Indicators of Inequality

Classification and selection of ethnic health disparity indicators

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Foreword

In 1999 the Government announced its *Reducing Inequalities* policy initiative. This initiative gives priority to reducing disparities in social and economic outcomes – including health outcomes – for disadvantaged New Zealanders. An intersectoral work programme has been put in place to ensure that measurable progress is made over the next three years to reduce these disparities. The work programme includes three broad strategies:

- public sector reform
- capacity building
- specific sector initiatives.

Running parallel to the *Reducing Inequalities* work programme is a significant programme of change within the health sector. This change is aimed at improving the health sector's capacity to:

- address the determinants of health
- address disparities in health
- implement comprehensive programmes.

The recently released *New Zealand Health Strategy* sets the platform for this change and identifies the Government's priority areas. It identifies broad goals and more focused objectives, which encompass the social and economic determinants of health. Strategies to reduce socioeconomic and ethnic inequalities in health will be developed within this framework, based on full consultation with the affected communities and the district health boards.

Linkage between the *Reducing Inequalities* and *New Zealand Health Strategy* work programmes will be achieved partly through the development of a Māori Health Strategy and a Pacific Health and Disability Action Plan. Both of these strategies will require a capability to measure and monitor ethnic inequalities in health.

This report, *Indicators of Inequality*, is intended to assist in the development of this capability by providing a classification for health indicators and criteria for their selection. The report should be read in conjunction with a more general review of ethnic health statistics, *Monitoring Ethnic Inequalities in Health*, published earlier this year by the Ministry of Health.

Comments on this report should be sent to Public Health Intelligence, Ministry of Health, PO Box 5013, Wellington.

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Acknowledgements and Disclaimer

Opinions expressed in this report are those of the author, and should not be construed as representing the view of the Ministry of Health.

Introduction

In 1998 Te Puni Kökiri (TPK) published a monitoring report, *Progress Towards Closing Social and Economic Gaps Between Mäori and Non-Mäori* (TPK 1998). This report included a set of health indicators, together with indicators for education, labour, income and housing. In May 2000 TPK updated this report (TPK 2000) and revised the indicators (including the addition of criminal justice indicators). TPK intends to further update and refine the report at regular (probably biennial) intervals, as part of the process for setting the agenda for, and monitoring progress towards, social equity.

The Ministry of Pacific Island Affairs has been examining the suitability of the TPK health indicators for measuring and monitoring the health disparity between Pacific peoples and other New Zealanders (Rachel Enosa, personal communication, February 2001), while the Ministry of Women's Affairs has done likewise for the selection of indicators appropriate for gender analysis (Penny Nicholas, personal communication, March 2001).

To assist with these and related initiatives, the Public Health Intelligence Group within the Ministry of Health has developed criteria for selection of ethnic disparity indicators in the health field. This task has been informed by work carried out for the *Our Health Our Future* report (Ministry of Health 1999), in particular the analyses of health expectancy, burden of disease, and avoidable mortality and morbidity.

Indicators of Inequality is intended to provide social policy agencies and health sector organisations interested in measuring and monitoring ethnic inequalities in health with a tool

kit comprising:

- a classification of disparity indicators
- a menu of potential indicators
- criteria for selecting indicators from this menu.

Broader issues relating to the construct of ethnicity itself, and the collection, analysis and interpretation of ethnic health statistics in New Zealand, are included in a separate report *Monitoring Ethnic Inequalities in Health* (Ministry of Health 2001a), which should be read in conjunction with this report.

1   Concepts and Definitions

Health

The concept of health is complex and at least partially culturally determined. The approach adopted in this report is to view health as a two-dimensional construct, comprising 'quantity of life' (mortality) and 'quality of life' (morbidity or disability) dimensions (Ministry of Health 1999; Murray and Lopez 1996). Ideally, health would be measured using a time-based unit that integrates both of these dimensions, since policy choices often involve trading off quality for length of life.

Although measuring survival is straightforward, it still requires a number of choices to be made. In particular it could be argued that it is the age of death, not the fact of death, that is the health indicator (since we all must die some time). So the need is for an indicator of the social burden of mortality – that is, the *prematurity* of death – rather than simply the rate or risk of mortality experienced by the group.

By contrast, the measurement of health-related quality of life (HRQOL) is complex and to some extent culturally bounded. In practice, non-fatal health states are typically described in terms of functional limitation (disability) rather than positive wellbeing, and the assumption is made that physical and mental functioning can be measured separately and independently of each other. It is also customary to identify social and spiritual dimensions, but in practice they tend to reduce to aspects of mental functioning. This may seem a very reductionist and limited view of HRQOL, but it represents a step forward from merely focusing on mortality – which in practice is still what tends to happen. It is worth noting that the New Zealand Burden of Disease Study (Ministry of Health 2001b) found that both fatal and non-fatal outcomes contribute about equally to the social burden of health loss in New Zealand today (for all ethnic groups).

The health construct used in this report by no means denies the validity of other constructs of health for different cultures or ethnic groups. Indeed, both Māori and Pacific cultures have traditionally favoured a more holistic concept of health, one which does not acknowledge the separability of physical from mental functioning, or even of 'health' from 'non-health' wellbeing (Scott et al 2000). Such concepts lead to indicators very different from those discussed in this report. While culturally specific indicators complement and enrich the more universal measures, they are beyond the scope of this report.

Causes and outcomes

It is important to distinguish (fatal and non-fatal) health *outcomes*, as defined above, from their *causes*. Failure to do so restricts our ability to intervene effectively on causal pathways, or evaluate the results of such intervention on outcomes.

