Appendix 1. Statistical supplement

Table 12: Health services expenditure and GDP, 1976 to 1996

Year ended 30 June	Expenditure (thousands of dollars)									
	Health		Hospital		Pharmaceutical		Medical		GDP	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
1976	5,719	17,679	2,094	6,514	560	1,486	919	2,870	76,643	235,825
1977	6,603	18,021	2,455	6,689	596	1,461	1,031	2,847	87,635	242,756
1978	7,469	18,841	2,897	7,279	631	1,423	1,152	3,010	95,294	244,972
1979	8,240	19,517	3,151	7,481	693	1,457	1,277	3,102	108,465	258,866
1980	9,078	19,502	3,485	7,489	694	1,365	1,461	3,180	122,933	264,372
1981	10,224	19,699	3,983	7,669	810	1,442	1,607	3,143	140,166	273,762
1982	11,798	20,393	4,567	7,869	950	1,534	1,876	3,345	158,127	279,871
1983	13,239	20,673	5,235	8,112	1,053	1,569	2,118	3,443	172,476	276,235
1984	14,958	21,989	5,681	8,292	1,221	1,753	2,416	3,664	195,830	293,003
1985	16,546	22,862	6,166	8,472	1,320	1,809	2,686	3,755	217,129	307,904
1986	18,586	24,180	6,753	8,770	1,491	1,930	3,091	4,099	240,475	319,924
1987	21,115	25,341	7,720	9,138	1,693	2,039	3,471	4,360	264,007	327,084
1988	23,328	26,287	8,471	9,503	1,864	2,062	3,887	4,470	299,340	345,051
1989	26,127	27,719	9,421	9,948	2,164	2,253	4,351	4,742	339,275	359,338
1990	28,874	28,874	10,359	10,359	2,490	2,490	4,945	4,945	370,188	370,188
1991	31,316	29,474	11,182	10,544	2,782	2,590	5,491	5,098	378,716	367,094
1992	33,213	30,372	11,812	10,850	3,101	2,745	5,928	5,383	387,045	368,554
1993	34,976	31,476	12,154	11,040	3,432	2,927	6,422	5,808	404,802	380,639
1994	36,577	32,609	12,487	11,220	3,797	3,274	6,886	6,115	429,713	399,566
1995	38,898	34,279	13,166	11,620	4,245	3,655	7,371	6,438	457,646	417,572
1996	41,742	36,099	14,869	12,869	4,902	3,992	7,808	6,731	489,184	433,656
% increase 1976 to 1996		**102.2**		**95.0**		**171.6**		**135.6**		**81.5**

Notes:

1. Nominal means actual dollar values for that financial year.
2. Real means that a deflator has been applied to convert all nominal values to the equivalent in 1989–90 dollars.

Source: AIHW.

Table 13: GDP and health services expenditure per person, in 1989–90 dollars, 1976 to 1996

Year ended 30 June	Population in millions	Real GDP & health services expenditure per person ($)				
		GDP	Health	Hospital	Pharmaceut.	Medical
1976	13.9657	16,886	1,266	466	106	205
1977	14.1107	17,204	1,277	474	104	202
1978	14.2796	17,155	1,319	510	100	211
1979	14.4364	17,932	1,352	518	101	215
1980	14.7519	17,921	1,322	508	93	216
1981	14.8098	18,485	1,330	518	97	212
1982	15.0516	18,594	1,355	523	102	222
1983	15.2914	18,065	1,352	531	103	225
1984	15.4851	18,922	1,420	535	113	237
1985	15.6820	19,634	1,458	540	115	239
1986	15.9009	20,120	1,521	552	121	258
1987	16.1350	20,272	1,571	566	126	270
1988	16.3990	21,041	1,603	579	126	273
1989	16.6856	21,536	1,661	596	135	284
1990	16.9387	21,855	1,705	612	147	292
1991	17.1770	21,371	1,716	614	151	297
1992	17.3949	21,187	1,746	624	158	309
1993	17.5874	21,643	1,790	628	166	330
1994	17.7634	22,494	1,836	632	184	344
1995	17.9585	23,252	1,909	647	204	359
1996	18.1920	23,838	1,984	707	219	370
% increase 1976 to 1996	**30.0**	**40.4**	**56.3**	**50.8**	**109.2**	**81.5**

Source: AIHW.

Table 14: Health services expenditures as a percentage of GDP, 1976 to 1996

Year ended 30 June	Expenditure as a % of GDP				% of health expenditure		
	Health	Hospital	Pharmaceut.	Medical	Hospital	Pharmaceut.	Medical
1976	7.46	2.76	0.63	1.20	36.84	8.40	16.07
1977	7.53	2.76	0.60	1.18	37.12	8.10	15.61
1978	7.84	2.97	0.58	1.21	38.63	7.55	15.42
1979	7.60	2.89	0.56	1.18	38.33	7.46	15.50
1980	7.38	2.83	0.52	1.19	38.40	7.00	16.09
1981	7.29	2.80	0.53	1.15	38.93	7.32	15.72
1982	7.46	2.81	0.55	1.19	38.59	7.52	15.90
1983	7.68	2.94	0.57	1.23	39.24	7.59	16.00
1984	7.64	2.83	0.60	1.23	37.71	7.97	16.15
1985	7.62	2.75	0.59	1.24	37.06	7.91	16.23
1986	7.73	2.74	0.60	1.29	36.27	7.98	16.63
1987	8.00	2.79	0.62	1.31	36.06	8.05	16.44
1988	7.79	2.75	0.60	1.30	36.15	7.84	16.66
1989	7.70	2.77	0.63	1.28	35.89	8.13	16.65
1990	7.80	2.80	0.67	1.34	35.88	8.62	17.13
1991	8.27	2.87	0.71	1.45	35.77	8.79	17.54
1992	8.58	2.94	0.74	1.53	35.72	9.04	17.85
1993	8.64	2.90	0.77	1.59	35.07	9.30	18.36
1994	8.51	2.81	0.82	1.60	34.41	10.04	18.83
1995	8.50	2.78	0.88	1.61	33.90	10.66	18.95
1996	8.53	2.97	0.92	1.60	35.65	11.06	18.71

Source: AIHW.

Table 15: Reason for most recent consultation with a doctor, National Health Survey, 1989–90 and 1995

