How many general practitioners are 'enough'?

– Forecasting GP workforce capacity in New Zealand

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Introduction

A *benchmark* is a standard by which something can be measured or judged. One element of a benchmark is a *ratio*: a measure that accounts for the relation between two quantities expressed as the quotient of one divided by the other. Unfortunately, these terms are often used interchangeably by policymakers. International studies consider general practitioner (GP) ratios as benchmarks on which to gauge workforce shortages and assess phenomena such as 'brain drain', educational matriculation and workforce retention. The very nature of a GP ratio presumes that the measure can be readjusted according to increasing workloads (i.e. the needs of an ageing population may require an increased level of health care) and increasing population (i.e. an increasing population count demands a higher number of GPs in the workforce to cope with new patients).[1,2] However, the simplicity and development of such ratios often falls short of accurately describing the capacity of the health workforce. It is our contention that a GP workforce benchmark should not be based solely on a GP to population ratio, ergo a 'head count'. In New Zealand (NZ), the GP benchmark should indicate *an adequate GP workforce to service a population's health needs*.

At present, NZ has an official 'GP per Population ratio' of 1:1400 in the Health and Disability Services Act 1993 (Section 51), but this ratio is often not recognised as a national standard because no explanation has been given as to its formulation. The Medical Council of New Zealand[3] concurs that *'there is no agreed ratio of GPs to patients in New Zealand'* but continues to use the ratio of 1:1400 patients as a benchmark, without questioning its validity.[4] *'This equates to 71.4 doctors per 100,000 population. The current ratio of GPs is 70 GPs per 100,000 population (headcount) and 72 FTE GPs per 100,000 population.'*[3] Once again, an unsubstantiated benchmark will gain currency without a foundation of robust logic to corroborate its use. Previously, the NZ Medical Association[5] noted that *'an ideal ratio of doctor per population for NZ conditions has not been established, so a measure of the service gap cannot be easily determined'*. This paper identifies the criteria for developing a GP-specific workforce benchmark by considering international GP ratios and identifying the key components of a benchmark. Where possible, a GP to 'patient' population ratio (GP:Pop[n]) is presented rather than a crude doctor to population ratio. The term 'doctors' is often inclusive of other skilled health practitioners such as specialists, gynaecologists, anaesthetists etc. Here, we recognise that GPs are a specific specialist health workforce.

Why set a national GP workforce benchmark for New Zealand?

While international ratios allow quick comparisons, there are many pitfalls to just adopting 'such ratios' for the NZ context. This said, the Australian GP ratio is still used as a guide for NZ workforce analysis.[5] As the Australian Medical Workforce Advisory Committee [AMWAC][6] concluded, *'...the whole point of establishing benchmarks for medical workforce is to provide the basis for predicting what workforce size and composition will be desirable in the future, and to monitor whether the desirable level has been achieved.'*[6] Like other countries, there is growing concern in NZ that there will not be enough GPs to meet the expected demands of future health care needs given the anticipated population growth and the projected increase in the ageing population, as the 'baby boomer' generation steadily reach the

Table 1. Longitudinal summary of New Zealand's GP:Population ratio

Longitudinal summary of New Zealand's GP:Population ratio*					
Year	Total number of GPs**	Population (est.)	Ratio: Pop^n	Ratio GPs:100 000 Pop^n	MCNZ ***Ratio All drs:100 000 Pop^n
1999	3191	3 851 200	1: 1207	83:100 000	157:100 000
2000	3166	3 873 000	1:1223	82:100 000	171:100 000
2001	3037	3 912 100	1:1288	77:100 000	190–195:100 000
2002	2917	3 975 900	1:1363	73:100 000	205–208:100 000
2003	3006	4 039 400	1:1344	74:100 000	223–234:100 000
2004	3009	4 084 200	1:1357	74:100 000	213–223:100 000
2005	2924	4 100 600	1:1402	71:100 000	213–223:100 000

* The data in this table is from the MCNZ APC forms. This excludes doctors who are temporary registrants.

** The information has been sourced from MCNZ (2004/2005/2007) workforce reports with data from 2002–2003.

*** This figure is inclusive of the numbers of GPs in NZ including those working in the secondary and tertiary health systems. The two ratios (GPs vs All drs) is not directly comparable. Note that the population estimate for 2006 now stands at approximately 4 142 00.

age of 65. For the purposes of forecasting shortages in health care provision, providing quality health care and adequate GP training levels, measuring the health workforce with a greater degree of accuracy and consistency is imperative.

In 2004, Brabyn and Barnett[4] provided a NZ ratio of '*1400 patients per full-time GP—which is the number used by the Ministry of Health* [MoH] *in 2001 for a full-time work load*', however they still give no reasoning as to how the ratio was established (more specifically, what constitutes a full-time workload) and they themselves acknowledge the inadequacy of such a simplistic ratio as *'a crude measure of geographical access'*. Not only is this measure too simplistic to provide accuracy but it does not account for the dynamic nature of the NZ health system over the three-year period since the MoH report. In recognition of its inadequacies as a measure, they incorporate two further methods of evaluation in their analysis: a least cost path analysis (LCPA) and an allocation technique that considers the number of GPs available and considers how many people a GP can service. *'Both methods represent an improvement on traditional ratio measures of GP access, as they involve more detailed calculations of travel distances and travel times. In addition, they are not constrained by area boundaries and aggregation problems of ignoring the intra-district location of GPs relative to their patients.'*[4]

A longitudinal summary of NZ's GP:Pop^n ratio (Table 1) shows GPs who are vocationally registered and those doctors who have an Annual Practising Certificate (APC) issued by the NZ Medical Council (MCNZ). The MCNZ ratios for all doctors are given as a range to acknowledge the difference in how the MCNZ defined GPs and other specialist doctors, i.e. they consider 'Active Medical Practitioners' (AMPs) and 'temporary registrants' as two distinct categories in their 2004 estimates. In some instances, temporary registrants have not been included in the MCNZ's surveys, even though a significant number are working in general practice, so very little is known about them.

