THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Pacific students undertaking the first year of health sciences at the University of Otago, and factors associated with academic performance

Faafetai Sopoaga, Tony Zaharic, Jesse Kokaua, Alec J Ekeroma, Greg Murray, Jacques van der Meer

Abstract

Aim To describe Pacific students in the first year of health sciences at tertiary level, their academic performance, and factors associated with academic outcomes.

Method Routinely collected data for students who enrolled in the Health Sciences First Year (HSFY) programme at the University of Otago between 2007 and 2011, including their school National Certificate in Educational Achievement (NCEA) results were obtained in anonymous form. Descriptive statistics were calculated and regression analyses were undertaken using SAS v9.2 software.

Results A small but increasing number of Pacific students are enrolling in health sciences at tertiary level. Pacific students had poorer performance compared to non-Pacific students in both NCEA and the HSFY programme. Factors associated with academic performance were gender, NCEA results, school decile, accommodation type, ethnicity, international status and disability.

Conclusion Pacific students are under-represented in health sciences and would benefit from better preparation from school. Pacific solutions are required to improve academic outcomes over and above mainstream policy solutions. Tertiary institutions need to engage prospective students earlier to ensure they are well informed of requirements, and are appropriately prepared for study at the tertiary level.

Pacific peoples in New Zealand currently make up 7.7 % of the total population, a proportion that is expected to increase to 10% by 2026.[1] Pacific peoples are over-represented in poor health and education outcomes.[1-4] The Tertiary Education Strategy,[5] Tertiary Education Commission Statement of Intent[6] and the Pasifika Education Plan[7] outline the need to do better for Māori and Pasifika.

The Ministry of Health has indicated clearly its intention to increase the Pacific health workforce in New Zealand, as part of its plan to improve health and education outcomes for Pacific communities.[8] There have been efforts aimed at improving Pacific outcomes in the health and education sectors in New Zealand.[8-13]

Despite these efforts, Pacific peoples continue to be under-represented in the health professional workforce, and there is an increasing gap in the health and education outcomes between Pacific peoples and all other New Zealanders.[2,3,14-16] There is a small but increasing body of knowledge which outlines the importance of incorporating the Pacific context, ethnic-specific worldview and realities, identities, cultural norms and values, language, cultural pride including a strength-based approach in efforts aimed at improving Pacific education outcomes.[17-22]

Researchers have found unfair and unequal treatment of minority students by educators have been part of the problem.[23,24] Pacific students have clearly identified the need for visible senior Pacific leadership within institutions, and to have Pacific-led support separated from Māori-led support services.[20] Education institutions should be part of the solution which includes proactive and appropriate engagement with Pacific communities, families and prospective students.[17,20,22]

The University of Otago is one of the largest providers of health professional training in New Zealand.[25] All students who wish to enter any health professional programme (Medicine, Pharmacy, Physiotherapy, Dentistry and Medical Laboratory Sciences) through the undergraduate pathway are required to undertake a prescribed programme.

The admissions criteria for each health professional programme are based on an academic and aptitude threshold. An affirmative action programme within the Division of Health Sciences assures entry for indigenous Māori and Pacific students who meet the admissions criteria.[15]

The transition experience from secondary education, and engagement of students in the first year in higher education, are important factors in student success and retention.[26,27] Engagement in this context is defined as "the extent to which students devote time to educationally purposeful activities; it also refers to policies and practices that institutions use to encourage students to take part in these activities".[28-30]

To encourage engagement, the University of Otago introduced a 13 week tailored orientation programme (Pacific Orientation Programme @ Otago – POPO) in 2011 for first-year Pacific students.[12] It was modelled in part on the Peer Assisted Student Sessions programme (PASS)[31,32] to assist with the transition to and engagement in the tertiary environment. Additional support for Pacific students was available during the year through the Student Learning Centre, Residential Colleges, Pacific Islands Centre and Student Health Services.[12]

The academic performance of Pacific students in the first year of health sciences at the University has not improved significantly despite these efforts. Thus there is a need to understand why we are not achieving expected outcomes, identify factors associated with academic performance, and invest into areas identified as likely to influence positive outcomes.