Reason for most recent consultation	1995 Males	1995 Females	1995 Persons	1989–90 Males	1989–90 Females	1989–90 Persons
			('000s)			
Infectious & parasitic diseases	52.3	62.4	114.7	40.5	60.6	101.1
Neoplasms	34.7	39.9	74.6	34.8	36.9	71.6
Endocrine, nutritional & metabolic diseases & immunity disorders	57.9	70.2	128.1	44.0	72.2	116.2
Diseases of the blood & blood forming organs	3.3	13.2	16.5	6.1	19.3	25.4
Mental disorders	55.9	62.8	118.7	34.7	58.1	92.8
Diseases of the nervous system & sense organs	123.7	152.8	276.5	122.2	142.7	264.9
Diseases of the circulatory system	131.1	152.6	283.7	141.5	220.0	361.5
Diseases of the respiratory system	383.3	462.9	846.2	339.3	401.4	740.7
Diseases of the digestive system	98.5	97.3	195.8	95.5	102.5	198.0
Diseases of the genito-urinary system	29.6	113.5	143.1	26.4	108.0	134.4
Complications of pregnancy, childbirth & the puerperium	—	3.9	3.9	—	12.0	12.0
Diseases of the skin & subcutaneous tissue	116.2	139.1	255.3	92.1	114.0	206.1
Diseases of the musculoskeletal system & connective tissue	183.3	191.4	374.7	172.6	219.4	392.0
Symptoms, signs & ill-defined conditions	110.8	170.5	281.3	113.8	169.4	283.2
Injuries & poisonings	143.9	95.5	239.4	151.4	97.1	248.5
Disability, not elsewhere classified	3.2	2.3	5.5	2.7	4.6	7.3
Other factors influencing health status or contact with health services—						
Check-up/examination	364.4	462.0	826.4	106.9	157.4	264.3
Test (including X-rays)	73.0	156.2	229.2	26.0	89.4	115.4
Pregnancy supervision	—	73.4	73.4	—	103.5	103.5
Contraceptive management	0.8	23.9	24.7	2.8	29.4	32.2
Immunisation	54.3	62.2	116.5	42.0	52.2	94.2
Other reasons	6.9	8.6	15.5	8.0	14.4	22.4
Total	**1,836.2**	**2,370.4**	**4,206.6**	**1,426.9**	**1,973.3**	**3,400.2**

	% increase 1989–90 to 1995 Males	% increase 1989–90 to 1995 Females	% increase 1989–90 to 1995 Persons	% of total 1995	% of total 1989–90
Infectious & parasitic diseases	29.1	3.0	13.5	2.7	3.0
Neoplasms	-0.3	8.1	4.2	1.8	2.1
Endocrine, nutritional & metabolic diseases & immunity disorders	31.6	-2.8	10.2	3.0	3.4
Diseases of the blood & blood forming organs	-45.9	-31.6	-35.0	0.4	0.7
Mental disorders	61.1	8.1	27.9	2.8	2.7
Diseases of the nervous system & sense organs	1.2	7.1	4.4	6.6	7.8
Diseases of the circulatory system	-7.3	-30.6	-21.5	6.7	10.6
Diseases of the respiratory system	13.0	15.3	14.2	20.1	21.8
Diseases of the digestive system	3.1	-5.1	-1.1	4.7	5.8
Diseases of the genito-urinary system	12.1	5.1	6.5	3.4	4.0
Complications of pregnancy, childbirth & the puerperium	—	-67.5	-67.5	0.1	0.4
Diseases of the skin & subcutaneous tissue	26.2	22.0	23.9	6.1	6.1
Diseases of the musculoskeletal system & connective tissue	6.2	-12.8	-4.4	8.9	11.5
Symptoms, signs & ill-defined conditions	-2.6	0.6	-0.7	6.7	8.3
Injuries & poisonings	-5.0	-1.6	-3.7	5.7	7.3
Disability, not elsewhere classified	18.5	-50.0	-24.7	0.1	0.2
Other factors influencing health status or contact with health services—					
Check-up/examination	240.9	193.5	212.7	19.6	7.8
Test (including X-rays)	180.8	74.7	98.6	5.4	3.4
Pregnancy supervision	—	-29.1	-29.1	1.7	3.0
Contraceptive management	-71.4	-18.7	-23.3	0.6	0.9
Immunisation	29.3	19.2	23.7	2.8	2.8
Other reasons	-13.6	-40.3	-30.8	0.4	0.7
Total	**28.7**	**20.1**	**23.7**	**100.0**	**100.0**

Source: ABS Cat. No. 4364.0.

Table 16: Population distribution by geographic category and indigenous status, 1996

Geographic category	Total area (in sq. km)	Population	Per cent	Population per sq. km	Indigenous population	Per cent Indigenous
Capital cities	33,591	11,644,479	63.6	346.65	117,103	1.0
Other metropolitan centres	7,206	1,376,057	7.5	190.96	22,880	1.7
Large rural centres	18,451	1,095,727	6.0	59.39	33,435	3.1
Small rural centres	64,935	1,194,581	6.5	18.40	34,009	2.8
Other rural areas	953,409	2,442,251	13.3	2.56	63,807	2.6
Remote centres	821,233	218,399	1.2	0.27	27,530	12.6
Other remote areas	5,769,747	336,125	1.8	0.06	87,088	25.9
Total	**7,668,571**	**18,307,619**	**100.0**	**2.39**	**385,852**	**2.1**

Source: ABS.

Table 17: Geographic distribution of primary care medical practitioners, 1995

	Practitioners per 100,000 persons			
Geographic category	VRGPs	RACGP trainees	OMPs	Total
Capital cities	109.4	8.6	12.1	**130.0**
Other metropolitan centres	98.4	7.6	8.8	**114.8**
Large rural centres	94.9	6.1	5.8	**106.8**
Small rural centres	85.3	5.8	5.6	**96.6**
Other rural areas	70.7	4.8	3.6	**79.1**
Remote centres	70.7	6.8	6.3	**83.8**
Other remote areas	45.0	6.0	14.0	**64.9**
Total	**99.1**	**7.6**	**9.8**	**116.5**

Source: AIHW.

Table 18: Primary care—GP consultations per 1,000 persons, 1995–96

RRMA category	Males	Females	Total	M:F ratio
Capital city	5.287	6.958	**6,133**	0.76
Other metropolitan	4.677	6.321	**5,508**	0.74
Large rural centre	4.073	5.614	**4,853**	0.73
Small rural centre	3.819	5.396	**4,617**	0.71
Other rural area	3.438	4.910	**4,188**	0.70
Remote centres	2.952	4.397	**3,693**	0.67
Other remote	2.389	3.668	**3,045**	0.65
Total	**4,725**	**6,367**	**5,557**	**0.74**

Source: AIHW from DHFS data.

Table 19: Death rates per 1,000 population, 1991–95[a]

Cause of death	Capital city	Other metropol.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
All causes								
Males	8.43	8.62	9.08	9.02	8.75	10.39	10.30	**8.62**
Females	5.15	5.29	5.46	5.40	5.35	6.68	6.78	**5.26**
Coronary heart disease								
Males	2.13	2.25	2.42	2.36	2.28	2.39	2.39	**2.20**
Females	1.17	1.26	1.34	1.28	1.25	1.51	1.29	**1.21**
Melanoma								
Males	0.07	0.09	0.08	0.08	0.06	0.04	0.06	**0.07**
Females	0.03	0.03	0.04	0.04	0.03	0.02	0.04	**0.03**
Injury								
Males	0.54	0.59	0.66	0.65	0.77	0.91	1.15	**0.60**
Females	0.21	0.22	0.22	0.23	0.26	0.30	0.44	**0.22**
Road accidents								
Males	0.13	0.16	0.19	0.19	0.27	0.33	0.35	**0.17**
Females	0.06	0.06	0.07	0.08	0.12	0.10	0.17	**0.07**
Homicide								
Males	0.02	0.02	0.02	0.02	0.02	0.06	0.08	**0.02**
Females	0.01	0.02	0.01	0.01	0.01	0.03	0.08	**0.01**
Asthma								
Males	0.04	0.04	0.05	0.04	0.05	0.06	0.07	**0.04**
Females	0.04	0.04	0.05	0.05	0.05	0.06	0.05	**0.04**
Diabetes								
Males	0.16	0.13	0.15	0.18	0.18	0.30	0.27	**0.16**
Females	0.11	0.10	0.13	0.12	0.14	0.24	0.30	**0.12**

(a) Rates were age-standardised using the 1991 Australian population.

