A. He Karakia Whakatipuranga—A Blessing for Growth and Wellbeing

“Manawa mai te mauri nuku” “Beats the Lifeforce within
Manawa mai te mauri rangi Beats the Lifeforce hereabout
Ko te mauri kai au. He mauri tipua The Lifeforce consuming me, Tis’ ancestral
Ka pakaru mai te Pō Shattered is the Night!
Tau mai te mauri The Lifeforce appeased
Haumie! Entwined! Gathered!
Hui e Taiki e!!” Tis’ Proclaimed!”

B. PHARMAC—the New Zealand government agency that decides which pharmaceuticals to publicly fund—makes choices about district health boards’ (DHBs’) spending on vaccines, community and cancer medicines; decides about the medicines funded in DHB hospitals; and is working towards budget management of hospital medicines and medical devices.

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C. PHARMAC’s Statement of Intent (SOI) is a statutory accountability document to guide it over the medium-term, SOIs being are required of all Crown entities (https://treasury.govt.nz/information-and-services/state-sector-leadership/guidance/strategic-intentions-and-statements-intent). In its SOI for 2017/18–2020/21,2 PHARMAC has set its strategic Bold Goals by 2025.

D. (i) With eligibility, guidance is provided by the Ministry of Health; eligibility here is as a right to be considered for publicly funded health or disability services, not an entitlement to receive any particular service.12 (ii) Note that some Pacific peoples in New Zealand are not eligible, due to their residency or citizenship status.

E. Equality and equity are variously defined10,11 as

- Health equality—a description of ‘sameness’ in health.
- Health equity—an ethical principle concerning the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage,10 where equity is the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or geographically.11
- Health inequity—the presence of systematic disparities in health between groups;10 or health inequity involves more than inequality with respect to health determinants, access to the resources needed to improve and maintain health or health outcomes—it also entails a failure to avoid or overcome inequalities that infringe on fairness and human rights norms.11

The New Zealand Medical Association (NZMA) uses the term ‘equity’ (not ‘equality’) because equity better recognises that people differ in their capacity for health and their ability to attain or maintain health. Consequently, equitable outcomes in health may require different (ie, unequal) inputs to achieve the same result. This is the concept of vertical equity (unequal, or preferential, treatment for unequals) in contrast to horizontal equity (equal treatment for equals).10

F. This article uses the term ‘inequities’ rather than ‘disparities’.9,10 ‘Disparities’ however is the term used formally within PHARMAC’s Factors for Consideration7 for populations experiencing negative health outcomes (compared with more positive health outcomes in the rest of the New Zealand population).

G. With PHARMAC’s Māori Responsiveness Strategy etc, the wider legal framework within which PHARMAC, a Crown agent,15 operates includes te Tiriti o Waitangi (the Treaty of Waitangi). To help give effect to these te Tiriti/Treaty partnership obligations, since 2016 PHARMAC has factored the areas of health need considered by Māori to be most important to Māori, alongside consideration of the evidence of clinical need for populations experiencing health disparities, which also includes Māori.7 Additional to the general statutory requirement to secure best health outcomes, PHARMAC also has a responsibility to ensure that Māori are able to access appropriate medicines.
There is clear evidence of inequities in health outcomes between ethnic groups in Aotearoa/New Zealand. According to recent data from Statistics New Zealand, for example, life expectancy at birth in 2013 was 73.0 years for Māori males and 77.1 years for Māori females, compared with 80.3 years for non-Māori males and 83.9 years for non-Māori females. The Māori infant mortality rate was also higher than the national average. Exposure to health risks and morbidity are generally higher among Māori than non-Māori, reflecting inequities in the social determinants of health. Māori have higher rates of cardiovascular disorders, asthma, diabetes, raised blood pressure, lung cancer, substance use disorders, suicide and mental health problems than non-Māori. In the most recent New Zealand Burden of Disease (NZBD) study, for cardiovascular disorders and diabetes, health loss for Māori was 2.5 times higher than for the non-Māori, after accounting for age structure and population size differences. These inequities represent significant, avoidable morbidity and mortality for Māori. For example, had Māori experienced similar mortality and morbidity rates to non-Māori for diseases occurring in 2006, 67,000 fewer years of healthy life would have been lost across the whole population in that year. Eliminating inequity in health outcomes would have reduced the burden of disease in the whole population by 7% and in the Māori population by 42%.

Analysis on the New Zealand College of Public Health Medicine’s website at https://www.nzcphm.org.nz/media/95762/2006_daly_losses.pdf depicts how, in 2006 (the only year that such pan-category burden of disease analysis has been available for New Zealand), of all combined categories integrating burden by disease, risk factors and crude inequity (Māori vs non-Māori), including double counting (totalling 1.5 million DALYs lost, where true disease burden across disease and injury alone was 955,230 DALYL, of which risk factors contributed to 417,753 DALYL), excess disease burden in Māori vs non-Māori had the highest DALYs lost, losing some 118,954 DALYs.