This research seeks to describe Pacific students in the first year of health sciences at tertiary level, their academic performance and factors associated with academic outcomes.

Method

Routinely collected data for students who enrolled in the Health Sciences First Year (HSFY) programme at the University of Otago between 2007 and 2011 were obtained in anonymous form. This included their NCEA Level 3 results in five key subjects (Biology, Chemistry, Mathematics with Calculus, Physics, and Mathematics with Statistics).

'NCEA score' refers to the number of credits accumulated by a student in a subject in high school, weighted by level of achievement (two for 'Achieved', three for achieved with 'Merit', four for achieved with 'Excellence'). First semester Grade Point Average (GPA) scores only included students who achieved a mark in all four of the first semester papers in HSFY.

The first semester papers are; CELS 191 – Cells and Molecular Chemistry, CHEM 191 - The Chemical Basis of Biology and Human Health, HUBS 191- Human Body Systems, and PHSI 191- Biological Physics. NCEA subjects analysed were selected because of their relevance to the HSFY papers.

Students who registered for the HSFY programme but did not confirm their attendance at Otago were excluded.

The term 'Pacific' refers to any student who declared at least one Pacific ethnicity at the time of enrolment, regardless of whether that student also declared any non-Pacific ethnicity (e.g. NZ European, Māori).

The term 'school leaver' refers to any student who met all of the following criteria:

- The student must have gained University Entrance by achieving NCEA Level 3;
- The student must be included in at least one of the NCEA result files provided by the New Zealand Qualifications Authority (NZQA) to New Zealand universities for the period 2005-2010 (students often complete their NCEA Level 3 credits over two years, hence the need to include 2005 results);
- Their last year of secondary education must have been at a New Zealand school;
- Their last year of secondary education must be immediately prior to enrolment in the HSFY programme;
- The student must be in his or her first year of tertiary study;
- They must have matriculated in the year of enrolment in the HSFY programme and;
- They must have enrolled at the start of the year in the HSFY programme.

Non-school leavers included students who entered the HSFY programme after undertaking a foundation programme or as mature students. Descriptive statistics were calculated and regression analyses were undertaken using SAS v9.2 software.

Results

Comparatively few Pacific students in any given year were enrolled in HSFY programme, with a maximum of 66 students in 2010 (Table 1). Most Pacific students were female (63%), similar to that for non-Pacific students (60%). Fewer Pacific students than non-Pacific students gained NCEA Level 3; 76% compared to 92% respectively (data not shown).

Table 1. Total number of Pacific and non-Pacific students enrolled in the HSFY programme (2007–2011)

Year	Headcount (%)	
	Pacific	Non-Pacific
2007	48 (3.6)	1293 (96.4)
2008	53(4.1)	1250(95.9)
2009	44(3.5)	1215(96.5)
2010	66(4.9)	1289(95.1)
2011	64(4.6)	1318(95.4)
Total	**275(4.1)**	**6365(95.9)**

Samoans constituted approximately one-third of all Pacific students, while Tongans and Cook Islanders each made up 14% and 12% of the total Pacific student population respectively (Table 2).

Students from most Pacific ethnic groups were under-represented compared to their proportional representation in the general population, except for Fijians. The majority in the Fijian cohort were Fijian Indians.

Table 2. Ethnic affiliation of all Pacific students enrolled in the HSFY programme (2007–2011)

Ethnic affiliation	Headcount	Proportion of Pacific HSFY	Proportion of the NZ Pacific population
Cook Island Māori	33	12.0%	22%
Indigenous Fijian	20	7.3%	4%
Fijian Indian	65	23.6%	
Niuean	13	4.7%	9%
Samoan	88	32.0%	49%
Tokelauan	4	1.5%	3%
Tongan	38	13.8%	19%
Other	33	12.0%	–

Note: Percentages do not add up to 100% as students may declare up to three ethnicities at enrolment.

Four out of five enrolled Pacific students were domestic students (i.e. they were citizens or permanent residents of New Zealand) and three-quarters of all domestic Pacific students were from the North Island. Thirty-six percent were from Auckland, 19% from Wellington and 13% from Christchurch. Only five percent of all Pacific students were from the Otago area (data not shown).