Table 20: Hospital separations per 1,000 persons for selected major diagnosis categories, 1995–96[(a)]

MDC code	Capital city	Other metropol.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
All separations								
Male	264.1	246.7	267.3	265.0	264.2	318.6	321.2	**264.4**
Female	288.4	282.6	304.5	307.8	315.0	407.3	409.8	**295.0**
MDC 01 Diseases & disorders of the nervous system								
Male	12.5	11.1	14.6	14.6	16.2	17.0	22.6	**13.3**
Female	10.0	9.4	11.9	12.5	14.3	15.0	19.5	**10.9**
MDC 04 Diseases & disorders of the respiratory system								
Male	15.7	14.6	18.6	18.5	20.4	32.5	32.9	**17.1**
Female	10.9	9.6	12.6	14.2	15.7	25.3	28.5	**12.1**
MDC 05 Diseases & disorders of the circulatory system								
Male	24.5	24.3	27.0	27.0	26.9	26.0	30.6	**25.2**
Female	15.2	14.8	17.4	18.4	19.6	20.2	26.3	**16.3**
MDC 06 Diseases & disorders of the digestive system								
Male	38.1	36.6	39.0	40.7	39.7	39.3	42.4	**38.5**
Female	34.9	32.9	36.6	38.9	38.9	39.0	47.4	**35.9**
MDC 10 Endocrine, nutritional & metabolic diseases & disorders								
Male	2.1	1.8	2.6	2.6	2.9	3.6	4.8	**2.3**
Female	3.0	2.7	3.3	3.6	3.7	5.0	6.5	**3.2**
MDC 11 Diseases & disorders of the kidney & urinary tract								
Male	36.8	34.5	27.9	25.3	21.3	59.2	26.6	**33.2**
Female	25.3	25.3	21.8	16.5	14.1	81.9	27.8	**23.3**
MDC 12 Diseases & disorders of the male reproductive system								
Male	10.6	9.7	12.8	12.0	12.1	10.0	10.9	**10.9**
MDC 13 Diseases & disorders of the female reproductive system								
Female	26.8	28.8	29.4	32.6	28.8	23.6	28.8	**27.6**
MDC 14 Pregnancy, childbirth & the puerperium								
Female	47.4	54.3	56.8	55.4	59.2	71.6	73.4	**50.4**
MDC 19 Mental diseases & disorders								
Male	7.7	5.7	5.2	5.9	5.2	6.0	6.4	**7.0**
Female	8.6	7.4	5.8	7.5	7.4	7.0	8.7	**8.1**
MDC 21 Injuries, poisonings & toxic effects of drugs								
Male	6.1	5.8	6.7	7.6	7.6	12.0	13.5	**6.6**
Female	4.9	4.6	5.4	5.7	5.9	10.6	11.3	**5.2**

MDC: major diagnosis category.
(a) Rates were age-standardised using the 1991 Australian population.

Table 21: Medical and surgical separation rates per 1,000 population, Australian hospitals, 1995–96[(a)]

	Capital city	Other metrop.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
Medical								
Males	165	147	159	163	170	236	243	**166**
Females	167	160	177	178	197	297	300	**173**
Surgical								
Males	75	76	85	79	74	66	63	**75**
Females	99	101	106	109	100	93	94	**100**

(a) Rates were age-standardised using the 1991 Australian population.

Table 22: Self-assessed health status by geographic area, National Health Survey, 1995

Geographic area	Excellent	Very good	Good	Fair	Poor	Total
			(per cent)			
Metropolitan						
Sydney/other metro	18.0	35.1	29.9	12.8	4.3	100.0
Melbourne/other metro	21.3	35.7	27.1	11.7	4.2	100.0
Brisbane	21.6	33.3	28.7	12.5	3.9	100.0
Other Qld metro	20.1	35.3	28.4	13.3	2.9	100.0
Adelaide	19.1	35.1	28.0	13.6	4.1	100.0
Perth	19.9	37.0	28.1	11.2	3.8	100.0
Hobart	19.9	39.5	21.4	12.4	6.7	100.0
NT urban	19.6	35.8	32.0	10.9	1.8	100.0
ACT	20.5	38.6	27.0	11.0	3.0	100.0
Total	*19.7*	*35.4*	*28.5*	*12.3*	*4.1*	*100.0*
Large & small rural centres						
NSW	20.6	33.8	27.6	13.9	4.0	100.0
Vic	21.0	37.4	24.8	13.2	3.6	100.0
Qld	19.5	34.3	29.6	13.7	3.0	100.0
SA	15.4	35.5	31.8	13.6	3.5	100.0
WA	15.2	34.6	35.0	12.0	3.2	100.0
Tas	20.0	34.2	26.8	15.5	3.5	100.0
Total	*19.7*	*34.9*	*28.3*	*13.6*	*3.5*	*100.0*
Other rural & remote areas						
NSW	18.5	34.9	26.9	15.8	4.0	100.0
Vic	19.3	38.2	25.7	12.7	4.1	100.0
Qld	17.7	35.5	30.4	12.3	4.1	100.0
SA	17.7	36.8	29.1	12.6	3.8	100.0
WA	17.9	37.3	33.7	8.2	2.9	100.0
Tas	19.0	35.3	26.3	15.1	4.3	100.0
Total	*18.4*	*36.3*	*28.4*	*13.0*	*3.9*	*100.0*
Total						
NSW	18.4	34.9	29.3	13.3	4.2	100.0
Vic	21.0	36.2	26.6	12.0	4.1	100.0
Qld	20.2	34.2	29.2	12.8	3.6	100.0
SA	18.6	35.4	28.5	13.4	4.0	100.0
WA	19.1	36.8	29.8	10.7	3.6	100.0
Tas	19.6	36.5	24.7	14.3	4.9	100.0
NT urban	19.6	35.8	32.0	10.9	1.8	100.0
ACT	20.5	38.6	27.0	11.0	3.0	100.0
Total	**19.5**	**35.4**	**28.4**	**12.6**	**4.0**	**100.0**

Source: AIHW, from ABS national health survey data

Table 23: Persons consulting a doctor in a 2-week period by geographic area, National Health Survey, 1995