Inequity in health is ‘fiscal failure’ as well as ‘moral failure’, because health equity helps improve economic performance. It makes sense to invest in health by investing to improve health equity; acting to reduce health inequities benefits both the economy and wider society.

New Zealand-wide data on use of medicines subsidised in the community by being listed in the New Zealand Pharmaceutical Schedule was and is available, linking prescriptions dispensed with anonymised age, gender and ethnicity data.

For the updated analysis, only dispensing claims for prescriptions issued to individual patients and with valid NHI numbers were included. Dispensings without an NHI or with invalid NHIs were excluded. To account for excluded dispensing claims, all dispersed medicines with complete NHIs were scaled up.
O. For data linking, first, based on the NZF and MIMS, the main clinical indication(s) of each dispensed medicine were determined; then WHO ICD 10 code(s) were identified for the main indication(s) for which the dispensed medicines were used; then each formulation of the dispensed medicine was linked to the NZBDIRF Study’s broader and specific disease group codes.

P. Inequalities in disease burden and medicine usage between ethnic groups were reported using absolute and relative scales of measurement. Absolute disparities in disease burden estimates (ie, DALY counts) and medicine access/persistence were estimated using differences in standardised rates, being differences in age-standardised rates for DALYs or dispensed scripts between Māori and non-Māori populations. Relative disparities were estimated using standardised rate ratios, being the ratios of the age standardised DALY or dispensed scripts for the two groups. Change in percent difference of age standardised script rates and ratio of rate ratios was used to measure relative inequalities over two time periods. Refer to the UniServices report for details.

Q. A simpler expression of gap formulae, than previously, would be (source: Martin Tobias):

\[ \text{Gap} = \text{Observed} - \text{Expected} \quad \text{(absolute scale)} \]
\[ \text{Gap} = \frac{\text{Observed} - \text{Expected}}{\text{Expected}} \quad \text{(relative scale)} \]

where:
- \( \text{Gap (G)} \) = shortfall or excess in medicines use
- \( \text{Observed (O)} \) = actual volume of dispensings to group of interest (summed over all ages for both genders)
- \( \text{Expected (E)} \) = volume of dispensings that would have been found if the comparator group had the same population size, age structure and health need as the group of interest

(above is for each Rx or indication based therapeutic group (IBTG) for each study year)

In mathematical notation:
\[ E = [A\text{SR}_c] D P \]

where:
- \( \text{ASR}_c = \text{age standardised dispensing rate for the comparator group in the study year} \)
- \( D = \text{age standardised DALY rate ratio (group of interest/comparator group) for the disease or disease group mapped to Rx/IBTG concerned} \)
- \( P = \text{total population of group of interest} \)

(Note that if ASR is expressed per capita, then P is the actual population count; if ASR is expressed as a rate per thousand, then P must also be expressed in thousands.)

R. Definitions of ‘access’ and ‘persistence’:
- Access is differential dispensing to Māori of first prescriptions (index scripts), compared with what numbers would be if non-Māori. It is the variation in numbers of Māori people (less or more patients) accessing medicines compared with access in non-Māori after adjusting for population size, age structure and disease burden.
- Persistence is the subsequent residual variation in overall numbers of scripts dispensed due to variations in subsequent scripts per index patient, ie, the individualised frequency of subsequent scripts dispensed to those Māori who had an initial script. It also adjusts, in effect, for age structure and disease burden.

S. To make valid comparisons between the two time periods, newly funded medicines (since 2006/07) and 2006/07 medicines no longer funded in 2012/13 were excluded from this part of analysis, ie, the second key cohort. The overall disease burden-ad-
justed inequalities in medicine dispensings between Māori and non-Māori widened by 5.6%, being 0.944 ratio of rate ratios, comparing the Māori vs non-Māori age-standardised rate ratio overall in 2012/2013 (0.594) against that in 2006/2007 (0.629), where 0.594/0.629=0.944. The 5.6% change in relative uptake (M:nM, adjusted for age, population and disease burden) over the six years (2012/13 vs 2006/07) was statistically significant—RR 0.944, 95% CI 0.910–0.980; however, the uncertainty limit was 0.552 to 1.615 (accounting for additional nonsampling error—with measurement error from model instability in the input nonfatal health loss (YLD) component of disease burden inputs, and model specification error from pharmaceuticals/disease mapping).

Hence, there was definitely no improvement in the overall pattern of medicine inequity over the six years, and no certain actual deterioration (that could not be ruled out by possible modelling uncertainty). See Statistical Appendix for further detail.

T. Access age-standardised rate ratio overall 0.577 in 2012/13 ÷ 0.649 in 2006/07, = -11% relative change; persistence age-standardised rate ratio overall 0.583 in 2012/13 ÷ 0.570 in 2006/07 = +2% relative change.

