

Holding a mirror to society? The sociodemographic characteristics of the University of Otago's health professional students

Peter Crampton, Pro-Vice-Chancellor, Division of Health Sciences, University of Otago, Dunedin.

Naomi Weaver, Planning and Institutional Research Analyst, University of Otago, Dunedin.

Andrea Howard, Director, Policy and Programmes, Division of Health Sciences, University of Otago, Dunedin.

Reprinted from: Journal of the New Zealand Medical Journal, 07-September-2012, Vol 125 No 1361

ABSTRACT

Aim To describe the sociodemographic characteristics of students accepted into eight health professional programmes at the University of Otago.

Methods Student data were obtained from the University of Otago's central student records system. Data were obtained in anonymous, summary form. New Zealand population data were obtained from Statistics New Zealand. Descriptive statistics were calculated.

Results In 2010 health professional students at the University of Otago were largely from outside the Otago region (88.1%). 59.6% were female and 84.8% were either New Zealand citizens or permanent residents. Within the domestic student cohort, 65.0% of students self-identified as being within the New Zealand European & Other category (compared with 75.3% of the national population), 34.2% as Asian (compared with 11.1%), 6.3% as Māori (compared with 15.2%), and 2.3% as Pacific (compared with 7.7%). A large proportion of students came from high socioeconomic areas and only 3.4% of students had attended secondary schools with a socioeconomic decile of less than 4.

Conclusion Schools and Faculties within the University of Otago's Division of Health Sciences do not achieve the sociodemographic mirror of society we hope for, and we strive to improve both our selection processes, within the constraints and limitations of the available selection tools, and our student support mechanisms. We will continue to refine these policies and work with other key stakeholders in better preparing school leavers for health professional programmes.

INTRODUCTION

The University of Otago's Division of Health Sciences aims to produce health professionals equipped to meet the needs of society; this is at the heart of the social contract between the University and society.

The University strives to train health professional graduates who reflect and are responsive to the diversity within society. The sociodemographic profile of health professional students is important because, in part, these

characteristics influence future career choices in terms of place of practice and types of populations served.¹⁻³

The overarching admissions policy of the University's Division of Health Sciences states:

Ideally the make-up of health professional classes should be equivalent to holding a mirror up to society. In order to achieve this we aim to attract and support the most academically able students from a wide variety of backgrounds. The gender, ethnic, socioeconomic and rural/urban composition of our graduates should, more or less, reflect the diverse communities in Aotearoa.

The above statement reflects recent international consensus and calls to action from inter-country working groups.^{4-7,8p249,9} The Australian Medical Council also recognises the importance of encouraging and prioritising student diversity in its guidelines for the accreditation of medical schools (which apply to medical schools in New Zealand).¹⁰

In Australia and New Zealand, inequalities remain in the health status of various social and cultural groups. Medical schools have a responsibility to select students who can reasonably be expected to respond to the needs and challenges of the whole community, including the health care of these groups. This may include selection of students who are members of such groups. The medical curriculum should also provide opportunities for cultural education programs, and opportunities for training and provision of service in under-served communities.

We believe indigenous health and Pacific health are areas of special responsibility because of New Zealand's history, demographic makeup, and location as a Pacific nation. In the case of Maori health and Maori education, New Zealand's universities have a dual obligation to honour the contractual obligations defined in the Treaty of Waitangi and the responsibility to correct the inequitable health and education outcomes experienced by Maori populations.

The University's Division of Health Sciences adopts the following principles in the selection of students into its health professional programmes. Each of these programmes aims to select students who:

- Are committed to and capable of academic excellence;
- On balance reflect the gender, ethnic, socioeconomic, and rural/urban composition of society; and
- Are committed to serving the needs of individuals, families and communities in New Zealand or overseas.

The purpose of this study is to describe the current sociodemographic characteristics of the University's health professional students in order to a) evaluate performance against our goals, b) inform policy development within the University, and c) to provide a benchmark against which to measure change.

METHODS

Health Professional Programmes All students (domestic and international) accepted into in the following eight health professional programmes in 2010 were included in the study (Table 1).

Professional programme	School-leaver entry pathway	Tertiary entry pathways
Bachelor of Dental Surgery (BDS)		√
Bachelor of Dental Technology (BDentTech)	√	√
Bachelor of Medical Laboratory Science (BMLSc)		√
Bachelor of Medicine and Bachelor of Surgery (MBChB)		√
Bachelor of Oral Health (BOH)	√	√
Bachelor of Pharmacy (BPharm)		√
Bachelor of Physiotherapy (BPhy)		√
Bachelor of Radiation Therapy (BRT)	√	√

Table 1: Eight professional programmes included in the study.

Data sources Student data were downloaded from the University of Otago's central student records system (which contains routinely collected data). Data were obtained in anonymous, summary form.