	Checkup or examination		All doctor consultations		Checkup or examination as % of all consultations		% of population receiving a checkup or examination in a 2-week period	
Locality	**GP**	**Specialist**	**GP**	**Specialist**	**GP**	**Specialist**	**GP**	**Specialist**
NSW								
Metropolitan	212,665	48,912	1,080,583	234,144	19.7	20.9	4.7	1.1
Rural centres	38,862	2,895	140,266	16,738	27.7	17.3	5.0	0.4
Other	46,206	7,314	160,665	29,172	28.8	25.1	5.9	0.9
Total	*297,733*	*59,121*	*1,381,514*	*280,054*	*21.6*	*21.1*	*4.9*	*1.0*
Victoria								
Metropolitan	136,830	26,873	712,426	147,251	19.2	18.2	4.1	0.8
Rural centres	16,324	3,523	86,908	16,552	18.8	21.3	3.3	0.7
Other	22,712	3,699	127,910	22,989	17.8	16.1	3.5	0.6
Total	*175,866*	*34,095*	*927,244*	*186,792*	*19.0*	*18.3*	*3.9*	*0.8*
Queensland								
Brisbane	56,686	13,999	316,583	62,349	17.9	22.5	3.8	0.9
Other metropolitan	22,421	5,049	94,158	20,250	23.8	24.9	5.4	1.2
Rural centres	29,785	4,431	122,378	24,107	24.3	18.4	4.6	0.7
Other	18,030	6,392	117,983	18,994	15.3	33.7	2.5	0.9
Total	*126,922*	*29,871*	*651,102*	*125,700*	*19.5*	*23.8*	*3.9*	*0.9*
South Australia								
Adelaide	36,238	7,571	242,816	43,939	14.9	17.2	3.4	0.7
Rural centres	3,501	468	20,528	3,230	17.1	14.5	3.3	0.4
Other	9,633	1,571	53,934	8,883	17.9	17.7	3.3	0.5
Total	*49,372*	*9,610*	*317,278*	*56,052*	*15.6*	*17.1*	*3.3*	*0.7*
Western Australia								
Perth	38,752	7,098	257,092	47,198	15.1	15.0	3.1	0.6
Rural centres	3,954	1,218	26,407	4,623	15.0	26.3	3.1	1.0
Other	10,503	1,597	56,557	3,839	18.6	41.6	3.1	0.5
Total	*53,209*	*9,913*	*340,056*	*55,660*	*15.6*	*17.8*	*3.1*	*0.6*
Tasmania								
Hobart	8,117	1,555	33,494	6,843	24.2	22.7	4.2	0.8
Rural centres	3,814	0	27,800	4,233	13.7	0.0	2.6	0.0
Other	6,170	1,517	34,392	6,647	17.9	22.8	4.6	1.1
Total	*18,101*	*3,072*	*95,686*	*17,723*	*18.9*	*17.3*	*3.8*	*0.6*
NT urban	4,337	1,202	22,581	4,189	19.2	28.7	3.8	1.1
ACT	6,867	1,881	57,002	13,028	12.0	14.4	2.3	0.6
Total:								
Metropolitan	**522,913**	**114,140**	**2,816,735**	**579,191**	**18.6**	**19.7**	**4.1**	**0.9**
Rural centres	**96,240**	**12,535**	**424,287**	**69,483**	**22.7**	**18.0**	**4.2**	**0.5**
Other	**113,254**	**22,090**	**551,441**	**90,524**	**20.5**	**24.4**	**3.9**	**0.8**
Total	**732,408**	**148,765**	**3,792,462**	**739,199**	**19.3**	**20.1**	**4.1**	**0.8**

Source: ABS Cat. No. 4364.0.

Table 24: Percentage of the population consulting a doctor in a 2-week period by geographic area and type of doctor, National Health Survey, 1995

Locality	Population	% of population consulting a doctor in a 2-week period GP	Specialist
NSW			
Metropolitan	4,556,185	23.7	5.1
Rural centres	779,458	18.0	2.1
Other	779,500	20.6	3.7
Total	*6,115,143*	*22.6*	*4.6*
Victoria			
Metropolitan	3,370,742	21.1	4.4
Rural centres	487,537	17.8	3.4
Other	643,721	19.9	3.6
Total	*4,502,000*	*20.6*	*4.1*
Queensland			
Brisbane	1,489,069	21.3	4.2
Other metropolitan	415,932	22.6	4.9
Rural centres	643,714	19.0	3.7
Other	728,658	16.2	2.6
Total	*3,277,373*	*19.9*	*3.8*
South Australia			
Adelaide	1,080,972	22.5	4.1
Rural centres	104,698	19.6	3.1
Other	288,296	18.7	3.1
Total	*1,473,966*	*21.5*	*3.8*
Western Australia			
Perth	1,262,569	20.4	3.7
Rural centres	126,336	20.9	3.7
Other	342,818	16.5	1.1
Total	*1,731,723*	*19.6*	*3.2*
Tasmania			
Hobart	194,668	17.2	3.5
Rural centres	144,102	19.3	2.9
Other	134,252	25.6	5.0
Total	*473,022*	*20.2*	*3.7*
NT urban	112,970	20.0	3.7
ACT	304,125	18.7	4.3
Total:			
Metropolitan	**12,787,232**	**22.0**	**4.5**
Rural centres	**2,285,845**	**18.6**	**3.0**
Other	**2,917,245**	**18.9**	**3.1**
Total	**18,051,230**	**21.0**	**4.1**

Source: AIHW, derived from ABS NHS and population data.

Table 25: Medicare A1 group GP consultations by location of patient and provider, 1995–96

Provider major practice location	Location of residence of patient: Capital city	Other metrop.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
				(number)				
Capital city	60,250,460	292,200	222,640	281,710	824,970	49,920	86,150	62,008,050
Other metropolitan	335,480	6,513,350	45,940	77,410	156,980	6,380	9,300	7,144,840
Large rural centre	158,890	27,500	4,428,060	83,060	511,550	16,420	21,940	5,247,420
Small rural centre	222,740	47,580	91,100	4,520,670	418,620	5,370	41,280	5,347,360
Other rural	380,290	61,660	148,500	160,520	7,587,480	25,730	72,180	8,436,360
Remote centre	30,590	3,060	7,570	7,930	22,640	521,720	46,510	640,020
Other remote	29,520	4,280	7,690	12,030	28,480	15,350	504,450	601,800
Total	**61,407,970**	**6,949,630**	**4,951,500**	**5,143,330**	**9,550,720**	**640,890**	**781,810**	**89,425,850**
				(residence of patient: per cent of services by locality of provider)				
Capital city	98.1	4.2	4.5	5.5	8.6	7.8	11.0	**69.3**
Other metropolitan	0.5	93.7	0.9	1.5	1.6	1.0	1.2	**8.0**
Large rural centre	0.3	0.4	89.4	1.6	5.4	2.6	2.8	**5.9**
Small rural centre	0.4	0.7	1.8	87.9	4.4	0.8	5.3	**6.0**
Other rural	0.6	0.9	3.0	3.1	79.4	4.0	9.2	**9.4**
Remote centre	0.0	0.0	0.2	0.2	0.2	81.4	5.9	**0.7**
Other remote	0.0	0.1	0.2	0.2	0.3	2.4	64.5	**0.7**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
				(location of main practice of provider: per cent of services by locality of patient)				
Capital city	97.2	0.5	0.4	0.5	1.3	0.1	0.1	**100.0**
Other metropolitan	4.7	91.2	0.6	1.1	2.2	0.1	0.1	**100.0**
Large rural centre	3.0	0.5	84.4	1.6	9.7	0.3	0.4	**100.0**
Small rural centre	4.2	0.9	1.7	84.5	7.8	0.1	0.8	**100.0**
Other rural	4.5	0.7	1.8	1.9	89.9	0.3	0.9	**100.0**
Remote centre	4.8	0.5	1.2	1.2	3.5	81.5	7.3	**100.0**
Other remote	4.9	0.7	1.3	2.0	4.7	2.6	83.8	**100.0**
Total	**68.7**	**7.8**	**5.5**	**5.8**	**10.7**	**0.7**	**0.9**	**100.0**

Source: AIHW, from Medicare statistics, DHFS.