GP numbers have fluctuated over the period from 1999 to 2004. The 'GP count' from the Royal NZ College of General Practitioners (RNZCGP) and the MCNZ are not exactly comparable, because MCNZ records those GPs currently practising, and the RNZCGP counts all members regardless of their work status, i.e. retired, taking a break or working overseas (the RNZCGP 2005/2006 Survey had a response rate of 60% from 2057 members). While there was an increase in the number of GPs in 2003, it is simplistic to take this increase as a sign that GP numbers will cope with the population's needs. Other impacting factors need to be taken into consideration, i.e. a declining interest in training as a GP,[7] a growing part-time workforce, difficulty in retaining GPs and a steadily increasing ageing population.[1,2,8,9,10] In October 2004 a study of 296 newly graduated doctors (158 respondents), revealed that 25% of the respondents intended to leave NZ after one year and nearly two-thirds of the respondents stated that they would consider leaving NZ within three years of graduation.[11] These factors will undoubtedly have a significant impact on the adequacy of a GP ratio.[8,9,10]

As is the international trend, there has been a concerning shift to specialist care. The OECD estimates almost a 50-50 split in the NZ workforce between GPs and other specialists. *'Specialists generally earn substantially more than GPs, partially explaining the changing specialist/GP balance and the resulting concerns about GP shortages in several countries.'*[12] This shift possibly 'masks' shortages in general practice and is associated with higher costs and poorer health care outcomes[13] and so is contrary to goals of the NZ Primary Health Care Strategy (2001).

Generally, a health workforce is considered at risk if the GP:Pop^n ratio reaches the 'alert level' of 1:2000.[14] Currently, the national

Table 2. A Comparison of international ratios

Country	Year of data (publication reference and year)	Number of physicians or GPs	Population	Ratio – Drs*:per 100 000 population
World Health Organisation (WHO)	2004	N/A	N/A	29:100 000 = 1:3500 (all dr ratio)
	2006	N/A	6 602 224 175 (July 2007 est.)	123:100 000 = 1:813 (all dr ratio)
New Zealand Area – 268 680km^2	1999 (MCNZ)	3191 (GPs specifically)	3 851 200	83:100 000 = 1: 1207 (GP-specific ratio) 157:100 000 (all dr ratio – MCNZ)
	2000 (OECD, 2001)	3166 (GPs specifically)	3 873 000	220:100 000 =2.2:1000 = 1:455 (OECD) 82:100 000 = 1:1223 (GP-specific ratio) 171:100 000 (all dr ratio – MCNZ)
	2001 (MCNZ)	3037 (GPs specifically)	3 912 100	77:100 000 = 1:1288 (GP-specific ratio) 190–195:100 000 (all dr ratio – MCNZ)
	2002 (MCNZ)	2917 (GPs specifically)	3 975 900	73:100 000 = 1:1363 (GP-specific ratio) 205–208:100 000 (all dr ratio – MCNZ)
	2003 (MCNZ)	3006 (GPs specifically)	4 039 400	74:100 000 = 1:1344 (GP-specific ratio) 223–234:100 000 (all dr ratio – MCNZ)
	2004 (MCNZ)	3009 (GPs specifically)	4 084 200	74:100 000 = 1:1357 (GP-specific ratio) 213–223:100 000 (all dr ratio – MCNZ)
	2005 (MCNZ)	2924 (GPs specifically)	4 100 600	71:100 000 = 1:1402 (GP-specific ratio) 213–223:100 000 (all dr ratio – MCNZ)
United States Area - 9 161 923 km^2	1999 (OECD, 2001)	N/A	N/A	270:100 000 = 2.7:1000 = 1:370 (all drs)
	2004 (Mullan, 2004)	796 013	285 million	279:100 000 = 2.8:1000 = 1:358 (all drs)
	2005 (OECD, 2007)	N/A	301 139 947 (July 2007 est.)	240:100 000 = 2.4:1000 = 1:417 (all drs)
United Kingdom Area – 241 590 km^2	1999 (OECD, 2001)	N/A	N/A	180:100 000 = 1.8:1000 = 1:556 (all drs)
	2002 (NHS, 2005; Malcolm, 2005)	N/A	N/A	44:100 000 = 1:2273
	2004 (Mullan, 2004)	136 536	60 million	228:100 000 = 2.28:1000 = 1:439 (all drs)
	2005 (OECD, 2007)	Not given	60 776 238 (July 2007 est.)	240:100 000 = 2.4:1000 = 1:417 (all drs)
Australia Area – 7 617 930km^2	1994 (AMWAC, 2002)	18 673	N/A	205:100 000 = 2.05:1000 = 1:488 (all drs)
	1995 (AMWAC, 1998)	N/A	N/A	254:100 000 = 2.54:1000 = 1:394 116:100 000 = 1:864; Rural-specific 108:100 000 = 1.929; Urban-specific 129:100 000 = 1:778
	1998 (CDHAC)	N/A	N/A	111:100 000 = 1:898 (GP-specific ratio)
	1998 (AMWAC, CDHAC)	20 852	N/A	111:100 000 = 1:904 (GP-specific ratio)
	1999 (Mullan, 2004)	50 221	20 million	247:100 000 = 1:405 (All drs)
	• 2000 (DHAC) • 2000 (DHAC-RLRP est.) • 2000 (Healthwiz) • 2000 (AMWAC)	N/A	N/A	• 111:100 000 = 1:898 (1:1153 FTW) (GP-specific ratio) • 78:100 000 = 1:1280 (FTE) (GP-specific ratio) • 91:100 000 = 1:1100 (GP-specific ratio) • 110:100 000 = 1:904 (GP-specific ratio); Rural-specific 99:100 000 = 1:1012 (AMWAC)