Diseases and injuries are the proximal causes (pathophysiological processes) of health outcomes – not the outcomes (health states) themselves, a distinction that should be kept in mind when reading this report. Risk factors – biological and behavioural – are further 'upstream' along the causal chain, as the risk factors of today generate the diseases of tomorrow. Social conditions or contexts are the distal causes of health outcomes, acting both directly on pathophysiological processes and indirectly through shaping exposure to risk.

In practice, the social determinants of health are also the concern of other social policy agencies (for example, the Ministry of Social Policy and the Ministry of Education), and social indicators developed by these agencies are already included in TPK's monitoring framework (TPK 2000). For this reason this report focuses on health states, diseases (and injuries), and (biological and behavioural) risk factors rather than the social determinants of health.

Indicators

Technically, an indicator is a manifest variable (something that can be observed) thought to correlate with a latent variable (the true thing of interest, but an abstract construct that cannot be directly observed). In this case, the latent variable is health disparity, and two sorts of indicator variables need to be distinguished:

- indicators intended to represent or measure the health disparity itself ('whole of disparity' indicators)
- indicators intended to represent causes of, or contributors to, the health disparity, rather than being measures of the health disparity *per se* ('disparity share' indicators).

In this report, the generic term 'health disparity indicator' (HDI) is used to refer to both indicator types.

Targets

The observed level of an indicator can be *benchmarked* – compared with a desired or expected level. A commitment by an organisation to change the level of an indicator to some benchmark for a specified population by a specified date constitutes a *target*. The means by which this change will be achieved (the *strategy*) should be identified, and a designated organisation held accountable for implementing this strategy. The success of the accountable organisation in implementing the strategy should be evaluated against tightly specified (and pre-agreed) *performance measures*.

Performance measures

The distinction between health disparity indicators (HDIs) and health system or provider performance measures needs to be clearly understood. Health outcomes and their proximal causes at the population level change only slowly (and slightly) in response to any particular policy, indicating the importance of monitoring measures of performance in delivering interventions, in addition to monitoring HDIs.

Performance measures may range from input measures (such as Māori provider development), through measures of access (for example, disparities in immunisation coverage or rates of coronary artery bypass grafting adjusted for need), to measures of quality of care (for example, disparities in lower limb amputation rates among diabetics). The selection of performance measures will be largely determined by the kind of strategy (intervention) involved. Ideally, the impact on health outcomes or proximal causes of each change in intervention (for example, changes in service funding, provision, access, utilisation or quality) would be modelled, but often this cannot be done quantitatively.

This report is concerned only with health status (health outcome and health risk exposure) measures, not with health service indicators.

Measuring disparity

External or internal comparator?

Disparity can be measured by comparing groups: one group is defined as the reference group (external standard or frame of reference) and the health of other groups is compared with it. This provides a direct measure of inequality between the groups, but risks constructing the non-reference group as 'the problem', and so can lead to victim blaming (Reid 2000).

Alternatively, a group can be compared with itself (internal standard or frame of reference). This involves the group creating for itself its own scale of measurement, based on its own assessment of its starting position and priorities. This measurement model is compatible with culturally specific health concepts and indicators, but provides only an indirect measure of social equity.

While the 'external standard' approach is adopted in this report, the complementary use of both models has advantages. After all, the aim of the *Reducing Inequalities* initiative is to promote development, not to address 'cultural deficits'. The use of indicators that reflect only between-group comparisons will therefore not meet all the information needs of this policy initiative.

Whichever approach to comparative measurement is adopted – between-group, within-group or both – monitoring of health outcome or risk indicators will provide a more useful input to policy if linked to monitoring of both health service indicators and socioeconomic contexts.

Absolute or relative measures?

A health disparity can be measured in an absolute (difference) or relative (ratio) sense. While ratio measures are more common – and possibly more intuitive – difference measures are preferred here. This is because ratios depend on the baseline level of the variable whereas differences do not, so the same absolute decrease in Mäori and European (for example) rates of a health indicator will affect the rate ratio but not the rate difference. Equally, the same proportionate increase in Mäori and European rates will be reflected in a change in the rate difference but not in the rate ratio. The rate difference – because it reflects the actual (absolute) size of the disparity – is generally more salient from a policy perspective. Ideally both rate differences and ratios would be measured simultaneously to enable meaningful interpretation of trends in health disparity indicators.

Measuring contributions to the disparity

To be a useful disparity share indicator (as opposed to a whole-of-disparity indicator), a measure must reflect a health condition (state, disease or risk) that makes a major contribution to the health of at least one of the subgroups being compared, *and* is substantively unequally distributed between them.

For example, blood total cholesterol makes a major contribution to the health of both Mäori and European New Zealanders, but is not (at present) significantly unequally distributed between these groups, and so is not a good disparity share indicator. On the other hand, tuberculosis is highly unequally distributed (age-adjusted notification rate ratio of > 6 in 1999) but makes only a small absolute contribution to the health of the Mäori population (and even less to that of the European population), and so may not be a particularly useful disparity share indicator, at least for most policy purposes.

2   Classifying Health Disparity Indicators

Based on the above conceptual definitions, a framework for health disparity indicators has been constructed which enables a multi-axial classification of indicators. Use of this framework may assist in ensuring that an appropriate mix of indicators is selected to represent all life-cycle stages, gender and social class cleavages, and causes. This classification applies to both whole-of-disparity indicators and disparity share indicators.