University student data are a mix of verified and unverified fields. Age and sex are verified by the sighting of birth certificates, and data are complete for these fields. Ethnicity data are complete but unverified, and home area statistics are unverified with 0.7% missing for the student population. Home area data were analysed only for domestic students (not international).

Home area statistics are collected by the University in a student's first year of study only, and are derived from the contact address provided by students when they first enrol.

Student citizenship was classified into the following categories: New Zealand citizens; New Zealand permanent residents; Tokelau/Niue/Cook Island citizens; Australian citizens; international citizens.

For University purposes, based on the allocation of funding by the Tertiary Education Commission, domestic students are those students who are New Zealand Citizens, or New Zealand Permanent Residents, or citizens of Tokelau, Niue, Cook Islands, or Australia.

New Zealand population data were sourced from 2011 estimates provided by Statistics New Zealand.¹¹⁻¹³

Ethnicity Classification/definitions When students enrol at the University of Otago, they can nominate up to three ethnicities they identify with; these ethnicities are self-declared. Students can change which ethnicities they associate with at any point in time. Ethnic groups were aggregated into the following four categories: Māori; Pacific; Asian; New Zealand European and Other.

As students can nominate more than one ethnicity the sum of ethnicities in the student population is greater than 100% of students. The 'Asian' category, as used in the New Zealand health sector; includes students from East, South and Southeast Asia but excludes people from the Middle East and Central Asia. This category has acknowledged shortcomings because of the ethnic diversity within the category.¹⁴

The 'New Zealand European and Other' category includes students who identified as New Zealand European plus students who did not fall into any of the other categories. The proportion of New Zealand European within the 'New Zealand European and Other' category was approximately 97% for the University population and 94 % for the Health Sciences population. Other includes students who identify as Middle Eastern, Latin American and African.

Socioeconomic deprivation Socioeconomic deprivation was measured using the NZDep2006 (NZDep) index of socioeconomic deprivation for small areas. NZDep is an area-based measure combining nine variables from New Zealand's 5-yearly census that reflect eight dimensions of deprivation.¹⁵⁻¹⁸ Each NZDep index is created for small areas built from one or more contiguous meshblocks. Meshblocks, containing around 90 people, are the smallest geographical units defined by the central government statistics agency, Statistics New Zealand. The small areas were constructed with, as far as possible, at least 100 people usually resident. In 2006, for example, only 4% contained fewer than 100 people, while 76% contained fewer than 200 people, and just 3% had more than 300 people. The NZDep indexes were created from the proportions of people in each census-specific small area with each of nine characteristics related to deprivation.

The NZDep scale runs from 1 to 10 where, for example, a value of 10 indicates that the meshblock is in the most deprived 10% of small areas in New Zealand. At a national level, the number of people in each NZDep category is roughly equal. The level of diversity increases as the geographic unit of measurement becomes smaller.

In order to link the student and NZDep datasets, the meshblock associated with the home residence of students was attached to individual records in the University's student dataset (domestic students only). The corresponding NZDep value for each domestic student's home address was then added.

School socioeconomic scores The Ministry of Education uses a school rating scale to indicate the extent to which it draws its students from low socioeconomic communities. Decile 1 schools are the 10% of schools with the highest proportion of students from low socioeconomic communities, whereas decile 10 schools are the 10% of schools with the lowest proportion of these students. A school decile does not indicate the overall socioeconomic mix of the students attending a school or measure the standard of education delivered at a school.¹⁹ It is not possible to calculate decile information for students who went to correspondence school or an overseas school.

RESULTS

Geographic location of home area Auckland is home for 33.4% of the New Zealand population; in 2010 15.0% of the University of Otago's student population came from Auckland, and 22.0% of the professional programme population came from Auckland (Table 2). The four regions of Auckland, Canterbury, Otago and Wellington made up around 70% of both the University student population and the professional programme student population.

Region	% of NZ population	% of University population	% of Health Sciences Professional Programme population
Northland	3.6	2.0	1.8
Auckland	33.4	15.0	22.0
Bay of Plenty	6.3	5.0	4.9
Waikato	9.4	3.1	5.8
Gisborne	1.1	0.7	0.9
Hawkes Bay	3.5	2.5	2.5
Taranaki	2.5	1.7	1.8
Wanganui-Manawatu	5.3	2.6	4.5
Wellington	11.1	11.7	14.0
Tasman	1.1	2.8	2.4
Marlborough	1.0	1.0	1.1
West Coast	0.7	0.5	0.2
Canterbury	13.0	15.4	22.7
Otago	4.7	27.4	11.9
Southland	2.2	8.4	3.4
Unknown	0.0	0.7	0.4

Table 2: Geographic location of domestic students' home areas (2010 year).

