Minister of Health

Report of the Health Workforce Advisory Committee on Encouraging Māori to Work in the Health Professions

Recommendations
1. HWAC recommends that you, as Minister of Health:
   1) note that:
      • more Māori and Pacific people are needed in the health professions to both provide enough professionals to meet the future needs of the general population, and to meet the specific health needs of their communities
      • the health professions do not appear to appeal to Māori high school students and may not be considered achievable
      • many Māori are prevented from entering health professions as they do not have high school science qualifications
   2) refer this report to the Māori Health Directorate for consideration in the implementation of Raranga Tupuake
   3) ask the Māori Health Directorate to liaise with ‘FutureinTech’, and report to you on whether either:
      • a stand-alone ambassadors scheme or
      • an extension of the existing ‘FutureinTech’ scheme
      could cost-effectively encourage Māori (as well as other) high school students to take science and mathematics and go on to train for health professions. We envisage such a scheme providing role models, student mentoring, advice on careers and study pathways, and community outreach to whānau and sources of community influence
   4) relay to your colleague, the Minister of Education, and of Research, Science and Technology, HWAC’s endorsement of the following initiatives:
      • revision of the science curriculum to better link it to communities and daily life, and make it more interesting and cross-disciplinary
      • Te Kotahitanga Programme which is improving teaching of Māori students in mainstream schools through recognition that both the teacher and the students are learning from each other, and using students’ cultural capital to widen the range of science examples used in class and homework
      • ‘Quality Career Advice for Students’ – which will individually help 100 schools to review and improve their careers advice programme
      • the electronic ‘ASTEL’ tool that enables teachers to assess individual students’ areas of weakness and which provides advice on how best to address them
• the new MoRST programme to link schools and research organisations to help schools make science classes more interesting and relevant

5) **ask** the Minister of Education to:

- instruct his Ministry to work with the Māori Health Directorate and Pacific Team of the Ministry of Health to identify how the initiatives of each could be aligned to improve science outcomes for Māori and Pacific students
- undertake a best evidence synthesis review of science teaching
- provide you with annual statistics showing on Māori and Pacific students’ science achievement rates

6) **ask** the Minister for Tertiary Education to advise you of attrition rates for Māori in tertiary health courses and any causal factors

7) **ask** the Pacific Team within the Ministry of Health, and invite your colleague the Minister of Pacific Island Affairs, to advise you whether they consider any of the proposals in this report should be extended to Pacific people and communities

8) **instruct** the Pacific Team in the Ministry of Health to provide for the proposals in implementing its Pacific Health and Disability Workforce Development Plan, should these proposals be found:

- desirable for Pacific students and
- cost-effective.
Purpose of report
2. In this report the Health Workforce Advisory Committee (HWAC) sets out a number of recommendations aimed at encouraging Māori, and possibly also Pacific people, to work in the health professions.

3. Reports and sector consultation have identified that the health sector is likely to face a significant workforce shortage in the medium future and that it already faces a shortage of health professionals with an understanding of Māori and Pacific health perspectives and cultures. HWAC considers that increasing the absolute and comparative numbers of Māori and Pacific people working in health would effectively contribute to addressing both problems.

HWAC approach in developing recommendations
4. HWAC has previously identified a need for a focused analysis of Māori health and disability workforce needs and established a Māori Sub-committee. The Sub-committee’s key tasks, as set out in its 2004 Terms of Reference, are attached as Appendix A.

5. As a basis for developing recommendations the Sub-committee commissioned research into:
   - Māori and Pacific secondary students’ uptake and success rates in high school science
   - the economic benefits of increasing the Māori Health workforce.

6. A symposium was also held, which was attended by people from within the health and education sectors. Further, the Sub-committee learned of the Institute of Professional Engineers New Zealand’s (IPENZ) education and industry recruitment initiative known as ‘FutureinTech’.

7. Based on these research findings and symposium advice the Sub-committee made a number of draft recommendations to HWAC. We reformatted these to a more strategic level and asked our secretariat to investigate the extent to which Government is already giving effect to them or otherwise working towards the desired outcome.

8. We are aware, and pleased, that the Māori Health Directorate of the Ministry of Health has consulted with the Sub-committee in the development of its Raranga Tupuake Māori Workforce Development Plan 2006 and note that a number of the Sub-committee’s recommendations can be met through the implementation of that Plan. We are advised that concrete implementation activities are still being developed and we suggest that you forward our report to the Māori Health Directorate.

