



Te Kaunihera Rata
o Aotearoa

**Medical Council
of New Zealand**

The New Zealand Medical Workforce in 2019

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Foreword

Tenā koutou,

Council is pleased to present the 2019 Workforce Survey.

This report is drawn together from the feedback gathered in the workforce survey that each doctor completes when applying for an annual practising certificate (APC).

The data collected during this process informs the survey report providing an overview of the current medical workforce, insights into the changing demographics of the profession, and the trends around where and how doctors are working.

I would like to thank the doctors who completed the survey and also thank all members of the medical profession for the work they do in service of New Zealanders.

We trust the workforce survey will be of interest and use to you. Council welcomes your feedback on the report (workforce@mcnz.org.nz), including what information you would like to see presented in future editions.

Noho ora mai

Dr Curtis Walker

Chairperson

Medical Council of New Zealand

Introduction and acknowledgements

This report presents the results of the Medical Council of New Zealand workforce survey for 2019. Andrew Cullen, Council's Senior Information Systems Analyst prepared the report with support from other Council staff and Bill Grant of AllGo Analytics.

We would like to thank all the doctors who responded to the survey and provided the valuable data on the type and amount of work they are doing.

Key findings

Māori doctors are under-represented in the medical workforce but there are positive developments at undergraduate and graduate levels

The proportion of Māori doctors is 3.8 percent, well below the proportion of Māori in the New Zealand population. 15.3 percent of students beginning medical school between 2015 and 2019 identified as Māori, and in 2018, almost 16 percent of Otago's graduates and 14 percent of Auckland's graduates were Māori.

The proportion of female doctors increased

46.3 percent of doctors in the active workforce were female, up half a percentage point from 2018. We predict women will outnumber men in the workforce by 2025.

The number of practising doctors increased: The total number of doctors, based on registration data, increased by 3.8 percent in 2019 from 16,292 to 16,908. This represents doctors on the register with a current practising certificate.

The fastest growing specialties were diagnostic radiology, urgent care, and emergency medicine: The number of doctors registered in the vocational scope of diagnostic radiology increased by over 11 percent in between 2019 and 2020. Urgent care increased by 9.7 percent and emergency medicine increased by 9.4 percent.

Facts at a glance	2014	2015	2016	2017	2018	2019
Size of the workforce ¹	14,533	14,737	15,212	15,819	16,292	16,908
Doctors per 100,000 population ²	317.6	318.1	321.3	327.9	333.5	344.7
Proportion of IMGs ³ (%)	42.0	40.4	40.4	40.0	40.1	40.4
Proportion of females (%)	42.4	43.5	43.9	44.8	45.1	46.3
Average age of workforce	45.7	45.2	45.5	45.9	46.1	46.0
Average weekly workload (hours)	43.6	44.4	44.7	44.2	43.8	44.5
Average proportion of new IMGs retained after 1 year ⁴	55.4	56.9	57.7	58.4	59.1	-

¹ Figures are based on registration data. See Table 4 for more information.

² Figures are based on the size of the workforce as measured by registration data (see Table 4) and Statistics New Zealand's estimated residential population as at 31 March of the particular survey period.

³ IMG: international medical graduate (see page 49 for definition).

⁴ See 'Retention' on page 38 for more information and 'Survey method' on page 43 for information on how this figure was calculated.

Key terms and definitions

Here are some of the key terms and their definitions we've used in this publication. Please see page 49 for the full list.

General practitioner (GP)

A GP is any respondent who indicated working in the GP work role at one of their work sites. It does not specifically refer to a doctor holding the FRNZCGP qualification or a vocational scope of general practice. We sometimes need to use a different definition of GP. We will specify that we have done this in the text.

Specialist

This work role category is generally understood to require membership of the relevant specialist college (and registration within a vocational scope of practice). However, the data are self-reported and doctors who respond to the survey may apply the term more broadly. General practice is a specialty, and GPs are specialists. However, we ask doctors working in general practice, urgent care, and other primary care disciplines to use separate work role categories to help us analyse the data.

Registrar

A doctor who has at least 2 years of experience since graduation from medical school. Registrars are generally undertaking vocational training in their chosen specialty.

House officer

House officers are doctors in their first 2-3 years out of medical school. Doctors in their first year out of medical school are sometimes known as interns or PGY1s.

International medical graduate (IMG)

We define IMGs as doctors who obtained their primary medical qualification in a country other than New Zealand.

Please take care when comparing the proportion of IMGs employed in New Zealand to the proportion in other countries – many countries define IMG differently from us.

Ethnicity

Changes in ethnicity of the workforce over time

The proportion of doctors who identify as Māori is 3.8 percent. This is up from 3.4 percent in 2015 and 3.0 percent in 2010. The proportion of Pasifika doctors is 1.8 percent – the same as in 2018 but down from 2015 (2.0 percent) and up from 2010 (1.3 percent).

The proportion of NZ European/Pākehā doctors is decreasing. In 2019 it was 51.0 percent, down from 51.4 percent in 2015, and 53.3 percent in 2010. The proportion of doctors identifying as other European was down slightly but remains about 20 percent as it has since 2010.

Table 1: Proportion of doctors by ethnic group (%)

Ethnicity	2000	2005	2010	2015	2019
Māori	2.3	2.6	3.0	3.4	3.8
Pacific Island (Pasifika)	1.1	1.5	1.3	2.0	1.8
Chinese	4.5	5.4	5.3	5.9	6.1
Indian	4.5	5.1	5.9	6.0	5.7
Other non-European	7.6	10.8	9.9	11.9	10.1
Other European ¹	-	15.4	19.7	20.5	18.9
NZ European/Pākehā	76.5	57.5	53.3	51.4	51.0
Not answered	3.2	1.5	1.5	2.4	2.6
Refused ²	0.2	0.2	0.2	-	-
Total³	100.0	100.0	100.0	100.0	100.0

¹ In 2000, other European and NZ European/ Pākehā were combined in one category.

² From 2016, not answered is no longer an available option. The ethnicity question can only be answered or refused.

³ Individual categories may not add up to total due to rounding.

Proportion of doctors by ethnicity in the workforce compared with the New Zealand population

Māori and Pasifika are noticeably under-represented compared to their proportion of the population, even allowing for differences in method.¹ Māori make up 16.5 percent of the population, but only 3.8 percent of doctors. Over 8.1 percent of New Zealanders identify as Pasifika compared to less than 2 percent of doctors.

What would a representative workforce look like? If the number of doctors reflected the makeup of the New Zealand population, there would be 2,807 Māori doctors and 1,378 Pasifika doctors. The results of the survey suggest there are currently about 647 Māori doctors and 306 Pasifika doctors². This is a significant gap, but it is closing. We talk more about the developments in this area in the next section. In addition, Māori and Pasifika

¹ We are using a prioritised count to assign a doctor to one ethnic group (see the survey method section on page 46), whereas Statistics New Zealand counts a person once for every ethnic group they identify with. Because of the way the Census results were published, it was not possible to find an equivalent figure for each group.

² Applying the percentages for each group in Table 2 to the number of registered doctors with a current practising certificate as at 31 March 2019 - 17,015.

populations experience greater health needs, creating a needs-based argument for greater than demographic proportionality amongst the medical workforce.

Table 2: Proportion of doctors and New Zealand population by ethnic group

Ethnicity ¹	Proportion of doctors (2019)	Proportion of New Zealand population (2018 Census) ²
Māori	3.8	16.5
Pacific Island (Pasifika)	1.8	8.1
NZ European/Pākehā	51.0	64.1
Total³	100.0	100.0

¹ Proportions calculated including the other ethnicity categories not shown in the table. The table includes only these three categories for ease of reading.

² Figures based on the results of the 2018 Census published by Statistics New Zealand – see <https://www.stats.govt.nz/information-releases/2018-census-ethnic-groups-dataset>.

³ Individual categories may not add up to total due to rounding.

Developments in the ethnicity of medical graduates

While there is still a large gap in the representation of Māori and Pasifika doctors amongst the medical workforce, the proportion of Māori and Pasifika doctors is higher amongst more recently qualified doctors, especially house officers. This reflects the significant progress that New Zealand’s medical schools are making at undergraduate and graduate levels to increase the numbers of Māori and Pasifika doctors entering the workforce.

Ethnicity of undergraduates

15.3 percent of students beginning medical school between 2015 and 2019 identified as Māori. The proportion of students identifying as Māori was highest in 2018 (17.7 percent) and lowest in 2015 (12.1 percent).

The proportion of students identifying as Pasifika increased significantly between 2015 and 2019 – from 3.6 percent in 2015 to 9.7 percent in 2019. Overall, 7.2 percent of students beginning medical school between 2015 and 2019 identified as Pasifika³.

Ethnicity of graduates

Otago University advised that, in 2017, they had 27 Māori graduates out of a total of 249 graduates (10.8 percent) and, in 2018 they had 42 Māori graduates out of a total of 267 (15.7 percent).

Auckland University advised that in 2017, 11.5 percent of medical graduates were Māori. In 2018, the equivalent figure was 14.3 percent.

³ New Zealand Medical Schools Outcomes Database (MSOD), *National report on students commencing medical school in New Zealand in 2015-2019*, <https://www.otago.ac.nz/medical-school/undergraduate/medicine/msod/>.

Ethnicity by age

Māori, Pasifika, and Chinese all have average ages lower than the overall figure. Chinese doctors have the lowest average age for females – 36.9 years. Māori are the youngest group amongst males – 39.6 years.

Male doctors identifying as NZ European/Pākehā are the oldest, on average. They are also the only group to have an average age greater than 50 (51.9 years).

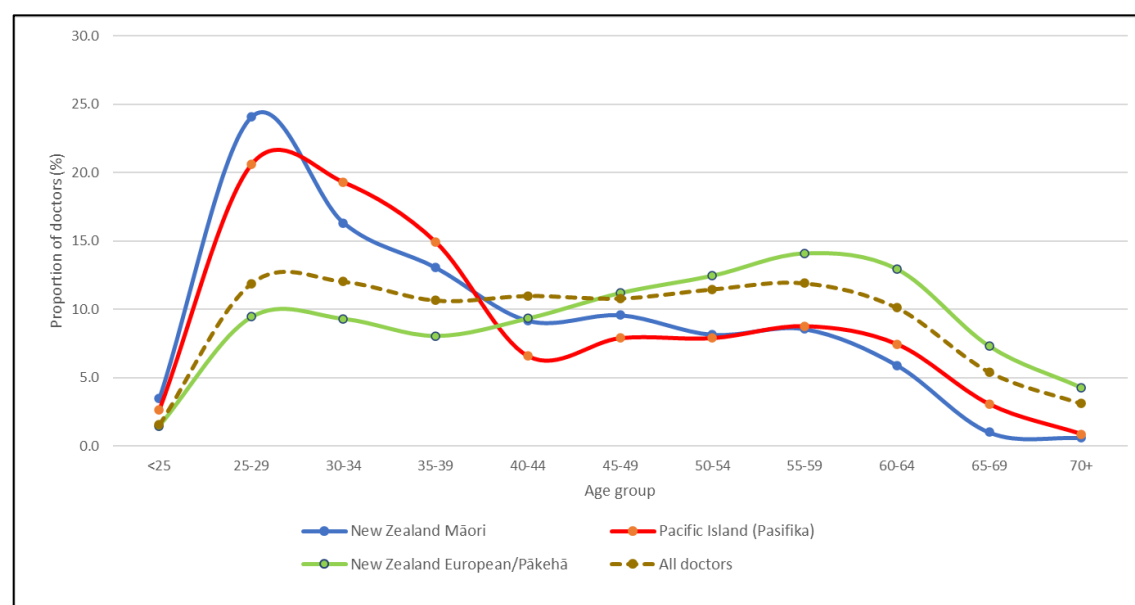
Table 3: Average age of doctors by ethnicity and gender

Ethnicity	Average age		
	Female	Male	Overall
Māori	38.2	41.2	39.6
Pacific Island (Pasifika)	39.5	42.2	40.8
Chinese	36.9	41.9	39.7
Indian	43.7	47.4	46.0
Other non-European	40.8	44.7	42.9
Other European	42.5	47.1	44.8
NZ European/Pākehā	44.9	51.9	48.7
All doctors	43.0	48.6	46.0

Ethnicity by age group

Māori and Pasifika doctors are more likely to be aged under 35 years compared with NZ European/Pākehā doctors and the overall workforce. 43.9 percent of Māori doctors, and 42.5 percent of Pasifika doctors are aged 34 and under, compared with 25.5 percent of the overall workforce.

Figure 1: Ethnicity by age group (selected groups)



Doctors identifying as New Zealand European/Pākehā and other European are more likely to be 45 or over – 48.1 and 62.3 percent. They are relatively less likely to be aged under 35 – 20.3 and 25.1 percent.

This increased number of older doctors in these group may reflect IMGs⁴ who come to New Zealand after already working as doctors for several years.

Ethnicity by work role

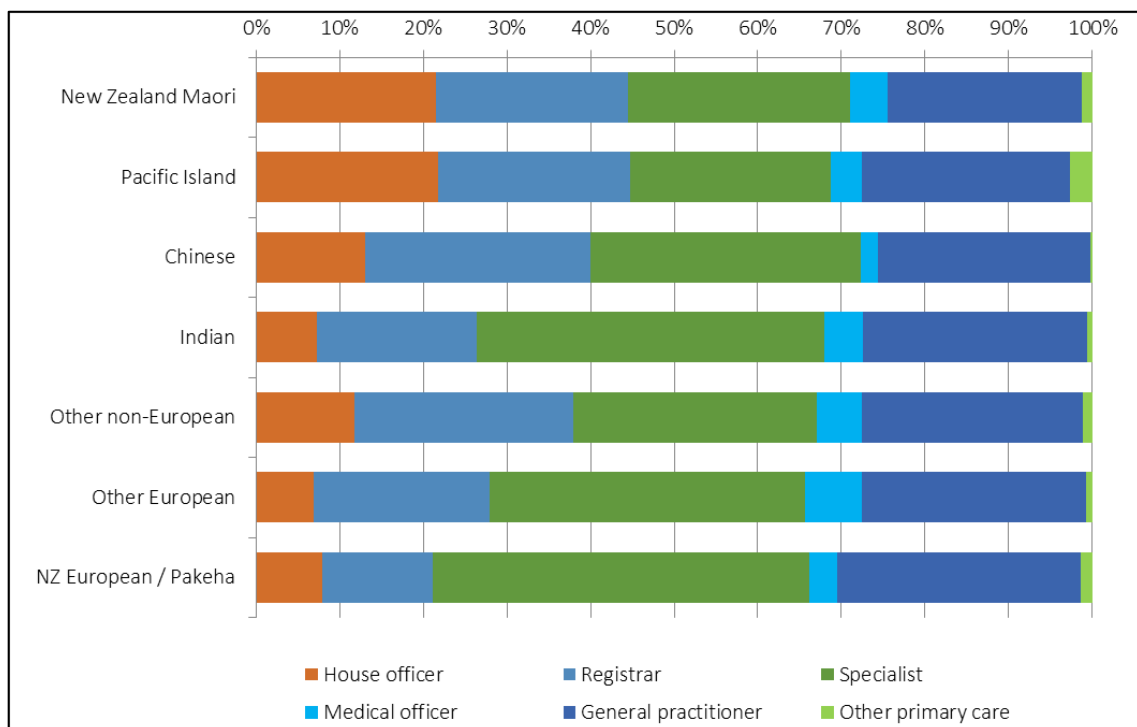
The proportion of Māori and Pasifika doctors reporting their work role as house officers and registrars is higher than that for NZ European/Pākehā (43.9 percent for Māori, 43.3 percent for Pasifika, and 20.5 percent for NZ European/Pākehā). This reflects their greater representation amongst more recently qualified doctors.

Specialists

Conversely, the proportion of doctors reporting as specialists and medical officers (MOSS) is highest amongst NZ European/Pākehā doctors (47.0 percent), compared to only 30.6 percent for Māori and 26.8 percent for Pasifika.

The proportion of doctors reporting as general practitioners was a lot more consistent across ethnicities. NZ European/Pākehā doctors were most likely to be a GP with 28.3 percent reporting this, followed by Indian doctors (26.5 percent). Māori doctors were least likely to work as a GP with only 22.9 percent reporting this work role.

Figure 2: Proportion of ethnic groups by work role at main work site



⁴ IMG: international medical graduate (see page 34 for definition).

Māori working in general practice

Māori doctors made up just 3.3 percent of doctors working as GPs (based on work role). Even allowing that some GPs may still be in training and reporting their work role as registrar, the level of representation of Māori doctors amongst GPs is considerably less than in the workforce.

We reported in previous publications that the Royal New Zealand College of GPs (RNZCGP) is working to improve the representation of Māori doctors amongst vocationally-registered GPs. The goals the RNZCGP are aspiring to achieve by 2021 are to increase the number of:

- Māori GPEP1 registrars to 22 percent of the annual intake,
- Māori GPs in Taranaki, Whanganui, and Hauora Tairāwhiti to add 50 percent more GPs, and
- Māori GP teachers, medical educators, and examiners.⁵

Proportional representation at graduate level may not be enough

A major obstacle to general practice and other specialties increasing the representation of Māori doctors amongst their numbers is that the pool of available Māori doctors graduating from medical schools is limited. The representation of Māori doctors amongst medical graduates is still slightly behind compared with representation of Māori in the New Zealand population.

There are about 190 fully funded general practice training (GPEP1) places. To achieve its goal of 22 percent Māori representation, the RNZCGP would need to increase the number of Māori registrars to about 42.

New Zealand registered 521 new graduates in 2019. Assuming about 15 percent of these were Māori, this is approximately 78 doctors. Therefore, the RNZCGP would need more than 60 percent of new Māori graduates to achieve their goal. This would leave the other specialties competing for the remaining graduates, all of which are likely have similar goals to increase their Māori representation.