Table 26: Persons per dwelling by statistical subdivision, selected cities, 1996

Statistical subdivision	Dwellings	Population	Persons per dwelling	% popn. under 15	% popn. 60 or more
Sydney					
Eastern Suburbs	95,575	230,748	2.41	13.7	17.4
Lower Northern Sydney	109,307	267,744	2.45	15.4	17.9
Inner Sydney	110,976	276,866	2.49	12.2	13.8
Northern Beaches	80,332	212,014	2.64	17.9	18.2
Inner Western Sydney	54,594	148,608	2.72	16.6	19.4
St George–Sutherland	141,754	391,962	2.77	19.4	18.0
Central Western Sydney	93,452	270,586	2.90	20.4	15.6
Canterbury–Bankstown	98,020	290,095	2.96	21.0	17.7
Hornsby–Kuringai	79,048	235,778	2.98	20.7	17.5
Outer Western Sydney	97,771	293,009	3.00	25.6	10.7
Blacktown–Baulkham Hills	110,504	351,764	3.18	24.7	10.1
Outer South Western Sydney	65,438	209,295	3.20	28.3	8.4
Fairfield–Liverpool	91,932	301,982	3.28	24.1	11.3
Melbourne					
Inner Melbourne	100,598	228,991	2.28	10.4	14.9
Southern Melbourne	142,806	358,872	2.51	18.0	20.1
Boroondara City	55,997	144,590	2.58	17.4	19.3
Moreland City	50,273	130,093	2.59	17.0	20.5
Mornington Peninsula Shire	42,114	110,409	2.62	22.3	21.4
Northern Middle Melbourne	87,661	234,388	2.67	18.1	18.6
Frankston City	38,448	103,971	2.70	23.0	14.6
Eastern Middle Melbourne	139,872	391,784	2.80	17.2	17.8
Western Melbourne	136,996	387,173	2.83	20.3	15.0
Eastern Outer Melbourne	76,204	222,117	2.91	23.6	12.0
Yarra Ranges Shire Part A	44,115	130,043	2.95	25.3	11.0
Greater Dandenong City	42,575	126,179	2.96	20.4	14.7
South Eastern Outer Melbourne	60,407	184,129	3.05	27.5	9.0
Melton–Wyndham	35,729	113,066	3.16	27.6	7.1
Hume City	35,632	116,030	3.26	26.8	8.5
Northern Outer Melbourne	47,905	156,310	3.26	25.0	8.5
Brisbane					
Redcliffe City	19,327	48,026	2.48	19.3	23.7
Brisbane City	303,118	806,746	2.66	17.8	16.5
Caboolture Shire Part A	32,963	94,451	2.87	25.9	15.2
Gold Coast City Part A	14,036	40,349	2.87	26.3	11.5
Ipswich City (Part in BSD)	38,806	114,481	2.95	25.7	11.4
Logan City	52,243	158,460	3.03	26.9	7.3
Pine Rivers Shire	33,466	103,193	3.08	25.9	7.6
Beaudesert Shire Part A	7,153	23,078	3.23	27.2	6.5
Adelaide					
Western	84,842	201,801	2.4	16.8	22.8
Eastern	86,510	214,257	2.5	16.0	20.0
Southern	119,384	304,664	2.6	20.6	17.9
Northern	119,962	325,132	2.7	22.9	13.7

Source: 1996 census, ABS.

Appendix 2. Literature review

Steven A. Schroeder MD, How Can We Tell Whether There Are Too Many or Too Few Physicians? The Case for Benchmarking, Editorial, *Journal of the American Medical Association* (*JAMA*), (1996)

'By any method imaginable—common sense, needs- or demand-based planning, or benchmarking—evidence is overwhelming for an impending physician over-supply, especially of specialists. The implications are enormous—for health care and its costs'.

Schroeder reviews the Goodman et al. study (following) and argues in his JAMA editorial that public policy on physician workforce supply is important for at least four reasons:

- determination of the number of medical student positions;
- public subsidy of medical school and postgraduate medical education;
- demand by young people for medical training well in excess of positions available; and
- supply of physicians—and its distribution according to specialty, geography and ethnic makeup—exerts important influences on such key issues as medical expenditures, quality of care and access.

Common sense indicators of physician over-supply in the USA include:

- incomes falling after decades of steady growth;
- job advertisements for specialists have declined steeply;
- poor job satisfaction: large numbers of physicians say if they had to do it all over again they would choose a different career; and
- newly trained physicians finding it difficult to find full-time employment.

The traditional quantitative planning methods have been use of needs-based and demand-based measures. Briefly, needs-based demand estimates compare the projected supply with estimates of disease frequency and new technology development. Demand-based planning extrapolates future physician utilisation levels from current ones and then estimates supply requirements accordingly.

In contrast, benchmarking compares the present physician supply in an area with different geographic regions or with organised health care systems that have distinctive staffing patterns. The benchmark used is a 'lean' level of supply, in which there is no evidence of shortages having adverse effects on health outcomes.

Schroeder says that 'conceivably standards other than efficiency could be used to benchmark national or local workforce levels. For example, physician supply benchmarks could be extrapolated from communities with the lowest infant mortality rates or longest life expectancy'. This has pitfalls, given the tenuous link between health status and medical care.

David C Goodman MD et al., Benchmarking the US Physician Workforce, *JAMA* (1996)

The study used the per capita number of clinically active physicians by specialty, adjusted for age and sex population differences and out-of-region health care utilisation, for 306 hospital referral regions in the USA.

The measured physician workforce was compared with four benchmarks: staffing of a large HMO (2.4 million members), a hospital referral region dominated by managed care, a region dominated by fee-for-service, and a balanced physician supply (50% generalists).

Goodman says that comparing physician resources with a benchmark health plan or region provides a guidepost that does not depend on a hypothetical optimal physician level but depends on a real-world and attainable health care system. Needs-based planning suffers from having to rely on a panel of experts to estimate the per capita number of physicians needed to treat the diseases managed by a given specialty. Forecasting disease rates, outcomes of physician services, and technology is very difficult, regardless of the level of expertise. He says that demand-based planning perpetuates current utilisation and ignores the evidence that an increased supply of medical resources leads to increased utilisation.

Benchmarks selected are those that achieve low levels of deployment of clinically active physicians without measured loss of patient welfare due to shortage of physicians. The benchmarks are then used as a current best estimate of a reasonable physician workforce active in patient care. Goodman said, 'A reasonable step using current data is to identify communities that are similar in their demographic and health profiles, including overall mortality, but are markedly different in their costs and deployment of health care resources. The benchmarking question can then be framed, "If the population of Minneapolis or Wichita can achieve apparently equal outcomes with fewer physicians, why shouldn't we?" Comparing Miami with Minneapolis, for example, one finds 35% more physicians there, 2-fold greater Medicare expenditures, nearly identical mortality rates, and no benefits in terms of satisfaction with care.'

Dr Richard A Cooper, USA (1995)

In 1995 Richard A Cooper MD assessed physician supply and demand in the United States for the period extending to 2020. He estimated the national benchmark for physician demand in 1993 as 205 per 100,000 population. Demand was 'projected to increase by 18% by 2020, because of both an expansion in beneficial services and a reduction in physician work effort'. In his model, expanding beneficial services included increases in specialist care, science and technology, ageing of the population, and the death rate, while declining physician work effort arose from changes in the age structure, more female doctors, and changes in physician lifestyle leading to reductions in hours worked.