Applicability to Pacific students and communities
9. The Sub-committee’s Terms of Reference were focused on the future Māori workforce. However, information from the symposium has led us to conclude that the number of Pacific people in health professions also needs
to increase. In addition, education statistics show that Pacific students are also under-achieving in high school science courses.

10. Given the deadline for completing this report HWAC has been unable to further consult Pacific health users, service providers or students. Nor do we claim a comprehensive understanding of relevant existing programmes. We understand that the Ministry of Health has begun a stocktake of programmes to encourage and help Pacific people into the health sector.

11. Nonetheless, we do not wish to overlook the need to improve Pacific uptake of health professions and a number of our proposals may well be applicable to those communities. We therefore recommend that you seek the advice of the Ministry of Health’s Pacific Team and your colleague the Minister of Pacific Island Affairs on whether any of these proposals should include Pacific students and communities.

**What HWAC wants to achieve**

12. As noted above, the health sector is likely to face a significant workforce shortage and already lacks sufficient health professionals with an understanding of Māori and Pacific communities. There are three broad approaches to increasing the number of Māori and Pacific people working in health:

- removing barriers to Māori and Pacific people entering the health workforce
- actively attracting Māori and Pacific people into the sector
- measures to retain existing workers.

13. Given the low number of Māori and Pacific people in the health professions, we have chosen to focus on attracting new workers to the sector either through removal of barriers or active recruitment.

**Options for interesting Māori students in the health professions**

14. The attractiveness of the health professions to Maori needs to be addressed. Broad approaches to changing this situation include:

- showing health careers to be both “cool” and worthwhile, strongly contributing to the wellbeing of Māori communities
- providing role models and encouragement to individual students to study maths, science and tertiary health courses
- promoting these careers to the students’ communities and whānau, which influence students’ study and career decisions
- maintaining and stressing the economic incentives.

**How effective is current careers advice?**

15. MoRST research has found that most high school students do access careers advice but do not necessarily find it useful as it has not been sufficiently personalised to them. The Ministry of Education has found that the most influential sources of careers advice are, in order; peers, whānau,
teachers and then careers advisors. This is backed by MoRST research indicating that students do generally listen to parents’ advice. These findings have major implications for how to most effectively assist or influence students study and career decisions.

16. ‘FutureinTech’ has questioned careers advisors to ascertain their knowledge of science careers. The low numbers of analysed results mean that results are not statistically significant. But nonetheless, we were surprised that none of those responding showed a broad understanding of science careers (although they knew of more in the biological/ecological science areas). The respondent career advisors also had a very traditional view of the personal qualities best suited to “scientists” and a somewhat narrow understanding of career pathways.

A marketing campaign
17. We believe that a two-pronged marketing campaign to target the expectations of both:

- students, through media attractive to them and involving images of financially and personally rewarding careers that also benefit their communities
- whānau and Māori communities, with messages focused on the achievability of the career, its status and security. (This aspect of the campaign should highlight community members who have successful careers.)

should be a central tool in encouraging Māori into the health professions.

18. The campaign would need to be developed by an agency with a proven track record in changing behaviours in the Māori community. It would also need to be strongly integrated into the timetable of an ambassadors programme (see below) if it is to be effective.

An ambassadors programme
19. Isolated public-service marketing campaigns have not always been cost-effective in the past. We believe that one, such as we are proposing, would be more effective if backed by a programme of ambassadors similar to the IPENZ ‘FutureinTech’ programme. Exactly what form such an ambassadors programme should take, and how it would be administered best, would need more investigation should you wish to proceed with this recommendation. However, we would envisage it having the following features:

- Young health professionals, especially Māori, would be identified to act as ambassadors and mentors. They would visit secondary schools to engage in curriculum projects and to explain face to face why they find their jobs appealing and the career pathways they followed to get them. These interventions will need to start occurring in year 10 to reach students before they start dropping science subjects.
- Students would be able to electronically access the ambassadors.
• The information provided by ambassadors would be backed-up by a web-site which would hold case-studies of science graduates and their jobs, employers, the specific study and career paths necessary to get particular jobs, and information on courses and scholarships. The information is most likely to be accessed by the students and would be presented in a style appealing to that age group. As an example, the ‘FutureinTech’ web-site can be accessed at www.futureintech.org.nz A new web-site should be linked to the new inter-active careers advice web-site being developed by the Ministry of Education.