New Zealand needs more Māori and Pasifika doctors at graduate level for all specialties to achieve demographic proportionality at specialist level. To achieve this in any meaningful timeframe would require Māori representation amongst medical students that is greater than Māori representation in the New Zealand population.

⁵ New Zealand Doctor, *TIME TO KŌRERO. Te reo! Give it a go*, 12 September 2018, <https://www.nzdoctor.co.nz/article/print-archive/time-korero-te-reo-give-it-go>.

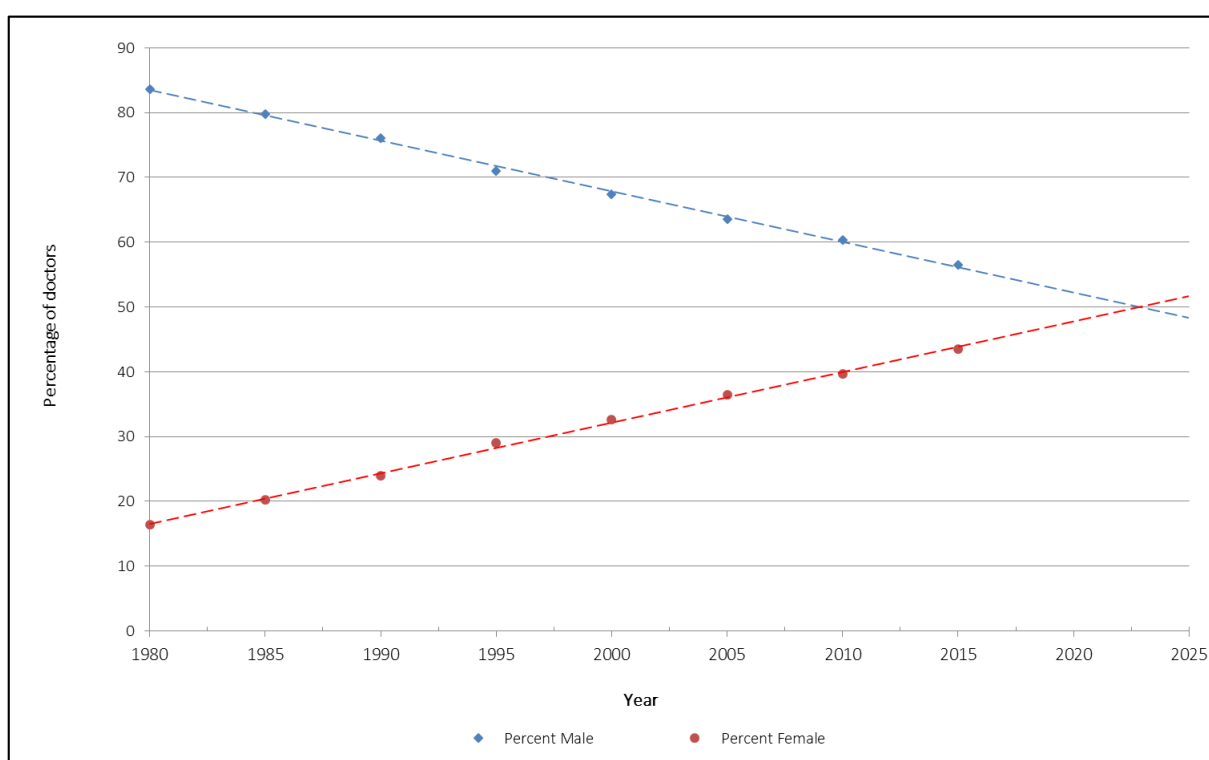
Gender

Gender distribution of the workforce

The proportion of women in the workforce continues to increase. In 2019, 46.3 percent of the active workforce were female. This compares with 45.8 in 2018, 44.8 percent in 2017 and 43.9 percent in 2016.

Figure 3 compares the proportion of females in the active workforce at 5-yearly intervals going back to 1980. This shows that the proportion of females was just 16.4 percent in 1980 but has been increasing steadily since that time. A projection of the current trend suggests that women will outnumber men by 2025.

Figure 3: Proportion of active doctors by gender (1980–2018) showing projected trend forward to 2025.



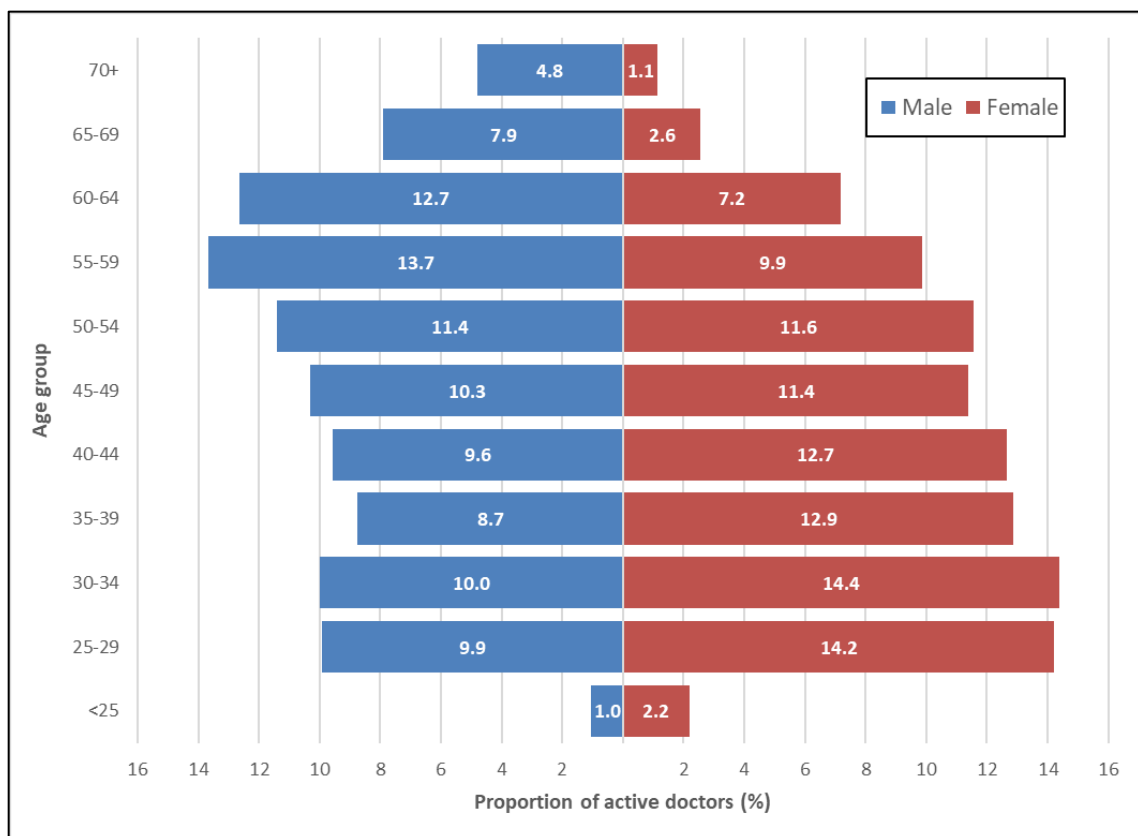
Distribution by age and gender

There are more young female doctors than young male doctors. The largest groups of female doctors are those aged between 25 and 34. The largest groups of male doctors are those aged 55–64.

This reflects that women outnumber men amongst medical school graduates. See Figure 6 on page 14.

Figure 4 shows the distribution of doctors by age and gender using a population pyramid.

Figure 4: Distribution of active doctors by age and gender



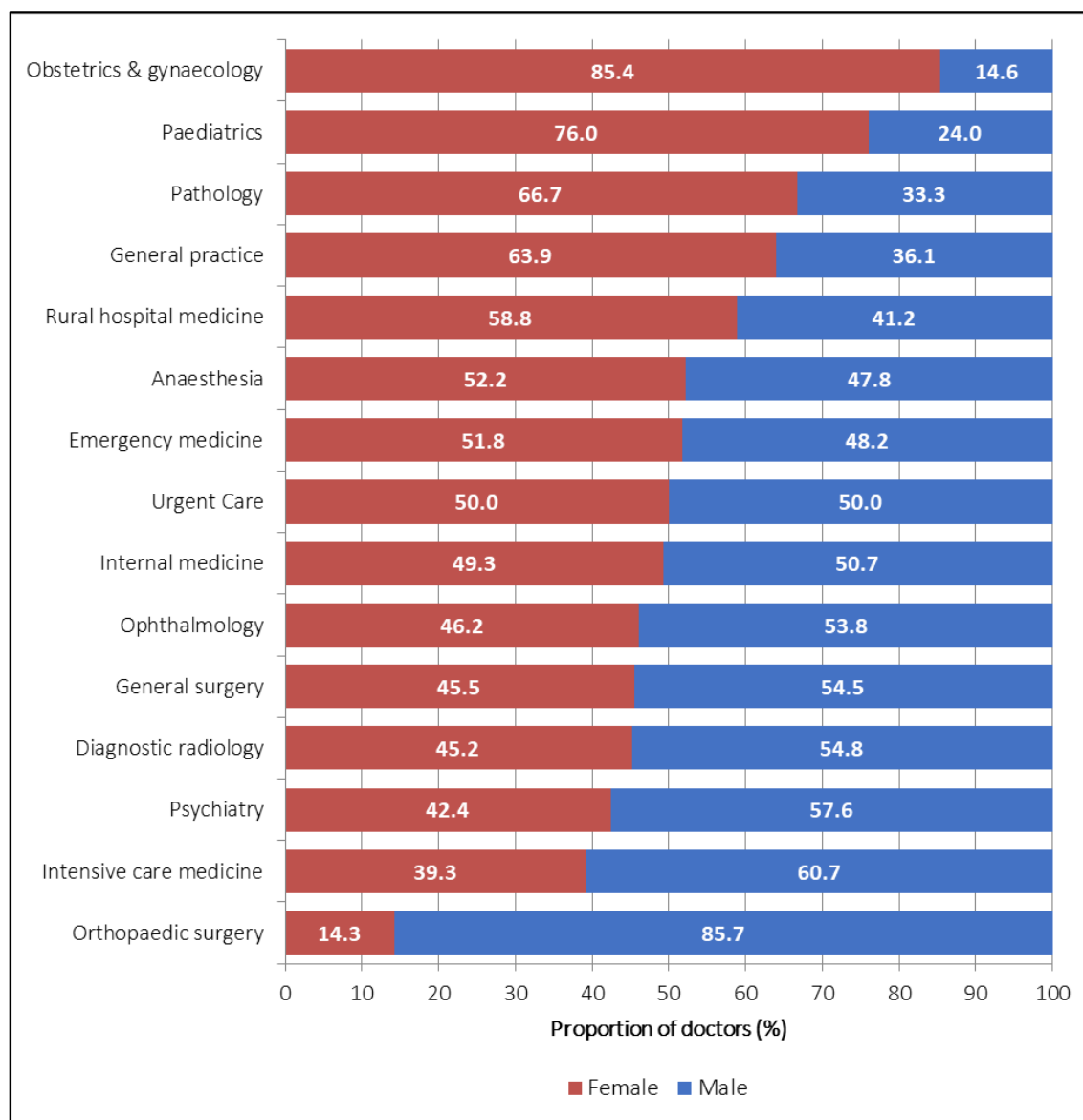
Vocational trainees

Female doctors outnumber male doctors in vocational training – 56.2 percent of trainees are female. Female doctors are most highly represented in obstetrics & gynaecology (85.4 percent), paediatrics (76 percent), and pathology (66.7 percent). They are also highly represented in general practice and rural hospital medicine (63.9 percent and 58.8 percent).

Male doctors are most highly represented in orthopaedic surgery (85.7 percent), intensive care medicine (60.7 percent), and psychiatry (57.6 percent).

Figure 5 shows the proportion of trainees in each vocational training area by gender, focusing on those areas with more than 20 trainees.

Figure 5: Vocational training area by gender (areas with more than 20 trainees)



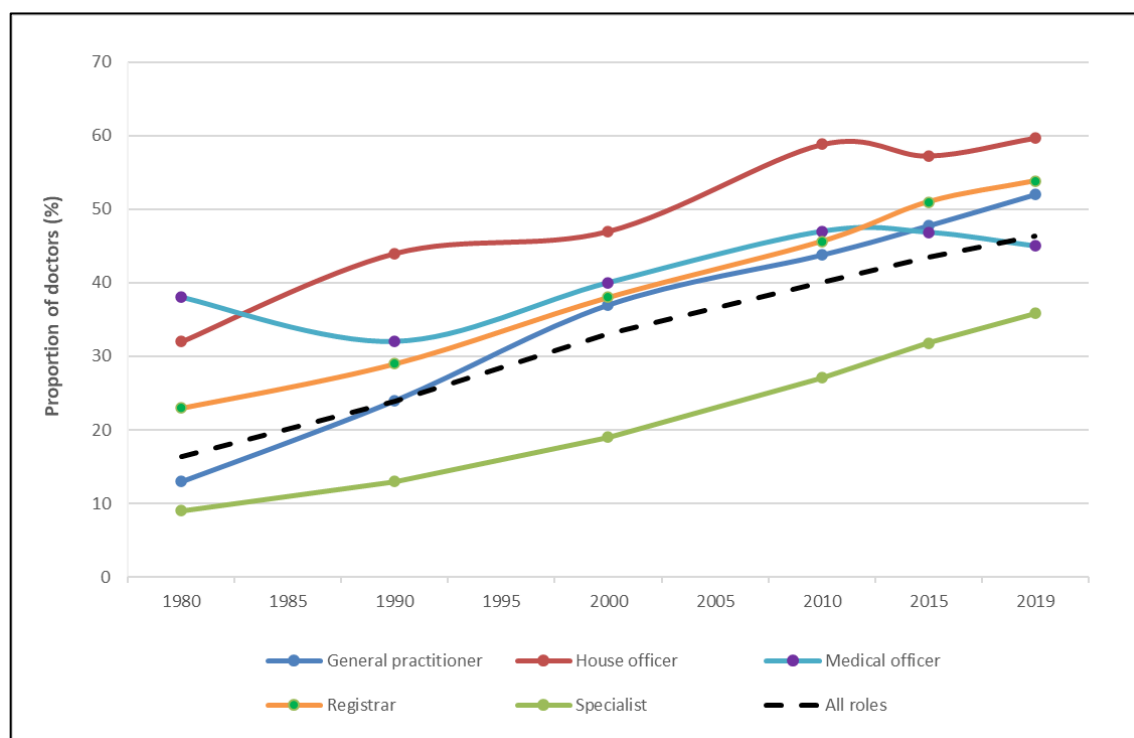
Work role

Women outnumber men amongst house officers (59.7 percent), registrars (53.8 percent) and GPs (52.0 percent).

Women are least represented amongst specialists, making up 35.2 percent, up from 27.1 percent in 2010, and 31.8 percent in 2015. This gap should continue to decrease as the doctors who are currently house officers and registrars complete their vocational training.

Figure 6 shows the change in the proportion of females in the workforce by work role at their main work site between 1980 and 2019.

Figure 6: Proportion of females by work role at main work site (1980-2019)



Work types

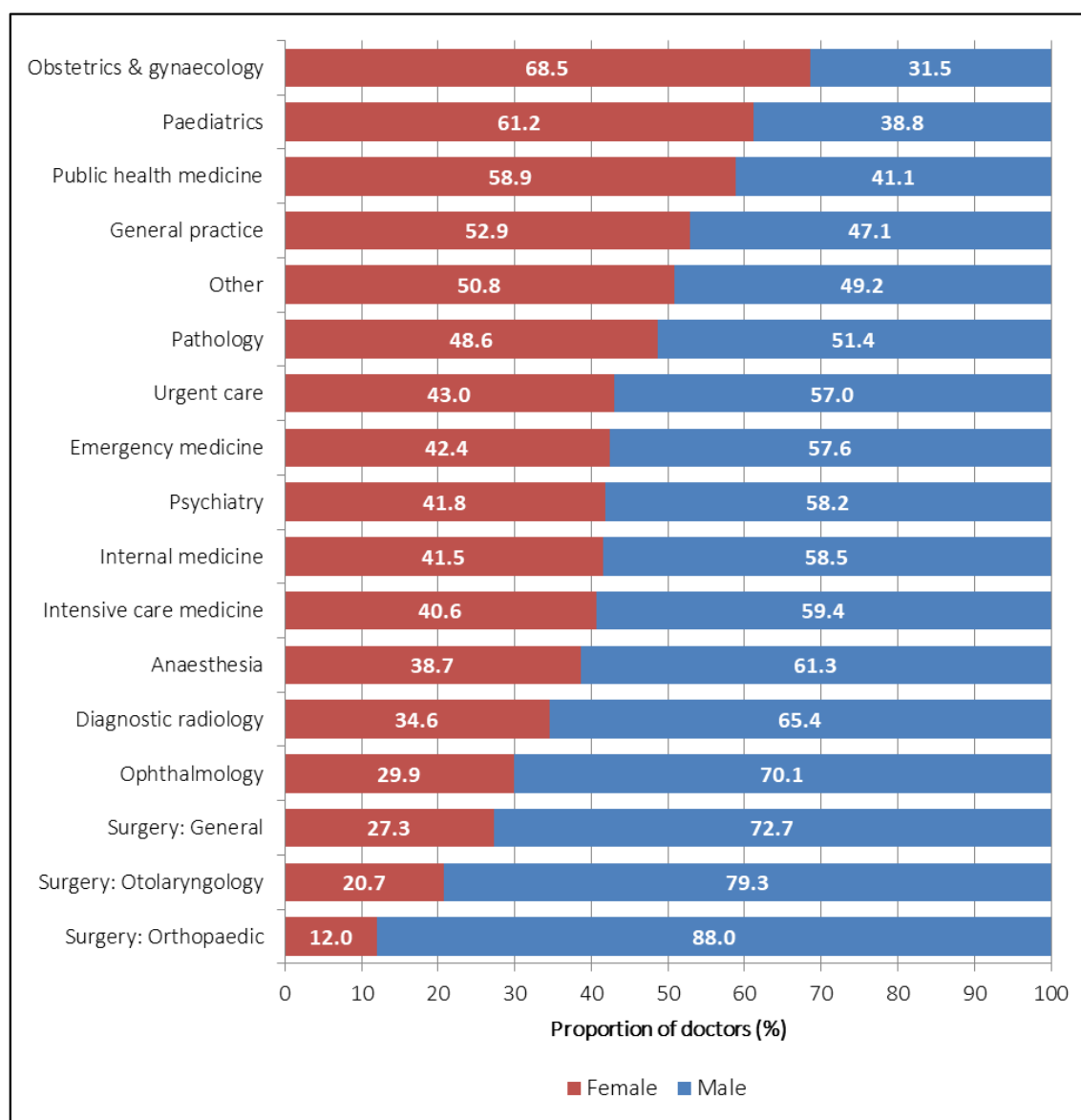
Women are most highly represented in the areas of obstetrics and gynaecology (68.5 percent), paediatrics (61.2 percent), public health medicine (58.9 percent) and general practice (52.9 percent).