In the Auckland area, two out of three Pacific students attended decile 1–4 schools, whilst almost three-quarters of non-Pacific students attended decile 8–10 schools. For the rest of New Zealand, Pacific students were spread more evenly across the three decile bands, and nearly 60% of non-Pacific students attended decile 8–10 schools (Table 3).

Pacific students had lower mean weighted NCEA scores in all five subjects compared to non-Pacific students.

The greatest difference was in Chemistry and Physics, where the average NCEA scores for non-Pacific students were approximately 40% higher than the average scores for Pacific students.

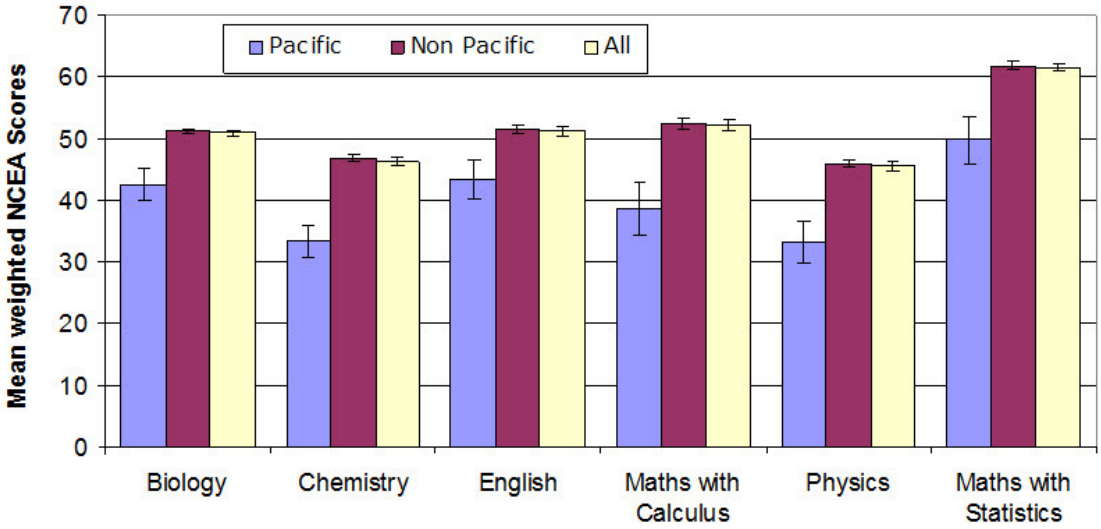
Table 3. School region and decile group for all Pacific and non-Pacific students enrolled in the HSFY programme (2007–2011)

School region	Decile	Headcount (%)		
		Pacific	Non-Pacific	Total
Auckland	1-4	56 (65.9)	193 (15.4)	249 (18.6)
	5-7	9 (10.6)	149 (11.9)	158 (11.8)
	8-10	20 (23.5)	911 (72.7)	931 (69.6)
	All	85 (100)	1253 (100)	1338 (100)
Rest of New Zealand	1-4	36 (26.7)	373 (8.6)	409 (9.1)
	5-7	52 (38.5)	1480 (34.1)	1532 (34.2)
	8-10	47 (34.8)	2493 (57.4)	2540 (56.7)
	All	135 (100)	4346 (100)	4481 (100)
All decile areas*	1-4	92 (41.8)	566 (10.1)	658 (11.3)
	5-7	61 (27.7)	1629 (29.1)	1690 (29)
	8-10	67 (30.5)	3404 (60.8)	3471 (59.6)
	All	220 (100)	5599 (100)	5819 (100)

* Total in school regions with a decile excludes those from other areas or overseas.

The average scores in Mathematics with Calculus scores were 36% higher for non-Pacific students, while scores in Biology, Mathematics with Statistics and English scores were on average approximately 20% higher. All students had lower scores in Chemistry and Physics compared with all other subjects (Figure 1).

Figure 1. School leavers mean* weighted NCEA scores for all Pacific and non-Pacific students enrolled in the HSFY programme (2007–2011)



* Intervals represent 95% confidence intervals for the means.

A regression analysis of NCEA scores showed that Pacific students had a lower score for all subjects compared to all other ethnic groups after adjusting for a number of variables.