• The web-site and ambassadors programme would also emphasise the financial, as well as other, rewards of the health professions.

• We believe that if a ‘FutureinTech’-type programme is to encourage Māori, and possibly Pacific, students to study mathematics\(^1\), science and to take up health professions, it would need a community outreach component. In this it would differ from the existing ‘FutureinTech’. Ambassadors would need to visit key organisations in the particular communities as a way to link into whānau and change their expectations for their children and grandchildren. Whānau expectations are a powerful influence over students’ decisions on courses and careers.

Cost-effectiveness
20. While our proposed ambassadors programme would differ in some ways from the current ‘FutureinTech’ model, we had hoped that the latter would have provided some indication of likely cost-effectiveness. Unfortunately, we are advised that it is too early to have empirical data that might show a correlation between schools using ‘FutureinTech’ and an increase in the percentage of their students continuing on to tertiary study in maths, engineering or technology. This is understandable given that students can start eliminating future careers as early as primary school.

21. The Ministry of Education has also advised that an ambassadors scheme such as we envisage would align well with its themes of maximising student outcomes and involving whānau and communities. The Ministry stressed, however, that to be effective and taken up on a longterm basis, the scheme would need to be designed to directly contribute to curriculum requirements.

Administration and scope of the scheme
22. Is a new ambassadors scheme, separate from ‘FutureinTech’ necessary? Could the existing scheme be expanded to include health sciences and professions and to include an outreach component into the Māori, and possibly Pacific, communities?

23. It is reasonable to expect that the health professions will benefit from the ‘FutureinTech’ proposal as it currently exists, given that it promotes generic

\(^1\) While HWAC’s NCEA research focused on science subjects, students also need to be successful in mathematics if they are to enter many health professions.
high-school mathematics and science courses. It should also be technically feasible to extend it by:

- adding a health sciences and careers aspect to the web-site
- widening the professional range of ambassadors
- adding an outreach component to communicate with Māori whānau and communities
- targeting the scheme so as to appeal to Māori as well as other students.

24. A shared programme could potentially reduce overhead costs as well as share the benefits of a general improvement, and increased interest, in high school mathematics and science.

Is ‘FutureinTech’ independently developing a Māori and Pacific student focus?

25. There may come to be an additional reason to expand on ‘FutureinTech’ rather than develop a new stand-alone programme. New Zealand Trade and Enterprise (NZTE) has asked ‘FutureinTech’ to scope an extension of its existing programme to focus on Māori and Pacific students.

26. When our secretariat last met with the Director of ‘FutureinTech’ the final form of the scoped extension was still quite fluid, but it was expected to involve university staff in providing student mentors to Māori and Pacific students, working with the Pacific Island Forum\(^2\) in Porirua to identify families with 13 to 14 year old students with academic abilities, and working with schools. FutureinTech’s role would be as the catalyst, and to keep relationships and momentum going.

27. Another factor that might affect the structure and funding of any scheme is the range of similar or complementary initiatives that an expanded ambassadors scheme should work with. These include, but are unlikely to be limited to:

- a new MoRST programme to link schools and research organisations to help teachers make science classes more interesting and relevant
- ‘Team Up’ – the Tana Umaga advertisements are to be followed up by booklets for parents with a substantial amount of careers advice
- ‘Quality Career Advice for Students’ – This programme sets up a team of external support people to work with 100 individual schools to help them review and improve their careers advice programme. It is to be rolled out in 2007. Schools with a high number of Māori and Pacific students have priority.
- a proposed DHBNZ “branding scheme”. This will have an aim of making health careers appear more appealing to young people.

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\(^2\) An organisation established in 2002 to express the views and needs of Pacific peoples in the Porirua Community, Porirua City Council web-site, 18/7/06
28. If you support an ambassadors scheme for the health sciences and professions, further work will be needed to clarify costs and identify the best structure and funding mechanism. We recommend that you instruct the Māori Health Directorate of the Ministry of Health to liaise with ‘FutureinTech’ and report to you on these matters.