Table 1:   Multi-axial classification of health disparity indicators

Axis	Explanation
Integrated – domain specific	Integrated indicators represent the disparity in both fatal and non-fatal outcomes in a single number. Domain-specific indicators represent either the mortality or the morbidity domain (and within the latter may represent only the physical or mental health domains).
Generic – cause specific	Generic indicators sum up all causes of the outcome of interest. Cause-specific indicators represent only the subset of outcomes attributable to a specific cause (eg, a particular risk factor or disease) or cause group (eg, 'avoidable' mortality). Note that cause-specific mortality indicators conflate incidence with case fatality, making any difference or trend difficult to interpret.
Whole-of-population – life-cycle stage specific	Note that for comparative purposes, a whole-of-population indicator must be age standardised. Also, life-cycle stages may have different age boundaries in different ethnic groups, and this makes comparison difficult. In addition to age, gender and SES are other axes of social stratification that should be taken into account where relevant.
Proximal – distal level of causation	Causes closely related to health states (diseases and, in particular, risk factors) have a policy advantage over the health outcomes themselves: they directly indicate the appropriate policy response, and change more quickly in response to policy intervention.

Indicator taxonomy can be symbolised by labelling the poles of each dimension '1' or '2' and standardising the order of dimensions shown above from left to right. Thus a domain-specific, cause-specific, whole-of-population, proximal indicator would be described as 2211, and so on.

A variety of health indicator frameworks may be derived from this classification, for different purposes. For example, the Ministry of Health classifies health indicators for the Ministry of Social Policy's reporting on *New Zealand Social Indicators* (MOSP 2001) as:

1.   Summary measures of population health.

2.   Physical health measures: a. fatal outcomes; b. non-fatal outcomes.

3.   Mental health measures.

4.   Social health measures: a. sexual health; b. violence; c. drug-related harm.

5.   Measures of health risk exposure: a. biological; b. behavioural.

3 Choosing Health Disparity Indicators: Selection Criteria

Having classified potential indicators using the above framework, criteria are needed to select a manageable number of indicators. Criteria are needed at two levels: for the individual indicator and for the set of indicators collectively. The following criteria are suggested, based on experience and international models (see, for example, WHO 1999; DOH 2000).

Table 2:   Criteria for selecting individual-level health disparity indicators

Criterion	Explanation
Validity	Measures the disparity, or an important component of the disparity (reflects a health condition or risk that is both important and unequal) with high sensitivity and specificity. Performance measures for specific strategies or interventions (eg, input, access or quality measures) are equally necessary, but are different.
Reliability	Can be measured accurately and precisely.
Responsiveness	Capable of changing measurably within the short (1–3 years) or medium (3–5 years) terms.
Modifiability	Change in indicator can be at least partially attributed to policy-sensitive drivers (strategies).
Accountability	A specific organisation can be held accountable, at least for implementing relevant strategies, if not for the indicator itself (the disparity indicator can be linked to performance measures).
Monitorability	Repeated measures of the indicator can be taken at appropriate intervals (preferably annually, but at least 3–5-yearly).
Predictiveness	Indicator is future orientated – predicts future or potential need rather than current or realised health status.
Acceptability and sustainability	Indicator is understandable to policy makers and other key constituencies, and will survive change in government.

Table 3: Criteria for selecting set-level health disparity indicators

Criterion	Explanation
Size	While a single disparity indicator is theoretically possible, a number of disparity component indicators are necessary. These should be limited to no more than 25 (when combined with indicators in the other social policy areas, the total number may otherwise be unmanageable and fail to 'tell a story').
Comprehensiveness	Ideally a single disparity indicator quantifying the disparity in its totality is needed. The set of disparity component indicators should add up to this same total, and all age, gender and socioeconomic groups should be represented.
Balance	All classification axes should be represented, with reasonable balance across them.
Congruence	As far as possible, indicators already selected by TPK, as well as those being used to monitor other health or intersectoral strategies, and those likely to flow from the objectives included in the NZ Health strategy, should be selected. These indicators should be measured consistently across all agencies and applications (eg, use of consistent ethnic denominators). Consistency with indicators already being monitored by international agencies (eg, WHO) should also be considered, where relevant.

The criteria identified above have not been ranked or weighted. However, at the individual indicator level, *reliability* and *validity* are fundamental properties of a usable indicator (in that order). At the indicator set level, the *size* of the set is likely to be a key consideration for most practical applications.

4   A Menu of Health Disparity Indicators

Based on the above framework and criteria, a lengthy array of possible HDIs can be identified. The menu below has been derived by emphasising:

- a small number of integrated whole-of-disparity indicators, including both health expectancy and health gap measures

- coverage of all stages of the life cycle

- attention to gender and class differences

- the need for cause-specific indicators to reflect both the size and distribution of the associated burden of disease, and its responsiveness to realistic intervention strategies.

In total the menu defines a reasonably comprehensive or 'optimal' set of indicators. Recommendations for a 'minimum' set are also given, based on the additional criteria that the short term (less than three years) is more relevant than longer timeframes, and that new data collection systems (such as surveys) may not be possible. Indicators that are not self explanatory are defined in the Glossary.