Table 4. Regression model coefficients for ethnicity and other variables on NCEA scores[§] for school leavers enrolled in the HSFY programme (2007–2011)

Variables	Coefficient (SE)					
	Biology	Chemistry	English	Maths with Calculus	Physics	Maths with Statistics
Intercept	39.06 (1.329)***	35.438 (1.585)***	35.904 (1.646)***	42.981 (2.121)***	35.765 (1.743)***	48.72 (1.583)***
Women	1.117 (0.54)*	-0.237 (0.636)ns	5.352 (0.695)***	-0.682 (0.828)ns	-3.522 (0.679)***	-0.93 (0.644)ns
Disability	-11.369 (2.968)*	-10.925 (3.462)*	-4.65 (4.605)ns	-2.018 (5.201)ns	-7.481 (3.91)ns	-10.821 (3.576)*
International student	-10.93 (2.048)***	-5.097 (2.335)*	-8.211 (3.555)*	0.654 (2.678)ns	-9.608 (2.503)*	-5.25 (2.204)*
European	4.874 (0.95)***	3.239 (1.128)*	3.941 (1.158)*	0.634 (1.528)ns	3.087 (1.259)*	2.274 (1.123)*
Maori	-2.017 (1.124)ns	-3.69 (1.322)*	-2.178 (1.368)ns	-4.804 (1.902)*	-4.483 (1.497)*	-3.152 (1.308)*
Pacific	-5.132 (1.525)*	-10.206 (1.806)***	-4.006 (1.819)*	-10.774 (2.602)***	-9.44 (2.105)***	-8.881 (1.831)***
Asian	3.263 (0.988)*	4.473 (1.173)*	0.931 (1.211)ns	8.373 (1.582)***	4.728 (1.303)*	6.357 (1.171)***
Decile	1.009 (0.12)***	1.095 (0.142)***	1.274 (0.151)***	0.88 (0.19)***	1.201 (0.158)***	1.409 (0.144)***
Number of observations	4031	4209	2686	2230	3467	3047

* indicates significance at the 0.05 level,** significance at the 0.01 level, *** indicates significance at the 0.001 level ns – not significant

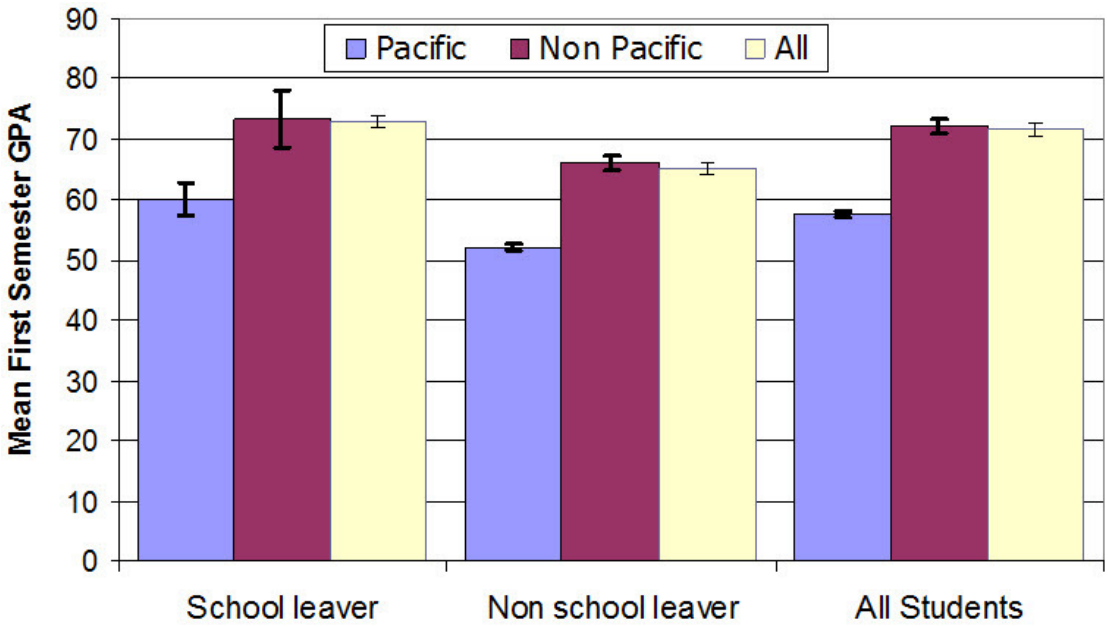
§ Students with 'zero scores' in a given subject were excluded from this analysis.

