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The Northland Regional-Rural program (Pūkawakawa): broadening medical undergraduate learning in New Zealand

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A B S T R A C T

Context: Medical schools in Australasia are using a range of initiatives to increase the number of graduates working outside major centres. This article describes the design, implementation and selected outcomes of the University of Auckland's regional-rural program, Pūkawakawa. The program is based on a 'hub and spoke' model located in Northland, New Zealand, an area of 150 000 people with a high proportion of Māori and relative social deprivation.

Issue: A 27 week curriculum for 20 volunteer year 5 students was developed in collaboration with stakeholders. The curriculum had three main attachments: integrated care and general practice; women and children's health; and secondary care. These were designed to promote better continuity with patients and supervisors, and a greater likelihood of a rural career. Funding for Pūkawakawa came from existing government grants with a contribution from the Northland District Health Board. A mixed-methods evaluation of the first year was conducted.

Lessons learned: Staff and students reported high levels of satisfaction with the program and students performed at an academic level similar to their standard-program counterparts. Early reservations related to the experience of supervisors with assessment standards, and the resourcing required to maintain academic equivalence across sites. It is too soon to detect whether students'



career aspirations are altered as a result of Pūkawakawa. Areas for future study include student preparedness for later stages of training, career destination, how students learn in this environment and the benefits to the Northland region more broadly.

Key words: Indigenous, Māori, medical curriculum, medical education, New Zealand, regional health, rural medical school, student assessment.

Context

In common with many other countries New Zealand (NZ) has an acute shortage of rural and regional doctors¹⁻³. In recent years there has been a net loss of GPs, the reasons for which have been widely reported in the literature⁴⁻⁹. While a significant increase in medical student numbers is planned, multi-level interventions are needed to address workforce shortages outside urban areas⁹. This article describes the design and implementation of one such initiative, the University of Auckland's new regional-rural program.

The University of Auckland's medical program is one of two in NZ for a population of over 4 million, 15% of whom are Māori (Indigenous). Each year 155 domestic students plus several international students are admitted. Up to 50 of the domestic students enter via 2 affirmative entry pathways: up to 30 are students of Māori or Pacific origin (MAPAS) and 20 are of rural origin. All medical students undertake two rural general practice attachments (2 weeks in year 4 and 3 or 6 weeks in year 6) plus 2 or 3 attachments to urban general practice.

In late 2006, medical school leaders began discussions with stakeholders in Northland about a regional-rural program. The main goal was to develop a student learning experience that would foster the local health workforce, now and in the future. Partnerships were established with the local Northland District Health Board (NDHB), primary health providers, Māori health providers and tribes. Local Māori Elders gave the name Pūkawakawa to the program, reflecting its significance in terms of the partnership, the local geography and a traditional medicinal plant. Funding

was provided from within existing government medical student grants, with a significant contribution from NDHB.

Of the Northland population of 150 000, two-thirds live in rural settings, one-third is Māori, and two-thirds reside in the two most socioeconomically deprived decile areas¹⁰. Unlike many Australian and US rural models^{1,11-14}, Pūkawakawa was designed to combine experiences in regional and rural settings in a 'hub and spoke' model, for geographic as well as academic and social reasons¹⁵. The 223 bed regional hospital at Whangarei serves as the 'hub' or home site for students. This is 2.5 hours by road north of the main campus in Auckland. The 3 'spoke' sites are approximately 2 hours away from the hub with populations ranging from 500 to just over 5000¹⁰. These towns are served by GPs, community healthcare workers, Māori health providers and small rural hospitals staffed by local generalists and visiting sub-specialists. Two or three students are allocated to each of the spoke sites at a time.

Issue: intervention

Curriculum model

Pūkawakawa is closely aligned with other descriptions of mixed urban-rural schools¹⁶. These schools are historically urban-based with an expanded mandate to address the needs of specific rural and remote jurisdictions. They retain learning outcomes common to the urban program, but within a different geographical and service setting and with a different pattern of clinical attachments. The Pūkawakawa curriculum ran beside the standard year 5 program for 27 weeks. Students in year 5 were felt to have a sufficiently



strong base of clinical and professional skills to make the most of new learning opportunities.

The curriculum design principles and program are outlined (Fig1, Table 1). There were 3 main attachments, each longer than in the standard program with one-third of the students on each clinical attachment at a time. It was anticipated that students would have more continuity of involvement in patient care, curriculum and supervision¹⁷, and more 'hands-on' experiences. An Australian study found that rural-based students saw double the number of common medical conditions and performed 6 times as many clinical procedures¹⁸. Another driver was that rural placements of less than a month were unlikely to increase the likelihood of students choosing a career in rural practice^{15,19}. As a consequence, the integrated care and general practice attachment was 7 weeks, compared with a 2 week urban experience in the standard program.