Table 4:   A menu of health disparity indicators

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
1111	$DALE_0$	Integrated whole-of-disparity measure (health expectancy type) Recommended by WHO (WHO 2000) Can be made life cycle stage-specific if desired	Disability component difficult to measure Social preferences for different disability states needed Disability does not fully represent all dimensions of HRQOL Difficult to decompose by cause (lacks the property of additive decomposition)	Yes (provided health or disability survey can be made continuous or three-yearly)
1111	ILEo	Whole-of-disparity measure Can be made life cycle stage-specific Unlike DALE, does not require valuations of disability states	Disability difficult to measure Disability does not fully represent HRQOL Unlike DALE, requires arbitrary threshold for level of disability	Yes (provided health or disability survey can be made continuous or three-yearly) DALE may substitute for ILE
1111	All-cause age-adjusted DALY rate	Integrated whole-of-disparity measure (health gap type) Decomposable by cause (unlike DALE)	Extreme measurement difficulties Requires valuations of health (disability) states	Yes in principle (but major data and technical limitations at present)

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
2111	LEo	Readily understood all-cause mortality measure Does not require age adjustment	Limited to mortality domain of health Not readily decomposable by cause	Yes
2111	All-cause age-standardised YLL rate	Reflects prematurity of death – better indicator of social burden of mortality than LE Readily decomposable by cause	Limited to mortality domain Less familiar to policymakers than LE Method of measurement not fully standardised (especially use of remaining life expectancy vs arbitrary upper age limit)	Yes
2111	Self-rated health	Readily understood and measured Morbidity measure (adults only)	Reflects mainly physical domain Somewhat culture specific	Yes (provided health survey can be made continuous or three-yearly)
2111	SF-36 – PCS	Summary measure of physical health (non-fatal domain)	Not relatable to specific causes of morbidity Appears to be culturally specific (Scott et al 2000)	WHO standard instrument or EQ may be preferable
2111	SF-36 – MCS	Summary measure of mental health	Not relatable to specific causes of morbidity Appears to be culturally specific (Scott et al 2000)	National mental health survey (currently being piloted) may provide better indicators for mental health and/or mental illness
2111	Disability prevalence (adjusted for age and severity)	Functional and role limitation represents one way to operationalise HRQOL Severity can be measured in terms of need for assistance (ie, dependency) Separate physical and mental disability (or other typologies) can be measured	Difficult to measure, and to relate to specific causes of morbidity Some degree of cultural specificity, both in definition and in severity assessment Note that functional limitation model of disability differs from rights-based (social) model used by the disability sector	Yes (provided health or disability survey could be made continuous or three-yearly) Note that suitable module could be included in the Health Survey (based on the WHO standard instrument)
2111	All-cause age-adjusted hospitalisation rate	Traditional indicator of serious morbidity	Actually better as an access measure, once adjusted for need (generally mortality used as a proxy for need)	Probably not (interpretation problematic as an outcome measure)
2211	Age-adjusted avoidable mortality rate	Essentially an indicator of unmet need	Categorial attribution of causes (ICD codes) and upper age limit not internationally standardised (Ministry of Health 1999)	Yes
2211	Age-adjusted avoidable hospitalisation rate	Indicator of unmet need	Conflates need with access/quality of PHC Also not internationally standardised (Ministry of Health 1999)	Probably yes (although interpretation remains problematic)

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
2121	IMR	Traditional indicator of child health	Most variation restricted to postneonatal period (and SIDS is a major driver of this) – postneonatal or SIDS mortality rate may be a better alternative	Yes
2121	LBW	Powerful predictor of future adult health status	Performance as an indicator improved if premature birth separated from IUGR European rate has long since plateaued and is now being affected by improved foetal survival	Yes
2121	Growth rate	Breastfeeding, failure to thrive, stature, and childhood obesity predict future adult health	Requires longitudinal measurements of birth cohorts (except breastfeeding – which could be included)	Not possible at present (except for breastfeeding rate)
2221	Child abuse notification rate	More sensitive an indicator than child hospitalisations for intentional injury	Confounded by variation in referral to CYPFS by ethnicity and SES Indicators of unintentional childhood injury (eg, poisonings, drownings, house fires) could also be included	No
2221	Child dental caries rate (DMF age 12)	Sensitive indicator of oral health in adulthood	Not all children may be screened	Yes
2221	Hearing failure rate at school entry	Powerful predictor of school performance, socialisation, cognitive and linguistic development	Screening test has limited specificity	Yes
2221	Youth fertility	One of the few indicators of 'social health' available	Some degree of cultural specificity Some would not consider this a health indicator (rather a social indicator)	Yes
2221	Youth suicide rate	Major current health problem	Gender analysis requires that intentional self harm hospitalisation rate be monitored in addition to completed suicide rate Unclear whether this is a mental or social health indicator	Yes (both suicide rate and attempted suicide rate)
2221	Youth road traffic injury hospitalisation rate	Road traffic injury is a major health problem, and youth are at significantly higher risk of such injury than other age groups	Road traffic mortality rate could be substituted In either case, could be broadened into a whole-of-population indicator	Yes