Sex When compared with the New Zealand population females were over-represented at the University of Otago in general, and professional programmes in particular (Table 3). The programmes with the sex distribution most similar to the New Zealand population were the Bachelor of Dental Technology and the Bachelor of Medicine and Surgery,

Population	Male (%)	Female (%)
NZ	49.0	51.4
NZ 18–24 year old	43.0	40.4
University of Otago students	43.2	47.3
Health Science Professional Programme students	35.0	45.1
BDS students	12.9	39.6
BDentTech students	35.5	14.1
BMLSc students	51.0	48.6
MB ChB students	57.0	59.6
BOH students	56.8	52.7
BPharm students	65.0	54.9
BPhy students	87.1	60.4
BRT students	64.5	85.9

Table 3: Sex (2010 year; domestic and international students).

Citizenship Programmes with the smallest proportion of New Zealand citizens were the Bachelor of Dental Technology, the Bachelor of Dental Surgery and the Bachelor of Pharmacy (Table 4). The Bachelor of Dental Technology had the highest proportion of New Zealand permanent residents. All types of citizenship in the table, except for international, are eligible for government funding and therefore considered to be domestic students.

Population	NZ citizen (%)	NZ permanent resident (%)	Tokelau Niue Cook Islands (%)	Australian citizen (%)	International (%)
University of Otago students	76.9	9.1	0.03	1.6	12.4
Health Science Professional Programme students	73.1	11.7	0.04	1.4	13.8
BDS students	62.7	13.0	0.00	1.7	22.6
BDentTech students	62.4	24.7	0.00	1.1	11.8
BMLSc students	73.3	18.3	0.00	0.0	8.3
MB ChB students	74.3	8.3	0.08	1.5	15.7
BOH students	69.0	14.7	0.00	1.7	14.7
BPharm students	64.3	21.4	0.00	1.3	13.0
BPhy students	87.7	7.5	0.00	1.2	3.6
BRT students	95.8	4.2	0.00	0.0	0.0

Table 4: Citizenship status (2010 year; domestic and international students).

Ethnicity In 2010, Maori, Pacific and New Zealand European students were under-represented, while Asian students were over-represented in Otago's health professional programmes (Table 5).

Māori students were also under-represented in the wider University of Otago student population, Health Sciences population and each of the professional programmes. The professional programme with the highest proportion of Māori students was the MBChB.

When assessing Maori participation it is more accurate to compare with the domestic student population as there were very few international students who identified as Maori.

Pacific students were also under-represented in the wider University student population, Health Sciences population, and each of the professional programmes. The professional programme with the highest proportion of Pacific students was the MBChB. A significant minority of Pacific students were international students, so there is validity in comparing Pacific students with both the total student population and the domestic student population.

New Zealand European and Other students were slightly over-represented in the wider University student population, but under-represented in the Division of Health Sciences, and in each of the professional programmes except the Bachelor of Physiotherapy and the Bachelor of Radiation Therapy. In the Bachelor of Dental Technology only 24.7% of students identified as New Zealand European and in the Bachelor of Pharmacy, only 37.5% of students identified as New Zealand European.

Asian students were over-represented in the wider University population, Health Sciences population and each of the professional programmes. Nearly 50% of international students at the University in 2010 were from Asian nations; however the over-representation in the Division of Health Sciences, and in the professional programmes, was still apparent when the analysis was restricted to domestic students.

The Bachelor of Dental Technology had 73.1% of all students, and 72.0% of domestic students who identified as Asian, and in the Bachelor of Pharmacy the corresponding figures were 63.0% and 57.5% respectively. The Bachelor of Dentistry also had a high proportion of Asian students, with figures of 56.5% for all students, and 49.6% for domestic students.

Socioeconomic deprivation At a national level, the number of people in each NZDep category is roughly equal; however for all eight professional programmes there was a preponderance of students from areas of low deprivation (Figures 1–8).

This pattern was least pronounced in the Pharmacy and Medical Laboratory Science programmes (Figures 1, 2). The socioeconomic pattern for Māori (Figure 9) and Pacific (Figure 10) students differed markedly from the pattern for students who identified as European and Other (Figure 12), with a greater proportion of Māori and Pacific students recording home addresses in socioeconomically deprived neighbourhoods.

Population	Māori (%)	Pacific (%)	Asian (%)	NZ European and Other (%)
NZ	15.2	7.7	11.1	75.3
NZ 18–24 year old	17.0	8.8	13.8	60.4
University of Otago students	7.6	3.1	17.2	78.9
University of Otago domestic students	8.7	3.3	12.8	83.8
Health Science Professional Programme students	5.4	2.2	41.1	57.8
Health Science Professional Programme domestic students	6.3	2.3	34.2	65.0
BDS students	4.1	0.7	56.5	44.2
BDS domestic students	5.3	0.9	49.6	50.9
BDentTech students	1.1	4.3	73.1	24.7
BDentTech domestic students	1.2	4.9	72.0	25.6
BMLSc students	1.7	1.7	38.3	63.3
BMLSc domestic students	1.8	1.8	36.4	65.5
MB ChB students	6.4	2.5	36.1	62.4
MB ChB domestic students	7.6	2.7	27.0	72.2
BOH students	5.2	3.4	37.9	55.2
BOH domestic students	6.1	4.0	32.3	59.6
BPharm students	3.4	2.3	63.0	37.5
BPharm domestic students	3.9	2.4	57.5	43.1
BPhy students	6.3	1.8	16.9	81.3
BPhy domestic students	6.6	1.6	15.3	83.1
BRT students	8.5	0.0	22.5	77.5
BRT domestic students	8.5	0.0	22.5	77.5

Table 5: Ethnicity (2010 year; domestic and international students).