The women and children's attachment was an intertwined timetable of paediatrics with obstetrics and gynaecology, designed to maximise the learning experience across these 2 clinical departments at Whangarei Hospital. During this time students spent 5 days with a midwife in clinics and on home visits. Some of the women and children's health learning activities took place in the integrated care and general practice attachment.

The secondary care attachment incorporated many of the activities of the standard program, especially geriatrics, ophthalmology, otolaryngology, and other aspects of surgery. Differentiating features were the attachments to acute medicine and surgery, with a broader and more undifferentiated acute case mix than is seen in metropolitan hospitals. During the secondary care attachments, students were living close to the hospital with free access to clinical areas and educational activities, such as intern teaching and hospital grand rounds. Students in the integrated care and general practice attachment were encouraged to follow patients in the local hospitals and into secondary and tertiary care settings.

Students completed 2 longitudinal case studies on selected patients, one who had a chronic medical condition and the other a woman with a complicated pregnancy. Over a period of 16 weeks at least 4 visits were made to each patient. The primary focus was not the medical aspects of the case but the wider issues of chronic disease management. Students critically examined the integrated nature of the care for the patients, involvement with patient family/whānau, broader health perspectives (eg social, cultural and economic impacts), and linkages between the relevant systems/services in the continuity of care.

Features in common with the standard program included a week-long procedural skills course at the start of year 5, taken by the standard program students at the beginning of year 6. There were 4 weeks on campus in Auckland covering core clinical and professional topics, plus a 4 week student-generated option undertaken in any discipline. The Pūkawakawa students undertook their population health project in Northland, developing a feasible strategy to address a local health problem, informed by discussions with local community agencies.

Assessment

Year 5 summative assessments for the Pūkawakawa students were similar to those in the standard program. These consisted of objective structured clinical exams (OSCEs), case presentations and supervisor reports during clinical attachments, 4 projects (including the population health group project), an end-of-year medical and surgical OSCE and 6 hours of written examinations. Results from the written examinations were combined with a grade derived from all the other assessments to determine whether students received a distinction, pass or fail for the year. To allow for the longitudinal case studies, Pūkawakawa students completed 2 fewer written case reports than students in the standard program.



- Students study an alternative, but equivalent program in order to achieve the core learning outcomes for Year 5.
- Students must live in Northland for the duration of the program and learn through immersion in clinical settings and regional communities.
- The curriculum is explicit, so students and staff are aware of expectations.
- The curriculum aims not to place an undue extra workload on students.
- The curriculum allows flexibility to maximise special learning opportunities at each teaching site.
- The Integrated Care and General Practice attachment runs over seven consecutive weeks.
- The curriculum model is to be sustainable in Northland as well as transferable to any other regional and rural programs.

Figure 1: Summary of Pūkawakawa curriculum design principles.

Table 1: Comparison of the year 5 Standard and Pūkawakawa programs

Standard program	Weeks	Pūkawakawa program	Weeks
Obstetrics & gynaecology	6	Women and children's health (hub)	8
Paediatrics	6		
General practice (urban)	2	Integrated care & general practice (spoke)	7
Specialty surgery - Ophthalmology (1 week) - ORL (1 week) - Urology (3 days) - Other (8 days)	4	Secondary care (hub) - Ophthalmology (1 week) - ORL (1 week) - Urology (3 days) - Acute surgery and subspecialist clinics (8 days)	10
Specialty Medicine	6	- Acute medicine (4 weeks)	
Geriatrics	2	- Geriatrics (2 weeks)	
Population Health Week	1	Population health week (hub)	1
		Procedural skills week	1

ORL, Otorhinolaryngology.

Students

There were 38 applicants for the 2008 program. Selection for the inaugural cohort of 20 was by ranking based on a semi-structured interview and a small weighting factor. Rural-origin students received the highest weighting, followed by MAPAS, standard domestic and international students. This resulted in nine students of rural origin, five MAPAS, five other NZ domestic and one international student. Rural-origin students were encouraged but not compelled to apply for the program. For personal reasons, one student returned late in the year to Auckland. The 2009 cohort was selected in

a similar manner and consisted of seven students of rural origin, seven MAPAS, and six other NZ domestic students.

Staff and student resources

Three new university appointments were made in Northland, namely an academic coordinator (0.5 FTE), a full-time administrator and a part-time clinical case coordinator (0.6 FTE). This person located patients prepared to be involved in the longitudinal case studies and other student teaching. While clinical teachers from the NDHB and the primary care sector provided most of the teaching and supervision, Auckland-based staff also contributed.



The NDHB provided 2 learning rooms: one with 20 computers linked to the University of Auckland network, and the other a tutorial room with videoconferencing facilities. Students had 24 hours/day, 7 days/week access to the main university resources through the intranet and to a medical library on-site. The NDHB refurbished an entire floor of the old nurses' home for student accommodation. Costs for accommodation and necessary travel between sites were met by the university. Local community organisations facilitated social activities for the students.

