

Evidence-based Health Objectives

for the New Zealand Health Strategy

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Contents

Foreword	v
Acknowledgements	vi
Introduction	1
Method	3
Size of the burden	3
Modifiability of the burden	4
Distribution of the burden	4
Grid approach	4
Equity adjustment approach	4
Results	6
Size of the burden	6
Modifiability of the burden	7
Distribution of the burden	8
Grid approach	9
Equity adjustment approach	11
Conclusion	13
Appendices	
Appendix 1: Health Goals and Objectives	15
Appendix 2: Priority Objectives	18
References	19

List of figures

Figure 1:	Top 25 causes of DALYs lost, New Zealand, 1996	6
Figure 2:	Top 25 causes of modifiable DALYs lost, New Zealand, 1996	8
Figure 3:	Age-adjusted DALY rate ratios or prevalence rate ratios, New Zealand, 1996	9
Figure 4:	Equity gain versus health gain grid, New Zealand, 1996	10
Figure 5:	Top 20 causes of equity-adjusted modifiable DALYs lost, New Zealand, 1996	12

List of tables

Table 1:	Modifiability multipliers for selected conditions, New Zealand, 1996	7
Table 2:	Equity adjustors for selected conditions, New Zealand, 1996	11

Foreword

The New Zealand Health Strategy aims to provide an overarching framework for the health sector in New Zealand and provides the context within which the newly established District Health Boards will operate.

The Strategy identifies a set of health *goals* for the nation. For each goal, the Strategy defines a number of specific health *objectives*, which contribute to the achievement of a goal. A sector reference group and an expert advisory group assisted the Ministry of Health in choosing these goals and objectives.

From the variety of objectives identified, 13 were selected as priority issues for the health sector to address in the short to medium term. Selection was based in part on three epidemiological criteria:

- ?? the *size* of the burden of premature death and disability attributable to the cause of interest
- ?? the *modifiability* of the burden through health sectoral interventions
- ?? the *distribution* of the burden (reflecting considerations of equity).

The final list of priorities also inevitably reflects non-epidemiological criteria.

This report describes how the epidemiological criteria were applied to data extracted from the New Zealand Burden of Disease Study carried out by the Ministry of Health and Health Funding Authority in 1999. As well as providing an example of the application of burden of disease analysis to policy, the report also provides insight into the development of the health goals framework – which makes up an important part of the New Zealand Health Strategy. As such it should be of wide interest to workers throughout the health and social policy sectors.

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



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Disclaimer

This report is published with the approval of the Director-General of Health. However, opinions expressed are those of the authors and should not be taken as representing the policy of the Ministry of Health.

Introduction

Following its election in 1999, the Labour–Alliance Coalition Government charged the New Zealand Ministry of Health with the development of a health strategy for the country. This led to the publication in June 2000 of a discussion paper (Ministry of Health 2000). Public consultation on the document closed at the end of July 2000, and a final version, incorporating the outcome of this consultation process, was completed towards the end of 2000 (King 2000). The New Zealand Health Strategy was launched by the Minister of Health on 14 December 2000.

The New Zealand Health Strategy outlines a framework and set of guiding principles for the health sector, covering both the Ministry itself and the newly established District Health Boards (DHBs). A set of health goals and objectives translate this vision into the focused actions intended to make a difference to the level and distribution of health. The next phase will involve working jointly with DHBs and other stakeholders to link the health objectives to identifiable services and programmes, which will have quantitative outcome indicators and specific performance measures built into funding agreements and other contractual arrangements.

In developing the health goals (high-level strategies) and objectives (specific aims contributing to goal attainment), a sector reference group was set up with the Director-General of Health as chair. This group included representatives of health provider organisations, consumer groups, and the Government, reflecting the need to seek a wide range of views and perspectives to develop a credible and sustainable strategic direction for the sector. The sector reference group was assisted in its work by an expert advisory group of epidemiologists, economists and clinicians, supported by Ministry of Health officials.