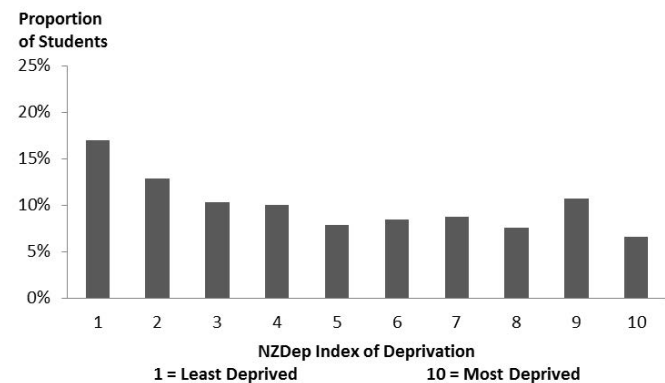


Figure 1: Bachelor of Pharmacy students by NZDep.

* NZDep (index of socioeconomic deprivation).



Figure 2: Bachelor of Medical Laboratory Science students by NZDep.

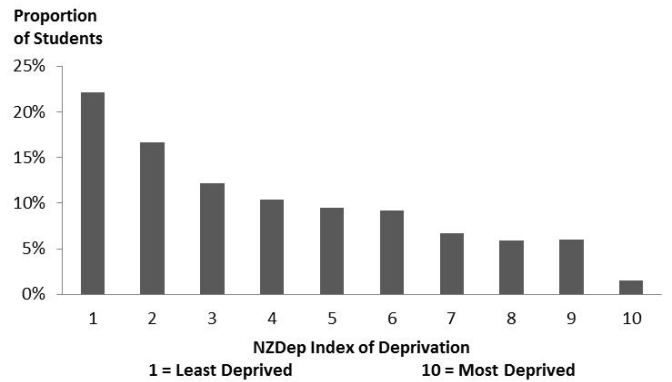


Figure 3: Bachelor of Medicine and Bachelor of Surgery students by NZDep.

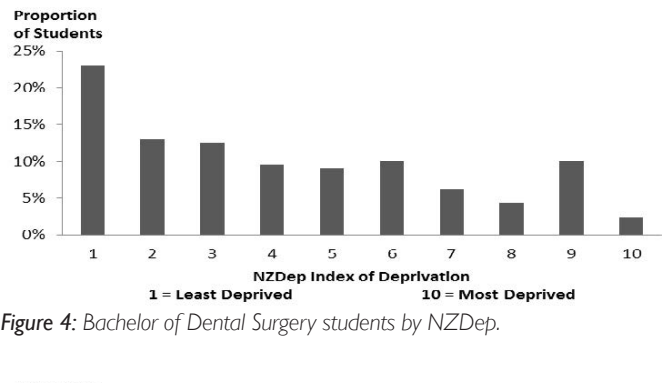


Figure 4: Bachelor of Dental Surgery students by NZDep.

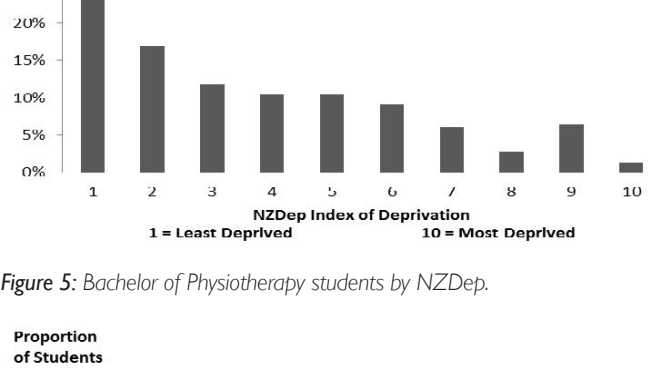


Figure 5: Bachelor of Physiotherapy students by NZDep.