Women are least represented in orthopaedic surgery (12.0 percent), otolaryngology head and neck surgery (20.7 percent), general surgery (27.3 percent) and ophthalmology (29.9 percent).

Looking at all the surgical work types together, women make up 20.3 percent of doctors. Female doctors have long been under-represented amongst surgical work types, but this is slowly improving. In 2005, women made up 9.2 percent of doctors working in surgery. This increased slightly to 11.8 percent in 2010 and 18.0 percent in 2015.

Figure 7 shows the distribution by gender for work types with a total of 100 or more doctors.

Figure 7: Proportion of doctors by work type and gender



Changes in the medical workforce

Size of the workforce

The number of practising doctors increased by 3.8 percent in 2019 — from 16,292 to 16,908. This compares to an increase of 3.7 percent in the previous year (see Table 4).

Table 4: Estimated yearly workforce growth and changes in composition

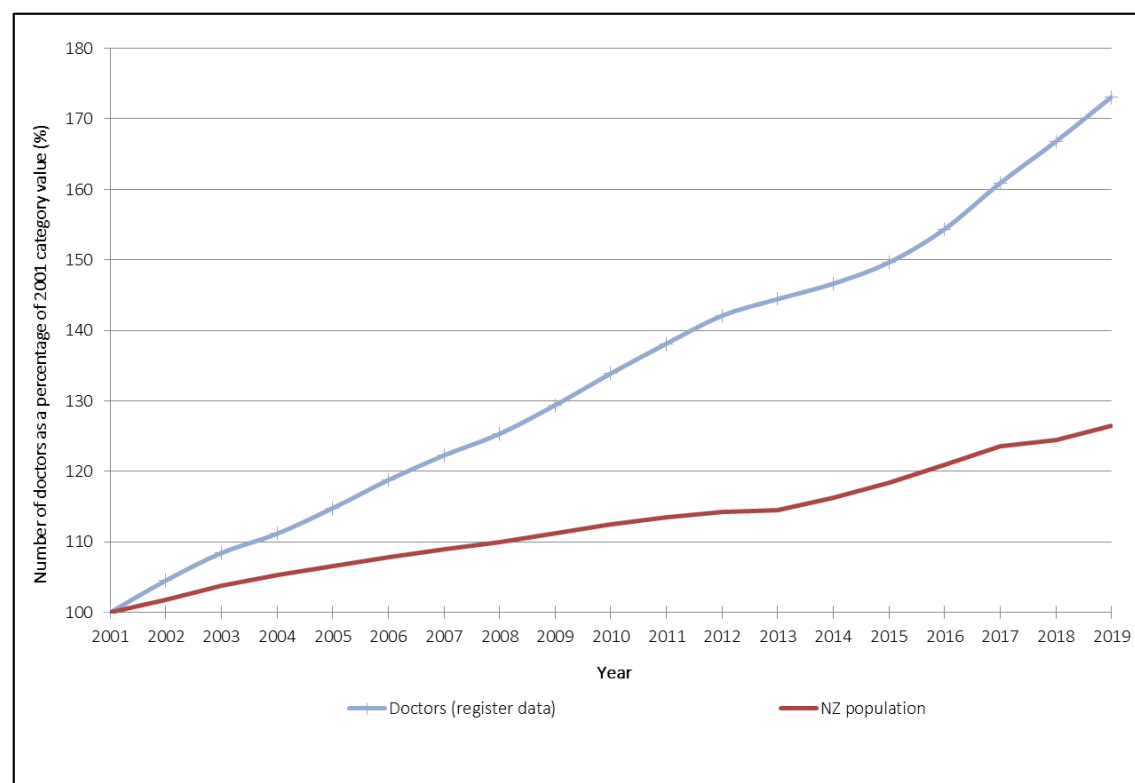
	1985	1990	1995	2000	2005	2010	2018	2019
Total workforce (based on registration data)¹	6,337	6,806	7,998	9,779	11,215	13,266	16,292	16,908
Percentage change in total workforce from previous year measured by registration data (%) ²	-	-	-	-	3.3	3.5	3.7	3.8

¹ The total workforce according to registration data represents the number of doctors on the medical register with a current practising certificate as at 30 June of that year taken from Council's Annual Report.

² Percentage change cannot be shown for years prior to 2005 because the available data are incomplete.

Figure 8 shows the size of the medical workforce as measured by registration data and of the New Zealand population compared to 2001 levels.

Figure 8: Change in size of the active medical workforce compared to change in size of the New Zealand population (2001–2019)

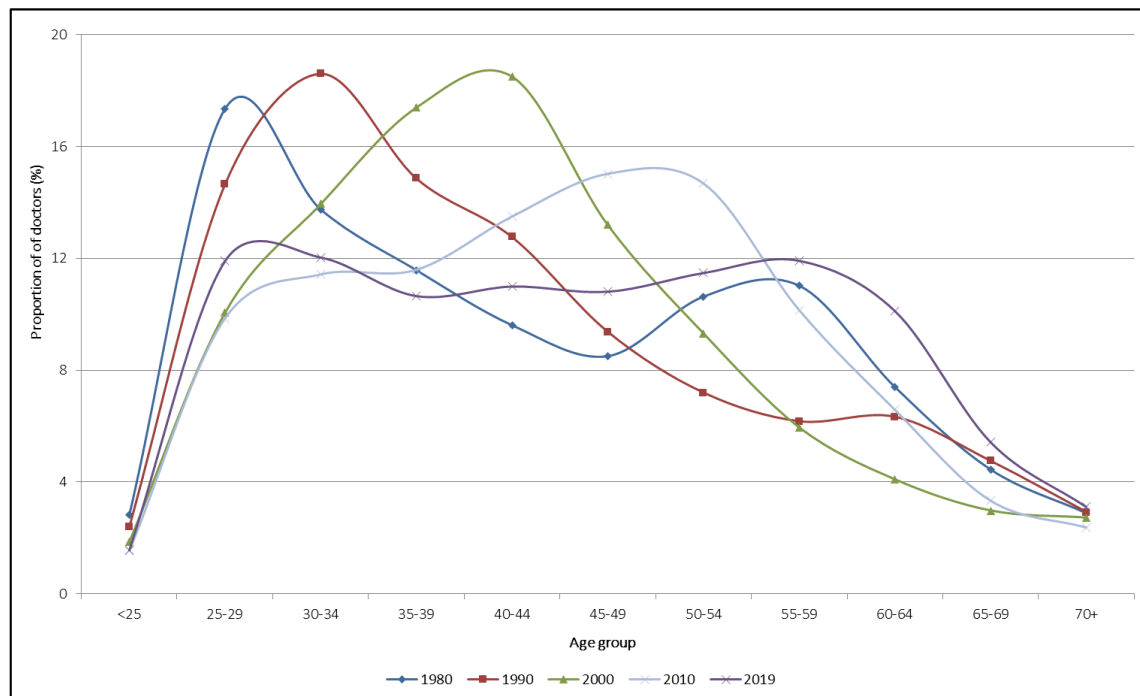


Age distribution of the workforce

The average age of the workforce, at 46 years, is higher than it used to be. However, the overall distribution of doctors is now more evenly spread. Figure 4 compares the age distribution of the active workforce⁶ based on survey data from 1980 to 2019. We have focused on selected series (1980, 1990, 2000, 2010 and 2019) to make it easier to see the changes over time.

In 2019, the largest group of doctors were those aged 30–34 (12.0 percent), followed closely by those aged 25–29 and 55–59 (both making up 11.9 percent). This reflects the increased numbers of graduates being produced by New Zealand’s medical schools in recent years (see Table 23 on page 57).

Figure 9: Age distribution of the active workforce (1980–2019)



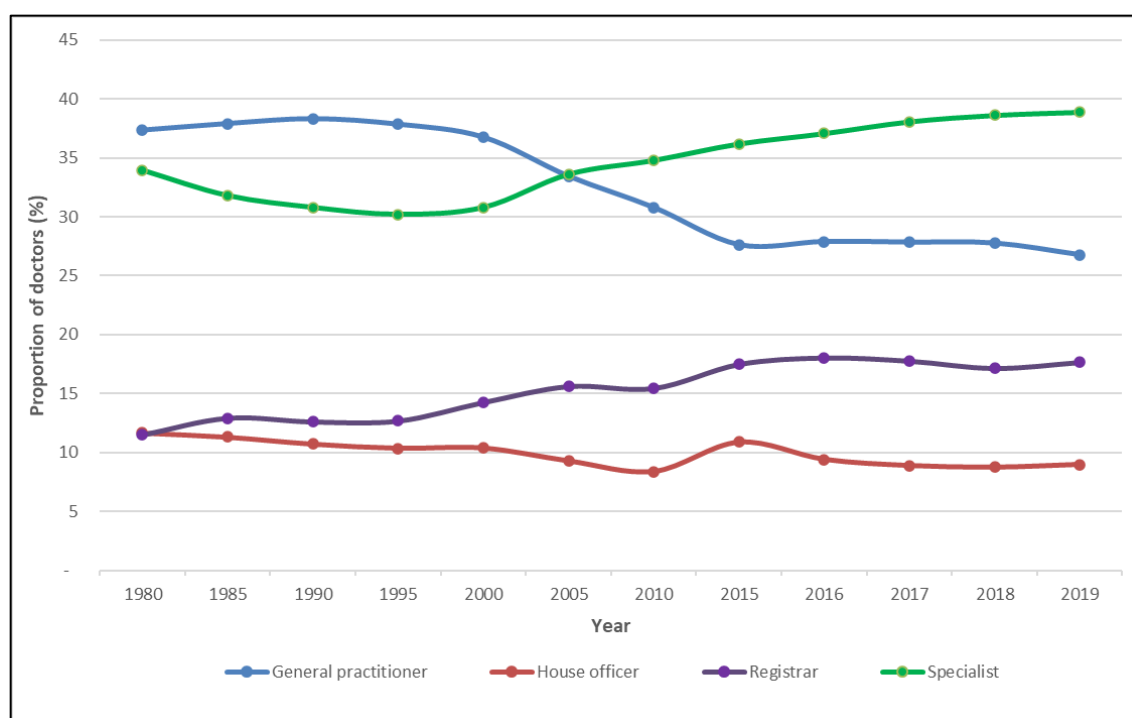
⁶ Active doctors are those who responded to the workforce survey and reported working 4 or more hours per week.

Changes by work role

Specialists make up an increasing proportion of the workforce. Specialists make up 39 percent of the workforce in 2019 compared with 31 percent in 2000. Conversely, the proportion of GPs has decreased – down to 27 percent in 2019 from 37 percent in 2000.

Figure 10 shows how the proportion of doctors by work role at their main work site has changed over time. It focusses on the four main work roles of specialist, GP, Registrar and House Officer. Please note that the time scale is in five-year intervals from 1980 through to 2015 and then one-year intervals from 2015 to 2019.

Figure 10: Proportion of active doctors by work role (1980–2019)



Clarification of terminology used

The categories may not reflect current terminology in some cases but have been retained to allow for comparison of data over time. The main example of this is house officers who are now more commonly known as interns or PGY1s (postgraduate year 1s).

General practitioner and specialist

General practice is a specialist scope of practice for the purposes of registration. Doctors registered in a vocational scope of general practice are specialists. However, for the purposes of the survey, specialist and general practitioner (GP) are separate categories to help us to analyse and interpret the data. Because data are self-reported, not all doctors who report themselves as specialists or GPs will hold a vocational scope of practice.

Work type

The vocational scopes of diagnostic radiology, urgent care, and emergency medicine increased the most between 30 June 2019 and 30 June 2020. Diagnostic radiology increased by 11.5 percent, with urgent care and emergency medicine increasing by 9.7 percent and 9.4 percent.

General practice, the largest vocational scope with 3,748 doctors in 2020, increased by 2.1 percent. Internal medicine, the second largest with 1,222 doctors, increased by 5.0 percent.

Several scopes decreased in 2020. Cardiothoracic surgery, clinical genetics, medical administration, plastic and reconstructive surgery, and vascular surgery all had fewer doctors in 2020 compared with the previous year.

Palliative medicine, neurosurgery, paediatric surgery, rehabilitation medicine, and sexual health medicine did not change between 2019 and 2020.

Table 5 show the changes in the number of doctors registered in vocational scopes of practice. Only scopes with more than 100 doctors in 2020 are shown. The full list including all vocational scopes can be found in Table 20 on page 53.

Table 5: Number of doctors by vocational scope for selected years (2005–2020)

Vocational scope	Year ¹					Percent change 2019–2020
	2005	2010	2015	2019	2020	
General Practice	2,446	2,701	3,303	3,670	3,748	+2.1
Internal Medicine	656	761	958	1,164	1,222	+5.0
Anaesthesia	488	577	737	835	879	+5.3
Psychiatry	425	489	559	635	671	+5.7
Diagnostic radiology	266	303	448	511	570	+11.5
Paediatrics	219	289	353	411	422	+2.7
Emergency Medicine	88	135	224	320	350	+9.4
Obstetrics & Gynaecology	223	234	280	321	337	+5.0
Pathology	225	238	278	319	324	+1.6
Orthopaedic Surgery	211	237	273	303	311	+2.6
General Surgery	227	235	262	294	298	+1.4
Urgent Care	103	119	136	227	249	+9.7
Public Health Medicine	130	157	177	172	180	+4.7
Ophthalmology	107	124	134	157	166	+5.7
Rural Hospital Medicine	-	26	105	120	128	+6.7
Surgery: Otolaryngology	85	97	108	118	119	+0.8
Intensive care medicine	44	58	81	107	111	+3.7
Total	6,389	7,310	9,069	10,117	10,863	+7.4

¹ Figures represent the number of doctors with vocational scope registration and current practising certificates as at 30 June of the year.

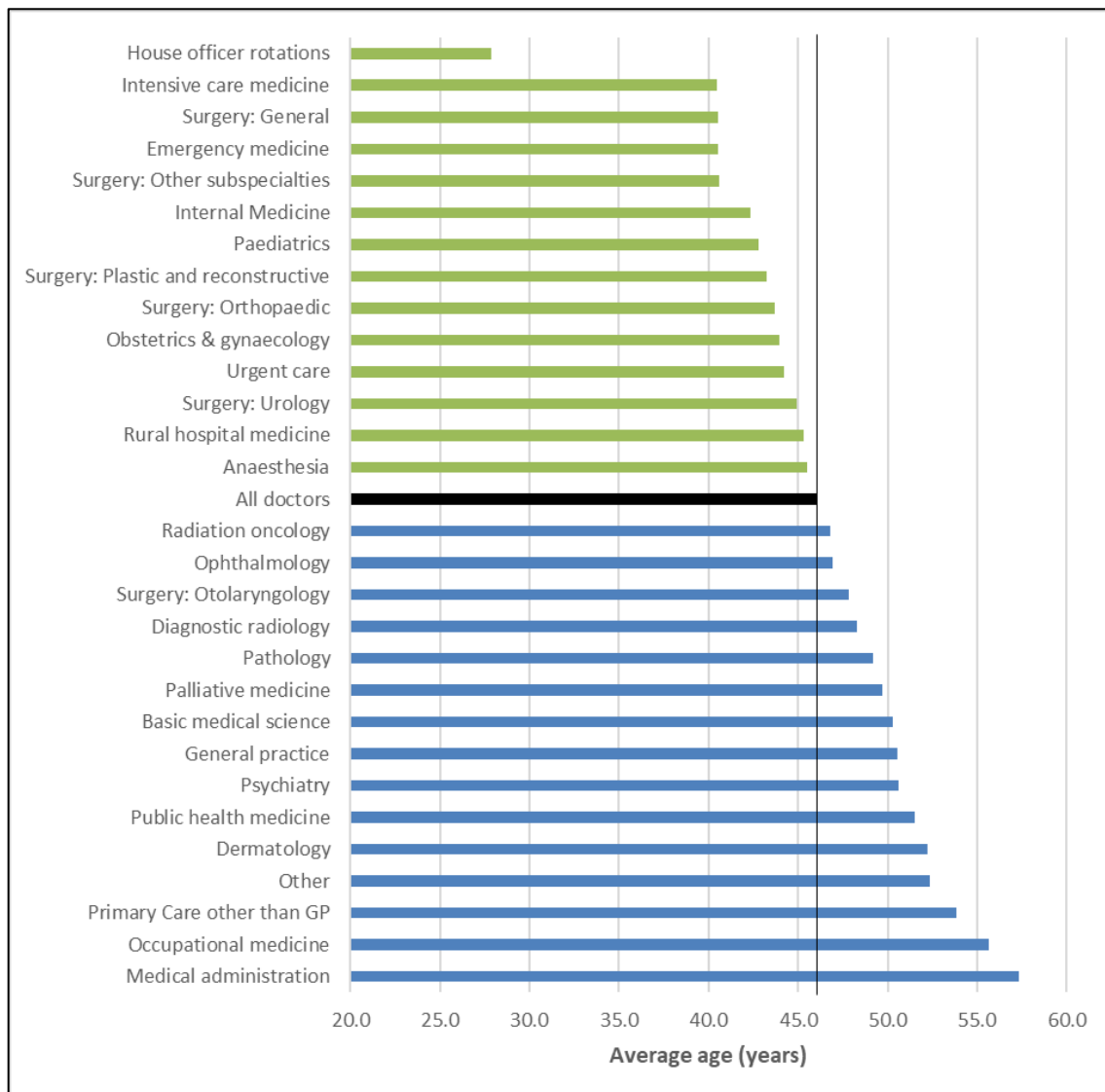
Work type and age

The average age is highest in medical administration (57 years), followed by occupational medicine (56 years) and primary care (54 years).