In particular Mathematics, Chemistry and Physics were the worst subjects for Pacific students. Women were more likely to do well in Biology and English but less likely to do well in Physics. Increased school decile ranking had a significant influence on all subjects (Table 4).

Approximately two out of three Pacific students entering HSFY were school leavers compared with 83% of non-Pacific students. Fewer (46%) Pacific students remained in the HSFY programme until the end of the year, compared to 68% of non-Pacific students (data not shown).

The mean first semester GPA of school leavers was higher than the mean GPA of non-school leavers, in both Pacific and non-Pacific groups. However, the mean GPA of Pacific students in the HSFY programme was lower compared to non-Pacific students for both school leavers and non school leavers (Figure 2).

Figure 2. Mean first semester GPA* in the HSFY programme by school leaver status, for all Pacific and non-Pacific students (2007-2011)



* Intervals represent 95% confidence intervals for the means.

Table 5 shows the regression analysis of HSFY scores on ethnicity and other related variables. Of all ethnicities, being Pacific had the greatest negative impact on mean first semester GPA scores. Factors that had a positive influence on first semester GPA scores were living in a residential college, enrolled in a school with a high decile rating and having high NCEA achievement.

Conversely, being female or an international student were negative influences on GPA scores.

Table 5. Regression model coefficients for ethnicity and other variables on first semester HSFY GPA scores for all students (2007–2011)

Variables	Coefficient (SE)
	First semester GPA
Constant	2.006 (0.158)***
Female	-0.351 (0.043)***
Disability affecting Study	-0.478 (0.258)ns
International Student	-0.878 (0.159)***
European	0.23 (0.077)*
Māori	-0.335 (0.091)*
Pacific	-0.714 (0.125)***
Asian	0.431 (0.08)***
Residential College	0.316 (0.057)***
NCEA or equivalent	1.827 (0.122)***
School decile	0.096 (0.01)***
Number of observations	4636

* indicates significance at the 0.05 level, ** indicates significance at the 0.01 level, *** indicates significance at the 0.001 level.

Discussion

A small but increasing number of Pacific students are enrolling in health sciences in tertiary education. Pacific students were more evenly distributed across the three school decile groups compared to non-Pacific students. Most students entered University immediately after high school (school leavers).

All Pacific groups except Fijians were under-represented in the health sciences compared to their percentage in the national population. The majority in this group were Fijian Indians. Most Pacific students (75%) were from the North Island, of which approximately one third were from Auckland.

Pacific students had lower NCEA scores and HSFY GPA compared to non-Pacific students. Chemistry, Physics and Mathematics were the worst subjects. School leavers performed better than non-school leavers.

Factors that had a significant association with academic performance in higher education were gender, NCEA results, school decile, accommodation, ethnicity, international status and having a disability.

Mismatches between population demographics and enrolment demographics at tertiary education institutions can occur for a variety of reasons.

Encouragingly, an increasing (though small) number of Pacific students are enrolling in health sciences in tertiary education. Given that the proportion of Pacific peoples in New Zealand is 7.7%, we might have expected 511 Pacific students to have enrolled in HSFY at Otago University over the study period of 2007–2011.

The actual enrolment of 275 represents a 46% shortfall based on ethnicity demographics. We have sought in this study to describe the cohort of Pacific students entering HSFY at Otago, and begin to assess factors that contribute to the success or otherwise of these students, with a view to increasing both the participation and success of Pacific students in health sciences.

The Pacific community in New Zealand is diverse. With the exception of Fijians (with the majority in this group being Fijian Indians), all Pacific groups were under-represented in HSFY relative to their proportion in the national population.

On average, student numbers in these groups were 59% of what would be expected if the cohort mirrored New Zealand society. Whilst this suggests that a Pacific-wide strategy is required to elevate student numbers, it may also be the case that ethnic-specific programmes are required, though the small numbers of students in these subgroups makes it difficult to identify sub-group specific performance factors in this study.