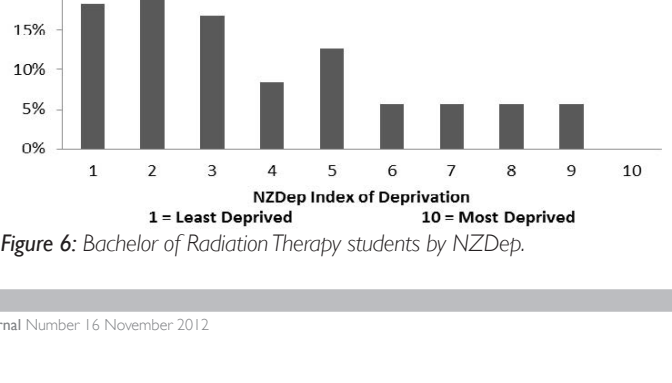


Figure 6: Bachelor of Radiation Therapy students by NZDep.

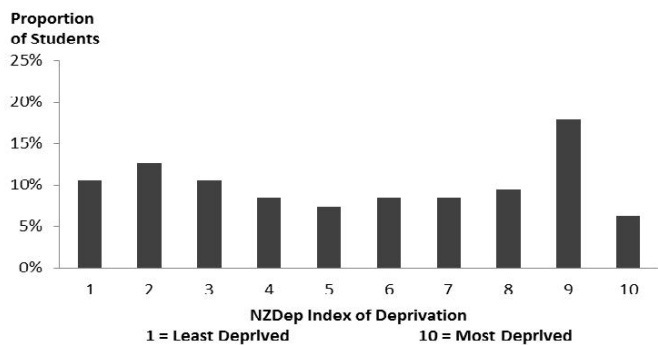


Figure 7: Bachelor of Oral Health students by NZDep.

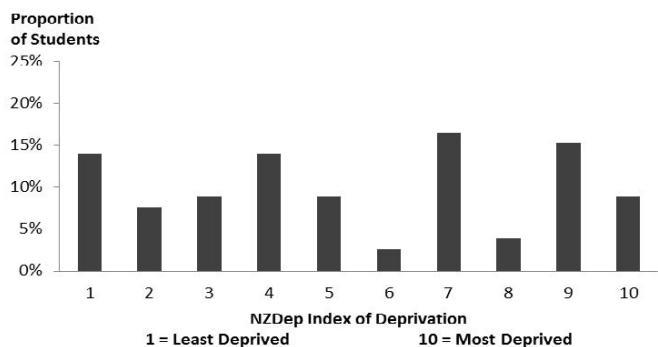


Figure 8: Bachelor of Dental Technology Health students by NZDep.

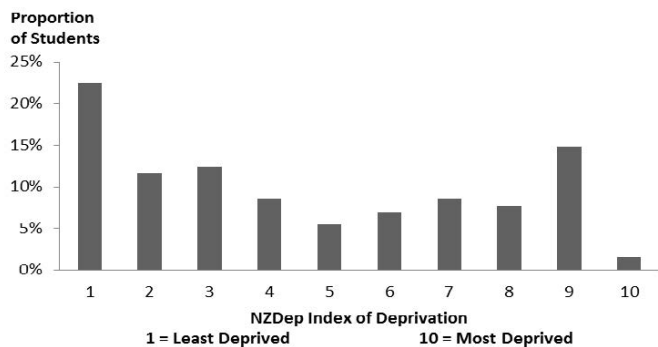


Figure 9: Maori Health Science professional programme students by NZDep.

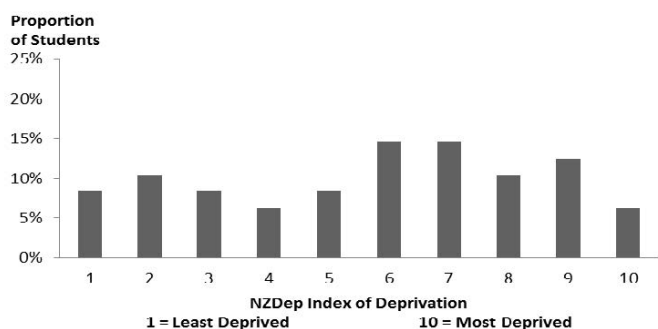


Figure 10: Pacific Health Science professional programme students by NZDep.

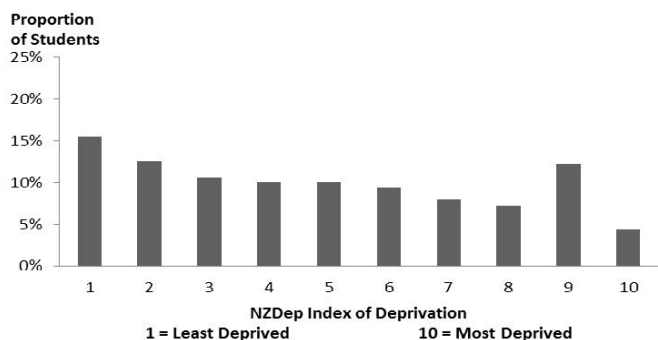


Figure 11: Asian Health Science professional programme students by NZDep.

School socioeconomic scores Students from schools with a decile rating of less than 4 (socioeconomically disadvantaged) were under-represented in the University population, the Health Sciences population and the professional programme population (Table 6).