Table 2 cont.

Country	Year of data (publication reference and year)	Number of physicians or GPs	Population	Ratio – Drs*:per 100 000 population
Australia cont.	2001 (CDHAC) 2001 (DHAC) 2001 (Healthwiz)	N/A	N/A	93:100 000 = 1:1076 (GP-specific ratio) 110:100 000 = 1:904 (GP-specific ratio) 91:100 000 = 1:1097 (GP-specific ratio)
	2002 (ABS, 2003) 2002 (Productivity Commission) 2002 (DoHA August) 2002 (DoHA November)	N/A	N/A	96:100 000 = 1:1042 (GP-specific ratio) 85:100 000 = 1:1176 (GP-specific ratio) 76:100 000 = 1:1319 (FTE) (GP-specific ratio) 72:100 000 = 1:1397 (FTE) (GP-specific ratio)
	2004 (OECD, 2007)	N/A	20 million	270:100 000 = 2.7:1000 = 1:370
	2005 (2002)	N/A	N/A	220:100 000 projection (All drs)
Canada Area – 9 984 670km^2	1961 (Ward, 2004)	N/A	N/A	857:100 000 = 1:117 (All drs)
	1971 (Ward, 2004)	N/A	N/A	671:100 000 = 1:149 (All drs)
	1981 (Ward, 2004)	N/A	N/A	549:100 000 = 1:182 (All drs)
	1991 (Ward, 2004)	N/A	N/A	475:100 000 = 1:211 (All drs)
	2001 (Ward, 2004)	N/A	N/A	478:100 000 = 1:209 (All drs)
	2002 (Mullan, 2004)	68,096	31 million	220:100 000 = 1:455 (All drs)
	2005 (OECD, 2007)	N/A	33 390 141 (July 2007 est.)	220:100 000 = 1:455 (All drs)

* This figure is inclusive of GPs in the various countries. Where possible a separate figure for the number of GPs is listed separately. As discussed earlier, variations in international data recording means that it is not possible to provide direct comparisons. Here, we have tried to include a variety of specific GP classifications, ranging from those who are medical graduate (MGs) to registered GPs. The date given in brackets is the date this information was published. We have endeavoured to provide only the most recent references.

GP:Pop^n ratio average is about 1:1402 (MCNZ), and 1:1350-1939 for rural NZ.[5,15] This marginal increase in GP numbers is more attributed to an increase in Overseas Trained Doctors (OTDs) rather than the building of a NZ-trained workforce.

Despite the NZ Health Workforce Advisory Committee's (HWAC) own admission that the use of *'models for forecasting demand and supply requirements, such as the use of target practitioner to population ratios, are of limited use in complex and rapidly changing environments,'*[16] basic practitioner to population ratios continue to be used by policy makers to indicate sufficient or insufficient workforce capacity.[5,16] Indeed, HWAC's 2005 stocktake of the health workforce expressed *'major concerns about the GP workforce situation and the significant decline in the GP:Popn ratio in recent years.'*[16]

International ratios: A NZ comparison

A rough comparison of international GP and all doctors:population ratios is given in Table 2. The determination of these ratios is generally not explained and so, for most, it is unclear how the 'per 100 000 of population' ratio is determined. Using a ratio of GPs per 100 000 of population only provides a relative measure of patient access to primary health care and is flawed in simplicity – not every patient will go to the closest GP and other factors also impact on a GP's capacity to see patients. There are obvious limitations to using ratios and, indeed, to an international comparison of such ratios, but it is interesting to see what ratios have been adopted overseas and how they have been determined. Are they purely headcount ratios or are they more complex benchmarks that include measures of GP/doctor, workload, type of work and workforce composition?