Supply was forecast to 'initially increase more rapidly, resulting in a surplus of 31,000 physicians (5% of patient care physicians) in the year 2000 and increasing to 62,000 physicians (8%) in 2010, after which the gap will narrow'. However, he qualified this by emphasising that 'physician distribution is not homogeneous, and the number of physicians per capita varies by more than twofold among states. Relative to the national norm, surpluses already exist in some states and shortages in others. Local surpluses will be influenced principally by how physicians distribute themselves geographically.' A map of the United States shows physician supply in 1993 ranging from 281 per 100,000 population in New York and 292 in Massachusetts down to 118 in Mississippi, 132 in Idaho and 143 in Alaska. Cooper also notes that, while in 1993 the overall physician-to-population ratio was 208 per 100,000 population, metropolitan areas had an average ratio of 226 per 100,000 population and non-metropolitan areas an average ratio of 118 per 100,000. Fourteen per cent of Americans were estimated to live in areas with ratios of primary care physicians to population of 30 per 100,000 or less, and 0.2% live in counties with no physicians at all.

Cooper cites a number of previous studies predicting significant surpluses. He said that 20 years earlier, 'just as the United States was finishing an unprecedented doubling of its capacity to train new physicians', the Graduate Medical Education National Advisory Committee (GMENAC) undertook a study of supply and predicted a 13% surplus by 1990 and 22% surplus by 2000. Such large surpluses did not eventuate because of what Cooper

estimates to have been a 15% decrease in physician work effort, as defined above, over a 15-year period.

In more recent studies, very large surpluses have been estimated because of projected rapid rises in the proportion of the United States population covered by health maintenance organisations (HMOs), and a medical workforce per 100,000 patients in HMOs well below the national norm.

Dr ML Barer and Dr Greg L Stoddart, Canada (1992)

In the *Canadian Medical Association Journal* on 1 February 1992, Barer and Stoddart, well-known Canadian health economists, wrote that among the first tier medical workforce issues in Canada was poor geographic distribution of physicians including 'the overwhelming consensus that there were serious surpluses of general practitioners in urban centres'.

Council on Graduate Medical Education (COGME), USA (1992, 1994)

COGME reports to Congress and the Secretary of the Health Department with the legislative requirement to advise on physician workforce issues. In its third (1992) and fourth (1994) reports, its key findings were:

- The USA has too few generalists and too many sub-specialties.
- The current physician to population ratio is adequate; further increases will do little to enhance the health of the public, or to address the problem of access to care, and will hinder efforts to contain costs.
- Problems of access to medical care persist in rural and inner city areas.
- The racial and ethnic composition of the nation's physicians does not reflect the general population and contributes to access problems for under-represented minorities.

Note: the US active physician to population ratio was 245.0 per 100,000 population in 1992 and included physicians working in teaching, research and administration. The equivalent figure for Australia in 1995 was 269.4 per 100,000 population.

David A Kindig MD, PhD and Kevin Grumbach MD, USA (1996)

Kindig and Grumbach provided a paper *The US Physician Workforce* to the first Trilateral Physician Workforce Conference in November 1996. This presents what appears to be a comprehensive literature review on the US medical workforce.

In respect of comparisons between projected supply and requirements for specialists:

- The paper notes a number of studies studies projecting large surpluses.
- Of interest though is an opposing methodology used by Schwartz et al. (1988) for internal medicine. Using a sustainable practice approach, Schwartz and colleagues made projections based on the assumption that every city greater than 50,000 population needs a sub-specialist in every field, and this may be warranted for cities with a population of 30,000 or more. They then concluded that there would be a shortfall of 7,000 internal medicine sub-specialists in cities of this size by the year 2000. Furthermore, they calculated that, after making adjustments for projected declines in resident and female physician productivity, demand for physician services would increase by 1.3% per capita per year, based largely on the needs of new technology and increased coverage.

In respect of generalists, there are federal criteria for designating Health Professions Shortages Areas (HPSAs) and Medically Underserved Areas (MUAs). Once the boundaries

of each geographic area in a State have been defined, the predominant criterion used to determine adequacy, shortage or surplus has been the ratio of primary care physicians to population. Initially a MUA was any area with less than a 1:4,000 ratio (25 per 100,000), but the ratio now is 1:3,500 (29 per 100,000) with a higher 'level 2' criterion of 1:3,000 (33 per 100,000) for areas of unusually high need or insufficient capacity. A 'level 3' ratio of 1:2,000 (50 per 100,000 population) was identified to approximate a 'target ratio' of adequacy. It was estimated by the US Department of Health and Human Services in 1994 that 5,085 additional generalists were needed to remove the HPSA designation and 11,708 extra to achieve a target provision of 50 per 100,000 population.

A benchmarking approach is also used to argue that there is a great under-representation of doctors in the workforce of particular ethnic backgrounds. '1990 census data show a white physician to white population ratio of 251 per 100,000 population, while the comparable figures for hispanics, blacks and native americans are 129, 71 and 48 respectively. Scenarios are modelled to test options for increasing these ratios to higher levels by 2020.'

In looking to the future, Kindig and Grumbach discuss a number of influences on future requirements for physicians which have been raised in the health literature:

- Without reform, health expenditures in the US will approach 20% of GDP by 2002. This will increase pressure to examine lower cost alternative workforce composition for given conditions, mixing professionals and para-professionals in local area models, and an increasing focus on the issues of over-service.
- There will be an increasing emphasis on the workforce issues associated with non-financial barriers such as culture, language, social support, individual behaviour change, and interfaces with other sectors such as education, environment and welfare.
- Advances in biomedical science may reduce chronic disease and degeneration.
- Advances in information systems may give patients more responsibility for health care decisions and reduce a substantial amount of care provided in person.

Kindig and Grumbach prepared an addendum paper *A Physician Workforce Research Agenda: Moving from Body Counts to Measuring System Performance* for the Trilateral Physician Workforce Conference in November 1996.

This argues that physician workforce planning needs to move to a health outcome focus. They report that initial ventures in this field have tended to be of either the telescopic or microscopic variety. The telescopic approach has 'consisted largely of cross-sectional analyses of small areas (often using counties as the unit of analysis) that attempt to measure associations between physician supply and/or specialty mix and various outcomes such as health care costs, hospitalisation rates, or mortality'. The problem with this approach is that it is difficult to tease out the unique contribution of doctors independent of other health system and ecological variables. 'Causal inferences are not robust.'

The microscopic approach scrutinises individual patients and practitioners, and can demonstrate findings such as care being more costly by specialists than GPs when managing similar patients to GPs. This approach does not lead very far in determining outcomes for different supply parameters for geographic regions.

Kindig and Grumbach then argue for studies which in the Australian setting might be:

- comparing health outcomes and costs for similar rural Aboriginal communities with different mixes of supply between doctors, nurses and Aboriginal health workers;
- comparing the health outcome measures of capital cities or large rural centres with similar demographic profiles against different medical workforce supply parameters; and

- comparing GP workforce productivity between high and low supply metropolitan areas.

Robert B Sullivan MA, MAB and Mamoru Watanabe MD, PhD, Canada (1996)

Canada has criteria which determine over-supplied and under-supplied areas, but these are not described in the paper. From April 1994, Nova Scotia physicians starting practice in over-serviced areas were to be paid 80% of the schedule fee, and at 115% in under-serviced areas.

Canada had a number of rounds of reducing medical school intakes in the 1980s and 1990s in responses to projections of over-supply, mainly arising because population growth from the 1970s onwards was much lower than projected in the 1960s.

In 1992, there were 99.1 primary care practitioners per 100,000 population, ranging from 79.2 in Prince Edward Island province to 113.0 in Yukon Territory. At the same time there were 88.3 specialists per 100,000 population, ranging from 13.3 in the Yukon Territory to 101.8 in Quebec.