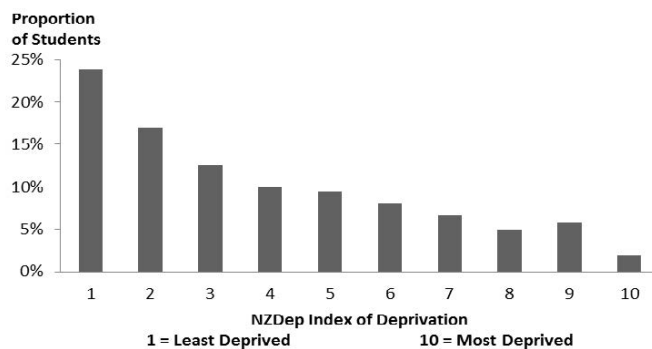


Figure 12: New Zealand European and Other Ethnicity Health Science professional programme students by NZDep.

Population	Decile < 4 (%)	Decile between 4 and 7 (%)	Decile > 7 (%)	Decile unknown (%)
University of Otago students	3.5	29.8	43.0	23.7
Health Science Professional Programme students	3.4	27.1	50.9	18.6
BDS students	2.7	19.9	51.7	25.7
BDentTech students	4.3	17.2	58.1	20.4
BMLSc students	10.0	38.3	43.3	8.3
MB ChB students	2.4	26.0	50.7	20.8
BOH students	6.9	32.8	37.9	22.4
BPharm students	3.4	29.7	47.7	19.3
BPhy students	4.2	32.5	55.7	7.5
BRT students	7.0	31.0	62.0	0.0

Table 6: School socioeconomic score* (2010 year; domestic students).

*1 (lowest socioeconomic level schools) — 10 (highest socioeconomic level schools).

DISCUSSION

The analysis shows that in 2010 students studying in health professional programmes at the University of Otago were largely from outside the Otago region (88.1%), and were either New Zealand citizens or permanent residents (84.8%). Female students were over-represented (59.6%). It is important to note that the distribution of citizenship by programme is significantly influenced by government funding decisions.

Within the domestic student cohort, the majority of students in the professional programmes self-identified as being within the New Zealand European and Other category (65.0% compared with 75.3% of the national population). To a lesser extent, students also identified as Asian (34.2% compared with 11.1%), as Maori (6.3% compared with 15.2%), and as Pacific (2.3% compared with 7.7%).

A large proportion of students came from socioeconomically advantaged areas and only 3.4% of students had attended secondary schools with a socioeconomic decile of less than 4. The increased number of students living in areas categorised as NZDep 9 is probably due to some students, particularly those who are permanent residents, listing Dunedin North as their 'home' address.

It is clear that at the University of Otago, in New Zealand and around the world, health science faculties struggle to achieve a balance of students which reflects the ethnic and socioeconomic reality of the societies they serve.²⁰⁻²⁴ In historical terms this is understandable as universities have traditionally been elitist educational institutions which have developed within the context of socially and ethnically stratified societies.

Furthermore, there are disparities in access to quality high school educational opportunities for some sectors of our population. Health professional selection policies and student support policies should attempt to counter some of these historical and social forces.

The University of Otago has a range of strategic policies and processes aimed at ensuring we play our part in modifying the historic imbalances within the health professional student programmes, the wider health sector and indeed society. These policies broadly fall into two categories: those aimed at attracting and recruiting students from diverse backgrounds, and those aimed at responding to the specific learning needs of vulnerable student groups (for example, those from low decile schools).

The University's Division of Health Sciences has adopted a number of policies to assist with attracting and recruiting students from diverse backgrounds. In an attempt to broaden access to the health professional programmes, the University has a common First Year Health Science programme.

This programme allows students to further improve their knowledge base in subjects appropriate to the study of health professional programmes. This enables students from diverse educational and societal backgrounds to compete more appropriately for places in health professional programmes. However, this approach to levelling the playing field is offset to some extent by the differences in preparation of students at secondary school, and the competitive and academically challenging nature of this course of study.

Therefore, part of the ongoing solution is ensuring that all key stakeholders, including as the Ministry of Education, Ministry of Health, Tertiary Education Commission and the University, work together to continue to improve educational outcomes for all young people, from a range of backgrounds and at all levels.

Various further strategies have been adopted by the University to redress the imbalances of our student cohorts including a school-leavers' bridging programme for Māori and Pacific students taught by the University's subsidiary Foundation Studies. This approach is showing early success, as are similar programmes for medical students in the UK.²⁵

The University also runs several science outreach programmes focussed towards keeping secondary school students active in, and inspired by, the field of science. For example, a series of 'Science Wānanga' aims to engage and inspire Māori students by making science relevant and positive for them through stimulating, hands-on science projects that are relevant to their local area. The Science Wānanga are undertaken in a number of communities by Māori and non-Māori University staff and postgraduate students.