From an educational perspective, the Pacific students entering HSFY are likely to be amongst the highest achieving of their peer-group because of the high academic marks required for entering these restricted programmes. Despite this, their performance in key NCEA sciences was below that of their non-Pacific classmates, with the greatest discrepancies in Physics and Chemistry. This is important because our experience is that overcoming deficiencies in preparation for these subjects in HSFY is more difficult than for biological sciences.

Physics and Chemistry also comprise half of the first semester papers, and thus it is unsurprising that like performance in NCEA, Pacific students in the first semester of HSFY lags behind that of the non-Pacific cohort. There is a need also to highlight Mathematics with Calculus to prospective students, as this is of particular relevance for HSFY Physics.

In the context of increasing the proportion of Pacific participants in health professional training programmes, and by extension the health professional workforce, addressing these knowledge gaps is important. This is because selection into health professional programmes is in part based on academic performance, and progression into the second semester of HSFY is predicated on successful completion of the first semester programme. Thus, identifying factors associated with better performance in HSFY is an important step in increasing Pacific students' entry to health professional programmes.

We found that school decile (a measure of the socio-economic status of the communities in the catchment area of a school, with a decile of 1 indicating the highest proportion of low socio-economic communities) was a significant factor associated with both NCEA and HSFY performance.

Forty-two percent of Pacific students came from decile 1-4 schools (compared to 10% of non-Pacific students) and 30% came from decile 8-10 schools (compared to 61% of non-Pacific students).

Given the interrelationship between NCEA and HSFY performance and the differing socio-economic histories of Pacific and non-Pacific students, attending a low decile school is an important factor in, and arguably a barrier to success for Pacific students in the HSFY programme.

Whilst this analysis may indicate there is a "decile problem" that needs to be addressed rather than a "Pacific problem", we would contend that "Pacific solutions" need to be included in the efforts to improve outcomes.

Our regression analysis showed that being Pacific was second only to being an international student as a negative effector on school leaver performance in HSFY. Furthermore, in a separate analysis (data not shown) HSFY performance within any given decile band was worse for Pacific students than other ethnic groups.

There has been concern over the years about the poor performance of Pacific students in education institutions in New Zealand. To improve educational outcomes will not equate to a simple linear equation.

There is a need to understand better and respond appropriately to the context for Pacific peoples in Aotearoa, their migration history and lived realities in New Zealand, discrimination in the education system which are either overt or embedded in institutional processes and procedures, and have equal inclusion and participation of key stakeholders (includes Pacific staff, students, communities and families) in developing the pathway forward.[17,18,20,22]This will shift the focus from a deficit model within education institutions to a strength-based approach.[20,21]

What part can tertiary institutions play in contributing to the development of a Pacific solution? Whilst developing a pathway forward is likely to be multifactorial, not all parts of the solution will necessarily be difficult to implement. For example, our analysis shows that accommodation in a residential college has a positive effect on HSFY performance. This finding is supported by a previous study which found that living in residential colleges was a significant factor in the completion rates of students (in both actual and adjusted terms).[33]

The academic and social programmes offered by residential colleges have a key role in maintaining the previously discussed "engagement" that contributes to success in HSFY. Thus encouraging Pacific students to stay in a residential college, and assuring acceptance of Pacific students into colleges, coupled with Pacific accommodation scholarships where necessary, would be relatively easy to implement and likely be a well-placed investment.

Clearly, improving preparation from schools will improve HSFY performance. It may be that tertiary institutions need to be more proactive in the engagement of, and the provision of pathways for, Pacific students from schools into higher education. However, if policy deliberations deem this neither desirable nor achievable, tertiary institutions still have a role in maximising the success for Pacific students enrolled in the institution.

In addition to strengthening orientation programmes (e.g. the previously described POPO programme), other programmes could include early identification/prediction of Pacific students who are likely to require additional support prior to the start of the academic year. Targeted early advice and appropriate remedial and ongoing support to assist these students could contribute to improving Pacific educational outcomes, and ultimately Pacific participation in the health workforce.