A caveat

29. For a marketing campaign and associated ambassadors scheme to succeed, their messages must be backed by those from health professionals. Those people need to emphasise the financial and other satisfactions of their careers through their daily conversations and dealings with people.

Options for removing barriers to the health professions

30. We are told that both the Ministry of Health’s Pacific and Māori Provider Development Schemes include specific projects to evaluate possible barriers to Māori and Pacific people entering and remaining in the health workforce. The sector will be interested in their future findings. In the interim, working from a first principles basis, we have considered the following options:

- further increasing the numbers of students studying science
- improving the teaching of science generally
- improving the teaching of Māori and Pacific students.

31. Ministry of Education statistics for the total high school population, show that while the percentage of students taking NCEA science subjects has decreased, the actual numbers have substantially increased (see Appendix B). However, as noted earlier in this report, we commissioned research into Māori success rates in high school science subjects. We were saddened that Māori are less likely than students generally to take high school science subjects and, when they do, are less likely to pass. Those findings are summarised in Appendix C.

32. While the absolute numbers of senior high school students taking science subjects has increased, the percentage might increase if students had more individual choice over the modules comprising the courses.

33. Without high school science qualifications Māori are prevented from proceeding into tertiary health science training and entering the health professions. This situation is not sustainable either in terms of providing the targeted health services needed by the Māori community, nor (given the growth of Māori as a proportion of the New Zealand population and future labour force) for the provision of health services to the general community.

34. The ambassadors scheme already discussed should help increase the number of Māori (and other) students with the prerequisite academic qualifications by increasing the number of such students succeeding in relevant subjects. It should also markedly improve careers advice as it will be provided in conjunction with the relevant professions and employers.
Improving the teaching of science generally

35. International comparisons have found that New Zealand high school students are doing well at science\(^3\), in particular they are able to apply the approach and concepts. Therefore, to date, the Ministry of Education has not given science teaching the same level of professional development resourcing as generic literacy and numeracy.

36. However, good teaching is key to students’ success in science and other subjects. Up to 59% of the variance in student performance is attributable to differences between teachers and classes and the Ministry of Education is aware of concerns that the way science is being taught may be causing students to find it “boring or irrelevant”\(^4\).

37. There may also be perceptions amongst students that science:
   - is only for the very brainy or else
   - requires students to totally specialise and give up other subjects that they find satisfying.

38. These perception issues may be especially damaging to Māori and Pacific students where influential student peers are unlikely to be doing as well as the general population in science and where students may have particular reasons to wish to continue to study other subjects such as Te Reo or Samoan.

39. Simply making science an educational “priority” will not in itself solve these concerns and perceptions. It would not directly address them and indeed the more priorities an organisation is presented with, the less likely it is that any will receive a real focus and be effective. MoRST has identified that no single information, nor support strategy will suffice to encourage higher levels of participation in science courses.

40. To this end the science curriculum is being revised\(^5\). The new curriculum is expected to address the above concerns and perceptions by:
   - better relating science to daily life and future careers
   - ceasing to teach it either as a set of everlasting hard facts or as a pure method of testing hypotheses
   - providing further opportunities for a more cross-disciplinary approach
   - linking with students, research and business communities (as does the current technology curriculum).

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\(^3\) They are in the second-best tranche of countries for 15 year olds along with Canada and Australia. It was noted that the first tranche in these studies often consists of only one or two countries. PISA OECD study


\(^5\) A draft is currently out in the public for consultation
41. While the new science curriculum is not specifically targeted at Māori or Pacific students, but rather at encouraging all students to study the sciences, it should make some contribution towards encouraging Māori and Pacific students to continue studying science. This should particularly be the case, when combined with the measures below which are aimed at improving the teaching of diverse students.

**Improving the teaching of Māori and Pacific students**

42. Measures to improve the teaching of diverse students discussed below, should also assist Māori and Pacific science students.

43. As with teaching science, 2003 research concludes that there is no simple, single answer as to how to more successfully teach Māori and Pacific students. While increasing teachers’ expectations of these students is necessary, it is not sufficient, and indeed can be counter-productive if not backed up by good teaching.

44. Further, there is evidence that some teachers’ previous attempts to be culturally sensitive have been counter-productive. Examples include:

- teachers avoiding asking questions of shy or non-self-promoting students
- kinaesthetic teaching methods, which have been perceived by some teachers as “best” for Māori but which evidence shows to be less effective.