The advisory group reviewed past experience of goal setting in New Zealand (Department of Health 1989; Public Health Commission 1993; Ministry of Health 1997) and a recent analysis of the health of New Zealanders (Ministry of Health 1999a). Draft goals and objectives were then developed on the basis of their potential to:

- ?? improve the health of the population (size and modifiability of the disease burden)
- ?? reduce health inequalities (especially the distribution of the disease burden between Māori and non-Māori ethnic groups)
- ?? engage the health sector and focus its attention on outcomes rather than processes or inputs
- ?? enhance the scope for intersectoral action (to address the social determinants of health)
- ?? build social inclusion (for example, encompass all age groups)
- ?? maintain continuity with existing strategies
- ?? gain public and political support and sustainability
- ?? provide focus and direction to DHBs and other providers (including the ability to translate objectives into quantitative targets)
- ?? give effect to the intent of the Treaty of Waitangi.

The process of applying these criteria in order to select goals and objectives began by addressing social determinants such as labour market dynamics, income distribution and social capital. The next step was to assess the immediate environment in which people live and, specifically, the

scope for health and equity gain through community development and family support. Attention was then directed toward individual lifestyles, and finally to biological pathways (biological risk factors, diseases and injuries). The outcome of this process was a set of 10 health goals which reflected the fundamental purpose of the health strategy (to improve population health and reduce inequalities in health between Māori and non-Māori ethnic groups), and 61 specific health objectives identifying the key focal points for attainment of these goals (see Appendix 1).

The large number of objectives necessitated the selection of a subset to be accorded priority attention (see Appendix 2). This was done using the same criteria employed for the initial development of the goals and objectives, but with a greater focus on specific issues amenable to effective intervention by the health sector in the short to medium term (5–10 years). This involved placing a higher weighting on the epidemiological criteria, which were further elaborated and operationalised through an extension of the analysis carried out for the New Zealand Burden of Disease Study in 1999 (Ministry of Health 1999a, 2001).

Among the non-epidemiological criteria, priority status was accorded to those issues for which the health sector could make a difference through treatment and rehabilitation as well as prevention and intersectoral action. However, it is important to emphasise that the final selection of objectives to be accorded priority status was made by the Government, not the sector. The priority setting process as a whole was far more than merely a technical exercise.

This report briefly describes how the epidemiological analysis was carried out, and used as a policy decision support tool. As far as is known, it represents one of the first applications of burden of disease analysis to help answer a real-life policy question.

Method

Three epidemiological criteria were used to select a small number of priority objectives from the total set of 61 on the basis of objective evidence:

- ?? size of the burden attributable to the cause of interest
- ?? modifiability of the burden (given resource-realistic interventions, preventive or curative)
- ?? distribution of the burden (between Māori and non-Māori ethnic groups).

These criteria were applied at two levels of the health causal chain:

- ?? diseases and injuries (proximal causes)
- ?? behavioural (lifestyle) and biological risk factors (distal causes).

Social conditions, while clearly important in shaping exposures and directly influencing biological processes, were not considered candidates for priority objectives (because of the requirement to focus on the short to medium term), although addressing these ultimate determinants of health still remains central to the New Zealand Health Strategy in the longer term.

Size of the burden

The unit used to quantify the disease (or risk factor) burden in this study was the disability-adjusted life year (DALY) (Murray and Lopez 1996). The DALY is well suited to this application because it integrates both fatal and non-fatal health outcomes, and is built up on a condition-by-condition basis. In brief, one DALY represents one year of healthy life lost. It is constructed (for each cause and population subgroup) by adding to the burden of premature mortality (denominated in years of life lost, or YLL) the equivalent years lost to disability, adjusted for severity (YLD):

$$\text{DALY} = \text{YLL} + \text{YLD}$$

While the calculation of YLL is relatively straightforward, estimation of YLD requires extensive epidemiological modelling together with information on social preferences for the non-fatal health states included in the study (disability weights). The disability weights were derived from the Dutch (Stouthard et al 1997) and Australian (Mathers et al 1999) Burden of Disease Studies.

Once the burden had been estimated at the disease level, standard population attributable risk methods were used to attribute the burden to a range of chronic disease risk factors. The risk factors included were restricted by the availability of the necessary data: recent estimates of prevalence in New Zealand, and estimates of the relative risk of disease conditional on exposure to the risk factor. The former estimates were extracted from the 1996/97 New Zealand Health Survey (Ministry of Health 1999b) and 1997 National Nutrition Survey (Ministry of Health 1999c), and the latter by systematic review of the scientific literature (Ministry of Health 1999a).