Putting aside house office rotations, the average age is lowest in emergency medicine, intensive care medicine and general surgery (all 41 years). Doctors working in house officer rotations are almost exclusively new graduates. As a result, they have the youngest average age (28 years).

Figure 11 compares the average age of different work types, focusing on those work types with more than 50 respondents.

Figure 11: Average age by work type at main work site (areas with more than 50 doctors)



Age and vocational scopes

The average ages in Figure 11 include doctors at all levels and so does not give an accurate indication of the age of the specialist workforce in an area of medicine. We have therefore analysed the average age of doctors on the register by vocational scope of practice to provide more accurate figures.

Looking at vocational scopes with 100 or more doctors, otolaryngology head & neck surgery and psychiatry have the highest average age – 54 years. General practice was next highest with an average age of 53 years.

The youngest vocational scope is emergency medicine with an average age of 46 years. The next youngest are anaesthesia and diagnostic and interventional medicine, both with an average age of 49 years.

The average age of all doctors with a vocational scope is 52 years in 2020, up from 48 years in 2005.

Table 6 shows that the average age of doctors on the register practising in a vocational scope of practice between 2005 and 2020, focusing on scopes with 100 or more doctors. Table 21 on page 54 shows the same analysis but for all scopes.

Table 6: Average age of doctors on the register with a vocational scope (2005–2019)

Vocational scope	Year				
	2005	2010	2015	2019	2020
Anaesthesia	46	48	49	49	49
Diagnostic and interventional radiology	48	49	49	49	49
Emergency medicine	41	43	45	46	46
General practice	49	51	53	53	53
General surgery	49	51	51	52	52
Intensive care medicine	46	48	49	50	49
Internal medicine	50	51	50	51	51
Obstetrics and gynaecology	49	51	52	52	52
Ophthalmology	49	50	51	51	51
Orthopaedic surgery	49	50	52	52	52
Otolaryngology head and neck surgery	49	51	53	54	54
Paediatrics	47	48	49	50	50
Pathology	49	50	51	51	51
Psychiatry	48	50	52	54	54
Public health medicine	47	49	51	52	52
Rural hospital medicine		47	49	51	51
Urgent care	45	48	51	52	52
All doctors with vocational scope	48	50	51	52	52

Workloads

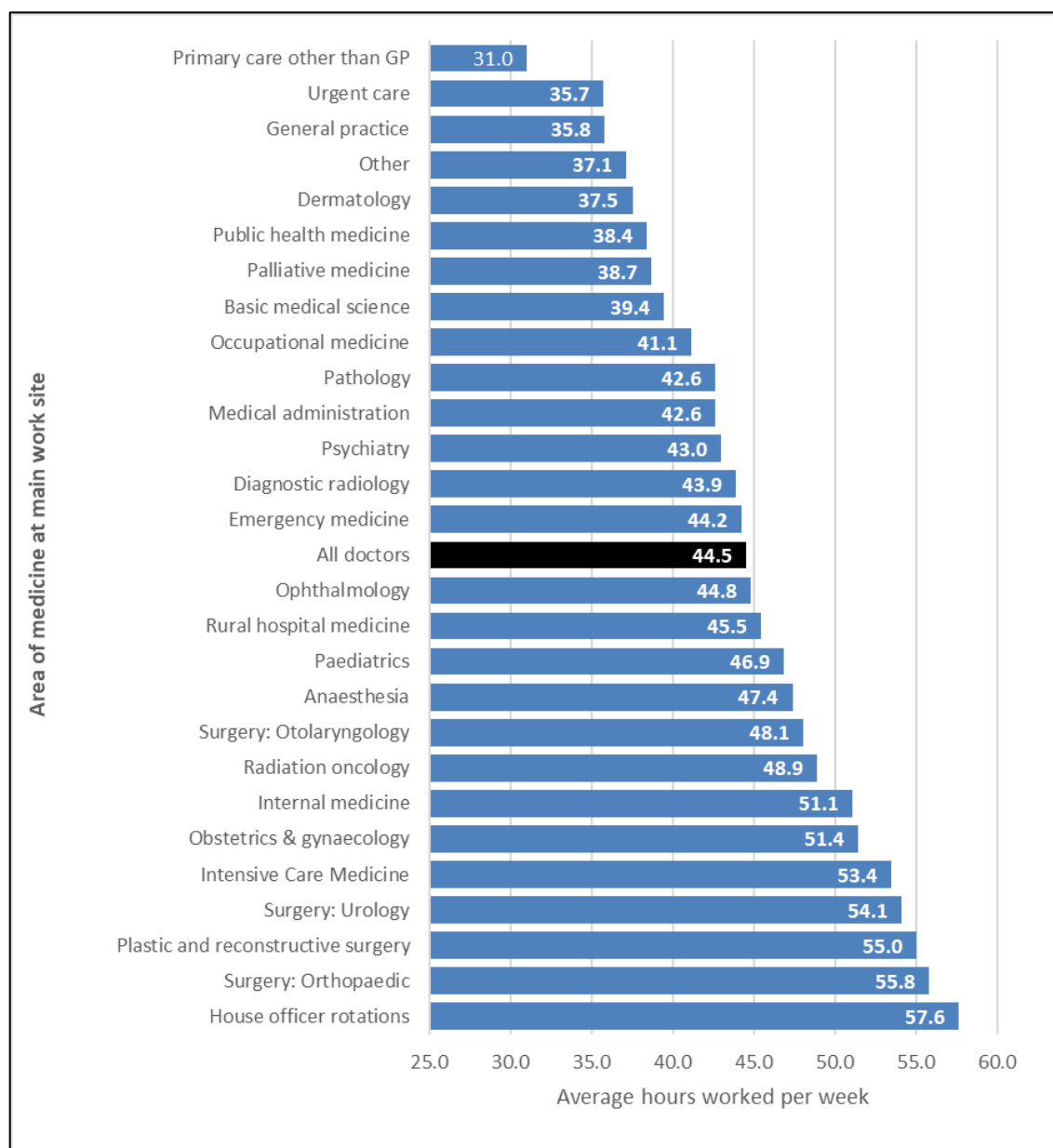
Hours worked by work type

Doctors in house officer rotations work the most hours (57.6 hours per week) followed by orthopaedic surgery (55.1 hours), and plastic and reconstructive surgery (55.0 hours).

Doctors in primary care (31.0 hours), urgent care (35.7 hours), and general practice (35.8 hours) worked the least hours. This reflects the number of doctors working part-time in these specialties. 54.9 percent of doctors in general practice reported working less than 40 hours per week, compared with 7.2 percent for orthopaedic surgery.

Figure 12 shows the average hours worked by work type, looking only at those work types with 50 or more respondents.

Figure 12: Average hours worked by work type (areas with more than 50 respondents)



Hours worked by work role

The average number of hours doctors reported working is decreasing – from 47.1 hours in 2000 to 44.5 hours in 2019. House officers and registrars report working the most hours, with GPs and specialists reporting the least hours.

Hours reported by house officers and registrars decreased between 2000 and 2010 but has increased in recent years. House officers are the only group reporting more hours worked than in 2000.

We have no information on why hours reported by house officers are increasing. This figure is surprising, given the changes in the general terms of employment for new doctors⁷. One possibility is that some house officers are trying to report multiple rotations rather than their typical or most recent working week. However, even looking at just the main work site, house officers reported working 53.3 hours per week – more than the workforce average.

Average hours worked by specialists and GPs continues to decrease, with GPs down to 35.6 hours (from 42.2 in 2000) and specialists down to 43.8 hours (from 48.2 in 2000). This is another example of the increased tendency of GPs and specialists to work part-time compared with house officers and registrars. 55.8 percent of GPs and 22.9 percent of specialists work less than 40 hours per week compared to only 0.5 percent of house officers and 10.4 percent of registrars.

Table 7 shows the changes over time in the average number of hours worked each week, by work role, at the doctor's main work site.

Table 7: Average hours worked by work role (2000–2019)

Work role	Year				
	2000	2005	2010	2015	2019
General practitioner	42.2	39.8	37.8	37.1	35.6
House officer	55.7	54.6	52.1	53.7	61.9
Registrar	55.0	53.1	51.6	51.4	53.3
Specialist	48.2	46.6	45.2	45.0	43.8
All doctors	47.1	45.5	43.9	44.4	44.7

⁷ As defined in the Multi Employer Collective Agreement (MECA) between the Resident Doctors Association (RDA) and the 20 District Health Boards (<https://nZRda.org.nz/rmos/meca-fags/>)

Hours worked by age and gender

Doctors aged in their 20s work the most hours per week, with women reporting slightly more hours than men (58.9 hours for women versus 57.1 hours for men). After the age of 30, men work more hours per week than women. This difference peaks in the 50-54 year age group where men work 46.2 hours compared with 36.5 for women.

Overall, women reported working 42.3 hours per week compared with 46.5 hours for men.

Table 8: Average of total hours worked, by age and gender

Gender	Age group											All ages, average hours
	≤24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+	
Female	58.9	59.8	47.1	39.4	36.8	37.2	36.5	37.0	36.7	34.8	30.2	42.3
Male	57.1	57.6	52.8	47.7	45.7	46.2	46.2	45.2	44.2	38.4	31.3	46.5
All doctors	58.3	58.8	49.6	43.1	40.9	41.8	41.7	42.1	41.8	37.6	31.1	44.5

The average number of hours worked by both women and men is decreasing. The decrease is more pronounced for men than women. Women worked 40.9 hours per week in 2018 compared with 41.2 hours in 2015. Men worked 46.2 hours per week in 2018 compared with 46.8 hours in 2015 and 48.3 hours in 2005.

Table 9: Average hours worked, by gender and year (2005–2019)

Gender	Year					
	2005	2010	2015	2017	2018	2019
Female	40.6	39.8	41.2	41.1	40.9	42.3
Male	48.3	46.6	46.8	46.7	46.2	46.5
All doctors	45.5	43.9	44.4	44.2	43.8	44.5

Gender and part-time work

Women are much more likely to work part-time than men. Almost 41 percent of women reported working fewer than 40 hours compared with 19 percent of men.

The most common reasons given by women for working part-time were personal preference (1,162 respondents), part-time work (527 respondents) and family commitments (488 respondents).

The most common reasons given by men for working part-time were personal preference (790 respondents), part-time work (156 respondents), and that they were retired or semi-retired. Only 47 male doctors reported family commitments as a reason for part-time work.

Paperwork and other non-clinical work

Paperwork and other non-clinical work on top of clinical work was another common reason given for working less than 40 hours per week. Some examples of these comments are:

- “for 25 hours booked work i can spend 10-15 hours doing paperwork”.
- “I do 40 hours + on paperwork, follow up etc as well as after-hours work. Am only paid for 36”.
- “Personal preference to work 3 days (0.6 FTE) a week. If you add in out of hours paperwork, total would be more like 30 hours per week”.

Hours on call by work role

Most doctors did not report working “on-call” – over 68 percent of doctors reported no on-call hours. Specialists reported the most on-call hours. Just under 55 percent of specialists were on-call, with 35 percent reporting 10 or more hours. House officers reported the least on-call hours – 97 percent indicating no on-call hours. Similarly, less than 15 percent of registrars reported on-call hours.

For house officers and registrars, the lower number of on-call hours reflects the higher number of hours they work on average. Where doctors are on-call and are required to work, we ask them to record these hours in their hours worked rather than their on-call hours.

Table 10 shows on-call hours by workforce role, grouped by on-call hours. Hours on call measures the additional hours when doctors were on call but were not required to work. If no on-call hours are reported, the doctor was either not on call or chose not to provide details of their on-call hours.

Table 10: Doctors’ on-call hours, grouped in each work role (%)

On-call hours, grouped	General practitioner	House officer	Registrar	Medical officer	Specialist
No on-call hours	76.6	96.9	85.4	75.7	46.4
1–4	7.3	0.5	1.5	1.7	6.8
5–9	4.7	0.9	4.1	5.8	11.7
10–19	4.1	1.0	5.3	7.8	19.0
20–49	4.5	0.6	3.1	6.3	13.4
50 and over	2.8	0.1	0.5	2.8	2.7
Total¹	100.0	100.0	100.0	100.0	100.0

¹ Individual categories may not add up to total due to rounding.

Hours on call by employer

Almost 85 percent of specialists who reported being on-call for 10 or more hours per week work in public hospitals.

Amongst other work roles, most doctors on-call for 10 or more hours per week worked in group private practices (42.2 percent), with public hospitals the next largest group (35.0 percent). 69.3 percent of all doctors on-call for 10 or more hours per week worked in public hospitals.

Table 11 shows the main place of work for doctors on call for 10 or more hours each week and compares specialists with all other work roles.

Table 11: Proportion of doctors on call for 10 or more hours each week, by employer (%)

Main employer	Specialist	Other work roles	Total
Commercial company	1.3	2.7	1.7
Government department/agency	2.5	3.7	2.9
Group private practice	4.0	42.2	15.7
Private hospital	2.6	1.0	2.1
Professional body	0.2	0.4	0.2
Public hospital	84.5	35.0	69.3
Solo private practice	2.1	5.9	3.3
University/polytechnic	0.7	2.1	1.1
Other	2.1	7.0	3.6
Total¹	100.0	100.0	100.0

¹ Individual categories may not add up to total due to rounding.

Hours on call – changes over time

Hours on-call reported by doctors is decreasing. All work roles show fewer on-call hours in 2019 compared to 2000. Specialists reported the most on-call hours (9.4 hours) with house officers and registrars reporting the least (0.4 and 2.6 hours respectively). GPs reported an average of 4.9 on-call hours.

Table 12 shows the changes in the average on-call hours by work role between 2000 and 2019.

Table 12: Average on-call hours by work role (2000–2019)

Work role	Year				
	2000	2005	2010	2015	2019
GP	9.6	5.6	5.3	4.8	4.9
House officer	2.6	1.3	0.8	0.5	0.4
Medical officer	8.9	5.6	4.6	6.7	5.3
Registrar	5.1	3.2	2.8	2.4	2.6
Specialist	16.7	13.1	11.0	10.2	9.4
All doctors	10.2	7.3	6.3	5.9	5.8

Geographic distribution

Important information about geographic data

We recommend caution in interpreting and relying on figures in this section. Although we take care in producing these figures, several limitations restrict how accurately we can report. These limitations include incomplete or imprecise workplace information for doctors, as well as challenges around representing the location of doctors who routinely work across multiple regions.

Doctors often work in more than one location. However, we need to allocate each doctor to a single TLA and DHB for reporting purposes. This means some locations where a doctor works will not be reflected in the results.

Because of this, the results tend to favour larger DHBs where neighbouring geographic regions are closely related — for example, in the wider Auckland and Wellington regions. Doctors might work across the entire region throughout the year but will only be represented in these figures against one DHB. This tends to be the largest DHB in the region — Auckland DHB in the Auckland region and Capital & Coast in the Wellington region.

Effect of reduced response rate

We are unable to present geographic data as headcounts as we have done in previous reports because of the reduced response rates since 2017. Instead, figures are presented as proportions of the total.

We apologise that we are unable to provide the data as presented previously and appreciate this will make the data less useful for some stakeholders. We are looking at ways to source and present headcount data in future reports, potentially based on non-register data collected from doctors.

District health boards

The largest DHB as measured by number of practising doctors is Auckland, followed by Canterbury and Capital & Coast.

The figure for Auckland will be exaggerated as we have to allocate each doctor to a single DHB. It is likely the doctors in Auckland, Waitematā and Counties Manukau are more evenly spread than these figures would suggest. Viewed together, the DHBs in the Auckland region contain 34.6 percent of doctors. This is consistent with their proportion of the population (34.2 percent).

Over three-quarters of doctors are based in the North Island (75.8 percent). Canterbury DHB is by far the largest DHB in the South Island with 12.7 percent of all doctors. This is slightly more than its proportion of the New Zealand population (11.4 percent).

Table 13 shows the proportion of doctors at each DHB, along with the proportion of FTEs, proportion of GPs, and average hours worked.

Table 13: Distribution of doctors and GPs by DHB region

DHB	Population	Proportion of population (%)	Proportion of doctors (%)	Proportion of total FTEs (%)	Proportion of GPs (%)	Average hours worked
Northland	189,600	3.8	3.3	3.3	3.7	44.6
Waitematā	624,700	12.5	8.5	8.4	10.6	44.0
Auckland	498,100	10.0	19.1	19.8	13.2	46.0
Counties Manukau	579,200	11.6	6.9	7.0	8.2	45.2
Waikato	428,900	8.6	8.4	8.7	7.9	45.9
Bay of Plenty	256,100	5.1	4.7	4.4	5.6	41.8
Lakes	115,100	2.3	2.1	2.0	2.4	43.8
Hauora Tairāwhiti	50,100	1.0	0.9	0.9	1.0	43.6
Hawke's Bay	175,000	3.5	3.1	3.1	3.9	44.7
Taranaki	122,900	2.5	2.2	2.2	2.2	44.8
MidCentral	184,200	3.7	3.2	3.4	2.3	46.9
Whanganui	67,400	1.4	0.9	1.0	1.3	48.0
Wairarapa	47,700	1.0	0.5	0.5	0.8	42.1
Hutt Valley	155,900	3.1	2.3	2.2	2.6	42.8
Capital & Coast	319,400	6.4	9.8	9.6	8.9	43.7
Nelson Marlborough	158,100	3.2	2.8	2.5	3.7	40.3
West Coast	32,300	0.6	0.4	0.3	0.3	42.5
Canterbury	569,700	11.4	12.7	12.6	12.3	44.0
South Canterbury	61,400	1.2	0.8	0.9	1.0	45.0
Southern	343,000	6.9	7.5	7.3	8.1	43.6
All DHBs	4,978,800	100.0	100.0	100.0	100.0	44.5

Distribution of GPs

The two largest DHBs in terms of numbers of GPs are Auckland and Canterbury (13.2 and 12.3 percent respectively).