45. Strategies recently employed to improve the school achievement rates of Māori and diverse other students include:

- teachers making the class culture explicit to students i.e. questioning both the science and the teacher is encouraged. Some Pacific students have avoided this in case it was seen as disrespectful to the knowledge or the teacher
- waiting for less forthcoming students to answer questions
- reciprocal learning where the teacher recognises that he or she is learning from the students as well as vice versa. This is important as it allows a student’s personal cultural capital to be brought to play in class which encourages the student, widens everyone’s understanding of the application of science and may help encourage the student to ask for further explanation because it increases their trust. Reciprocal teaching is being promoted as part of the Ministry of Education’s Te Kotahitanga programme which aims at better teaching of Māori students in mainstream schools. Research is showing that since this programme began Māori students have had better retention and achievement rates at high school. This programme received a major budget increase in 2006 and for out-years

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• ASTEL, an electronic tool that enables teachers to assess individual students’ areas of weakness and provides advice on how best to address them. While applicable to all students, it should also help teachers address any particular learning needs of Māori and/or Pacific students.

**Improving inter-departmental liaison**

46. HWAC endorses these programmes but believes that greater liaison between the Ministries of Health and Education is desirable to identify how the initiatives of each could be further strengthened and aligned. We suggest that you formally request your colleague, the Minister of Education, to both:

• instruct his Ministry to work more closely with the Ministry of Health on improving science outcomes generally, and for Māori and Pacific students in particular:

• provide you annually with statistics showing whether the number of Māori and Pacific students succeeding in science is increasing.

**Slipping between the cracks**

47. The Sub-committee was concerned that a number of students could potentially slip out of the education escalator in the summer period between finishing high school and commencing at a tertiary institution. Again this can be addressed through the mentoring aspect of an ambassadors scheme. Schools can also address this through encouraging and helping students to enrol in advance at tertiary institutions before they finish high school. It is not necessary to receive assessment results before enrolling. Fundamentally, however, the student needs to take responsibility for turning up to the tertiary course, given they meet the entrance prerequisites.

**Bridging courses**

48. As well as increasing the number of Māori and Pacific secondary students entering tertiary health and science courses, numbers can also be increased by attracting people who have already left the formal education system. As the majority of these will not have year 13 science and mathematics qualifications they will need to gain these skills and knowledge prior to commencing the tertiary courses. Such courses can also help students to build, or rediscover, good study habits and methodologies. Without this knowledge and skill set many of these students will find the course an unnecessary struggle and possibly fail.

49. Bridging courses are run by most tertiary institutions. Examples include Auckland University’s ‘Health Sciences Certificate’ and Victoria’s ‘Science and Technology Transition Course’, ‘Mathematics Bridging Programme’, and ‘Certificate of University Preparation’. These courses are being developed by the tertiary institutions themselves and can vary substantially. While this does make for a more complex picture for potential adult students, the Ministry of Education believes it allows bridging courses to be better tailored to the needs of particular regions and the particular recipient tertiary level courses.
50. It has been asked whether bridging courses are over-estimating the skills and knowledge students have on entering such courses. Institutes of technology and polytechnics (which do provide some health profession training, for example nursing courses) often provide not only bridging courses but also lower level "foundation skills" courses.

**Another caveat**

51. While this report has focused on getting students enrolled in tertiary health courses, this will not be effective in achieving our desired outcome of more Māori and Pacific health professionals, if the students are not completing and graduating these quite long study paths.

52. Again we have heard anecdotally that there may be an especially high attrition rate of Māori and Pacific students in these tertiary courses. While we do not know if this report has empirical backing or is representative, we do believe it would be worthwhile for attrition rates, and any causal factors, to be checked out. We suggest that you ask the Minister for Tertiary Education to look into this issue.

**Financial barriers**

53. The financial burden of study was raised by the Sub-committee and those at a symposium as a potential barrier to people, including Māori, studying for health professions. Various combinations of scholarships and bonding programmes were mooted.

54. While people studying for the health professions are likely to incur loans, any associated financial risk should be outweighed by the level of future salaries. Recently, Government has changed the student loan regime so that loans are interest free so long as students continue to live in New Zealand. This should significantly reduce financial barriers to study.