Full details of the methods used to calculate DALYs and the results for over 100 diseases and injuries and eight chronic disease risk factors have been published previously (Ministry of Health 1999a, 2001).

Modifiability of the burden

Assessment of ‘modifiability’ – that is, the responsiveness of the burden associated with each disease and risk factor included in the New Zealand Burden of Disease Study to health sector interventions (including any mix of health promotion, disease prevention, treatment and rehabilitation) – was made on the basis of expert judgement, informed by literature review and expert consultation.

Given the uncertainty inherent in expert judgement, conditions were rated simply as:

- ?? highly modifiable – burden potentially reducible by 50 percent or more (multiplier 0.5)
- ?? moderately modifiable – burden potentially reducible by 25–50 percent (multiplier 0.25)
- ?? slightly modifiable – burden potentially reducible by 10–25 percent (multiplier 0.125)

allowing in each case for resource realism and a time horizon of 10 years.

The modifiability multipliers were then applied to the DALY estimates extracted from the New Zealand Burden of Disease Study to rank conditions (diseases and injuries and risk factors) in terms of the scope each provides for health gain (thus incorporating the first two of the three epidemiological criteria listed above).

Distribution of the burden

Two approaches were used to incorporate distributional concerns (Māori compared to non-Māori), or ‘equity’, into the burden of disease analysis.

Grid approach

Equity gain was considered separately from health gain by representing each as an axis on a two-dimensional grid, thereby making transparent any trade-offs of one against the other.

For diseases and injuries, age-standardised DALY rates were calculated using conventional methods (direct standardisation with Segi’s world population as the reference). The measure of inequality was the ratio of Māori to non-Māori rates. For each condition this ratio was plotted on one axis of the grid (equity-gain dimension) against modifiable DALYs on the other (health-gain dimension).

For risk factors the method was analogous, except that prevalence rate ratios rather than attributable DALY rate ratios were used, as the former represent a more direct measure of differential exposure.

Equity adjustment approach

In the second approach, equity was considered simply as another variable alongside modifiability by adjusting the modifiable DALYs, so deriving a single number (for each cause and population

group) representing all three epidemiological criteria (size, modifiability and distribution of the burden).

An 'impact share' model¹ was used to estimate an equity adjustor for each condition. This model takes into account both the degree of variation in the distribution of the burden associated with each condition between Māori and non-Māori ethnic groups, and the extent to which that condition contributes to the total Māori–non-Māori gap:

$$\text{Equity adjustor} = 1 + [p (RR - 1) / p(RR - 1) + 1]$$

where RR is the age-standardised DALY rate ratio (diseases and injuries) or prevalence rate ratio (risk factors) as above, and p is the proportion of the total difference between Māori and non-Māori age-standardised DALY rates (80 per 1000) accounted for by the condition of interest.