Auckland is relatively over-represented compared to the proportion of the population (3.2 percentage points). However, the wider Auckland region including Waitematā and Counties Manukau is relatively underrepresented, with 34.2 percent of the population but only 32.1 percent of GPs. Waitematā is underrepresented by 1.9 percentage points and Counties Manukau by 3.4 percentage points.

Capital and Coast (2.5 percentage points) and Southern (1.2 percentage points) also have a proportion of GPs greater than their proportion of the population.

Most other areas have GP numbers that are consistent with their proportion of the population (+/- 1 percentage point).

Hours worked

Doctors reported working the most hours in Whanganui (48.0 hours) followed by MidCentral (46.9 hours) and Auckland (46.0 hours).

Doctors reported working the least hours in Nelson-Marlborough (40.3 hours), Bay of Plenty (41.8 hours), and Wairarapa (42.1 hours).

Hours worked by GPs

GPs outside of the major centres tended to report working more hours. GPs in South Canterbury reported working an average of 43.4 hours per week, followed by West Coast (41.3 hours) and Wairarapa (41.1 hours).

GPs in the Bay of Plenty reported working the fewest hours (32.4 hours). Nelson-Marlborough was next lowest with 33.4 hours followed by Capital and Coast (33.4 hours).

Gender

Women are more highly represented in larger centres. Capital and Coast has the highest proportion of female doctors and is the only DHB with more female doctors than male doctors (51.2 percent). The other large DHBs are not far behind. Most of the larger DHBs have between 47 and 48 percent female doctors, led by Counties-Manukau and Bay of Plenty (both with 48.1 percent).

Whanganui has the lowest proportion of female doctors – 32.5 percent compared to 46.3 for the overall workforce. West Coast (33.3 percent) was next followed by Wairarapa (36.9 percent).

International medical graduates

IMGs are more highly represented outside of the larger centres. West Coast has the highest percentage of IMGs – almost 69 percent (68.9 percent), followed by Whanganui (62.4 percent), Wairarapa (52.3 percent), and Taranaki (52.1 percent).

The DHBs with the lowest percentages of IMGs are Capital & Coast (32.9 percent), Auckland (33.4 percent), and Canterbury (34.9 percent). This may reflect that main urban areas are easier to staff and so rely less on recruiting doctors from overseas.

In addition, New Zealand graduates in their first two years of practice must work in training centres and cannot work in rural areas. This will also contribute to the lower proportions of IMGs in the main urban areas.

Age

Doctors tend to be older on average outside of the main centres. However, this trend is not as significant as it is with gender and country of qualification.

Doctors are oldest in Wairarapa (55 years), West Coast and Whanganui (50 years), and South Canterbury (49 years), compared to the overall average age of 46 years.

Doctors are youngest in MidCentral and Taranaki (both 44 years). Most other areas are about the same as the overall average (+/- one year).

Table 14 shows the percentage of female doctors, percentage of IMGs and average age for each DHB.

Table 14: DHBs by percentage female, percentage IMG and average age

DHB	Population	Percentage female (%)	Percentage IMGs (%)	Average age
Northland	179,100	46.7	50.7	47
Waitematā	620,300	47.9	39.2	47
Auckland	536,800	47.5	33.4	46
Counties Manukau	558,200	48.1	41.1	47
Waikato	416,400	38.9	50.9	45
Bay of Plenty	237,000	48.1	43.3	45
Lakes	109,700	44.7	51.5	45
Hauora Tairāwhiti	49,100	46.4	49.1	46
Hawke's Bay	165,800	46.5	43.9	45
Taranaki	119,800	43.4	52.1	44
MidCentral	179,300	41.9	45.8	44
Whanganui	64,900	32.5	62.4	50
Wairarapa	45,500	36.9	52.3	55
Hutt Valley	149,500	41.2	39.8	47
Capital & Coast	317,500	51.2	32.9	45
Nelson Marlborough	150,600	47.6	39.1	46
West Coast	32,600	33.3	68.9	50
Canterbury	563,200	48.0	34.9	45
South Canterbury	59,900	38.9	51.9	49
Southern	330,100	45.4	43.1	47
All DHBs	4,978,800	46.2	40.4	46

Urban/rural

Distribution of doctors

Urban areas have a higher concentration of doctors compared with rural areas. Almost three-quarters of doctors (74.8 percent) are in main urban areas compared with 61.2 percent of the population. One-quarter of people live in rural areas, but these areas only make up 11.6 percent of doctors.

Distribution of GPs

GPs are more likely to work in urban areas than rural areas. Almost 65 percent of GPs work in main urban areas compared with 61.2 percent of the population. Conversely, just under 21 percent of GPs work in rural areas compared to 25.9 percent of the population.

Hours worked and on call

The average number of hours worked per week is slightly lower in rural areas, but the number of on-call hours is higher. Doctors in rural areas work an average of 42.0 hours per week and are on call for a further 8.0 hours per week. This compares with 45.0 hours worked and 5.2 hours on call for doctors in main urban areas.

The average hours worked per week by GPs is higher in rural areas than in urban areas – 35.3 hours per week in rural areas compared with 33.3 hours per week in main urban areas.

Table 15 shows a summary of workforce statistics by population density of area. Please see the method section of the report on page 47 for information on how we calculated population density.

Table 15: Summary of workforce statistics by population density of area (all doctors)

Workforce measure	Population density		
	Main urban 100+ people per km ²	Secondary urban 21–99 people per km ²	Rural 0–20 people per km ²
Proportion of doctors (%) ¹	74.8	13.6	11.6
Proportion of GPs (%) ²	64.6	14.8	20.6
Population ³	2,990,590	697,100	1,265,620
Proportion of population (%)	61.2	14.3	25.9
Average hours worked	45.0	44.0	42.0
Average hours worked by GPs	33.3	33.2	35.3
Average on-call hours	5.2	7.0	8.0
Average age	45.6	46.3	48.5
Proportion of female doctors (%)	46.8	45.4	43.9
Proportion of IMGs (%)	37.6	45.2	52.9

¹ Represents all active doctors who responded to the survey.

² Represents active doctors who reported working in general practice at one or more of their work sites.

³ Population figures are based on Statistics New Zealand's estimated residential population as at 30 June of the particular survey period, in this case, 30 June 2019.

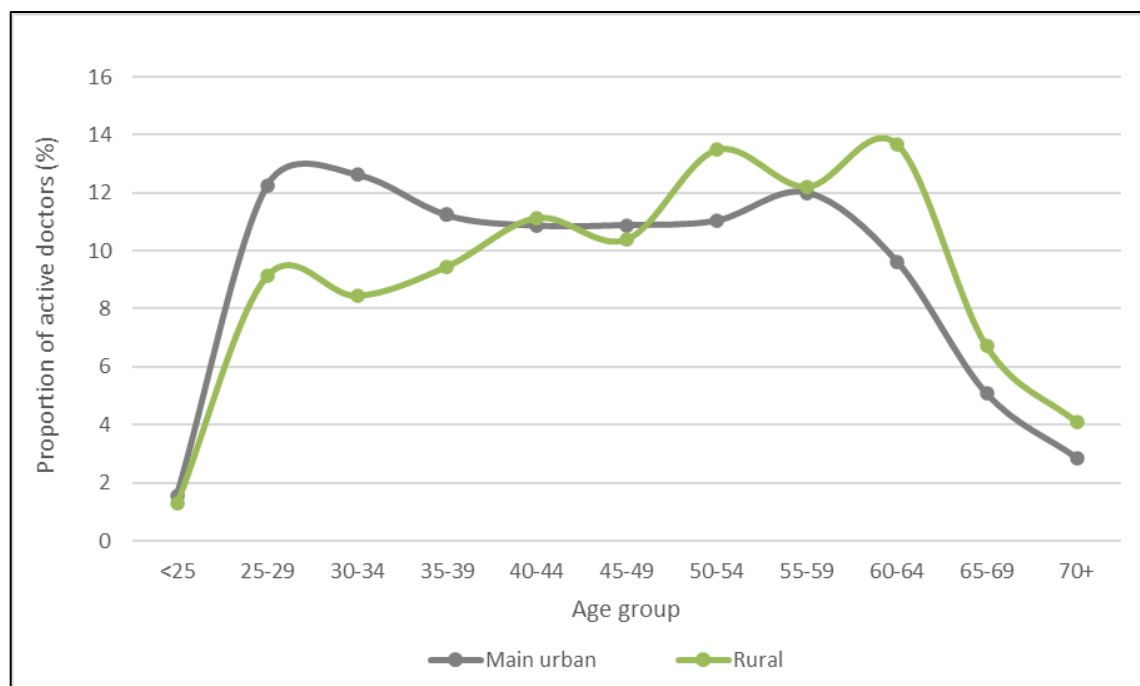
Age distribution

Doctors working in rural areas tend to be older than those working in urban areas. The average age is 48.5 years in rural areas compared with 45.6 years in main urban areas.

One reason for this is likely to be that most house officers, who tend to be much younger, will work in training centres in urban areas.

You can see this when the figures are broken down by age group. In main urban areas, 26.4 percent of doctors are aged 35 or under compared with 18.8 percent of doctors in rural areas.

Figure 13: Proportion of doctors by age group (main urban and rural)



Age distribution of GPs, registrars and specialists

Specialists in rural areas also tend to be older – 53.5 years versus 50.9 years in main urban areas. However, GPs in rural areas are slightly younger on average – 50.9 years in rural areas compared with 52.0 years in urban areas.

Table 16: Average age by work role and population density group

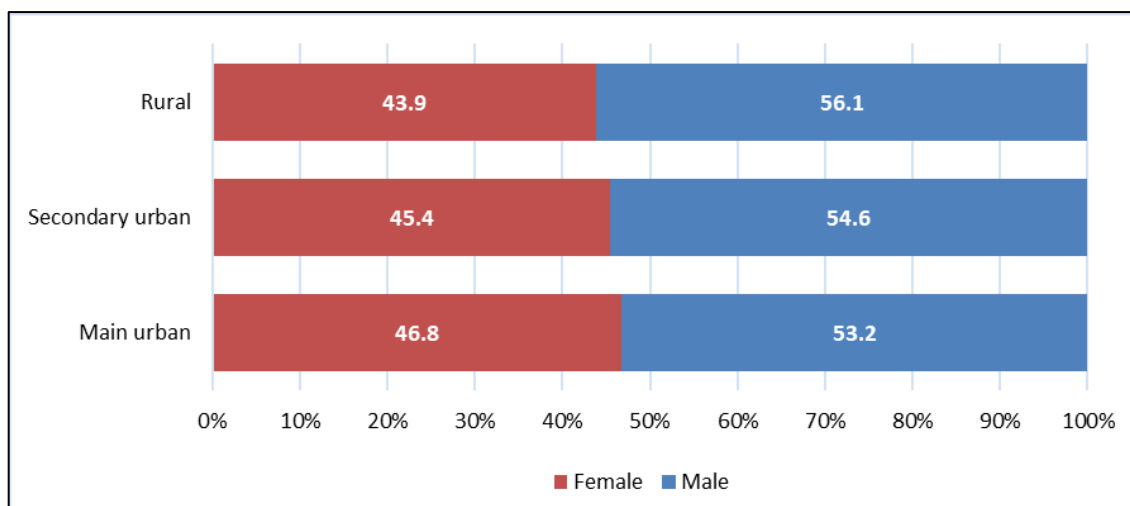
Workforce measure	Population density		
	Main urban 100+ people per km ²	Secondary urban 21–99 people per km ²	Rural 0–20 people per km ²
Average age (GPs) ¹	52.0	52.1	50.9
Average age (registrars) ¹	32.7	33.2	32.7
Average age (specialists) ¹	51.3	52.3	53.5

¹ Based on work role at main employer.

Gender

There is a slightly higher proportion of female doctors in urban areas compared with rural areas – 46.8 percent of doctors in main urban areas are female compared with 43.9 percent of doctors in rural areas. The overall proportion of female doctors in the workforce is 46.3 percent.

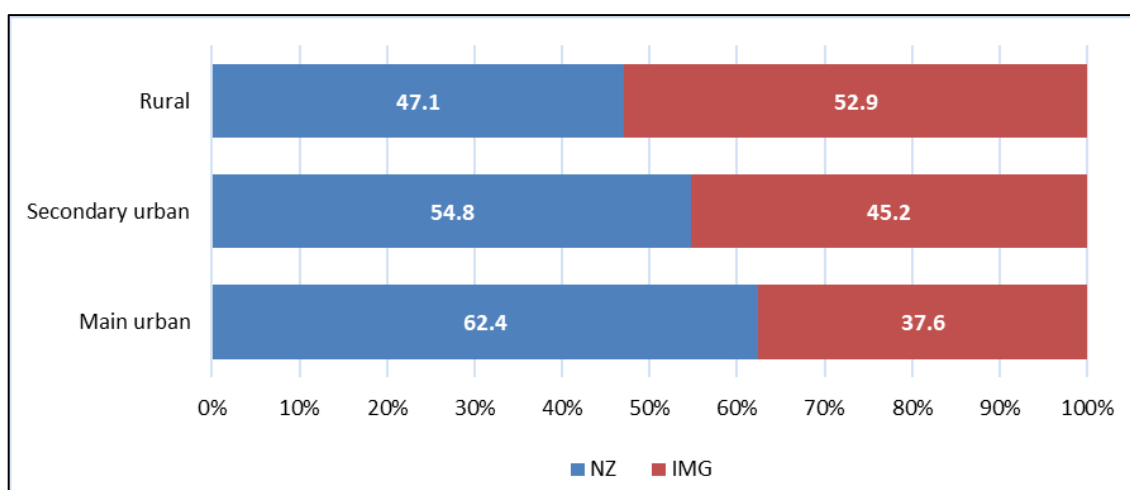
Figure 14: Proportion of doctors by gender and population density of area



International medical graduates

There is a higher proportion of international medical graduates (IMGs) in rural areas compared with urban areas – 52.9 percent of doctors in rural areas are IMGs compared to 37.6 percent in main urban areas. This may reflect that positions in rural areas are harder to staff and therefore more likely to be filled by doctors from outside New Zealand.

Figure 15: Proportion of IMGs by population density of area



Combined Auckland region

The Auckland “Super City” represents over a third of New Zealand’s population (33.2 percent) and has 34.6 percent of all doctors and 32.1 percent of all GPs.

Doctors in Auckland work slightly more hours but are on call for less hours on average compared to the overall workforce. GPs in Auckland work the same number of hours per week as the national average.

The proportion of female doctors in Auckland is slightly higher, while the proportion of IMGs is significantly lower.

Table 17: Summary of workforce statistics – Auckland City

Workforce measure	Auckland City	New Zealand
Proportion of doctors (%) ¹	34.6	-
Proportion of GPs (%) ²	32.1	-
Population ³	1,642,800	4,953,310
Proportion of population (%)	33.2	-
Average hours worked	44.2	43.8
Average hours worked by GPs	33.8	33.8
Average on call hours	5.2	6.1
Average age	46.6	46.1
Proportion of female doctors (%)	46.9	45.4
Proportion of IMGs (%)	35.2	40.0

¹ Represents all active doctors who responded to the survey.

² Represents active doctors who reported working in general practice at one or more of their work sites.

³ Population figures are based on Statistics New Zealand’s estimated residential population as at 30 June of the particular survey period, in this case, 30 June 2019.

International medical graduates

International medical graduates (IMGs) make up 40.4 percent of doctors who responded to the survey and 42.8 percent of doctors on the register. Historically the proportion of IMGs has tended to increase each year. However, over the last five years, this growth has stopped and the proportion is now either about the same or slightly less as the previous year.

Importance of IMGs to the workforce

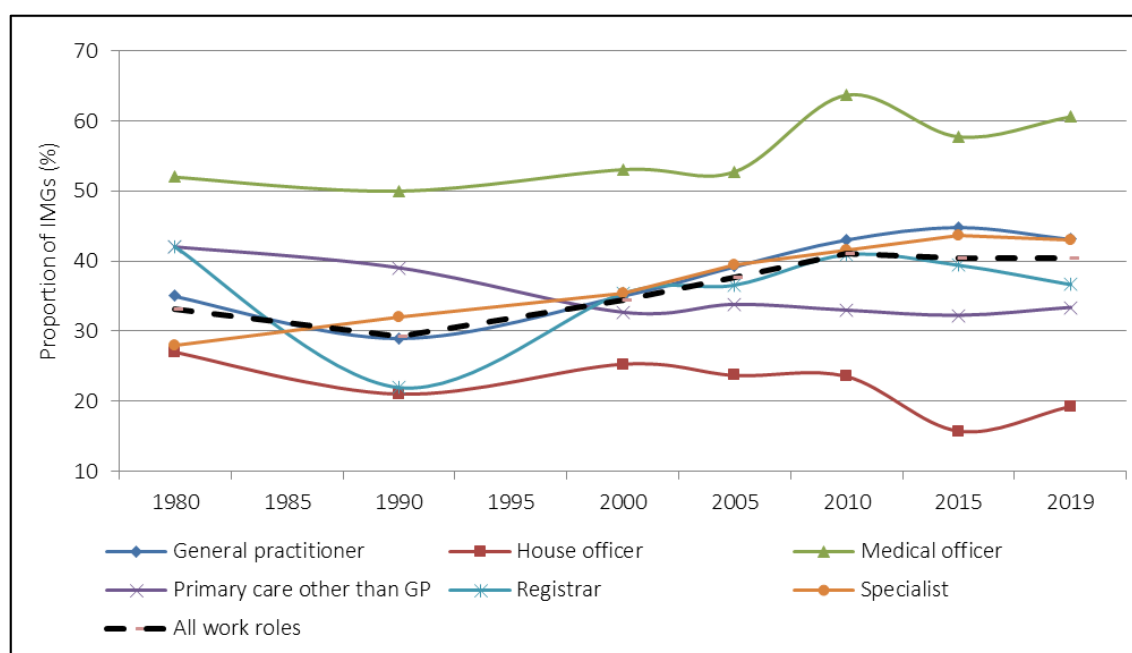
IMGs play an important role in the medical workforce. IMGs fill gaps that we cannot fill with locally trained doctors. Some IMGs come here to gain experience and expertise they cannot get in their home country. Other IMGs are moving to New Zealand permanently, giving us the benefit of their experience and expertise, that they gained overseas.