A 'head count' ratio may be useful for providing crude workforce estimates, *'the geographic variation in the proportion of doctors working part-time restricts the usefulness of the measure. As such, a common workload unit is required to provide comparability.'*[17] International ratios are not always directly comparable and often vary according to differences in:

- the benchmark itself, that is, the population registered against the GP/doctor in the ratio;
- demographic disparities between countries and within countries, e.g. urban and rural differences;
- economic disparities between countries and within countries, e.g. this can be related to perceptions of what constitutes adequate care;
- data that encompasses a variety of health practitioners, e.g. data

Table 3. Scenarios 1–3 – Three takes on the current workforce situation

Benchmark scenario	Situation	Consultation time	Patients per week	Patients per year	Population calculation	Benchmark ratio
1 : Current situation	52 wks – (3 wks of holidays + 3 wks of CME) = 46 working weeks	48 hours/wk – (9 hours [admin duties] + 6 hours [on call] + 5 hours [other work]) = 28 hours of patient consultation time per wk	28 hours consultation × 4 patients/hr = 112 patients/wk	46 working wks × 112 pt/wk = 5152 pt/annum/GP	According to MoH Annual Report (2005) if on average a patient makes 4 visits to the GP then the ratio is 5152/4 visits = 1288 patients/GP or 1:1288 GP:Pop^n	**1:1288** = 78:100 000* = 3229:4 140 000 GP:Pop^n (2006)
2 : Current situation *But varied by:* • the number of patients seen per hour is the 'ideal' recommended of 2.5 patients/hour	52 wks – (3 wks of holidays + 3 wks of CME) = 46 working weeks	48 hours/wk – (2 hours [admin duties] + 6 hours [on call] + 5 hours [other work]) = 35 hours of patient consultation time per wk	35 hours consultation × 2.5 patients/hr = 88 patients/wk (approximately 7 hours of administration time is spent on patient-related paperwork)	46 working wks × 88 pt/wk = 4048 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 4048/4 visits = 1012 patients/GP or 1:1012 GP:Pop^n	**1:1012** = 99:100 000 = 4099:4 140 000 GP:Pop^n (2006)
3 : Current situation *But varied by:* • the number of patients seen per hour is the 'ideal' recommended of 2.5 patients/hour • GPs would have 6 wks of holiday (incl. Statutory holidays)	52 wks – (6 wks of holidays + 3 wks of CME) = 43 working weeks. Also GPs are able to take their full holiday of 6 wks	48 hours/wk – (2 hours [admin duties] + 6 hours [on call] + 5 hours [other work]) = 35 hours of patient consultation time per wk	35 hours consultation × 2.5 patients/hr = 88 patients/wk (approximately 7 hours of administration time is spent on patient-related paperwork)	43 working wks × 88 pt/wk = 3784 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 3784/4 visits = 946 patients/GP or 1:946 GP:Pop^n	**1:946** = 106:100 000 = 4388:4 140 000 GP:Pop^n (2006)

NOTE: In MoH 2004/05 Annual Report (2005), the number of active GPs per 100 000 for 2003 was noted to be 78:100 000. According to MCNZ (2006), there were 3013 GPs in 2004. It remains to be seen if NZ had an increase of over 200 GPs since 2004.

* All decimal points have been rounded-off to the nearest whole number. The total 'GPs per 100 000' figure has been rounded-off to the nearest whole number. Subsequent calculations are based on the rounded-off figures. This applies to all GP:100 000 Population ratios in the later 'Scenarios'.

can specifically refer to GPs only or equally include different health practitioners or specialists such as anaesthesiologists, cardiologists etc.;
- data determinations of remuneration, e.g. full-time workload equivalents [FWE], full-time equivalents [FTE], salaried practitioners, permanent part-time practitioners or locums;
- data determination of specific workload estimates, i.e. the average hours worked by a GP each week;
- patient demographics, e.g. meeting the needs of an ageing population;
- definitions of how a GP or physician is classified, e.g. based on differing stages of vocational registration such as specialist registrars, GPs, GP registrars, or physicians;
- the inclusion of OTDs, whether they are registered or temporary resident doctors.

Table 4. Scenarios 4–6 – Rural workforce scenarios

Benchmark scenario	Situation	Consultation time	Patients per week	Patients per year	Population calculation	Benchmark ratio
4: Current situation in rural New Zealand	52 wks – (3 wks of holidays + 4 wks of CME) = 45 working weeks	60 hours/wk – (9 hours [admin duties] + 16 hours [on call] + 5 hours [other work]) = 30 hours of patient consultation time per wk	30 hours consultation × 4 patients/hr = 120 patients/wk	45 working wks × 120 pt/wk = 5400 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 5400/4 visits = 1:1350 GP per population 1:1350 = 74:100 000 = 3064:4 140 000 GPs:NZ Population (2006)	1:1350 = 74:100 000 = 429:579 600 (approx. rural population in NZ – 2006)
5: Current situation But varied by: • the number of patients seen per hour is the 'ideal' recommended of 2.5 patients/hour	52 wks – (3 wks of holidays + 4 wks of CME) = 45 working weeks	60 hours/wk – (2 hours [admin duties] + 16 hours [on call] + 5 hours [other work]) = 37 hours of patient consultation time per wk	37 hours consultation × 2.5 patients/hr = 93 patients/wk	45 working wks × 93 pt/wk = 4185 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 4185/4 visits = 1:1046 GP per population 1:1046 = 96:100 000 = 3974:4 140 000 GPs:NZ Population (2006)	1:1046 = 96:100 000 = 556:579 600 (approx. rural population in NZ – 2006)
6: Current situation But varied by: • the number of patients seen per hour is the 'ideal' recommended of 2.5 patients/hour • Rural GPs are able to take their full holiday of 6 weeks (incl. Statutory holidays)	52 wks – (6 wks of holidays + 4 wks of CME) = 42 working weeks	60 hours/wk – (2 hours [admin duties] + 16 hours [on call] + 5 hours [other work]) = 37 hours of patient consultation time per wk	37 hours consultation × 2.5 patients/hr = 93 patients/wk	42 working wks × 93 pt/wk = 3906 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 3906/4 visits = 1:977 GP per population 1:977 = 102:100 000 = 4223:4 140 000 GPs:NZ Population (2006)	1:977 = 102:100 000 = 591:579 600 (approx. rural population in NZ – 2006)