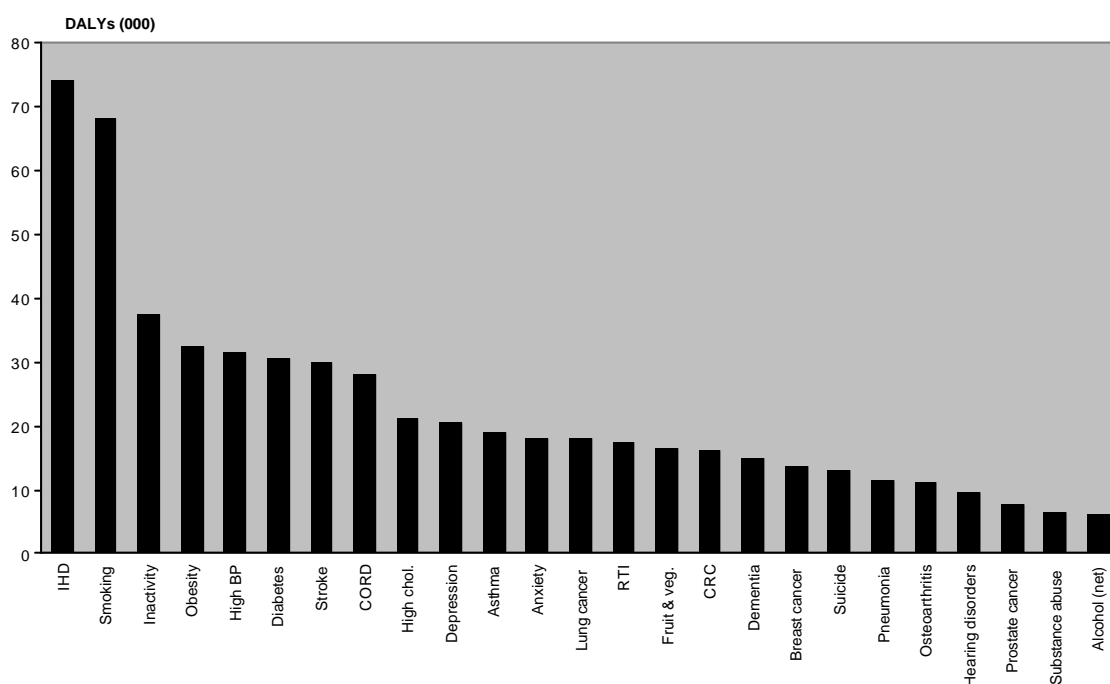
¹ This model is formally equivalent to a population attributable risk percent, or attributable fraction.

Results

Size of the burden

The top 25 conditions contributing to DALYs lost by the whole New Zealand population in 1996 are shown in Figure 1. For comparison, the total number of DALYs lost over all conditions was 563,000 (all results rounded to the nearest 1000 to reflect uncertainty in the YLD component of the DALY estimates).

Figure 1: Top 25 causes of DALYs lost, New Zealand, 1996



Notes: Obesity includes overweight (BMI 25–29). Alcohol is net of its protective effect on IHD, ischaemic stroke and related diseases. IHD = ischaemic heart disease; CORD = chronic obstructive respiratory disease; Chol. = total blood cholesterol; Anxiety = anxiety disorders; RTI = road traffic injury; Fruit & veg. = inadequate intake of fruit and vegetables; CRC = colorectal cancer.

Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a)

Modifiability of the burden

The modifiability multipliers judged appropriate are shown for selected conditions in Table 1.

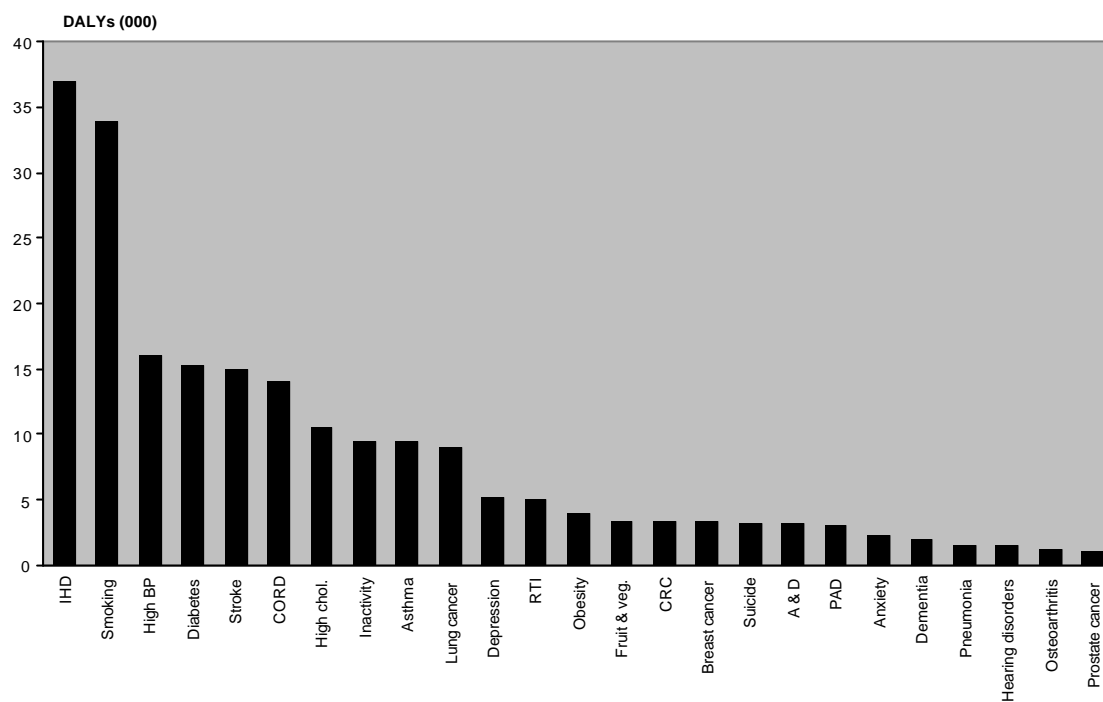
Table 1: Modifiability multipliers for selected conditions, New Zealand, 1996