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
2221	Age-adjusted IHD mortality rate	Major contributor to the disparity	Incidence would be preferable to mortality – but would require continuation of MONICA or similar surveillance system Partly predictable from risk factor distribution Could use an age-specific rate (eg, middle age) instead	Yes
2211	Age-adjusted RHD hospitalisation rate	Limited impact, but huge disparity (RR about 7)	Could substitute (or add) ARF notification rate instead – shorter policy latency	Yes (both)
2211	Age-adjusted stroke mortality rate	Significant contributor to disparity (high incidence although low RR)	As with IHD, information on incidence and prevalence would be preferable to just mortality As with IHD, partly predictable from risk factor distributions	No
2211	Age-adjusted kidney failure rate	Significant contributor to disparity; dialysis or transplantation very resource intensive	Prevalence of renal failure/ dialysis/replacement could be used instead of incidence	No (partly captured in diabetes)
2211	Age-adjusted asthma hospitalisation rate	Asthma contributes significantly to disparity (as does CORD)	Asthma hospitalisation rate conflates prevalence with quality of PHC and self-management – a direct measure of asthma (incidence and) prevalence would be preferable CORD is predictable from smoking (as is lung cancer, which also has long latency)	No
2221	Age specific (50–69 years) advanced-stage breast cancer registration rate	Significant contributor to disparity, and likely to become more so if differentials in screening develop	Could be broadened to all age groups, and mortality could be substituted for (or added to) incidence	Yes
2211	Age-adjusted invasive cervical cancer registration rate	Small but not insignificant contributor to the disparity	Could be made age specific to sharpen focus	Yes
2211	Age-adjusted primary liver cancer registration rate	Small but not insignificant contributor to the disparity	Acute hepatitis b notification rate could be substituted (or added) – much shorter policy latency	Yes
2221	Age-specific VPD notification rate	Small but not insignificant contributor to the disparity, if TB and HepB included	Immunisation coverage rate (on time) could be substituted Currently, invasive meningococcal disease notification rate could be monitored as well	Yes (both)

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
2211	Age-adjusted (or adult) psychiatric hospital first admission rate	At least a limited indicator of the burden of serious mental illness	Conflates variations in incidence with variations in use of and referrals from primary/community mental health services, making differences or trends difficult to interpret	No Better indicators of mental health should be extractable from the national mental health survey in future
2212	Age adjusted (or youth/ young adult/ middle-aged) smoking prevalence rate	Major contributor to the disparity	Could be sharpened by inclusion of exposure intensity measure (cigarettes/day) Exposure to SHS could be an additional indicator	Yes
2212	Adult (or child) average dietary intakes	Energy, fat including saturated fat, and fruit and vegetables in particular are major contributors to the disparity	Difficult to measure accurately, and expensive to measure frequently	Not possible at present (nutrition survey only 10-yearly at present)
2212	Age-adjusted prevalence of physical inactivity	Impact on population health unquestionable, but degree of (and trend in) disparity in exposure unclear	Difficult to measure accurately	Yes (provided HC can provide timely survey data)
2212	Age-adjusted (or youth) hazardous drinking prevalence	Impact on social health unquestionable, but impact on physical health complex Mäori may be disadvantaged both through a higher rate of hazardous drinking patterns and a higher rate of abstention	AUDIT may arguably provide a suitable survey tool, although it may be better used together with more traditional measures of alcohol consumption and drinking patterns	Yes (provided health or drugs survey can be made continuous or three-yearly)
2212	Age-adjusted (or youth) prevalence of regular cannabis use	Health impact very limited, but may have greater social impact, and consumption very unequally distributed	Difficult to measure accurately	Yes (provided drugs survey can be made continuous or three-yearly)
2212	Age-adjusted obesity prevalence	Major contributor to disparity, and trend worsening	Could include overweight alongside obesity BMI may not be best measure (different ethnic norms) – could complement with waist circumference	Yes (provided a new data collection method could be developed, eg, CATI survey for self-reported BMI – currently measured via 10-yearly nutrition survey)
2212	Age-adjusted prevalence of type 2 diabetes	Major and increasing contributor to the disparity	Could include incidence and attributable mortality alongside prevalence, as well as some measure of attributable morbidity (diabetes-related disability or hospitalisations) Directly coded mortality, and hospitalisation rates for specified diabetes complications, are alternative but inferior indicators	Yes (at least for some indicators)

Indicator type	Indicator	Strengths	Weaknesses	Inclusion in 'minimum' set
2212	Age-adjusted hypertension prevalence	Major contributor to the disparity	Assessment of attributable morbidity and/or mortality could be substituted, or one or more indicator conditions (eg, mortality from hypertensive heart disease) used instead (albeit with some loss of indicator performance)	Yes (if only via proxy indicators at present)
2212	Age-adjusted hyper-cholesterolemia prevalence	Major health impact, but little evidence for ethnic variation	Include only if ethnic difference widens in future surveys Ratio of total to HDL cholesterol would be a better indicator of CVD risk	No

The major data difficulties at present are our inability to monitor changes in risk factor distributions (other than smoking) or disability prevalence in the short term, and the incidence and prevalence of severe mental illness.

In any case, rapid change in these variables at the population level cannot realistically be expected, so three- to five-yearly monitoring of these indicators would be appropriate (although some of these indicators are only monitorable 10-yearly at present).