Conclusion

Pacific students are under-represented in health sciences, and need better preparation from schools in science subjects. Pacific solutions are required to improve academic outcomes over and above mainstream policy solutions.

Every effort must be made to give Pacific students the opportunity to stay in a residential college especially in the first year at University. Further research is required into Pacific students' performance in low decile schools. This might identify emerging successful approaches that could be replicated elsewhere.

Tertiary institutions need earlier engagement with prospective Pacific students so they are well informed of the requirements, and to ensure they are appropriately prepared for study at the tertiary level. This is entirely consistent with the government's intention to support a "pipeline approach" where students can transition well from schools into higher education.

Competing interests: None identified.

Author information: Faafetai Sopoaga, Senior Lecturer Pacific Health, Department of Preventive and Social Medicine, University of Otago, Dunedin; Tony Zaharic, Associate Dean Admissions, Faculty of Medicine, University of Otago, Dunedin; Jesse Kokaua, Research Fellow, Pacific Islands Research & Student Support Unit, Health Sciences, University of Otago, Dunedin; Alec J Ekeroma, Senior Lecturer, Department of Obstetrics & Gynaecology, University of Auckland; Greg Murray, Analyst, Planning and Funding, University of Otago, Dunedin; Jacques van der Meer, Associate Dean Academic, College of Education, Te Kura Akau Taitoka, University of Otago, Dunedin

Correspondence: Faafetai Sopoaga, Department of Preventive and Social Medicine, Dunedin School of Medicine, University of Otago, PO Box 913, Dunedin, New Zealand. Fax: +64 (0)3 4797298; email: tai.sopoaga@otago.ac.nz

References:

1. Statistics New Zealand. Demographics of New Zealand's Pacific Population. 2006. http://www.stats.govt.nz/browse_for_stats/people_and_communities/pacific_peoples/pacific-progress-demography.aspx [Accessed 22 October 2012]
2. Ministry of Health. The Health of Pacific Peoples. 2005. http://www.moh.govt.nz/moh.nsf/pagesmh/3914 [Accessed 20 October 2012]
3. Ministry of Health. A Portrait of Health. Key results of the 2006/7 New Zealand Health Survey. 2008. http://www.moh.govt.nz/moh.nsf/0/6910156be95e706e4c2568800002e403?OpenDocument [Accessed 20 October 2012]
4. Ministry of Education. Progress against Pasifika Education Plan targets. 2012. http://www.educationcounts.govt.nz/statistics/pasifika_education/progress_against_pasifika_education_plan_targets#12 [Accessed 20 October 2012]
5. Ministry of Education. Tertiary Education Strategy 2010-2015. 2010. http://www.minedu.govt.nz/NZEducation/EducationPolicies/TertiaryEducation/PolicyAndStrategy/TertiaryEducationStrategy.aspx [Accessed 20 October 2012]
6. Tertiary Education Commission. TEC Statement of Intent for 2012/13 – 2014/15. 2012. http://www.tec.govt.nz/Documents/Publications/Statement-of-Intent-2012.pdf [Accessed 22 October 2012]
7. Ministry of Education. Pasifika Education Plan 2013-2017. 2012. http://www.minedu.govt.nz/NZEducation/EducationPolicies/PasifikaEducation/PasifikaEducationPlan2013.aspx [Accessed 22 October 2012]
8. Ministry of Health and Ministry of Pacific Island Affairs. 'Ala Mo'ui: Pathways to Pacific Health and Wellbeing 2010-2014. 2010. http://www.moh.govt.nz/moh.nsf/pagesmh/10007/$File/ala-moui-pathways-to-pacific-health-wellbeing2010-2014.pdf [Accessed 22 October 2012]