Modifiability	Condition	Risk factor
High (0.5)	Ischaemic heart disease Stroke Chronic obstructive respiratory disease Diabetes Asthma Lung cancer Peripheral arterial disease	Smoking High blood pressure High blood cholesterol Diabetes
Moderate (0.25)	Depression Road traffic injury Breast cancer Colorectal cancer Suicide Osteoarthritis Substance use Lymphoma	Alcohol consumption Fruit & vegetable consumption Physical inactivity
Low (0.125)	Anxiety disorders Dementia Lower respiratory tract infection Hearing disorders Prostate cancer	Obesity

Note: Modifiability of conditions was determined by expert judgement (panel, literature review and key informant interviews).

Using these multipliers, the top 25 causes of modifiable DALYs (conditions ranked highly in terms of scope for health gain) are shown in Figure 2.

Figure 2: Top 25 causes of modifiable DALYs lost, New Zealand, 1996



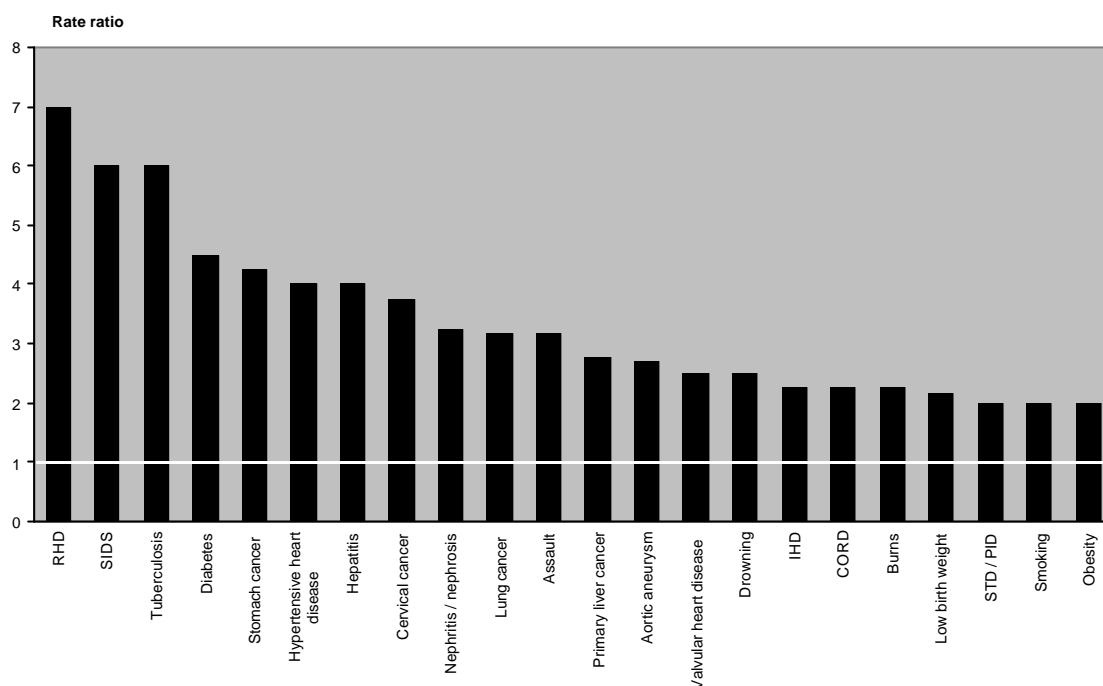
Notes: A&D = the net impact of alcohol plus the impact of other legal and illicit drugs (excluding tobacco). PAD = peripheral arterial disease. For other abbreviations, see Notes for Figure 1.

Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a).

Distribution of the burden

The most unequally distributed conditions are shown in Figure 3, measured in terms of rate ratio: the rate of the condition in Māori (standardised for age and sex) divided by the corresponding rate in non-Māori.

Figure 3: Age-adjusted DALY rate ratios or prevalence rate ratios, New Zealand, 1996



Notes: Only those conditions with rate ratio > 2 are shown. RHD = rheumatic heart disease; SIDS = sudden infant death syndrome (cot death); STD/PID = sexually transmitted diseases including pelvic inflammatory disease. For other abbreviations, see Notes for Figure 1.

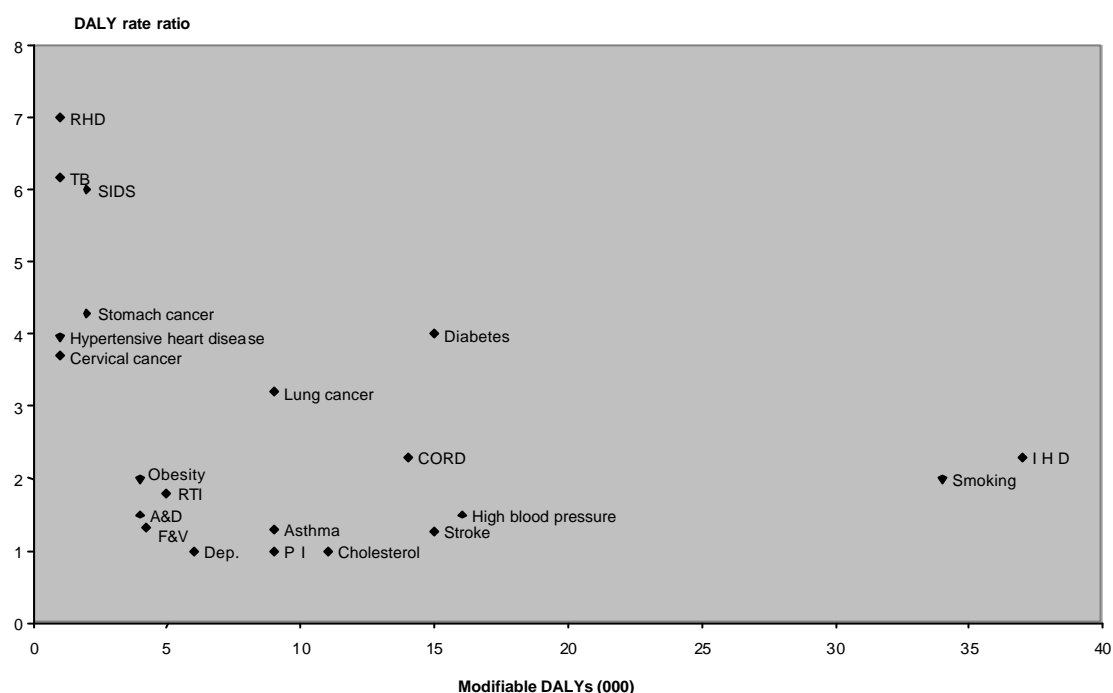
Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a).

As noted above, two approaches were used to incorporate equity concerns into the burden of disease analysis: the grid approach, and the equity adjustment approach.

Grid approach

The conditions listed in Figure 3, together with others ranked highly in terms of modifiable DALYs but not in terms of standardised DALY rate ratios, are arrayed on a grid with 'equity gain' and 'health gain' dimensions in Figure 4.

Figure 4: Equity gain versus health gain grid, New Zealand, 1996



Notes: Modifiable DALYs (000) = health gain dimension. DALY rate ratio = age-adjusted DALY rate ratio (diseases) or age-adjusted prevalence rate ratio (risk factors) (equity gain dimension). F&V = inadequate fruit and vegetable intake; Dep. = depression; P I = physical inactivity; TB = tuberculosis.

Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a).

Inspection of this grid allows decisions to be made transparently about where to set cut-offs on each dimension.