Selected health disparity indicators available three-yearly or more frequently

If indicators are needed that are measurable and responsive within less than three years, the list of candidates reduces to the following (approximately 25 indicators, mainly cause and/or lifecycle stage specific):

Table 5: Proposed minimum set of health disparity indicators

- $DALE_0$*
- LEo (and derivatives if desired, eg, probability of surviving middle age)
- All-cause YLL rate
- Self-rated health*
- Disability prevalence (adjusted for severity)*
- Avoidable mortality and YLL rate
- Avoidable hospitalisation rate
- IMR (or postneonatal mortality rate or SIDS rate, depending on the purpose)
- LBW (preferably distinguishing premature delivery from growth retardation)
- Breastfeeding rate (full at three months; full and partial at six months)
- DMF teeth at age 12
- Hearing failure at school entry (or earlier if possible)
- Youth fertility rate (or under 18 pregnancy rate)
- Youth suicide and attempted suicide rates
- Youth road traffic injury hospitalisation and mortality rates
- IHD mortality rate
- Rheumatic fever notification rate (and/or RHD hospitalisation rate)
- Breast cancer registration rate (linking to the performance measure: screening rate)
- Invasive cervical cancer registration rate (linking to screening rate)
- Hepatitis B notification rate (and/or primary liver cancer notification rate)
- Combined VPD notification rate (including TB) (linking to immunisation coverage rate)
- Meningococcal disease notification rate (temporarily only)
- Smoking rate (possibly including a smoking intensity measure)
- Physical inactivity rate*
- Obesity rate* (eg, if self-reported BMI can be collected through a CATI survey)
- Diabetes rate* (otherwise use indicator of diabetes burden, eg, amputation rate)
- Hypertension rate* (otherwise use proxy indicator, eg, HHD mortality rate).

* Currently only available from surveys with a periodicity of more than three years; would therefore require change in survey design or data could be collected (three-yearly or more frequently) by some other means.

The major limitations of the above list are the restricted range of risk factors included, and the inability to monitor trends in disability (within a three-year timeframe) and hence DALE, the key integrated whole-of-disparity measure recommended by WHO (WHO 2000). The measurement of mental health/mental illness is also seriously inadequate at present, although the national mental health survey currently being piloted would meet this need, were it to be repeated at regular intervals (for example, three-yearly). Realistically, this would involve a selected subset of the instruments included in the full survey (with the full survey itself being repeated 5- or 10-yearly).

The Ministry of Health is currently reviewing its survey programme to determine whether some of these data needs could be met, for example, by integrating surveys with each other and with other data collection systems; by greater use of computer-assisted telephone interviewing; or by moving from periodic to continuous survey designs.

5 Mapping the Proposed Minimum Indicator Set on to the TPK Indicators

Comparison of the 'minimum' set of health disparity indicators (HDIs) with the indicators used by TPK (TPK 2000) shows many similarities and some differences, summarised in Table 6.

Table 6: Mapping the minimum set of health disparity indicators to the TPK set

Indicator	HDI	TPK	Comment
DALE$_0$	(+)	–	May not be measurable in timeframe
LEo	+	+	
YLL	+	–	Complements LE by focusing on prematurity of death
Self-rated health	(+)	–	May not be measurable in timeframe; some cultural specificity
Disability (adjusted for severity)	(+)	–	May not be measurable in timeframe
Avoidable mortality	+	–	Conflates need with health system performance
Avoidable hospitalisations	+	–	Conflates need with health system performance
IMR	+	+	
LBW	+	–	Significant for both child and adult health; disparity remains large
DMF (age 12)	+	–	Predictor of adult oral health, a major cause of disability and one for which the disparity remains large
Hearing loss (child)	+	+	
Youth fertility	+	+	Could be considered a social rather than a health indicator
Youth suicide	+	+	
Youth self-harm hospitalisations	+	(+)	Complements completed suicide from a gender perspective; TPK uses all age instead
Youth RTI hospitalisations	+	(+)	TPK uses all age instead
IHD mortality	+	+	
ARF notifications	+	–	Small impact but huge disparity
RHD hospitalisations	+	–	Alternative to notifications
Breast cancer registrations	+	–	Large impact but small disparity (at present)
Cervical cancer registrations	+	(+)	TPK uses deaths instead
PLC registrations	+	–	Small impact but huge disparity
VPD notifications	+	–	Could just rely on immunisation coverage (health service rather than health outcome indicator)
Meningococcal disease notifications	+	–	Significant impact for Pacific children in particular
Smoking prevalence	+	+	Could include measure of intensity of exposure (cigarettes/day) and also of SHS exposure

Indicator	HDI	TPK	Comment
Physical activity prevalence	(+)	–	Disparity may not be great; also, may not be measurable within timeframe
Obesity prevalence	(+)	–	May not be measurable within timeframe
Diabetes prevalence	(+)	–	May not be measurable in timeframe
Diabetes complication hospitalisations	+	(+)	TPK uses deaths instead (despite known coding difficulties)
Hypertension prevalence	(+)	–	May not be measurable within timeframe; could use burden indicator instead
All-cause hospitalisations	-	+	Difficult to interpret as an outcome (need) measure
SIDS	(+)	+	Correlates with IMR or (better) with postneonatal MR
Asthma hospitalisations	(–)	+	More a health system performance measure than an outcome indicator (asthma prevalence would be better if it could be measured within timeframe)
Lung cancer mortality	–	+	Long latency and well correlated with smoking
P&I mortality	–	+	Worth considering, but coding of pneumonia as a COD is problematic; also could partly capture by extending immunisation coverage indicator

In summary, from the perspective of the HDI there are 19 mismatches, six partial matches, and only seven complete matches. Looked at from the TPK indicator set perspective, seven match completely, six partially, and five not at all.

Both sets are deficient in integrated or generic measures of health, and neither covers disability or mental health to any extent. Coverage of risk factors is patchy and could easily be limited in practice to smoking alone.

The HDI set does attempt to provide more generic or all-cause indicators than the TPK set, and also attempts to include more risk factors. It also aims to reduce the possibly excessive reliance of the TPK set on cause-specific mortality measures. However, it achieves this at the cost of increasing the size of the indicator set: about 25–28 indicators (depending on how they are counted) for HDI versus only 16 for TPK.