NOTE: Current data from the Rural GP Network suggests rural New Zealand having approximately 660 GPs (RNZCGP Membership Survey Report Part III, 2006). However it is unclear how many of these are full-time, part-time, and/or locums. The above ratio is based on rural GPs working a 60-hour week.

Comparing international benchmarks (Table 2), highlights the fact that standards currently set overseas cannot be readily applied to the NZ health context – they are too variable and the health contexts are very different. One must only look to the amount of variation amongst Australian health planners for a reason to standardise a benchmark for the NZ context. In Australia, despite actually setting benchmarks for the purposes of health workforce planning, too many benchmarks have been set and the *'benchmarks in use...are consistently inconsistent.'*[18]

Two of the most difficult factors to account for when comparing inter-

Table 5. Future workforce assumptions

Types of GP	Current workforce composition (as ratio of GPs)	How GP time is spent (RNZCGP Membership Survey (2005/2006)**	Workforce projections	FTEs (where 1FTE = 40hrs/wk)
Locums	13.5% locums × 78:100 000 = 10:100 000 are locum GPs	59% of their time in consultation 8% on on-call duties 13% on administration (11% for patient-related paperwork) 8% on CME related activities 12% doing other types of work like College work or taking a break from general practice	13.5% + 2%* (of the 13.5%) are locums = 15.5% will be locums	Locums work 37hrs/wk = 0.93 FTE
Part-timers	25% part-time GPs × 78:100 000 = 20:100 000 are part-time GPs	53% of their time consulting with patients 10% on on-call duties 15% on administration including (11% for patient-related paperwork) 10% on CME related activities 12% doing other types of work like College work or taking a break from general practice	25% + 4%* (of the 13.5%) are part-timers (salaried & self-employed) = 29% will be part-timers	Part-timers work 36hrs/wk = 0.9 FTE
Full-timers	46% full-time GPs × 78:100 000 = 36:100 000 are full-time GPs	60% of their time consulting with patients 13% on on-call duties 18% on administration (13.5% for patient-related paperwork) 5% on CME related activities 4% doing other types of work like College work or taking a break from general practice	46% + 7.2%* (of the 13.5%) are full-timers (salaried & self-employed) = 53.2% will be full-timers	Full-timers work 57hrs/wk = 1.4 FTE
Sub-specialised	2% sub-specialised GPs × 78:100 000 = 2:100 000 are sub-specialised GPs	47% of their time consulting with patients 13% on on-call duties 14% on administration (8% for patient-related paperwork) 10% on CME related activities 16% doing other types of work like College work or taking a break from general practice	2% + 0.3%* (of the 13.5%) are sub-specialities = 2.3% will be sub-specialised	Sub-specialised work 44hrs/wk = 1.1 FTE
Other non-GP work	13.5% of GPs do non-general practice work	Non-general practice medical work, non-medical work, working overseas, academia, management, unpaid and retired	–	–

* 13.5% – this percentage is proportionally distributed among GPs doing general practice work (See Table 6)

national GP ratios are the differences in health systems (i.e. different mixes of public/private contributions to delivery of health care) and health delivery (health care may be provided by a team of health professionals, where the GP may not necessarily take the lead role). While there is the potential for greater 'task-sharing' with other professional groups, research is cautionary about 'substitutes' for a GP workforce.[19,20,21,22,23] These intrinsic differences in the provision of health care across countries present another reason why international ratios may not 'fit' NZ's health context.

To estimate the NZ GP workforce more accurately, a method similar to that used by the AMWAC needs to be adopted, the setting of a national benchmark formula, based on components such as: the number of practising GPs, workforce dynamics (i.e. the number of assisting NPs) and average GP workloads. For forecasting, this would then need to be coupled with a supply and demand analysis of workforce given the numbers of GPs in training, recruitment and attrition. A benchmark based on data from the NZMA, MCNZ and the RNZCGP membership surveys, includes measures of:

- *GP Workforce Characteristics:* Hours worked by a full-time GP, ideally 1 FTE or a 40-hour week. GPs currently work a 48-hour week (1.2 FTE) inclusive of six hours on-call, nine hours on patient-re-