Equity adjustment approach

The equity adjustors calculated using the impact share model are summarised in Table 2, for those conditions ranked highly on either equity or health gain dimensions.

Table 2: Equity adjustors for selected conditions, New Zealand 1996

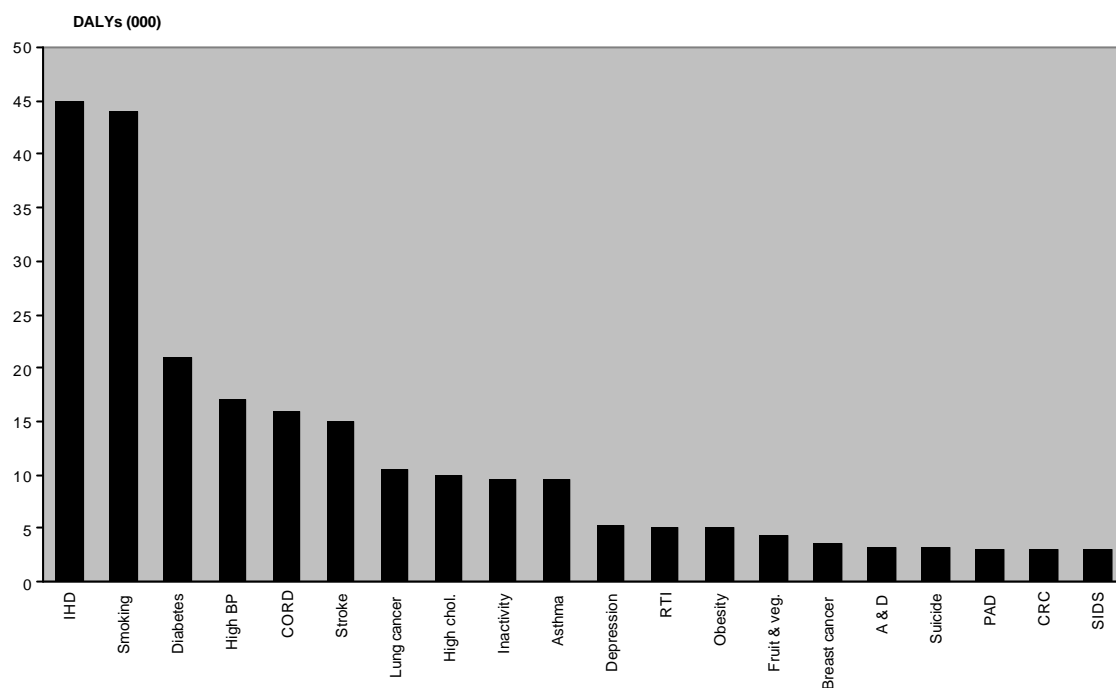
Disease	RR	p	Adjustor
Ischaemic heart disease	2.3	0.21	1.22
Stroke	1.4	0.02	1.01
Chronic obstructive respiratory disease	2.3	0.08	1.09
Diabetes	4.6	0.16	1.37
Depression	1.1	0.01	1.00
Lung cancer	3.2	0.09	1.17
Road traffic injury	1.8	0.02	1.01
Breast cancer	1.2	0.01	1.00
Suicide	1.4	0.02	1.01
Rheumatic heart disease	7.0	0.02	1.11
SIDS	6.0	0.04	1.17
Tuberculosis	6.0	0.01	1.05
Stomach cancer	4.2	0.03	1.09
Hypertensive heart disease	4.0	0.01	1.03
Cervical cancer	3.7	0.01	1.03
Diabetes	3.0	0.08	1.14
Smoking	2.0	0.40	1.29
Obesity	2.0	0.25	1.20
Hypertension	1.5	0.10	1.05
Fruit and vegetable consumption	1.5	0.75	1.27
Physical inactivity	1.0	n/a	1.00
Alcohol	1.0	n/a	1.00
Cholesterol	<1.0	n/a	1.00

Notes: RR = Māori to non-Māori rate ratio; p = share of total Māori-non-Māori gap contributed by the condition.

Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a), New Zealand Health Survey (Ministry of Health 1999b) and National Nutrition Survey (Ministry of Health 1999c).