Program management

Initially program development was overseen by a multi-party project team. This transformed into a regional-rural curriculum committee, reporting to the MBChB Board of Studies. The initiative and evaluation plan were approved by the Board of Studies and the University's ethics committee. An independent project officer (0.8 FTE), conducted most of the evaluations, overseen by staff from the faculty's Centre for Medical and Health Sciences Education. The methods used were pre-course and post-course written questionnaires, focus groups, and individual semi-structured interviews with students, staff and stakeholders. Student achievement was also analysed. In addition to 'real-time' feedback to the project team on any pressing issues, a detailed report was supplied to the Board of Studies and other stakeholders in early 2009.

Lessons learned

Educational experience

All students ($n = 19$) completing the post-experience survey were satisfied with the Pūkawakawa experience (14 strongly so). The main reasons for satisfaction related to clinical learning opportunities, teaching and the acquisition of knowledge and skills. Students agreed they had seen a broad range of patients, and had adequate academic support, computer and library access and preparation for assessments.

Many reported better understanding of the broader aspects of healthcare delivery.

After the experience, reservations remained about two main aspects. The first was in relation to supervisor feedback. Only 42% of students agreed that their supervisors helped them identify their learning needs. Several students expressed concern about the restricted knowledge of teachers in terms of curriculum learning outcomes and preparation for the end-of-attachment and final clinical examinations. The second reservation related to a lack of clarity in the format of the longitudinal case study report. More detailed guidelines have been produced for subsequent cohorts.

The evaluation plan was sufficient for monitoring implementation and guiding curriculum improvement. Further analysis of data from this and future cohorts will enable a better understanding of learning in this environment. One project already underway is a comparison of the levels of competence and confidence during the trainee intern year between Pūkawakawa and standard program students.

Academic achievement and equivalence

All students passed the year, two with distinction. The grade distribution was similar to those in the standard program²⁰ and there was no obvious disadvantage to either group. That all students participated in the same core campus learning weeks as the standard year 5 students, as well as undergoing a similar system of assessments may have contributed to this finding. This is consistent with others' findings that performance among students studying in rural and urban settings is comparable^{11,14}. However, as students volunteered for this program and were selected after a ranking process they may not be directly comparable with their standard program counterparts. It is notable that in the past 2 years, 30% of the students on Pūkawakawa were MAPAS students (compared with 17% in the whole MBChB) and four of the five MAPAS students in the first cohort improved their ranking on the end-of-year written examinations by more than 10 places.



Concerns expressed by students prior to the year were similar to those in comparative programs. These related to perceived disadvantage in accessing relevant learning opportunities and examination preparation^{14,21}. After the experience, all except one student agreed that they were well prepared for examinations. Although Pūkawakawa students felt their supervisors were not well equipped to advise them on what to expect in the university examinations, they performed as well as their peers. Some of the anxiety may have related to a lack of familiarity with the new program among students and supervisors, but some may also be due to the usual anxiety among all year 5 students as they prepare for summative high stakes examinations.

Career intentions

It is too soon to determine whether Pūkawakawa has had an impact on career paths, or whether changes should be made to curriculum or selection criteria. Nine of the 20 students were of rural origin and it has been estimated that rural selection policies have 3 times the effect of rural curriculum exposures on the decision to practice rurally²².

Prior to the experience, 55% of students expected to work in a regional centre in the long term, 20% in a smaller town, 15% in a rural community and 10% in a major urban centre. Immediately after the experience, the proportions were not significantly different at 56%, 22%, 6% and 16%, respectively. Before Pūkawakawa, general practice was the first choice of career for 35% of the students and within the top 3 career choices for 70%. Afterwards it was the first choice of career for 28% of the students and within the top 3 career choices of 53%, which did not reach statistical significance. Thus, over 80% of students remain committed to a medical career outside urban settings. Pūkawakawa students will be studied as part of the faculty's tracking project of all graduates for at least 10 years to assess ultimate specialty and practice destination.

Staff and stakeholder views

The potential of the Pūkawakawa program generated excitement among stakeholders, enabling a quick and relatively smooth implementation. After 1 year there were high levels of satisfaction with its implementation. As many GPs had already had experience of Auckland students during the 2 rural general practice attachments in the program, there was not the degree of apprehension reported elsewhere²³. The development has hallmarks of 'symbiosis' in curriculum delivery, based upon a 'mutually reinforcing relationship between medical schools and health services, where both gain'²⁴. Already there have been related positive effects on the standard program, such as the move to cohort all year 5 students to specific health board regions in 2010, and plans for longitudinal cases in other sites.

Issues for ongoing attention are:

- better support for clinical supervisors
- maintenance of equivalence of curricula across different sites
- financial sustainability given there has been no extra funding from government
- determination of the extent of the benefits to Northland.

Conclusion

New Zealand's first regional-rural program was introduced in a short timeframe. The program has been well received by students and other stakeholders, and continues with only minor adjustments based on feedback. Longer term benefits will be watched with interest.

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