55. In addition a wide range of non-loan financial assistance for study is available. Sources include:

- **Step-up scholarships** available through the Ministry of Social Development (MSD). These are available to low-income, full-time, first year tertiary students and meet compulsory tuition fees totalling $3,000 or more per annum (students must pay the first $1,000 pa). This scheme involves one year’s bonding

- **Bonded Merit Scholarships** available through MSD for second and later years of bachelors courses. This scheme can meet up to $3,000 per annum in course fees and involves bonding. 500 scholarships were awarded in 2006 and 1000 will be awarded in future years

- **Student Allowances.** These allowances are income-tested and abate

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7 The Ministry of Education has told us that of a medical school’s Year One intake of 20 Māori students only 4 graduated.
• Training Incentive Allowances, to pay course fees, childcare, transport and disability costs, are available to some beneficiaries. Bridging courses are eligible
• 90 Māori Health Scholarships of $1,500, available through the Ministry of Health
• $350,000 of Ministry of Health scholarships for Pacific people taking third year study
• over 25 Māori Education Trust Scholarships worth up to $5,000 each
• a range of iwi-linked scholarships
• a wide range of non-government scholarships that are not linked to ethnicity
• a range of scholarships aimed at the high school level. The Ministry of Health which provides some high school scholarships is currently finding that demand is lower than supply. The Ministry of Education is piloting a programme to see if making the training allowance available for high school students would be effective in increasing academic success.

56. The multitude and scale of finance available suggests that cost itself need not be a barrier to undertaking training for a health profession. However, for the above to effective, potential students need to know that they exist and how to access them. This information is currently available through a number of web-sites and through careers advisors. The ambassadors programme could also include this information in an easily accessible form on its web-site.

Need for on-going monitoring and evaluation
57. The Sub-committee recognised that DHB Māori managers will have personal understanding of the ongoing and changing barriers that Māori may face in entering the health professions. The sub-committee was keen to see that knowledge feed into workforce development initiatives. We are advised that these managers have had significant input into the Raranga Tupuake. HWAC believes that the Māori managers of DHBs should be consulted as part of the monitoring and evaluation of those plans. (This would be in addition to their important, informal, role of promoting the health professions to young Maori. DHB Maori managers are well-placed to do that.)

58. Both the Raranga Tupuake and the Pacific Health and Disability Workforce Development Plan provide for the monitoring and evaluation of initiatives actioned under the aegis of those plans. Generally HWAC sees no added value in recommending any further monitoring and evaluation of Ministry of Health initiatives to develop the Māori and/or Pacific health workforces. An exception to this would occur, should you choose to establish a mentoring/ambassador programme. This would be an additional programme with a significant on-going expense and should be evaluated.
From an efficiency perspective you could ask the Māori Health Directorate to include it in its monitoring and evaluation programme.

59. Ministry of Education initiatives to improve the standards of teaching and careers advice are also monitored and evaluated. That Ministry has a process known as the “Best Evidence Synthesis” which draws together evidence about what produces better learning and which can link teaching practices to improved learning. To date this process has not been specifically directed at science teaching.

60. We therefore recommend that you ask your colleague, the Minister of Education, to:
   - provide you with annual statistics showing Māori and Pacific students’ science achievement rates
   - undertake a Best Evidence Synthesis review of science teaching.

61. In addition to the Best Evidence Synthesis, the Education Review Office is to provide iterative evaluation of the ‘Quality Career Advice for Students’ initiative to enable continuous improvement.
Appendix A

Key Tasks of the Māori Health and Disability Workforce Sub-committee of the Health Workforce Advisory Committee

Source: Terms of Reference 2004

The Māori Health and Disability Workforce Sub-committee’s key tasks, in line with HWAC’s Terms of Reference and with regard to available resources, are to:

- provide independent advice on Māori health and disability workforce development issues to the Minister of Health in collaboration with HWAC
- facilitate collaboration between health providers and education providers on where to allocate Māori health and disability workforce development funding consistent with the strategic direction of health and disability workforce development
- monitor other organisations on their delivery of Māori health and disability workforce development such as Tertiary Education Commission and the Clinical Training Agency
- monitor and evaluate the implementation of HWAC’s recommendations to the Minister of Health in relation to progressing Māori health and disability workforce development.
Appendix B

Numbers and Percentages of High School Students Taking Science Subjects

Source: Ministry of Education

The following tables are not broken down by ethnicity.