Comparison with other indicator sets

Both the *Strengthening Families* health indicators (Ministry of Social Policy 2000) and the existing *Progress On Health Outcome Targets* set (Ministry of Health 2001c) monitored by the Ministry of Health include some indicators not included in the proposed minimum HDI set (and vice versa). However, examination of these excluded indicators reveals that they probably do not meet the criteria for the current purpose. Similar comments apply to indicators included in the National Drugs Policy (Ministry of Health 1998), National Road Safety Plan (NRSC 2000) and Youth Suicide Strategy (Ministry of Health et al 1998) (but not included in the proposed HDI set). The National Mental Health Plan (Ministry of Health 1997) includes only input and process indicators.

At present, the *New Zealand Health Strategy* (King 2000) identifies only goals and objectives, but not targets. However, examination of the 'priority' objectives indicates few mismatches with the HDI set in terms of coverage (Table 7).

Table 7: Comparison of New Zealand Health Strategy priority objectives with the minimum set of health disparity indicators

NZHS objective	Inclusion in HDI set
Reduce smoking	Smoking prevalence included
Improve nutrition	Indicators such as fruit and vegetable consumption and fat intake included in nutrition survey; timeliness of data is problematic
Reduce obesity	Indicators such as BMI and WC included in nutrition survey; timeliness is problematic
Increase physical activity participation	Included in HC surveys; timeliness is problematic
Minimise harm caused by alcohol and other drugs	Included in Drugs Survey; timeliness is problematic
Reduce incidence and impact of cardiovascular disease	IHD mortality is included, as are major CVD risk factors
Reduce incidence and impact of cancer	Breast and cervical cancer included directly; some other cancers addressed through risk factors or inclusion in summary indicators such as avoidable mortality rate
Reduce incidence and impact of diabetes	Indicators of diabetes complications included; direct measures of diabetes incidence/prevalence also recommended
Improve health status of people with severe mental illness	Not included
Reduce impact and incidence of violence	Not included in HDI, but partly covered by TPK criminal justice indicators
Reduce rate of suicides and suicide attempts	Included (although suggestion is to restrict to youth/young adults)
Improve oral health	DMF at age 12 included
Ensure access to child health services	Link made (via VPD notification rate) to on-time immunisation coverage rate (a health service performance measure)

The Pacific disparity

The HDIs have been developed largely on the basis of the analyses of health expectancy, burden of disease, attributable risk, and avoidable mortality and morbidity carried out earlier by the Ministry of Health (Ministry of Health 1999). Many of these analyses were restricted to a comparison of Mäori with non-Mäori. However, a re-examination of the data from a Pacific perspective (Ministry of Health 2001d) failed to reveal any major new areas of disparity. This further re-analysis did, however, strengthen the case for inclusion of meningococcal disease, tuberculosis, and primary liver cancer/Hepatitis B in the minimum indicator set; diabetes and obesity also rate more highly as contributors to the Pacific–Päkehä health disparity, but were already included as key HDIs on the basis of the earlier analysis of Mäori–Päkehä differences.

Gender analysis

All indicators recommended for HDIs can (and should) be analysed by gender. This may provide sufficient insight into the different health experience of males and females across the ethnic divide. However, if the Ministry of Women's Affairs promote the use of additional indicators from a gender perspective, there is no reason why such indicators could not be added to the proposed minimum indicator set – provided they meet the other criteria defined in this report. In particular, it is probable that the subdomain of sexual and reproductive health is not as well covered in the current minimum set as it might be.

Class analysis

With respect to social class analysis, the approach of specifically including so-called 'diseases of poverty' in the set is rejected. Rather, each indicator should be stratified by NZDep96 (a measure of deprivation), or other measure of social class or socioeconomic status (SES), so that the impact of SES within ethnic groups can be seen. Ethnic-specific rates of an indicator should not be adjusted for SES/deprivation in the same way as for age. This is because SES is seen as being on the pathway between ethnicity and health outcome rather than being a confounder of the ethnicity–health relationship, similar (for example) to age. This issue is discussed in more detail in a separate report (Ministry of Health 2001a).

Technical considerations

Technical issues around data definitions, (numerator) data sources, choice of denominator, and time series analysis are outside the scope of this report, which is intended to assist in indicator selection rather than indicator operationalisation.

Linking HDIs to social indicators and to performance measures

The HDIs, once selected and operationalised, will also need to be linked to the social indicators being used to monitor ethnic disparities in other social policy sectors (for example, education, housing, labour market), many of which are in fact the distal determinants of the health indicators concerned.

It may also be necessary to advocate the inclusion of additional social indicators in the dataset, such as income inequality and social capital indicators – both of which have been shown to have major impacts on health and to be unequally distributed between ethnic groups (Howden-Chapman and Tobias 2000). However, an examination of the current TPK indicator set suggests that the existing array of 'non-health' indicators does indeed cover most of the currently recognised social determinants of health.

While monitoring the whole-of-disparity indicators will provide an overall assessment of whether the total disparity is worsening or improving, it is the monitoring of the disparity share indicators which will link across to specific policies, services and other intervention strategies – and so link with the performance measures used to hold identifiable agencies to account.

Evaluation of agency performance could be further assisted by modelling the responsiveness of the relevant disparity share indicators to the selected policy or service interventions. It would then be possible to predict by how much and how quickly the disparity could be reduced, were the selected strategies to be effectively implemented. Careful monitoring of trends in both the outcome indicator and the associated service performance measures would then allow the observed change to be evaluated against the expected change, so making possible an outcome evaluation of each selected strategy or intervention. Such evaluation tools are currently under development within the Ministry of Health and elsewhere.