Table 6. Scenario 7 – Part-time and locum workforce scenarios

Benchmark scenario	Situation time	Consultation week	Patients per year	Patients per calculation	Population ratio	Benchmark
7: Current situation with part-time GPs	52 wks – (3 wks of holidays + 3 wks of CME) = 46 working weeks	36 hours/wk – (5 hours [admin duties] + 4 hours [on call] + 4 hours [other work]) = 23 hours of patient consultation time per wk	23 hours consultation × 4 patients/hr = 92 patients/wk	46 working wks × 92 pt/wk = 4232 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 4232/4 visits = 1058 patients/GP or 1:1058 GP per population	1:1058 = 95:100 000 = 3933:4 140 000 GPs:NZ Population (2006)
If the formula above is used then the following ratios are generated:						
Locums	1:1150 = 87:100 000 = 3600:4 140 000 GPs:NZ population (2006)			15.5% will be locums × 1:1150 (ratio for locums) = 1:178		
Part-timers	1:1058 = 95:100 000 = 3 913:4 140 000 GPs:NZ population (2006)			29% will be part-timers × 1:1058 (ratio for part-timers) = 1:307		
Full-timers	1:1702 = 59:100 000 = 2432:4 140 000 GPs:NZ population (2006)			53.2% will be full-timers × 1:1702 (ratio for full-timers) = 1:906		
Sub-specialised	1:1150 = 87:100 000 = 3600:4 140 000 GPs:NZ population (2006)			2.3% will be sub-specialised × 1:1150 (ratio for sub-specialised) = 1:27		
Actual ratio	**1:1418 = 71:100 000 = 2939:4 140 000 NZ population (2006)**			**100% in general practice × 1:1418 ratio for New Zealand** **2939:4 140 000 NZ population (2006)** ***Note: MCNZ Report (2007) shows a ratio of 2924:4 100 600 for the year 2005***		

lated paperwork and administrative work, 2.5 hours/week on Continuous Medical Education (CME) or related activity (115 hours per annum or approximately three weeks/annum). GPs feel that they need four weeks of holidays annually (statutory minimum) + two weeks of statutory public holidays (Table 3). The RNZCGP survey reported that approximately 50% (990) of participants said their 'ability to take a holiday' was between average and very poor. The current situation assumes that GPs get one week holiday + the mandatory two weeks of public holidays, i.e. at least half of what they would like to have;

- *Workforce Context and Dynamics:* Staffing in primary health care teams, i.e. the numbers of practice nurses and their current scope of practice (this could also include their ability to identify what and how much of the current GP's workload they could take over, other than paperwork). It will be necessary to account for these contextual factors in future benchmarks;
- *Burden of disease and utilisation:* Burden of disease in the country/community impacts on the number of patient visits to GPs. GPs spend 58% of the week on patient consultations (28 hours/week). According to MoH Annual Report (2005) patients are likely see their GP four times a year on average (young children and elderly patients may require more than four visits per year). Anecdotal and observational evidence would suggest that the actual number of consultations would be approximately three to four patients/hr or each patient consultation on average is 15 minutes excluding time for updating patient folders, or that a GP sees 19 patients per day (4.7 hours (actual hours available a day for patient consultation) × four patients/hour). It should be noted that this figure could vary substantially depending on type of practice, number of practitioners, population demographics, and the disease burden of the community. However, the recommended ideal number of patients to be seen in an hour is 2.5.[24] Seeing 2.5 patients per hour would include doing patient-related paperwork,

Table 7. Scenarios 8–10 – Ideal world scenarios

Benchmark scenario	Situation	Consultation time	Patients per week	Patients per year	Population calculation	Benchmark ratio
8: Ideal work situation for GPs (2.5 pt/hr)	52 wks – (6 wks of holidays + 3 wks of CME) = 43 working weeks	40 hours/wk – (2 hours [admin duties] + 5 hours [on call] + 5 hours [other work]) = 28 hours of patient consultation time per wk	28 hours consultation × 2.5 patients/hr = 70 patients/wk	43 working wks × 70 pt/wk = 3010 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 3010/4 visits = 753 patients/GP or 1:753 GP per population	1:753 = 133:100 000 = 5506:4 140 000 GPs:NZ Population (2006)
9: Ideal situation *But varied by:* • the number of patients seen per hour is 4 instead of the recommended 2.5 pt/hr	52 wks – (6 wks of holidays + 3 wks of CME) = 43 working weeks	40 hours/wk – (7 hours [admin duties] + 5 hours [on call] + 5 hours [other work]) = 23 hours of patient consultation time per wk	23 hours consultation × 4 patients/hr = 92 patients/wk	43 working wks × 92 pt/wk = 3956 pt/annum/GP	If on average a patient makes 4 visits to the GP then the ratio is 3956/4 visits = 989 patients/GP or 1:989 GP per population	1:989 = 101:100 000 = 4181:4 140 000 GPs:NZ Population (2006)
10:Ideal situation But varied by: • the number of patients seen per hour is 4 instead of the recommended 2.5 pt/hr • The average number of patient visits increases to 6/yr	52 wks – (6 wks of holidays + 3 wks of CME) = 43 working weeks	40 hours/wk – (7 hours [admin duties] + 5 hours [on call] + 5 hours [other work]) = 23 hours of patient consultation time per wk	23 hours consultation × 4 patients/hr = 92 patients/wk	43 working wks × 92 pt/wk = 3956 pt/annum/GP	If the average number of visits a patient makes increases to 6 visits (as expected with an ageing population) then the ratio is 3956/6 visits = 659 patients/GP or 1:659 GP per population	1:659 = 152:100 000 = 6293:4 140 000 GPs:NZ Population (2005)

thus reducing the administration time from nine hours to two hours, (approximately seven hours of administration time is spent on patient-related paperwork).