Movement of doctors between countries is normal and expected. Just as IMGs come to New Zealand to work, many New Zealand-trained doctors work in other countries – see the retention section on page 48 for more on this.

Work role

IMGs are most represented amongst medical officers – 60.6 percent. They are least represented amongst house officers (19.3 percent) and registrars (36.6 percent). This reflects that we are training more doctors locally and so there are fewer training posts available for IMGs.

Figure 16: Proportion of IMGs by work role at main work site (1980–2019)



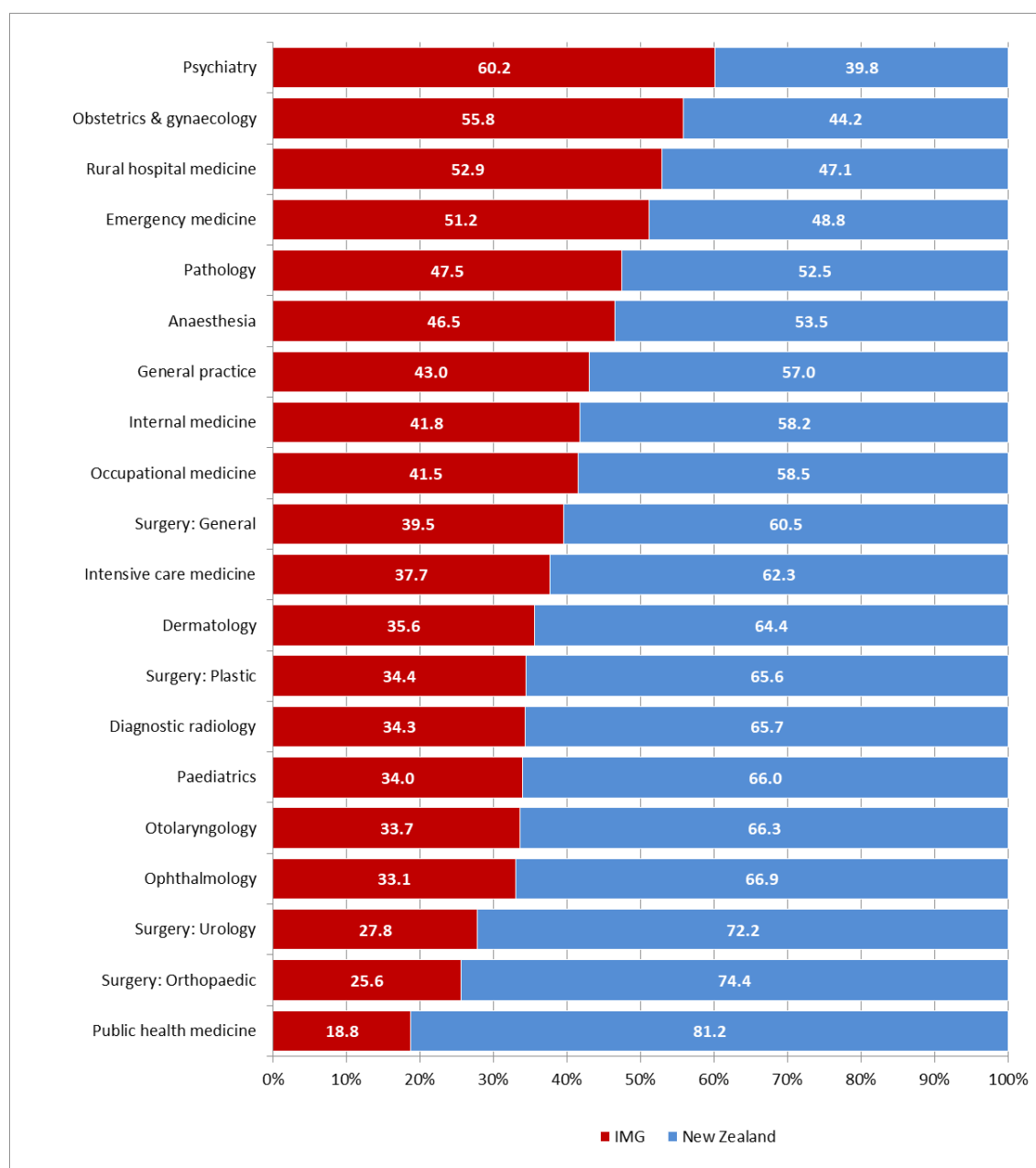
Work type

IMGs are most represented in psychiatry (60.2 percent), obstetrics and gynaecology (55.8 percent), and rural hospital medicine (52.9 percent).

IMGs are least represented in public health medicine (18.8 percent), orthopaedic surgery (25.6 percent), and urology (27.8 percent).

Figure 17 shows the proportion of IMGs working as specialists or general practitioners in vocational scopes for those areas with more than 50 doctors.

Figure 17: Proportion of IMGs by vocational scope (areas with more than 50 doctors)



Retention — how long do our doctors stay

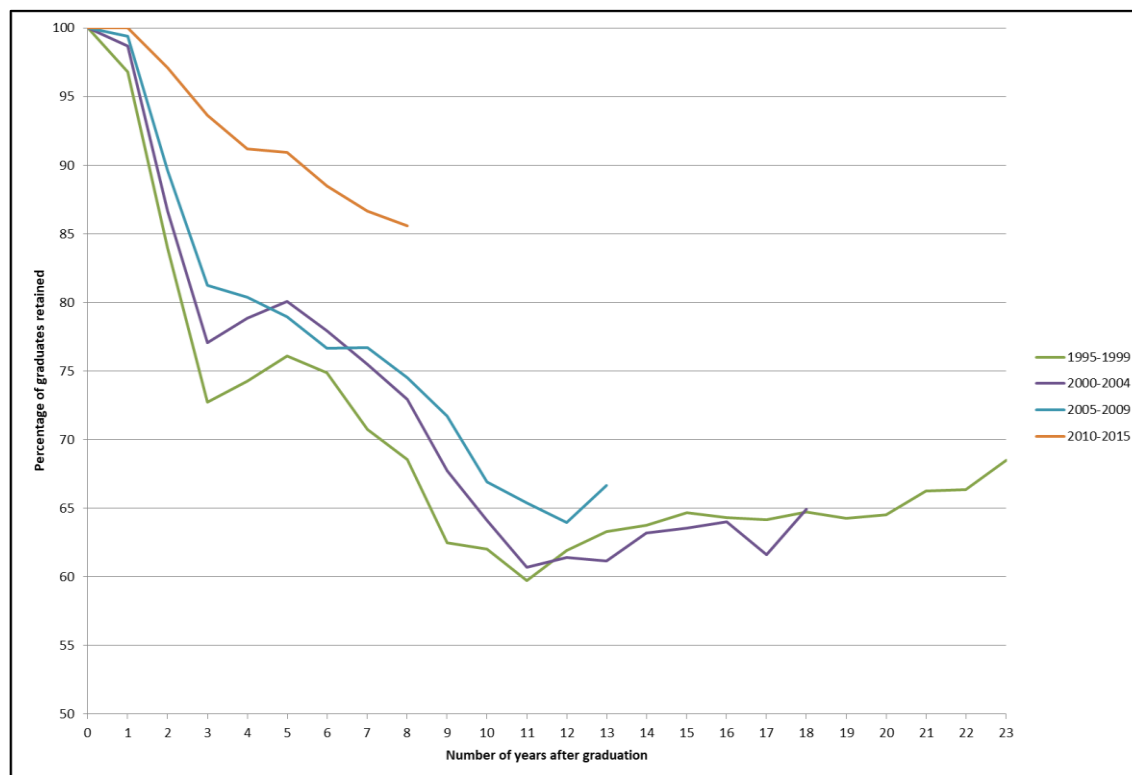
Retention of New Zealand graduates

New Zealand is retaining more of our own graduates than we used to. We retained no less than 90 percent of graduates from the 2010, 2011, 2012 and 2013 cohorts for 5 years after initial registration. Retention for earlier cohorts at the same point averaged just under 80 percent.

This may reflect initiatives like the Ministry of Health’s Voluntary Bonding Scheme⁸ giving graduates greater incentives to remain in New Zealand in the years immediately after graduation.

Figure 18 compares the retention rates at each year after graduation for successive classes of graduates from 1995 to 2015, combining these into 5-year cohorts to make it easier to see trends. See Table 23 on page 57 for more detailed retention data for New Zealand graduates.

Figure 18: Graduate retention of class years 1995–2015 (5-year cohorts)



⁸ <https://www.health.govt.nz/our-work/health-workforce/voluntary-bonding-scheme>.

Most graduates who leave go to Australia

Most New Zealand-trained doctors practising outside of New Zealand are in Australia (2,156 in 2018). This is not surprising given that Australia is our nearest (and largest) neighbour.

Other countries where New Zealand-trained doctors are practising include the United Kingdom (186 in 2018), Ireland (28 in 2019), Canada (107 in 2018), and Israel (5 in 2018)⁹.

The OECD data on how many doctors move each year is relatively incomplete. The available data shows that 24 doctors moved to Canada in 2018, 31 to the United Kingdom in 2019, and 3 moved to Ireland in 2019¹⁰.

⁹ OECD, Health Workforce Migration – Foreign-trained doctors by country of origin – stock (<https://stats.oecd.org/>).

¹⁰ OECD, Health Workforce Migration – Foreign-trained doctors by country of origin – Annual inflow (<https://stats.oecd.org/>).

Retention of International medical graduates

Most IMGs don't stay in New Zealand for long periods. Just over 60 percent leave in the first two years after they register. IMGs continue to leave in subsequent years until there are about 20 percent remaining. Retention at 1 year post-registration is improving significantly (see Figure 22), but the overall trend from 2 years post-registration onwards is largely stable.

Figure 19 and 22 show the overall retention rate for IMGs who registered in New Zealand between 2000 and 2018. See the method section on page 48 for information on how we grouped IMGs together into cohorts.

Figure 19: Retention rate for IMGs (2000–2018)

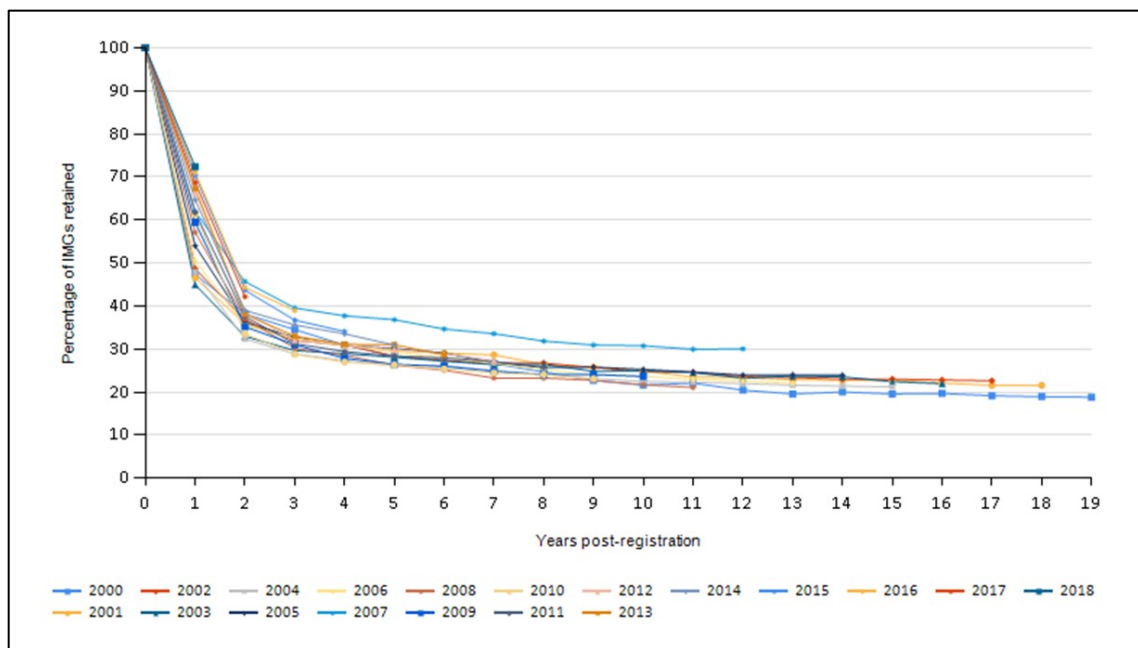
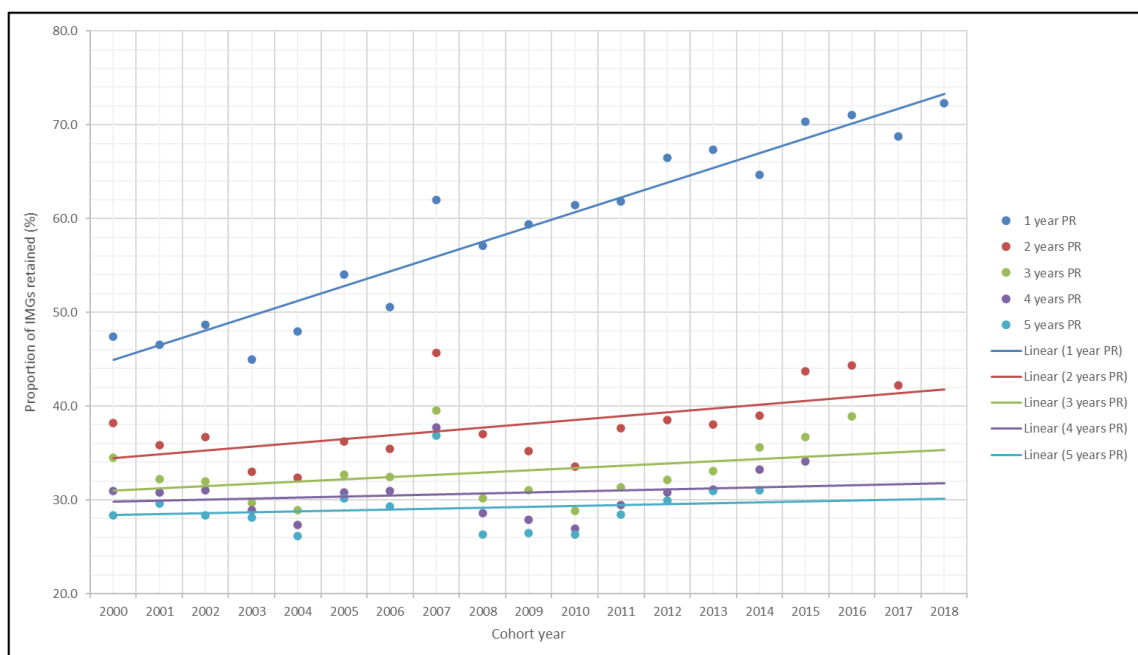


Figure 20: Changes in IMG retention over time (1–5 years post-registration (PR))



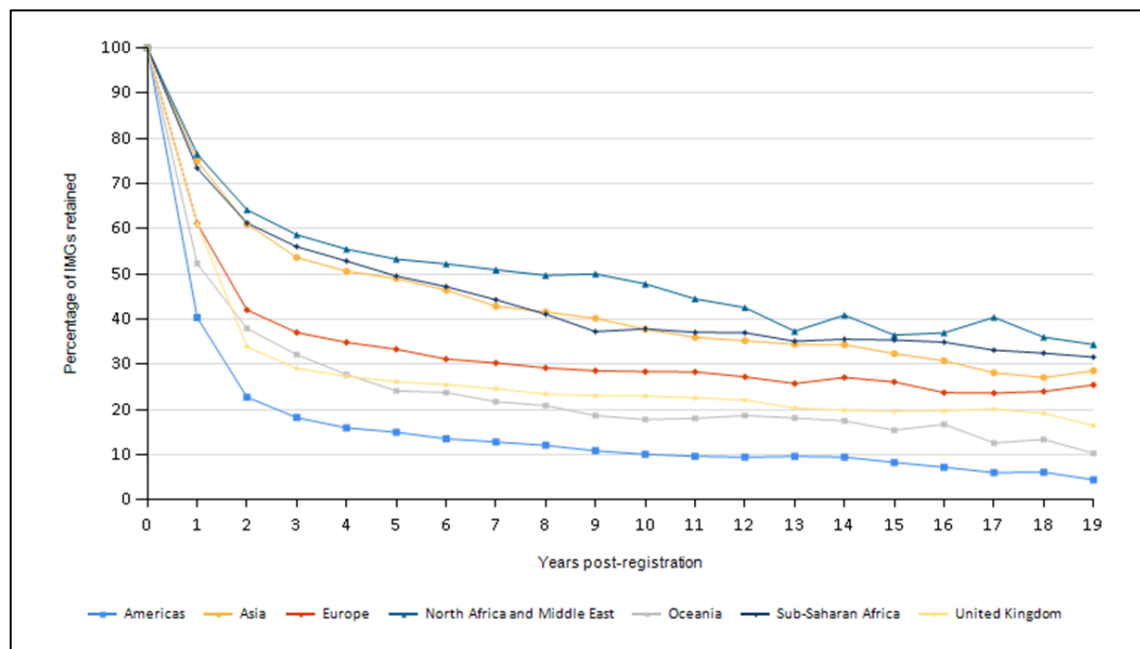
Retention by region of qualification

Doctors from Africa, the Middle East and Asia are most likely to stay. We retain three-quarters of doctors from these regions for one year and about 50 percent for a further four years. Over half of doctors from Africa and the Middle East are still in New Zealand up to eight years after they initially register.