David Spurgeon, Canada (1997)

Spurgeon reported in the 16 August 1997 edition of the *British Medical Journal* that, since 1995, doctors who moved into areas of British Columbia deemed by the medical services commission to have too many doctors received only 50% of the negotiated pay scale. Similar schemes have been adopted by other provinces. However in 1997 the Canadian Supreme Court ruled that this was unconstitutional.

Alan Maynard and Arthur Walker, UK (1997)

Workforce forecasting has changed from dealing with a predominantly male workforce seeking to work full-time until retirement at age 65 or more to a workforce with:

- increasing part-time employment by both male and female doctors, eg. 10% of female and 6% of male junior doctors now have part-time contracts, and the proportion of GPs in England working full-time has dropped from 94.5% in 1990 to 87.6% in 1995;
- increasing early retirement; and
- the gender balance expected to change quite rapidly. In 1993 there were 52,797 UK male physicians and 25,319 UK female physicians. In the 1990s the numbers of male and female medical students became approximately equal. By 2020 it is forecast that there will be 55,056 UK male physicians and 46,668 UK female physicians.

'Central to the determination of requirements in many of the forecasts over the years is the concept of the physician/population ratio.' The physician to population ratio for the UK is low by OECD standards, with just over 100,000 physicians serving a population of 58.4 million in 1993, of whom 80% live in urban areas. 'Current policy is based on the view that there is a shortage of physicians and a modest expansion of the medical school intake has been set in train.'

The overwhelming proportion of GP income comes from the NHS, principally via a practice allowance and age-weighted capitation payments for each patient on their list. There is a long-standing practice of restricting new physicians to certain areas. Since 1977 the number of patients per GP principal has fallen to reach 1,900 in England and Scotland in 1994.

Lynda Buske and Sheri Newton, Canadian Medical Association, Canada (1996)

Buske and Newton argue that doctor to population ratios are a very broad indicator of whether or not the number of physicians is increasing or decreasing relative to the patient population. To be more useful than that, such ratios need to take account of:

- differing population needs, eg. age and sex;
- services obtained outside the population area;
- critical mass issues, ie. the minimum number of physicians required in an area to provide adequate professional support; and
- variation in service provision levels of individual physicians.

A marked increase in attrition rates has had a significant effect on the expected doctor-to-population ratio in Canada. Annual rates of retirement and semi-retirement increased by over 40% between 1985–89 and 1990–95, while physicians moving abroad accounted for between 25% and 30% of attrition. The average net gain from 1985–89 was 1,783 per year; this dropped to 960 per year from 1990–95, mainly because workforce losses almost doubled from 6,965 to 12,236. This trend accelerated in 1994 and 1995, resulting in a net loss of 149 for the two-year period, mainly because of a changeover in the training period which reduced new entrants to the workforce.

The conclusion that can be drawn from this experience is that increased early retirement and net migration of Australian doctors need to be carefully monitored and factored into future supply projections. The AMWAC survey of career paths in late 1997 found that almost half of the doctors interviewed had spent a year or more overseas.

Mamoru Watanabe MD, PhD, geographic distribution in Canada (1997)

Watanabe says that universality and access are key principles of the Canada Health Act and dictate that health services be available to all Canadians regardless of geography and social status.

He says that policies and practices across Canada 'have favoured redistributing physicians from urban centres, considered to be relatively over-doctored, to rural and remote sites, considered to be under-supplied and under-serviced. And, indeed, perhaps resulting from these policies and practices, the distribution of physicians in rural Canada has been improving through the years.'

Watanabe then argues that in the 1990s the concepts of outcomes, health status and determinants of health re-orient thinking from 'demands' to 'needs' for health services. In the past, 'demands' thinking has had an objective of equalising distribution of doctors, but it is naive to think that the gaps in health status between native and non-native Canadians would be solved by equal numbers of doctors per 100,000 population to serve both. There is much to be gained in a change of thinking to planning physician services on the basis 'of providing solutions that, in responding to population health needs, minimises disparities in health status and equalises health outcomes'.

He points to measurable disparities in health status between urban and rural populations, although these are much smaller than the disparities between rich and poor within urban Canada, and between Canada's native and non-native populations. He concludes by saying that while closing the gap in disparities between the health status of subgroups in the population is a worthwhile objective, it is one which cannot be attained solely by improved access to conventional health care services, essential as those services are.

Albert C Baggs, *The Lancet*, 1996 (6 January)

Baggs discusses the campaign by the Permanent Working Group of European Junior Hospital doctors to place upper limits on working hours. In the Netherlands, as a result of the reduction in hours, the government budgeted for 1,700 extra junior doctors. A reduction in working hours for junior doctors in Australia would be likely to lead to a similar increased requirement for hospital medical staff.

Medical Workforce Standing Advisory Committee Third Report, *Planning the Medical Workforce*, UK, December 1997

Future demand for doctors is estimated to grow by from 1.4% to 2% per annum, with a central estimate of 1.7%.

The wastage rate for UK doctors is just over 3.5% per annum, a composite of death, retirement, and non-participation (due, for example, to working overseas, a career break or a career move).

Because the time scale for medical education and training is long, projections of supply and demand must cover 20 years into the future. Inevitably this length of time introduces uncertainty.

Long-term demand for health care is expected to rise significantly because of:

- demographic change, including a rising proportion of aged people;
- medical advances, making new treatments available for diseases not currently treatable;
- rising expectations from the public for medical investigation and treatment in primary and secondary care;
- society's view that high quality health care widely available is desirable; and
- political initiatives such as the reduction of waiting times.

Long term demand for doctors would be influenced by

- the rise in health care demand;
- changes to patterns of work, including reduced hours for junior doctors which will significantly increase the numbers required to provide the same service, and changes flowing from society generally (eg. more shared responsibility for child care, demand for more leisure time, earlier retirement);
- increased training given by consultants and GP principals, reducing service time. The European Working Time Directive now applies in the UK which applies a 48 hour limit to the working week of doctors-in-training. This may extend over time more broadly in the medical workforce, but has not been assessed yet;
- increased need for CME and other activities to keep abreast of modern techniques and to increase skills in more specialised areas, reducing service time;
- reduction in the whole life contribution from doctors of the future, both female and male;
- career patterns of new graduates different from previous generations, and a much greater need for part-time posts;
- in primary care, an increase in the tendency of individuals to consult their GPs, driven largely by an expansion in community care and the introduction of a wider range of services in primary care. More consultations are taking place in the surgery and by phone, and fewer in patients' homes;

- technological change—there is no evidence that technological change will reduce demand for doctors;
- changing ways of delivering care, including much shorter hospital stays, and more day surgery, increasing demand for more specialist management of patients rather than more doctors in the training grades; and
- improvements in quality through increasing use of research and development, evidence-based medicine and audit. However, it is not possible yet to determine the effect on workforce needs of these improvements.

Data from the 1991 Population Census has been used to estimate the length of the economic working lives of health service professionals. This was 30 years for male doctors and 22 years for female doctors. Equivalent figures from the 1995 labour force survey are 31.5 years for men and 22 years for women. The current average of around 27 or 28 years, gives an annual wastage figure of 3.5% to 3.7%.

Of 1983 graduates, 3% of males and 45% of females were working part-time in 1994. Before age 50, men work more hours than women, but hours become roughly equal at this age.