- *Patient demographics and distribution:* Patient distribution (i.e. rural and urban populations) and demographics (i.e. ageing population).
- *Patient access and socio-economic deprivation level:* Income levels, housing and distance to the nearest GP, etc. have been linked to health outcomes where lower socioeconomic level correlates with poorer health outcomes.[25–32] NZ has developed a socioeconomic deprivation index (NZDep91, NZDep96, and NZDep2001; Table 8) that is primarily used for resource allocation, research, and advocacy.[32] '*The 2001 Index combines a range of key socio-economic factors from the 2001 Census [like income, transportation, communications, support, ownership of homes, qualifications, employment, and living space] and estimates an overall score of material and social deprivation for a particular area, on a scale of 1 [least deprived] to 10[most deprived].*'[33] It is argued that regions with a deprivation score of one (least deprived) need the minimum recommended allocation of resources, and the most deprived areas need (associated with poorer health outcomes) the maximum

(double or triple) the recommended allocation of resources to achieve quality health outcomes.

One of the limits in calculating a GP benchmark for an 'ideal' work environment is that the ratio only considers the perspective of the provider of the service. Adapting the values given for the 'current situation' provides differing scenarios, allowing us to further develop benchmarks that relate specifically to rural general practice, an increasing part-time and locum workforce.

Rural general practice is quite different to urban general practice; approximately 14% of the population live in rural NZ and the expectation of after-hours care (24/7 or out-of-hours care) provision is substantial. By comparison, the differences between the 'current situation' and the current situation for rural GPs are:

(a) a 60-hour working week (1.5 FTE) equating to seven days/week and approximately 8.6 hours/day;
(b) on average 48–50% of time is spent in patient consultations (i.e. 29–30 hours/week);
(c) the rest of their time comprises 16 hours on-call (27% of their duties); 15% on administration including 11% for patient-related paperwork, 6% on CME-related activities (i.e. 3.5 hours/week is used for educating other health professionals, and rural GPs spend more time on this activity compared to their urban colleagues) and 4% doing other types of work or taking a break from general practice (Table 4).

A credible benchmark should also take into account the impact of locums, part-time, full-time and sub-specialised GPs on the current and future GP workforce in NZ: approximately 311 (13.5%) of the 2005/2006 RNZCGP survey participants did locum work and 569 (25%) did part-time work either as a salaried GP or a self-employed GP. More women are choosing part-time and locum work, as they take time off to raise families. Some older GPs are also opting for part-time and locum work. Part-time GPs work on average 36hrs/week (0.9 FTE), almost the same number of hours worked by locums and other GPs in non-general practice medical work or non-medical work. Effectively only 86.5% of the current GP workforce (including the sub-specialised) is actually involved in traditional general practice work. In other words, 13.5% of the GP workforce is not actually doing general practice work even though they are identified as GPs; some of them may also be vocationally registered as GPs. Arguably, even some sub-specialised GPs do not do any general practice work, so taking the current 78:100 000 GP:Pop^{n} ratio (Scenario 1) and accounting for GPs actually involved in 'pure' general practice work (86.5%), the ratio is calculated at 68:100 000 GP:Pop^{n}. A more accurate representation of the composition of the workforce 'working directly in general practice' is shown in Table 5 where the ratio (78:100000) is applied for locums, part-time, sub-specialised, and full-time GPs.

There is a deficit of 13.5% based on those GPs not doing any general practice work. This can be proportionally divided and added to the existing percentages of GPs (who work in general practice) for the purpose of forecasting, i.e. the actual composition of the workforce can be limited to certain work statuses. So, by applying a certain set of reality-based assumptions, a future GP workforce could comprise the percentages of different types of GPs as shown in Table 5.

In Table 6, the scenarios provide an example of how to account for these differences, the statistics for part-time GPs are used to show how a ratio for each of the 'types of GPs' can be calculated. Thereafter a formula will be used to aggregate the findings and find the 'true' benchmark for NZ in 2005.

The ratios reflect that full-time GPs are seeing far more patients due to working longer hours, not taking holidays and, as a consequence, having little time for professional development and other types of work. In an ideal situation, based on the percentages of time spent for each activity in the College's membership survey 2005/2006, GPs would:

- Work a 40-hour week (1 FTE), i.e. GPs work at least five days/week;
- Spend 58% of the week on patient consultations (23 hours/wk);
- Spend on average seven hours on administrative work that includes five hours for patient-related paperwork;
- Work five hours on-call (this is inclusive in the 40 hr week);
- Spend three weeks on CME annually (120 hours per annum);
- Take four weeks of holidays annually + two weeks of public holidays;
- Each patient consultation on average is 15 minutes + nine minutes for updating patient folders or a GP sees 12 patients per day (4.6 hours [actual hours available a day for patient consultation] × 2.5 patients/hr – as recommended by Graff et al.[24]). If the ideal patient consultation time is used then the actual time spent on ad-

Table 8. NZ Deprivation Index (DPI – NZDep2001) with ascribed values

The Deprivation Index (DPI)*	Values (DSV)
1	1
2	1.11
3	1.22
4	1.33
5	1.44
6	1.55
7	1.66
8	1.77
9	1.88
10	2

* The DPI has a scale of 1 to 10 with 1 indicating the least deprived areas and 10 indicating the most deprived areas. Here, the DPI is given a value on a scale across the scores from 1 to 10 (i.e. DSV). Statistics NZ (2006) data provides the population for the case study regions and their deprivation score values (DSV).

