

²Projected number of dentists needed at a year = Estimated population at a year divided by 2481 (population to one dentist ratio in the United Kingdom which is equivalent to 0.4030: the average number of dentists per 1000 population in the United Kingdom, WHO).