6   Summary and Conclusions

This report provides a toolkit for agencies concerned with the measurement and monitoring of ethnic inequalities in health. It should be used in conjunction with another Ministry report, which discusses broader issues in relation to ethnic health statistics (Ministry of Health 2001a).

This tool kit provides a taxonomy or classification of health disparity indicators, including both whole-of-disparity indicators and disparity share indicators. Criteria for the selection of HDIs from the theoretical universe of such indicators are then proposed, both at the level of the individual indicator and that of the indicator set. These criteria are then applied to select an 'optimum' and a 'minimum' set of indicators, differentiated largely on the basis of short-term monitorability.

The proposed minimum set is then mapped onto the TPK indicators (TPK 2000), and commonalities and differences between the two sets are identified. Further indicators may also be required to enable full gender and class analysis of the ethnic differences in health to be undertaken.

Finally, the point is emphasised that the (selected) HDIs need to be linked both to social indicators on the one hand, and to agency-specific performance measures relating to specific strategies (interventions) on the other. Only then can the success or otherwise of policies, programmes and services intended to achieve gains in equity of health outcomes between ethnic groups be evaluated, and appropriate corrective action taken.

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Glossary and Abbreviations

Avoidable hospitalisation	Hospitalisation of people aged 0–74 years due to causes considered to be responsive to preventive interventions or ambulatory health care.
Avoidable mortality	Deaths of persons aged 0–74 years from causes considered to be responsive to preventive or therapeutic interventions.
Disability	Functional or role limitation resulting from a health condition and lasting, or expected to last, for six months or more. A disability may or may not be associated with the need for assistance.
Disability adjusted life expectancy (DALE)	The average number of years an individual of a given age is expected to live, with the years of life weighted on a 0–1 scale according to the social preferences for the different states of health (ie, disability states) into which the population is distributed, if current mortality and morbidity rates and health state valuations continue to apply.
Disability adjusted life year (DALY)	An integrated health indicator that extends the concept of years of life lost to include the equivalent years lost to disability, weighted for severity. Thus one DALY represents one year of healthy life lost.
Disparity share indicator	An indicator of the contribution to the total inequality in health (along one or all domains) between groups attributable to a specific cause; the cause may be a disease (or injury), risk factor or determinant.
DMF index	Number of decayed, missing or filled permanent teeth.
Health disparity indicator (HDI)	An indicator of the inequality in health status between socially constructed groups.
Independent life expectancy (ILE)	The average number of years an individual of a given age is expected to live independently, if current mortality and (dependent) disability rates continue to apply.
Infant mortality rate (IMR)	The number of liveborn infants dying before exact age one year, per 1000 live births: the postneonatal mortality rate excludes from this definition infants dying in the first 28 days of life.
Life expectancy (LE)	A summary statistic derived from a life table, estimating the average number of years an individual of a given age is expected to live if current mortality rates continue to apply.
Low birth weight (LBW)	Less than 2500 gm; may result from premature birth or intrauterine growth retardation.
MCS (mental component summary score)	A summary score, representing the level of mental health of an individual or group, derived by principal component analysis of SF-36 scale scores.
PCS (physical component summary score)	A summary score representing the level of physical health of an individual or group, derived by principal component analysis of SF-36 scale scores.
Quality of life	An individual's perception of their position in life in the context of the culture in which they live, and in relation to their goals, expectations and standards. The term incorporates concepts of physical and psychological wellbeing, levels of independence and autonomy, social relationships and support, and spirituality. 'Health-related' quality of life emphasises the domains of physical and psychological wellbeing.

SF-36	A health-related quality of life instrument comprising 36 items (questions) that provide an eight-dimensional description of health states, including scales relating to physical, mental and social functioning. Each scale is psychometrically scored, generating a profile of eight scores to describe the health of an individual or group.
Whole-of-disparity indicator	An indicator of the size of the inequality in health status between groups; may cover all dimensions of health or only a single domain (eg, mental health).
Years of life lost (YLL)	An indicator of the social burden of fatal health outcomes. YLL may be calculated in two ways: by subtracting the age at death from the life expectancy remaining at that age; or by subtracting the age at death from an arbitrary upper age limit, such as age 65 or 70.

Abbreviations

ARF	acute rheumatic fever
BMI	body mass index
CATI	computer assisted telephone interviewing
CORD	chronic obstructive respiratory disease
CVD	cardiovascular disease
$DALE_0$	disability adjusted life expectancy at birth
DALY	disability adjusted life year
DMF	decayed, missing and filled teeth
HC	Hillary Commission
HDI	health disparity indicator
HHD	hypertensive heart disease
HRQOL	health related quality of life
IHD	ischaemic heart disease
ILE_0	independent life expectancy at birth
IMR	infant mortality rate
IUGR	intrauterine growth retardation
LBW	low birth weight
LE_0	life expectancy at birth
NZDep96	New Zealand index of deprivation based on the 1996 Census
RHD	rheumatic heart disease
RR	relative risk
SES	socioeconomic status
SF-36 MCS	Short Form 36 mental component score
SF-36 PCS	Short Form 36 physical component score
SHS	second hand smoke
SIDS	sudden infant death syndrome
TPK	Te Puni Kōkiri
VPD	vaccine preventable disease
WC	waist circumference
WHO	World Health Organization
YLL	years of life lost