The University has also recently established the Otago University Advanced School Sciences Academy, which is tasked with enhancing experience and knowledge of research science to motivated young rural students and students from low decile schools.

The ways in which students are selected into restricted health professional programmes are debated.²² Tests of cognitive ability dominate, but alongside these various other methods are advocated including, amongst others, aptitude tests, psychological tests, student interviews, and random selection.^{22,26,27} Presently, the University's selection processes identify students who have the aptitudes (as measured by the Undergraduate Medicine and Health Sciences Admission Test²⁸ (UMAT) in most cases) and academic ability (as measured by grade point average) to successfully complete its long and demanding programmes.

Amongst students who meet the aptitude and academic threshold other selection decisions are made to ensure that we are honouring our commitment to produce health professionals equipped to meet the needs of society. For example, across all of our professional programmes, Māori and Pacific students who meet the admissions criteria are given priority. As well, student interviews are used for Dentistry and Physiotherapy.

While there are still too few Māori and Pacific applicants above the academic threshold to match the demographic make-up of society, progress is nevertheless being made. For example, the proportion of Māori students in the 2012 second year medical school class was 15.7%. This proportion reflects the demographic characteristics of the broader society in which they will enter as future Doctors.

Also, in the medical programme special consideration, as part of a government initiative, is given to students from rural backgrounds and there is the ability to provide special entry for those with a demonstrable commitment to pursuing a career in mental health.

The graduate and 'other/alternative' category entry pathways available in most professional programmes provide further opportunities for 'selecting in diversity' from a pool of academically able students.²⁹ Recent evidence, however, from the UK suggests that graduate entry pathways have had little effect on the socioeconomic profile of UK medical students.^{25,30} In 2010, approximately 20% of those who were offered a place within the eight health professional programmes at Otago entered via these categories and did so having completed a prior degree.

The Division of Health Sciences has also adopted policies aimed at responding to the specific learning needs of vulnerable student groups. For example, specific leadership roles have been defined and created in most of the professional programmes to support Māori students and similar roles have been created for Pacific students.

The Division recently established the Pacific Islands Research and Student Support Unit and the Māori Health Workforce Development Unit. These Units are responsible for setting the high-level strategic direction in their respective areas as well as developing and providing programmes which support the specific learning needs of their students. Programmes are wide ranging and cover areas such as secondary school and community engagement, successful transition from secondary school to University and targeted support in the Health Sciences First Year course.

This study is based on analyses of routinely collected student data. The data are considered to be of high quality and the proportion of missing data is small. As detailed in the methods section, the data are a mix of verified and unverified fields and, as a consequence, there may be some error in the home address field. It is not possible to quantify the magnitude of any such error:

The above analysis shows that the Schools and Faculties within the University of Otago's Division of Health Sciences do not achieve the perfect mirror of society we hope for, and we strive to improve both our selection processes, within the constraints and limitations of the available selection tools, and our student support mechanisms.

We will continue to refine these policies and work with other key stakeholders in better preparing school leavers for health professional programmes.

Competing interests: None known.

Acknowledgments: We are grateful for comments made on earlier drafts by Professor Tim Wilkinson, Associate Professor Jo Baxter and by the anonymous NZMJ reviewers.

Correspondence: Professor Peter Crampton, Pro-Vice-Chancellor, Division of Health Sciences, PO Box 56, University of Otago, Dunedin, New Zealand.
Email: peter.crampton@otago.ac.nz



WANT TO SEE YOUR NAME IN PRINT?

The New Zealand Medical Student Journal is a biannual medical journal written and edited by medical students from all four clinical schools in New Zealand. We publish:

- Original research articles
- Literature reviews
- Features articles
- Book reviews
- Conference reports
- Summer studentship reports

Submissions that will be of interest to medical students are invited. Candidates applying onto vocational training schemes after graduation are rated highly by most Colleges if they have published in a peer-reviewed journal previously. Email us at: nzmsj@otago.ac.nz for more information.