Changes in numbers and percentages of secondary school students studying science:

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<td>2002</td>
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</tbody>
</table>

Reading the unbolded student numbers across the rows of the tables shows that the absolute numbers of students taking science have increased, especially in year 13.

Biology has seen a greater percentage decrease than the other science subjects. However, in the past biology was often perceived as a “soft” science and taken as a “fill-in” course that would not be studied further. To the extent that the drop in the percentage of students taking biology is composed of such students, it is unlikely to have altered the percentage of students with the necessary prerequisite results, or desire, to go on to tertiary health science courses.
Appendix C

Summary of findings on the uptake of, and success in, science by Māori and Pacific\(^8\) secondary school students

Source: Participation and Achievement in Secondary School Science by New Zealand Māori Students – An Internal Background Paper for the HWAC Māori Health and Disability Workforce Subcommittee

Key Findings:

The table below demonstrates that Māori are less likely than secondary school students as a whole to take external science assessments.

<table>
<thead>
<tr>
<th>Year</th>
<th>% of students in years 11 to 13 identifying as Māori (2004)</th>
<th>% of external assessments in science sat by Māori in 2002 to 04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 11</td>
<td>18.2 level 1</td>
<td>10.7%</td>
</tr>
<tr>
<td>Year 12</td>
<td>14.3 level 2</td>
<td>6.5%</td>
</tr>
<tr>
<td>Year 13</td>
<td>11.5 Level 3</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

The second table shows that when Māori do elect to take external science assessments, they are less likely to pass. The low pass rate is more pronounced for Pacific students.

<table>
<thead>
<tr>
<th>Non-achievement rates in external assessments in science</th>
<th>NZ Māori %</th>
<th>Pacific %</th>
<th>All students %</th>
</tr>
</thead>
<tbody>
<tr>
<td>level 1 (in 2002 to 2004)</td>
<td>59.0</td>
<td>63.2</td>
<td>39.6</td>
</tr>
<tr>
<td>level 2 (in 2003 to 2004)</td>
<td>55.5</td>
<td>60.0</td>
<td>39.1</td>
</tr>
<tr>
<td>level 3 (in 2004)</td>
<td>60.2</td>
<td>66.6</td>
<td>45.1</td>
</tr>
</tbody>
</table>

Using external assessment data only, rather than including internal assessment data, is likely to under-represent Māori students taking science, but not enough to change the conclusions that Māori students are less likely to take science as a subject and are less likely to succeed when they do so.

Other data suggests that Māori and Pacific students who do take science do less well in that subject than they generally do in others.

\(^8\) Although Māori students were the focus of the paper, it should be noted that the statistics appear to reveal significant issues for Pacific students as well.
Explanation and application of the information:

The following table explains the relationships between some terminology:

<table>
<thead>
<tr>
<th>Level of standard</th>
<th>Title of school year usually associated with a level</th>
<th>Old term for that school year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Year 11</td>
<td>5th form</td>
</tr>
<tr>
<td>Level 2</td>
<td>Year 12</td>
<td>6th form</td>
</tr>
<tr>
<td>Level 3</td>
<td>Year 13</td>
<td>7th form</td>
</tr>
</tbody>
</table>

Qualifications on findings:

The following qualifications to the above findings should be noted:

- There is no robust data that can be used to reliably identify patterns of participation in secondary schools in specific subject areas. It is still possible, however, to use the data to obtain a general indication of likely participation patterns.

- Data is not available on how many individual students are actually gaining NCEA achievement standards in an area.

- As the NCEA has been in place for only a short time, average data may be skewed by large differences between years, and may not indicate long-term patterns.
Source material

Hard copy documents:
‘Staying In Science’ MORST, April 2006
‘Staying In Science’ NZ Council for Educational Research, 2005
‘FutureinTech: Mediating the Science Education/Science Community Gap’, Dr Vicki Compton, University of Auckland
‘Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis’, Ministry of Education, 2003,

Web-sites:
Porirua City Council web-site, 18/7/06.
Ministry of Education web-site

E-mails and verbal advice:
Ministry of Research, Science and Technology
Ministry of Education
‘FutureinTech’