Doctors from North America are least likely to stay in New Zealand followed by Oceania (mainly doctors from Australia and the Pacific), the United Kingdom (UK), and Europe. Only 40 percent of doctors from North America are retained one year after initial registration, dropping further to 22.7 percent in the second year. Over 60 percent of doctors from the UK are retained after one year, but this then drops to just under 34 percent in the second year.

This suggests that doctors from the United Kingdom and North America are more likely to come to work in New Zealand temporarily or for short periods only (eg a working holiday). Doctors from Africa, the Middle East and Asia are more likely to relocate to New Zealand permanently.

Figure 21: Retention of IMGs by region of qualification



Retention by age group and time since initial qualification

Doctors aged between 30 and 50 are more likely to stay compared to doctors in their 20s and those aged 60 and over. Similarly, doctors moving to New Zealand in the middle of their careers are more likely to stay compared with newer doctors in their first 10 years of practice.

This suggests that doctors aged under 30 are more likely to come to New Zealand for a short period of time compared with doctors in their 30s and 40s, who are more likely to be relocating permanently.

Figure 22: Retention rates for IMGs by age group (2000–2018)

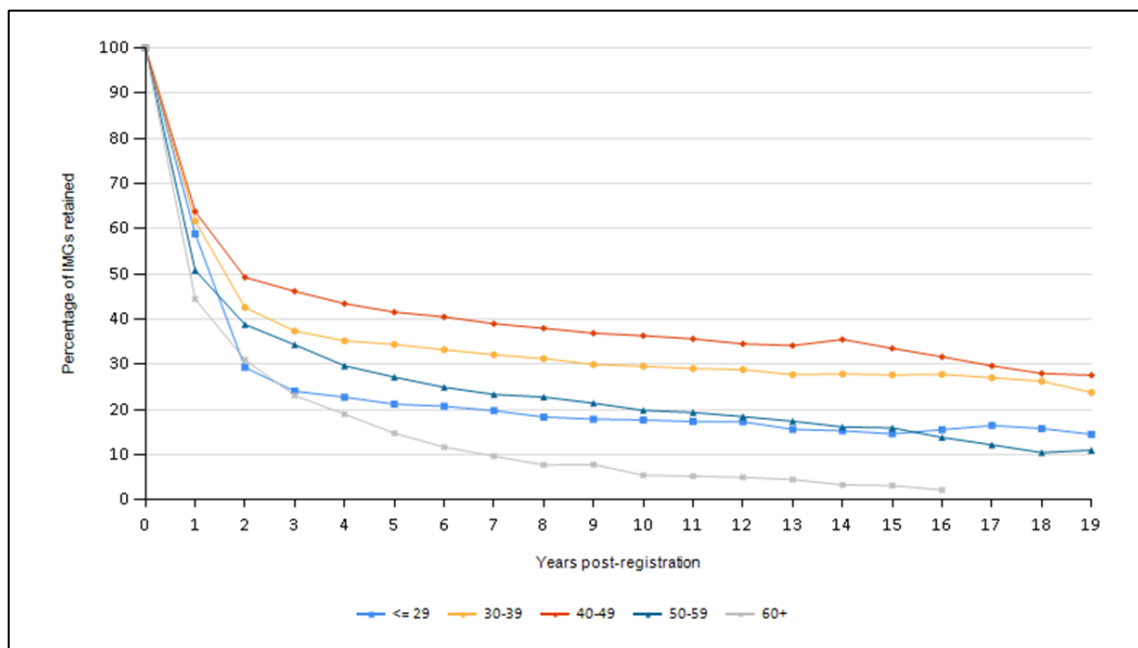
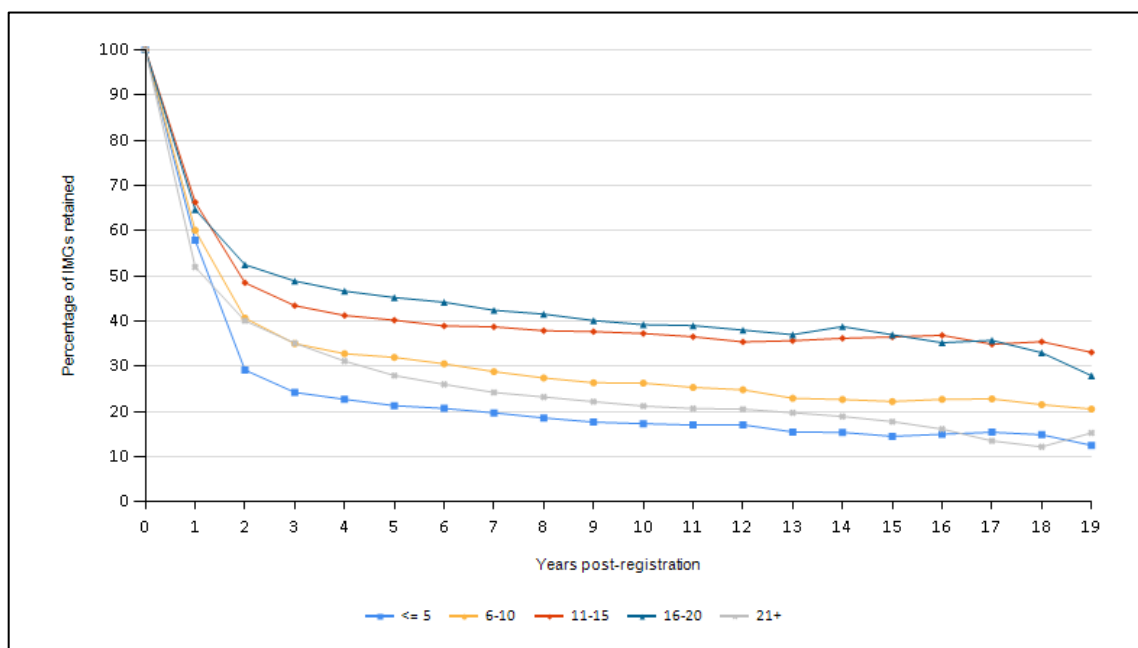


Figure 23: Retention rate for IMGs by time since initial qualification (2000–2018)



Data sources used in this publication

This report combines the results of the Medical Council of New Zealand workforce survey for 2019 with existing registration data. It also includes other non-register registration data collected from doctors as part of the initial registration process and when they renew their practising certificates each year.

Register data and other non-register data

Register data

Register data are that used as part of the medical register. This includes doctors' scopes of practice, practising certificate dates, and qualification data.

Non-register registration data

Non-register registration data are collected from doctors when they renew their practising certificate each year or when doctors notify Council of changes during the year. This includes information on where doctors are employed, the level of their practice, the type of medicine, and whether they are in a vocational training programme.

Survey data

We survey doctors as part of their application to renew their practising certificate. This survey collects detailed information from doctors about the work they are doing. This fills in the gaps not covered by register data and non-register registration data enriching these datasets.

Representativeness of the survey data

The response rate for the 2019 survey was slightly up on the previous year, but still down overall. 77.5 percent of doctors surveyed responded compared with 76.5 percent in 2018, 80.8 percent in 2017, and 96.3 percent in 2016.

We believe the response is still representative and that valid conclusions can be drawn from the data, despite the relatively low response rate. We make this assertion based on the population size and demographic comparison of the survey data with register data.

Survey statistical confidence – population size

A major factor in determining survey statistical confidence is the size of the population.

For our survey, the size of the population is the number of doctors on the register with current practising certificates – 17,015 as of 31 March 2019.

For a population of this size, a response rate of 77.5 percent should provide 95 percent certainty.¹¹ This supports our conclusion that, even though our response rate is relatively low, any conclusions drawn from the data are still valid.

¹¹ GreatBrook, *Survey Statistical Confidence: How Many is Enough?*, <https://greatbrook.com/survey-statistical-confidence-how-many-is-enough/>.

Demographic comparison – survey data versus register data

While the population size is important, the sample must accurately reflect the survey population. If it is, we can say that the survey data are representative.

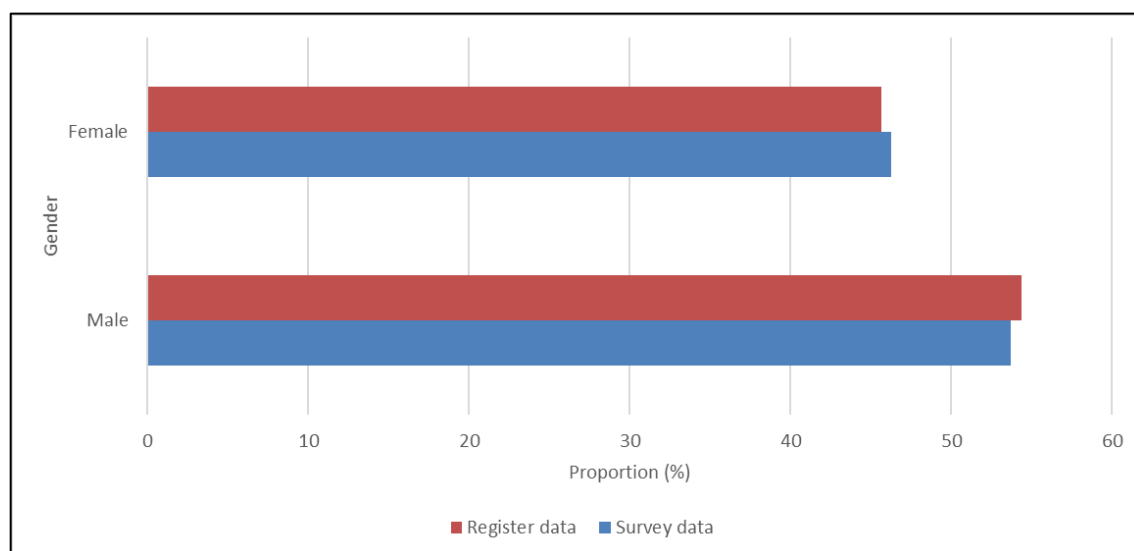
We compared the age and gender of those who responded to the survey with those on the medical register to test whether the survey data are representative. While there were some small differences when broken down by age group, the breakdown by gender was nearly identical.

This further supports our conclusion that the survey response for 2018 is representative.

Comparison by gender

Figure 24 illustrates that, when broken down by gender, the demographics of the two groups are effectively identical. In both cases, about 46 percent were female and 54 percent were male.

Figure 24: Comparison of survey respondents with doctors on the medical register as of 31 March 2019 by gender



Comparison by age group

Figure 25 and Table 18 show small differences between the two groups when they are broken down by age group.

There is a greater proportion of younger doctors (aged between 25 and 39) amongst doctors on the register, compared with those who responded to the survey. There is a corresponding larger proportion of doctors aged between 40 and 59 amongst survey respondents.

This suggests that doctors who come to New Zealand for short periods and are not asked to complete the workforce survey are, on average, younger.

Figure 25: Comparison of survey respondents with doctors on the medical register as of 31 March 2019 by age group

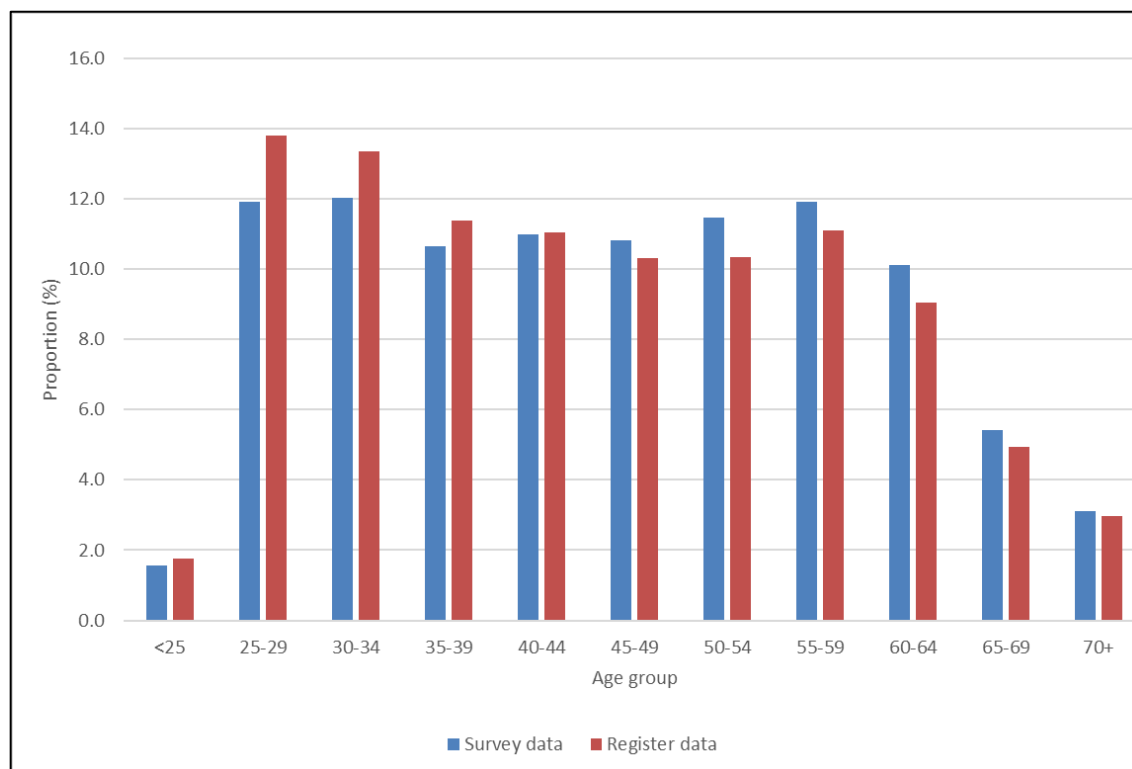


Table 18: Summary of differences between survey respondents and doctors on the medical register as at 30 June 2019 by age group (selected age groups only)

Age group	25–29	30–34	35–39	40–49	50–54	55–59	60–64
Survey difference to register	-1.9%	-1.3%	-0.7%	0.5%	+1.1%	+0.8%	+1.1%

Comparison by country of qualification

The proportion of international medical graduates (IMGs) amongst doctors on the register is higher than the proportion of IMGs amongst doctors who responded to the survey (42.8 percent versus 40.4 percent). This reflects that we don't ask IMGs who come to New Zealand for short periods to complete the survey.

Survey method

Change in delivery method

We are now delivering our survey questionnaire entirely electronically. We made this change when we moved our practising certificate renewal process online. Doctors now renew their practising certificates through myMCNZ (<https://mymcnz.org.nz/>). This is the fourth survey we have done electronically.

Timing of the questionnaire

We ask doctors to renew their practising certificate (and complete the workforce survey) at one of four dates during the year, determined by the doctor's birthdate.

The 2019 survey covers doctors who renewed their practising certificate from December 2018, March 2019, June 2019, and September 2019.

Doctors can complete the survey up to 6 weeks before these dates. We collected all data within 3 months of a renewal period ending.

Sampling frame

We ask doctors to complete the survey if they:

- hold a current general, provisional general, vocational or provisional vocational scope of practice, and
- hold a current practising certificate or held one at some point in the previous year, and
- have a New Zealand address.

We don't ask doctors who are registered for specific short-term purposes (special-purpose scope of practice) to complete the survey.

Responses to the survey

The response rate to the 2019 survey is 77.5 percent. We asked 16,746 doctors to complete the survey: 12,986 doctors responded. Of the doctors who did not complete the survey, 3,529 doctors declined to complete the survey and 231 doctors reported that they did not work.

This response rate is slightly higher than 2018 (76.5 percent), but lower than 2017 (80.8 percent), and significantly lower than 2016 (96.3 percent). We believe the reduced response to the survey is due to a combination of moving the survey online and making it clearer that the survey is optional (and easier for doctors to opt out).

However, this situation is changing. An amendment to the Health Practitioners Competence Assurance Amendment Act 2003 made in 2019 requires us to provide the Director-General of Health with key workforce information on doctors¹².

To meet this requirement, we've removed the ability for doctors to completely opt-out of the workforce questionnaire. Doctors will need to complete the questionnaire but will be able to decline to answer specific questions – for example, ethnicity. You will see the effect of this change in future reports.

Active doctors

The results in this report reflect the responses from active doctors. Active doctors are those who reported working four or more hours per week. There were 12,844 active doctors in 2019.

¹² Health Practitioners Competence Assurance Amendment Act 2019, s134A – <http://www.legislation.govt.nz/act/public/2003/0048/latest/LMS193179.html>

Categories of data

We asked doctors completing the survey to report an employer type (eg public hospital), role type (eg registrar) and work type categories (eg cardiology) for up to three work sites.

Use of registration data

We combined survey data with registration information to avoid asking doctors unnecessary questions and make it easier for them to respond to the survey. This information included the doctor's age, gender, registration date, and year and country of graduation.

We also used registration data in this report where it was more reliable than survey data.

How we do geographical analysis

We assigned doctors' responses to a territorial local authority (TLA) and district health board (DHB) region, based on their employment information.

We used Statistics New Zealand's Estimated Resident Population dataset as at 30 June 2017¹³ for DHB and TLA populations.

We now report the Auckland region as a single TLA. We used to try to break the Auckland region down into its historic boundaries to compare the data with 2014 and earlier years, but this is now impractical.