Peter Newbery, 'Substitution' For and Among Physicians: A Canadian View, Canada, 1997

Newbery notes that, as in Australia, many rural Canadian communities have great difficulty finding a physician. Nurses have been used in the past and increasingly governments are seeing nurses as a cost-effective substitute. 'Ministry of Health documents call for decreases in the number of family physicians and changes in the way they are paid in order to make room for nurse practitioners.'

Newbery's personal experience is of an isolated community of 1,000 First Nations people where 15 years ago a family physician who departed was replaced by two nurse practitioners, who, along with a resident public health nurse, could maintain a 24 hour a day on-call program. Physicians were available 30 minutes travel time away.

Newbery references studies which demonstrate that quality and effectiveness of care in providing a limited range of primary care service is as high for nurse practitioners as for doctors, and, in specific areas such as pap smears, the input by a nurse to a population served only by a male doctor can attract additional population coverage to the service.

In Canada, as in Australia, the shortage of specialists in rural communities means that GPs with the skills provide a significant level of specialist care.

Newbery concludes that the medical profession has a moral obligation to provide doctors for rural communities, and only if they abdicate that responsibility should nurses be substitutes. However, if nurses are to be substitutes, then work is needed to describe advanced nursing practice, define it in law, and develop mechanisms for nurses to bill patients and be remunerated for their work.

Jay Noren MD, MPH, A National Physician Workforce Policy, USA (1997)

'The current status can be summarised succinctly. If we seek to simply maintain the current physician-to-population ratio (approximately 200 physicians per 100,000 population), we must reduce the number of physicians by 29% overall, including 33% in non-primary care specialties and 20% in primary care specialties. In a managed care-dominated system, conservative estimates indicate that we must downsize further: 43% reduction overall, 52% in non-primary care specialties, and 29% in primary care.'

Manitoba Centre for Health Policy and Evaluation, Needs-Based Planning for Manitoba's Generalist Physicians, Canada, 1996

This report states that:

- age, gender, socioeconomic status and health status are important factors in determining need for physician services. It uses age, gender, a socioeconomic risk index and premature mortality to calculate expected physician visits and compare these with actual visits; and
- healthy people should visit a physician once every five years or so, or more often if in an at risk category, for preventive services and diagnosis of conditions for which early treatment might help.

The methodology, supplemented by the additional factor of premature mortality, is virtually the same as in *Australian Medical Workforce Benchmarks* for calculating GP under-supply and over-supply. The premature mortality rate has been suggested in some studies as the best single indicator of health status capturing the need for health care, and is currently used in the UK for allocation of funds from the Department of Health to regional health authorities.

They ask the question, 'Does a physician surplus provide health benefits?' To date they have found no evidence to support this. Higher than expected levels of doctor consultations should be associated with lower than expected premature mortality (better health), and the converse should hold for lower than expected consultations. No such relationships were found ($r^2 = 0.001$). A further study found that for elderly people over a 12-year period regular doctor contacts did not result in any improvements in quality of life indicators compared with people of the same age not having regular medical consultations.

They say that disadvantages of over-supply are concerns about overtreatment and that over-supply means expenditure of public money beyond what is needed.

They found marked differences among doctors in the numbers of consultations for patients with similar chronic conditions.

They say their methodology (similar to *Australian Medical Workforce Benchmarks*) is one of the more sophisticated attempts to assess physician supply and overcomes many of the weaknesses of earlier efforts. However, it is open to criticism that:

- there is a risk of over-estimating the need for physician services since the approach used tends to assume that all services delivered were needed; and
- it assumes that all services currently provided must be delivered by physicians, when in fact at least some of the services could be provided by nurses and other health professionals.

They ask if they could be wrong in their calculations of over-supply. If supply was reduced in over-supplied areas, would this produce long waiting lists for appointments? They think not. They have a higher supply than Newfoundland and New Brunswick and note that Manitobans make 5.0 visits to generalist physicians per year, compared with an average of only 3.2 for Americans.

Manitoba Centre for Health Policy and Evaluation, Issues in the Management of Specialist Physician Resources for Manitoba, Canada, 1996

This report says that planning the specialist workforce is challenging because:

1. There is no consensus on how best to estimate the number of specialists needed in any jurisdiction, either for current requirements or the future when practices may change.

2. Specialist supply bears no demonstrable relationship to population health status. Areas with low rates of contact with specialists can have equal or better health than those elsewhere. Similar findings have been made in the United States.
3. Some types of care delivered primarily by one specialty group can also be delivered by other types of practitioners. Paediatricians, GPs and nurse practitioners all provide certain types of care for children; optometrists can provide a significant amount of care delivered by ophthalmologists; midwives and GPs can substitute for obstetricians.
4. Most specialists are located in metropolitan areas. Therefore knowing that a province has more or fewer specialists per capita than others says little about the access of people of that province to specialist services, particularly if specialists are not providing an equal level of care to those outside the urban areas.

The methodology for specialist workforce planning is to address the following questions:

1. What is the adequacy of supply in a particular province by comparing it with
   – supply of specialists relative to recommended doctor-to-population ratios
   – supply relative to other provinces
   – level of care delivered in the province relative to other provinces?
2. Is there a problem with ageing of the workforce, and is projected supply sufficient to keep up with ageing of the population?
3. How well do specialists serve the residents of all regions of each province?
4. How well do specialists serve high-need populations?

Recommended population per FTE physician ratios are shown in table 27.

Table 27: Recommended population per FTE physician ratios from Federal-Provincial-Territorial Guidelines, Canada, 1996

Specialty	Recommended ratio
General practice	1,307
Medical specialties:	
Neurology	89,948
Dermatology	77,098
Medical specialists	8,166
Paediatrics	19,355
Psychiatry	10,232
Obstetrics & gynaecology	18,074
General surgery	18,074
Surgical specialties:	
CVT surgery	128,213
Neurosurgery	165,761
Ophthalmology	30,099
Otolaryngology	51,456
Orthopaedic	34,127
Plastic	107,938
Urology	56,464
Anaesthetics	13,805

Source: Manitoba Centre for Health Policy and Evaluation.

These ratios are acknowledged to have major limitations and represent best 'guesstimates'.

The methodology used to estimate future growth in demand for specialist services is to take age and sex breakdowns of current utilisation and project these for 20 years using

population forecasts. To take into account ageing of the workforce and a rising proportion of women specialists, projected FTE supply is calculated.

To evaluate the adequacy of surgical services to rural residents, rates of surgery experienced by rural residents were compared with those of metropolitan residents, and found to be the same in Manitoba, despite the concentration of surgeons in metropolitan areas. However, in psychiatry, specialists provide fewer services to residents of middle and low income neighbourhoods than they do to residents of upper income neighbourhoods.

Permanent Working Group of European Junior Hospital Doctors, *Medical Manpower in Europe by the Year 2000 — from Surplus to Deficit*, (1996)

This makes supply and demand projections for 19 European countries.

This analysis is particularly interesting on a couple of issues:

- Some countries have an over-supplied medical workforce to the point of significant unemployment. The most notable and their unemployment rates for doctors are Italy (24.5%), Austria (8.9%), Germany (5.2%), Spain (4.7%), and the Netherlands (4.6%).
- FTEs were calculated as a fraction of activity at age 50. In Australia, as in the UK and a number of other countries, age 50 is the point at which both men and women doctors average almost the same hours worked, and these hours are the highest average hours at any age during their working life.

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