U. Key caveats and limitations include, but are not confined to:

- The use of the WHO reference population for age standardisation privileges the non-Māori population's mortality experience, potentially influencing our estimates of disparities between the two populations, eg, only 3.5% of Māori are aged 65 years or more, compared with 13% of non-Māori.
- Dichotomous grouping of the cohort into Māori and non-Māori for the disease burden adjusted analysis introduces unmeasured confounding. (The dispensing of medicines to Pacific people and, for some conditions, South Asian groups mirrors that for Māori, but both Pacific People and South Asians were categorised as NZEO.)
- Dispensed medicines may or may not be taken by the patient, thus refill rates might not accurately represent actual medicine-taking behaviours.
- The dispensing claims database does not allow accurate assessment of the indication for a given medicine.
- A specific medicine is only linked to one specific medical condition; however, some medicines have multiple indications and can be used for several purposes.
- The analysis has limited scope to allow detailed review of antibiotics, cancer and cardiovascular medicines for specific disease conditions.
- There is no absolute measure for disparity/inequity.
- Once adjusted for burden of disease, inequalities could be one of three things:
  - True disparities—Māori not receiving sufficient of a medicine if at all, thus lost health gain opportunities;
  - Wastage—the non-Māori comparator group is receiving excess medicines, unnecessarily, without real gains;
  - Harm—Māori are receiving excess medicines of lesser benefit and thus experience harm, ie, net health loss, compared with the non-Māori comparator group.

The analyses are unable to differentiate between the three.

- ‘Scripts dispensed’ is not the same as ‘medicines prescribed’; many prescriptions are either not presented or not collected at pharmacies, and Māori are more likely to have uncollected prescriptions due to cost barriers. It is impossible to tell the extent that failure to dispense represents a systematic failure to prescribe or a systematic failure to ensure that prescriptions are filled.
V. Direct comparison of findings from Metcalfe et al\(^4\) and the updated analysis\(^3\) is invalid for several reasons:

- The two studies used different methods to derive the 2006/7 population.
- The data in the update and that from Metcalfe et al derived from different sources. The analysis in the updated report used burden of disease estimates contemporary to the dispensing data, and the updated New Zealand Burden of Disease, Injury and Risk Factors Study\(^21,41\) used a different disease categorisation methodology based on the World Health Organization ICD10 codes and did not discount disability-adjusted life year (DALY) losses over time, whereas Metcalfe et al needed to use outdated historical New Zealand Burden of Disease Study disease burden estimates that were based on ICD9-CM codes and which did discount DALY losses over time.
- Crucially, script rates and DALY estimates in the updated report were age standardised to the (older age structured) WHO standard reference population, rather than the (younger age structured) Segi standard population used in Metcalfe et al's study. Both standards were necessary to align with the corresponding quite separate burden of disease study datasets. But the use of different standard reference populations, regardless of necessity, causes inevitable distortions, at times large.
- The two studies differ in the number of dispensed medicines linked to clinical indications.
- In UniServices' update analysis, medicines dispensed to people who died during the study periods were excluded, whereas they were included in Metcalfe et al's preliminary study.

W. Although equity is an ethical concept, and inequities cannot be measured using standard quantitative tools,\(^18\) nonetheless analysis of the fairness/unfairness and avoidability/unavoidability of any differences can expose inequities.

X. “Broader health system” here refers to all sectors integral to the wider social, economic and environmental determinants of health,\(^30\) eg, health, education, housing, etc. Wider determinants of health are the factors outside of the health system that contribute to people's health and wellbeing, including housing, income, education and employment.\(^30\)

Y. Under the United Nations Declaration on the Rights of Indigenous People (UNDRIP), article 24 states\(^{51}\)

> “1. Indigenous peoples have the right to...access, without any discrimination, to all social and health services.
> 2. Indigenous individuals have an equal right to the enjoyment of the highest attainable standard of physical and mental health. States shall take the necessary steps with a view to achieving progressively the full realization of this right.”

Te Whaioranga 2013–2023, PHARMAC’s Māori Responsiveness Strategy,\(^{12}\) notes that te Tiriti o Waitangi is complemented by the Declaration on the Rights of Indigenous Peoples adopted by the United Nations General Assembly in 2007\(^{50,51}\) and supported by the New Zealand Government in April 2010.\(^{52}\) Te Whaioranga also comments the Declaration provides international support to te Tiriti on responsible government, tino rangatiratanga and equal rights for all, including for health (articles 21, 24 and 43 of the Declaration\(^{51}\)).

Z. Cultural safety vs cultural competence: Both cultural competence and safety relate to the relationship between the helper and the person being helped. However, cultural safety centres on the experiences of the patient, whereas cultural competence focuses on the capacity of the health worker to improve health status by integrating culture into the clinical context.\(^{79}\)