NZMSJ

New Zealand Medical Student Journal

Te Hautaka o ngaa Akongaa Rongoaa



REFERENCES

1. Ranmuthugala G, Humphreys J, Solarsh B, et al. **Where is the evidence that rural exposure increases uptake of rural medical practice?** *Australian Journal of Rural Health* 2007;5:285–8.
2. Rabinowitz H, Diamond J, Markham F, Paynter N. **Critical factors for designing programs to increase the supply and retention of rural primary care physicians.** *JAMA* 2001;286(9):1041–48.
3. Moy E, Bartman B. **Physician race and care of minority and medically indigent patients.** *JAMA* 1995;273(19):1515–20.
4. Frenk J, Chen L, Bhutta Z, et al. **Health professionals for a new century: transforming education to strengthen health systems in an interdependent world.** *The Lancet* 2010;376:1923–58.
5. Global Consensus for Social Accountability of Medical Schools. **Global Consensus for Social Accountability of Medical Schools: Global Consensus for Social Accountability of Medical Schools, 2010.** <http://healthsocialaccountability.org/>
6. The Training for Health Equity Network. **THEnet's Social Accountability Evaluation Framework Version 1. Monograph 1.:The Training for Health Equity Network, 2011.**
7. Boelen C, Woollard B. **Social accountability and accreditation: a new frontier for educational institutions.** *Medical Education* 2009;43:887–94.
8. Cooke M, Irby M, O'Brien B. **Educating Physicians, A Call for Reform of Medical School and Residency.** *San Francisco: Jossey-Bass, 2010.*
9. British Medical Association. **Equality and diversity in UK medical schools: British Medical Association, 2009.**
10. Australian Medical Council. **Assessment and Accreditation of Medical Schools: Standards and Procedures, 2002.** *Kingston, ACT: Australian Medical Council, 2002.*
11. Statistics New Zealand. **Subnational Population Estimates: At 30 June 2010 Wellington: Statistics New Zealand.** http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/SubnationalPopulationEstimates_HOTP30Jun10.aspx
12. Statistics New Zealand. **Projected Population of New Zealand by Age and Sex, 2009 (base) – 2061. Wellington: Statistics New Zealand, Table Builder** http://www.stats.govt.nz/tools_and_services/tools/tablebuilder.aspx
13. Statistics New Zealand. **Projected Ethnic Population of New Zealand, by Age and Sex, 2006 (base) – 2026 Update. Wellington Statistics New Zealand.** http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationProjections_HOTP09base-61.aspx
14. Rasanathan K, Craig D, Perkins R. **The novel use of 'Asian' as an ethnic category in the New Zealand health sector.** *Ethnicity and Health* 2006;11:211–27.
15. Crampton P, Salmond C, Sutton F. **NZDep91: a new index of deprivation.** *Social Policy Journal of New Zealand* 1997;9:186–93.
16. Salmond C, Crampton P. **Heterogeneity of deprivation within very small areas.** *Journal of Epidemiology and Community Health* 2002;56:669–70.
17. Salmond C, Crampton P, Atkinson J. **NZDep2006 Index of Deprivation. Wellington: Department of Public Health, University of Otago Wellington, 2007.** <http://www.wnmeds.ac.nz/academic/dph/research/socialindicators.html>
18. Salmond C, Crampton P, Sutton F. **NZDep91: a new index of deprivation.** *Australian and New Zealand Journal of Public Health* 1998;22:95–97.
19. Ministry of Education. **Our Education System. Wellington: Ministry of Education.** <http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/ResourcingHandbook/Chapter1/DecileRatings.aspx>
20. James D, Yates J, Nicholson S. **Comparison of A level and UKAT performance in students applying to UK medical and dental schools in 2006: cohort study.** *British Medical Journal* 2010;349:c478 doi:10.1136/bmj.c748.
21. Poole P, Moriarty H, Wearn A, et al. **Medical student selection in New Zealand: looking to the future.** *New Zealand Medical Journal* 2009;122(1306):88–100. <http://journal.nzma.org.nz/journal/122-1306/3884/content.pdf>
22. Prideaux D, Roberts C, Eva K, et al. **Assessment for selection for the health care professions and specialty training: consensus statement and recommendations from the Ottawa 2010 Conference.** *Medical Teacher* 2011;33:215–23.
23. Dhalla I, Kwong J, Streiner D, et al. **Characteristics of first-year students in Canadian medical schools.** *Canadian Medical Association Journal* 2002;166(8):1029–35.
24. Marino R, Morgan M, Winning T, et al. **Sociodemographic backgrounds and career decisions of Australian and New Zealand dental students.** *Journal of Dental Education* 2006;70(2):169–78.
25. Mathers J, Sitch A, Marsh J, Parry J. **Widening access to medical education for underrepresented socioeconomic groups: population based cross sectional analysis of UK data, 2002–6.** *British Medical Journal* 2012;341:d918.
26. Brown C, Lilford R. **Selecting medical students (editorial).** *British Medical Journal* 2008;336:786.
27. Gorman D, Monigatti J, Poole P. **On the case for an interview in medical student selection.** *Internal Medicine Journal* 2008;38:621–23.
28. Wilkinson D, Zhang J, Parker M. **Predictive validity of the Undergraduate Medicine and Health Sciences Admission Test for medical students' academic performance.** *Medical Journal of Australia* 2011;194(7):341–44.
29. Shelker W, Belton A, Glue P. **Academic performance and career choices of older medical students at the University of Otago.** *New Zealand Medical Journal* 2011;124(1346):64–68. <http://journal.nzma.org.nz/journal/124-1346/4965/content.pdf>
30. Mathers J, Parry J. **Why are there so few working-class applicants to medical schools? Learning from the success stories.** *Medical Education* 2009;43:219–228.