Table 9. Regional case study scenarios

Benchmark scenario	Situation	Population calculation	Actual ratio	Ideal benchmark ratio*
11: Gisborne	Population 45 000, the ratio will actually be 133.5:100 000 × 0.45 (45 000/100 000) = 60:45 000 (GP: Population of Gisborne). This is significantly below the deprivation-adjusted threshold (approx. 60%)	71:100 000 × 1.88 (DSV = 9 [1.88] for Gisborne) DSV = 9. No other region in NZ has a DSV of 9 based on available data	133.5:100 000 (GP: Pop^n)	**1:990 (Ideal)** 101:100 000 × 0.45 = 45.5:45 000 (GP: Gisborne Pop^n) —— **1:1282 (Actual)** 35:44 700 (MCNZ, 2007)
12: Canterbury	Population 522 000, the ratio will actually be 110:100 000 × 5.22 (522 000/100 000) = 441:522 000 (GP: Population of Canterbury). Below deprivation-adjusted threshold (approx. 46%) so this ratio does not account for DPI	71:100 000 × 1.55 (DSV = 6 [1.55] for Canterbury) DSV = 6. Auckland, Waikato, Taranaki, Wellington, Nelson, Otago and Southland have a DSV of 6 based on available data	110:100 000 (GP: Pop^n)	**1:990 (Ideal)** 101:100 000 × 5.22 = 527:522 000 (GP: Canterbury Pop^n) —— **1:1258 (Actual)** 441:524 800 (MCNZ, 2007)
13: Tasman	Population 47 000, the ratio will actually be 94:100 000 × 0.47 (47 000/100 000) = 45:47 000 (GP: Population of Tasman). Below deprivation-adjusted threshold (approx. 50%) so this ratio does not account for DPI	71:100 000 × 1.33 (DSV = 4 [1.33] for Tasman) DSV = 4. No other region in NZ has a DSV of 4 based on available data	94:100 000 (GP: Pop^n)	**1:990 (Ideal)** 101:100 000 × 0.47 = 47.5:47 000 (GP: Pop^n) —— **1:1044 (Actual)** 21:46 600 (MCNZ, 2007)

* In Scenarios 11–13 (Table 9), the ratio is not calculated to take the DSV into account if it can be argued that the ideal number of GPs is currently available to service the regional population – in these cases the use of the DPI becomes redundant or could possibly overstate the amount of resources needed.

ministration will reduce to possibly two hours/wk;

- Patients will most likely see their GP four times a year on average (young children and elderly patients may require more than four visits per year).

In the ideal situation scenarios (Table 7), any increase in the number of patient visits is likely to have a significant impact on the workload of GPs. With an ageing population, this is very likely to happen though new models of care may help reduce the number of GP patient visits.

Now the Deprivation Index (DPI) can be used in the calculation of a GP benchmark to take into account the populations' socioeconomic dynamics (Table 8), assuming that at least double the number of resources are required for the most deprived area: 71:100 000 (GPs:Pop^n) × 2 = 142:100 000 (GP:Pop^n). The use of this Index also provides a balance to the proposed GP benchmark model that has been predominantly provider focused. The DPI can be used to calculate the number of GPs that maybe required for different regions around NZ, namely Gisborne, Canterbury and Tasman as regional case studies (Table 9). These regions provide examples across a range of DPI areas.

Of all of the scenarios presented, Scenario 2 (1:1012 or 99:100 000 GP:Pop^n), Scenario 3 (1:946 or 106:100 000 GP:Pop^n), Scenario 5 (1:1046 or 96:100 000 GP:Pop^n), Scenario 6 (1:977 or 102:100 000 GP:Pop^n for rural NZ), and Scenario 9 (1:989 or 101:100 000 GP:Pop^n) present the best working environments for GPs with adequate time for consultations in a normal working week, sufficient time for CME and reasonable provision for a healthy lifestyle. Logically, an optimum working environment is likely to improve the quality of patient care.

Conclusion

The benchmark modelling above, with its assumptions and values, demonstrates that a formulaic approach to setting a GP benchmark is possible, provided there is agreement on the benchmark's component values. However, more discussion is necessary to account for other variables in the model including the impact of primary health care teams on GPs, ageing population, geographical variances and changing demographics (socioeconomic-deprivation scores, age and multiple health needs). By adjusting

variables like the DPI, number of patient consultations/hour and visits/year the model can take some account of the broader patient context. The development of a formulaic benchmark also lends itself to analyses of different health professionals and patient populations (e.g. ascertaining the number of GPs required for a given population including ethnicity-based populations such as Maori and Pasifika) but it is imperative that any benchmark used in workforce planning and forecasting in NZ is:

- Standardised nationally;
- Established by a centralised body via a population-based formula so that all subsequent research is comparable;
- Developed by using evidence-based research that determines what particular aspects of the workforce context are to be recorded and specifications for defining the health practitioner;
- Able to take into account patient demographics and socioeconomic deprivation.

Without establishing a standardised 'benchmark' as a fundamental tool for measuring the adequacy of the NZ general practice workforce, there will always be debate over 'how many GPs are enough'.

Competing interests

Judith Fretter was working in the RNZCGP when this article was written but currently is on secondment to another organisation. Mel Pande is currently an employee of the RNZCGP. He is also responsible for analysing and reporting data collected through the College's Membership Surveys.

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