9. Ako Aotearoa. Lifting our Game : Achieving greater success for learners in foundation tertiary education.: Ako Aotearoa National Centre for Tertiary Excellence. 2012. http://akoaotearoa.ac.nz/ako-aotearoa/ako-aotearoa/news/lifting-our-game-launch-speech
10. Horrocks J, Ballantyne N, Silao A, et al. Success for Pacific Learners : The Impact of Tertiary Education Strategies. 2012. http://akoaotearoa.ac.nz/tertiary-education-strategies-pacific-learners [Accessed 22 November 2012]
11. Thompson S, McDonald F, Talakai M, et al. Training manual for teaching working with pacific students : Engaging pacific learners. 2009. http://akoaotearoa.ac.nz/ako-hub/good-practice-publication-grants-e-book/resources/pages/training-manual-engaging-pacific-learners [Accessed 22 November 2012]
12. Sopoaga F, van der Meer J. Building a Pacific health workforce in New Zealand : Initial findings from a transition project in first year health sciences at University The International Journal in the First Year at Higher Education. 2011; 2:61-68.
13. Ministry of Health. Our Health, Our Future. 1999. http://www.moh.govt.nz/moh.nsf/0/6910156be95e706e4c2568800002e403?OpenDocument [Accessed 22 November 2012]
14. Sopoaga F, Leon de la Barra S, van der Meer J, et al. Developing a health workforce from an underserved population in New Zealand. ANZJPH. 2011;35: 494-495.
15. Crampton P, Weaver N, Howard A. Holding a mirror to society? The sociodemographic characteristics of the University of Otago's health professional students. NZMJ. 2012;125:12-27.
16. Sopoaga F, van der Meer J. Investigating factors that influence success of Pacific students in first-year health sciences at university in New Zealand. NZMJ. 2012;125 :28-38.
17. Anae M, Anderson H, Benseman J, et al. Pacific peoples and tertiary education : Issues of pacific peoples and tertiary education : Issues of participation. Auckland: University of Auckland;2002.
18. Coxon E AM, Mara D, Wednt-Samu T, et al. Literature review on Pacific education issues. Auckland: University of Auckland;2002.
19. Fletcher J, Parkhill F, Fa'afoi A, et al. Pasifika students : teachers and parents voice their perceptions of what provides supports and barriers to Pasifika students' achievement in literacy and learning. Teaching and Teacher Education. 2009;25:24-33.
20. Ng Shiu RSB. Its like going to the moon. The experiences of Samoan tertiary health students at the University of Auckland. PhD thesis : Social and Community Health, The University of Auckland 2011.
21. Mila-Schaaf K, Robinson E. 'Polucultural capital" and educational achievement among New Zealand-born Pacific peoples. Mai review. 2010;1:1-18
22. Gorinski R, Fraser C. Literature Review on the Effective Engagement of Pasifika Parents & Communities in Education. Report to the Ministry of Education. . Tauranga: Bay of Plenty Polytechnic 2006.
23. Helu S, Robinson E, Grant S, et al. Youth '07 The health and wellbeing of secondary school students in New Zealand : Results for Pacific young people. Auckland: University of Auckland;2009.
24. Brown LM, Dobbina H. Students' of colour and European American students' stigma - relevant perceptions of University instructors. . J Soc Issues. 2004;60:157-174.
25. University of Otago. Health Sciences, Courses and Subjects. 2010. http://www.healthsci.otago.ac.nz/courses/index.html [Accessed 22 November 2012]
26. Tinto V. Dropout from Higher Education : A Theoretical Synthesis of Recent Research. Review of Educ Res. 1975;45:89-125.
27. Tinto V. Taking student retention seriously : Rethinking the first year of College. NACADA Journal. 2000;19:5-10.
28. Coates H. Development of the Australasian survey of student engagement (AUSSE). High Educ. July 2010;60:1-17.

29. Krause K, Coates C. Students' engagement in first-year university. Assess & Eval in Higher Educ. 2008;33:493-505.
30. Kuh GD. What we're learning about student engagement from NSSE. Change 2003. http://cpr.iub.edu/uploads/Kuh%20(2003)%20What%20We're%20Learning%20About%20Student%20Engagement%20From%20NSSE.pdf [Accessed 22 November 2012]
31. van der Meer J, Scott C. Shifting the balance : from teacher instruction to peer-learning primacy. The Aust J of Peer learning. 2008;1:70-79.
32. van der Meer J, Scott C. Students' experiences and perceptions of PASS : towards ongoing improvement The Aust J of Peer Learning. 2009;2: 3-22.
33. Clark A, Van der Meer J, van Kooten C. Establishing baseline data: using institutional data to learn more about completion factors at one New Zealand university. J of Inst Res. 2008;14 : 43-57.