Method for determining whether areas are urban or rural

There is no one agreed method to determine whether an area is urban or rural. Statistics New Zealand outlines the complexities involved in classifying an area as rural or urban in its report *New Zealand: An Urban/Rural Profile*¹⁴. They also note that there is no internationally recognised definition of a 'rural' area.

For this report we have approximated how rural or urban an area is by looking at how densely it is populated. We have allocated TLAs into one of three groups based on population density. We calculated the population density for each TLA by dividing its population by its land area (in km²).

For example, Wellington City, an urban area, has an area of 290 km² and a population of 212,700, giving it an average population density of 733 people per square kilometre. South Wairarapa District, generally considered a rural area, has an area of 2,387 km² and a population of 10,250, giving it an average population density of 4.3 people per square kilometre.

The three groups are defined as:

- main urban — areas with 100 or more people per square kilometre
- secondary urban — areas with 21–99 people per square kilometre
- rural — areas with 20 or fewer people per square kilometre.

¹³ Statistics New Zealand: Estimated Resident Population as at 30 June 2016
http://archive.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationEstimates_HOTPA30Jun16.aspx.

¹⁴ Statistics New Zealand: New Zealand: An Urban/Rural Profile
http://www.stats.govt.nz/browse_for_stats/people_and_communities/Geographic-areas/urban-rural-profile.aspx

Ethnicity

Doctors can report up to three ethnicities. However, when we report data, we assign each doctor a single ethnicity using a simplified version of Statistics New Zealand's prioritisation standard. The priority order is:

1. Māori
2. Pacific Island (Pasifika)
3. Chinese
4. Indian
5. Other non-European
6. Other European
7. New Zealand European/Pākehā.

The ethnicity we use in analysis is the one reported by the doctor with the highest priority.

Calculating retention rates

Retention of New Zealand graduates

We calculate the retention rates for New Zealand graduates by comparing the list of graduates provided by the universities with the lists of doctors who held practising certificates in subsequent years.

Retention of international medical graduates

We calculate the retention rates for IMGs by grouping them into year cohorts and then checking whether doctors in the cohort held a practising certificate in subsequent years. We express the retention rate as a percentage. If 100 doctors are in the cohort and 90 doctors hold a practising certificate in the following year, the retention rate is 90 percent.

We include a doctor in the cohort for a year if they practised in New Zealand during that year but not in the previous year. For example, for an IMG to be included in the 2000 cohort, they must have practised in New Zealand in 2000 but not in 1999.

Inclusion in a group does not relate to the date of graduation in the IMG's home country.

Explanation of terms used

Active doctors

Active doctors are doctors who, by their own estimate, worked a total of at least 4 hours in medical (including non-clinical) work during a typical working week.

Full-time equivalent (FTE)

We base proportional calculation of FTEs on a 40-hour week. For example, 60 hours = 1.5 FTE. On-call time is only included in FTE when the doctor works.

General practitioner (GP)

A GP is any respondent who indicated working in the GP work role at one of their work sites. It does not specifically refer to a doctor holding the FRNZCGP qualification or a vocational scope of general practice. We sometimes need to use a different definition of GP. We will specify that we have done this in the text.

House officer

House officers are doctors in their first 2-3 years out of medical school. Doctors in their first year out of medical school are sometimes known as interns or PGY1s.

Hours on call

Hours on call are additional hours when doctors were on call but did not work.

Hours worked

Hours worked are those doctors report unless we specify otherwise.

We ask doctors to report the hours they work across all work sites during a typical working week. Alternatively, we ask doctors to report their most recent week if they cannot identify a typical week.

International medical graduate (IMG)

A doctor who obtained their primary medical qualification in a country other than New Zealand. IMGs used to be called overseas-trained doctors.

Please take care when comparing the proportion of IMGs employed in New Zealand to the proportion in other countries – many countries define IMG differently from us.

Main work site

The work site where the doctor spends most of their working hours.

Medical officer

The Multi Employer Collective Agreement (MECA) between the Association of Salaried Medical Specialists (ASMS) and DHBs¹⁵ defines medical officer as “any medical practitioner who is registered under the Health Practitioners Competence Assurance Act 2003 ... who is not a medical specialist”. Medical officers were previously called medical officers of special scale (MOSS).

Registrar

A doctor who has at least 2 years of experience since graduation from medical school. Registrars are generally undertaking vocational training in their chosen specialty.

¹⁵ <https://www.asms.org.nz/wp-content/uploads/2017/10/2017-2020-DHB-MECA-Signed.pdf>

Registered within a vocational scope of practice

Doctors registered in a vocational scope of practice have completed an approved or equivalent postgraduate training programme leading to the award of an approved or equivalent postgraduate qualification.

Registration within a vocational scope of practice was previously known as vocational registration.

Specialist

This work role category is generally understood to require membership of the relevant specialist college (and registration within a vocational scope of practice). However, the data are self-reported and doctors who respond to the survey may apply the term more broadly.

General practice is a specialty, and GPs are specialists. However, we ask doctors working in general practice, urgent care, and other primary care disciplines to use separate work role categories to help us analyse the data.

Work role

Work role category options for the survey are:

- GP
- primary care other than GP
- house officer
- registrar
- medical officer
- specialist/consultant
- other.

Work type

Work type is the area of medicine or specialty that the doctor is working in. For example, internal medicine or general surgery.

More information

Please contact Andrew Cullen, Council's Information Systems Analyst for further information about this report. You can send email requests to workforce@mcnz.org.nz.

You can also get further information about the medical workforce from the Ministry of Health. Please see:

<https://www.health.govt.nz/nz-health-statistics/access-and-use/how-access-data>

Alternatively, you can contact the Ministry at the following address:

Analytical Services
National Collections & Reporting
National Health Board
PO Box 1043
Wellington
New Zealand

Email: data-enquiries@moh.govt.nz

Website: www.moh.govt.nz

Phone: +64 4 816 2850

Appendix 1 – Changes in the medical workforce by work role

Table 19 shows the changes in the distribution of the workforce by work role over time.

Table 19: Changes in the medical workforce

Workforce role ²	Proportion of active doctors (%) ¹								
	1980	1985	1990	1995	2000	2005	2010	2015	2019
General practitioner (GP)	37	38	38	38	37	33	31	28	27
House officer	12	11	11	10	10	9	8	11	9
Medical officer	3	3	3	3	3	4	5	4	4
Primary care other than GP	1	2	3	4	2	2	1	1	1
Registrar	11	13	13	13	14	16	15	17	18
Specialist	34	32	31	30	31	34	35	36	39
Other	1	2	2	2	2	2	3	3	2
No answer	-	-	-	-	0	0	2	0	-
Total	100	100	100	100	100	100	100	100	100

¹ Proportion of doctors who responded to the survey and reported working 4 or more hours per week.

² Work role at the doctor's main work site.

Appendix 2 – Work type

Table 20: Number of doctors by vocational scope for selected years (2005–2020)

Vocational scope	Year ¹				
	2005	2010	2015	2019	2020
Anaesthesia	488	577	737	835	879
Breast medicine	4	-	-	-	-
Cardiothoracic surgery	19	23	28	34	31
Clinical genetics	6	7	12	18	16
Dermatology	50	56	63	74	77
Diagnostic and interventional radiology	266	303	448	510	570
Emergency medicine	88	135	224	319	350
Family planning and reproductive health	24	26	24	29	30
General practice	2,446	2,701	3,303	3,671	3,748
General surgery	227	235	262	294	298
Intensive care medicine	44	58	81	107	111
Internal medicine	656	761	958	1,164	1,222
Medical administration	12	15	25	32	30
Musculoskeletal medicine	20	22	20	23	24
Neurosurgery	18	20	23	24	24
Obstetrics and gynaecology	223	234	280	321	337
Occupational medicine	40	49	53	62	64
Ophthalmology	107	124	134	157	166
Oral and maxillofacial surgery	17	17	20	27	30
Orthopaedic surgery	211	237	273	303	311
Otolaryngology head and neck surgery	85	97	108	118	119
Paediatric surgery	15	14	19	24	24
Paediatrics	219	289	353	412	422
Pain medicine	-	-	23	30	34
Palliative medicine	32	42	54	71	71
Pathology	225	238	278	319	324
Plastic and reconstructive surgery	43	55	64	76	75
Psychiatry	425	489	559	634	671
Public health medicine	130	157	177	172	180
Radiation oncology	34	49	60	64	68
Rehabilitation medicine	11	16	24	27	27
Rural hospital medicine	-	26	105	120	128
Sexual health medicine	18	20	18	19	19
Sport and exercise medicine	12	19	26	30	33
Urgent care	103	119	136	227	249
Urology	51	54	64	67	68
Vascular surgery	20	26	33	34	33
Total	6,389	7,310	9,069	10,448	10,863

¹ Figures represent the number of doctors with vocational scope and current practising certificate as at 30 June of the year.

Appendix 3 – Age

Table 21 shows the changes in the average age of doctors holding a vocational scope between 2005 and 2020.

Table 21: Average age of doctors on the register with a vocational scope (2005–2020)

Vocational scope	2005	2010	2015	2019	2020
Anaesthesia	46	48	49	49	49
Cardiothoracic surgery	48	52	53	53	52
Clinical genetics	42	46	46	47	46
Dermatology	51	51	52	51	52
Diagnostic and interventional radiology	48	49	49	49	49
Emergency medicine	41	43	45	46	46
Family planning and reproductive health	53	53	53	52	51
General practice	49	51	53	53	53
General surgery	49	51	51	52	52
Intensive care medicine	46	48	49	50	49
Internal medicine	50	51	50	51	51
Medical administration	53	56	58	57	57
Musculoskeletal medicine	52	55	58	61	60
Neurosurgery	54	55	52	52	53
Obstetrics and gynaecology	49	51	52	52	52
Occupational medicine	50	53	55	57	58
Ophthalmology	49	50	51	51	51
Oral and maxillofacial surgery	45	48	52	49	49
Orthopaedic surgery	49	50	52	52	52
Otolaryngology head and neck surgery	49	51	53	54	54
Paediatric surgery	49	53	55	51	54
Paediatrics	47	48	49	50	50
Pain medicine	-	-	54	53	53
Palliative medicine	50	54	56	53	52
Pathology	49	50	51	51	51
Plastic and reconstructive surgery	49	48	50	51	52
Psychiatry	48	50	52	54	54
Public health medicine	47	49	51	52	52
Radiation oncology	46	47	49	51	51
Rehabilitation medicine	51	51	51	52	53
Rural hospital medicine	-	47	49	51	51
Sexual Health Medicine	50	52	55	54	55
Sport and exercise medicine	46	46	48	49	48
Urgent care	45	48	51	52	52
Urology	50	52	51	51	51
Vascular surgery	48	50	50	52	54
All doctors with vocational scope	48	50	51	52	52

Appendix 4 – Ethnicity by work type

Table 22 shows the distribution of ethnicity for each work type at doctors' main work site.

Table 22: Distribution of ethnicity by work type at main work site (%)

Work type	Māori	Pacific Island (Pasifika)	Chinese	Indian	Other	Other European	NZ European/Pākehā	Refused	Total
Anaesthesia	2.8	0.9	6.4	4.3	5.5	23.1	53.8	3.3	100.0
Basic medical science	0.0	3.4	8.5	8.5	6.8	20.3	49.2	3.4	100.0
Clinical forensic medicine	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0
Clinical genetics	0.0	0.0	0.0	0.0	0.0	22.2	77.8	0.0	100.0
Dermatology	1.5	0.0	6.2	7.7	3.1	15.4	61.5	4.6	100.0
Diagnostic radiology	1.7	0.7	6.1	6.1	7.6	14.2	59.6	3.9	100.0
Emergency medicine	3.4	0.7	3.7	4.2	8.8	35.7	40.5	3.0	100.0
Family planning	9.1	0.0	9.1	4.5	9.1	13.6	54.5	0.0	100.0
General practice	3.4	1.8	6.2	5.7	10.2	17.7	53.3	1.7	100.0
House officer rotations	8.7	4.7	9.7	3.7	12.8	10.3	48.3	1.8	100.0
Intensive care medicine	1.8	1.2	4.8	2.4	4.8	28.7	52.7	3.6	100.0
Internal medicine	3.7	1.1	8.4	6.4	13.1	18.1	45.4	3.8	100.0
Medical administration	7.6	0.0	1.5	1.5	7.6	9.1	71.2	1.5	100.0
Musculoskeletal medicine	5.3	0.0	10.5	5.3	0.0	15.8	57.9	5.3	100.0
Obstetrics & gynaecology	5.3	2.0	6.0	8.0	10.9	20.9	44.3	2.4	100.0
Occupational medicine	4.3	1.4	1.4	4.3	2.9	14.5	69.6	1.4	100.0
Ophthalmology	2.3	2.9	11.4	4.6	14.3	10.9	51.4	2.3	100.0
Other	3.2	1.1	4.2	1.6	3.7	22.1	62.6	1.6	100.0
Paediatrics	4.8	1.9	4.8	6.5	8.6	17.0	54.0	2.4	100.0
Palliative medicine	2.2	1.1	4.3	3.3	5.4	31.5	52.2	0.0	100.0
Pathology	1.4	1.4	6.4	5.9	11.9	15.5	55.3	2.3	100.0
Primary care other than GP	4.7	3.5	3.5	5.9	8.2	15.3	57.6	1.2	100.0
Psychiatry	3.5	1.7	3.5	8.2	13.5	24.2	42.6	2.8	100.0
Public health medicine	10.0	3.3	1.1	4.4	3.9	8.3	68.3	0.6	100.0
Radiation oncology	3.2	4.8	7.9	14.3	12.7	17.5	38.1	1.6	100.0
Rehabilitation medicine	5.7	0.0	14.3	5.7	22.9	28.6	22.9	0.0	100.0
Rural hospital medicine	2.2	0.0	2.2	3.3	5.6	24.4	56.7	5.6	100.0
Sexual health medicine	0.0	0.0	3.2	6.5	9.7	22.6	51.6	6.5	100.0
Sports medicine	9.8	0.0	2.4	0.0	9.8	7.3	68.3	2.4	100.0
Surgery: Other subspecialties	1.5	1.5	3.0	9.0	17.9	14.9	47.8	4.5	100.0
Surgery: Cardiothoracic	2.0	4.1	2.0	10.2	10.2	28.6	34.7	8.2	100.0
Surgery: General	4.9	3.6	6.4	6.1	12.3	14.6	49.4	2.8	100.0
Surgery: Neurosurgery	2.9	0.0	5.9	8.8	20.6	20.6	32.4	8.8	100.0

Work type	Māori	Pacific Island (Pasifika)	Chinese	Indian	Other	Other European	NZ European/Pākehā	Refused	Total
Surgery: Oral & maxillofacial	0.0	0.0	13.8	3.4	6.9	17.2	58.6	0.0	100.0
Surgery: Orthopaedic	6.0	3.1	4.8	3.8	6.2	13.8	58.2	4.1	100.0
Surgery: Otolaryngology	4.3	0.7	7.8	6.4	12.1	12.1	53.9	2.8	100.0
Surgery: Paediatric	0.0	10.3	10.3	10.3	10.3	17.2	37.9	3.4	100.0
Surgery: Plastic and reconstructive	3.8	0.9	14.2	4.7	5.7	13.2	52.8	4.7	100.0
Surgery: Urology	1.2	2.4	6.1	7.3	3.7	12.2	64.6	2.4	100.0
Surgery: Vascular	0.0	2.0	4.1	12.2	14.3	18.4	46.9	2.0	100.0
Urgent care	4.2	3.0	1.8	4.8	19.4	26.7	38.8	1.2	100.0
All doctors	3.8	1.8	6.1	5.7	10.1	18.9	51.0	2.6	100.0

Appendix 5 – Retention of New Zealand graduates

Table 23: Proportion of New Zealand graduates retained by cohort and year post-registration (%)

Graduate cohort	Year post-registration																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1995	100	96	85	74	74	79	76	72	68	65	64	65	67	70	68	68	67	68	69	67	66	68	68	68
1996	100	97	88	77	77	79	79	77	74	70	64	64	59	63	64	67	67	67	67	67	67	66	65	
1997	100	97	85	71	68	69	69	73	69	69	63	65	62	62	63	63	63	63	64	65	65	65		
1998	100	96	79	67	75	76	76	76	69	67	63	60	55	59	60	60	64	63	62	60	61			
1999	100	97	83	75	77	76	76	73	70	68	58	58	56	58	59	60	61	60	62	63				
2000	100	98	84	74	76	79	79	80	77	75	69	61	58	58	59	62	64	64	65					
2001	100	99	85	77	79	80	80	78	75	71	64	65	57	61	58	58	59	59						
2002	100	99	87	75	79	80	80	77	77	74	70	68	65	62	61	65	66							
2003	100	99	86	79	80	78	78	75	73	72	68	63	63	62	63	66								
2004	100	99	92	80	81	83	83	79	76	73	67	64	61	65	65									
2005	100	100	87	75	76	76	76	73	73	70	67	66	61	64										
2006	100	100	91	83	79	79	79	75	77	72	67	64	67											
2007	100	99	86	78	79	74	74	72	74	73	69	66												
2008	100	99	92	86	86	82	82	81	81	79	77													
2009	100	100	92	85	82	84	84	83	80	79														
2010	100	99	97	92	90	90	90	89	87															
2011	100	100	96	92	90	90	90	87																
2012	100	100	95	92	90	90	90																	
2013	100	99	97	93	94	93																		
2014	100	100	98	95	92																			
2015	100	100	100	99																				
2016	100	100	100																					
2017	100	100																						
2018	100																							
Average	-	99	90	82	81	81	80	78	75	72	66	64	61	62	62	63	64	63	65	64	65	66	66	68
Standard deviation	-	1.5	6.1	8.9	6.9	6.2	5.7	5.1	4.9	4.0	4.5	2.7	4.1	3.5	3.3	3.5	2.9	3.1	2.8	2.8	2.8	1.3	1.9	

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