Applying these adjustors to the modifiable DALY estimates for each condition yields the final ranking of conditions in terms of 'equity-adjusted modifiable DALYs'. The top 20 conditions ranked in this way are shown in Figure 5.

Figure 5: Top 20 causes of equity-adjusted modifiable DALYs lost, New Zealand, 1996



Note: For abbreviations used, see Notes for previous figures.

Source of base data: New Zealand Burden of Disease Study (Ministry of Health 1999a).

The above estimates, together with the grid, represent the epidemiological input into the selection process for evidence-based health objectives. The ultimate choice of objectives reflects other inputs as well, including the non-epidemiological criteria listed in the Introduction.

The conditions identified through the epidemiological (burden of disease) analysis represent two levels of causation – diseases and risk factors – and clearly overlap. This needs to be considered when designing strategies to reduce the burdens involved.

Conclusion

The New Zealand Burden of Disease Study carried out in 1999 (Ministry of Health 1999a) enabled estimates to be made of the size, modifiability and distribution of the (fatal and non-fatal) health burden associated with over 100 major diseases and injuries and eight chronic disease risk factors. This analysis provided a better evidence base for health objective development than has previously been available in New Zealand, especially with respect to the integration of fatal with non-fatal outcomes and the trade-offs between level and distribution of health.

The analysis has several limitations, however. Firstly, while all major diseases and injuries were included in the study, this was not the case for risk factors (and determinants were completely excluded). In particular, the failure to include nutritional risk factors (other than fruit and vegetable consumption) is of concern, although saturated fat intake is indirectly captured in blood total cholesterol. Occupational risk factors represent another notable omission.

Secondly, the analysis reflects current (actually 1996) need and takes no account of trends or escape potential (the ability of a condition to worsen if current control efforts were to be disinvested). An estimate of potential future need, rather than current realised need, would be more useful for planning. Also, estimates of the cost effectiveness of interventions would be helpful for the subsequent stage of resource allocation, especially at district level.

Thirdly, there are significant technical limitations (and hence uncertainties) in the models and data used for calculating DALYs, modifiability multipliers and equity adjusters. While these can be minimised to some extent by sensitivity analysis, the modifiability estimates in particular should preferably be based on objective effectiveness analysis rather than (more subjective) expert judgement. Also, the method used examines ethnic differences only in relation to equity. This means that an important cause of modifiable DALY loss for Māori could be missed, if it failed to make the initial cut of important modifiable causes for the whole population.

Despite these limitations, the analysis provided a useful 'grounding' for the debate on the selection of objectives. The final selection (Appendix 2) reflects this, although the choice has (appropriately) been influenced by consideration of non-epidemiological criteria as well. Indeed, comparison of Figure 5 with Appendix 2 suggests that approximately half of the priority objectives were selected primarily on the basis of the epidemiological evidence (those objectives relating to smoking, nutrition, obesity, physical activity, cancer, cardiovascular disease, diabetes, and mental illness). Selection of the remaining objectives reflects mainly non-epidemiological criteria (those objectives relating to alcohol and illicit drugs, suicide and self-harm, interpersonal violence, oral health and well child care).

The priority status given to selected objectives will also need regular revision and updating as the epidemiological situation, service environment and community preferences continue to evolve.

Both the short- to medium-term priority objectives and the more comprehensive framework of longer-term goals and objectives included in the New Zealand Health Strategy should provide a clear focus for planning by the Ministry of Health and the DHBs (and other providers). This in turn should contribute to improving the health status of all New Zealanders while simultaneously helping to reduce disparities in health outcomes for all New Zealanders including Māori and Pacific peoples.

Appendix 1:

Health Goals and Objectives

1. A healthy social environment

1. Assess public policies for their impact on health and health inequalities.
2. Support policies promoting universal access to high-quality education and training.
3. Support policies promoting workforce participation.
4. Support policies that reduce income inequalities and ensure an adequate income for all.
5. Eliminate social exclusion or discrimination against people on the basis of their health status or disability.

2. Reducing inequalities in health status

6. Ensure accessible and appropriate services for people from lower socioeconomic groups.
7. Ensure accessible and appropriate services for Māori.
8. Ensure accessible and appropriate services for Pacific peoples.

3. Māori development in health

9. Build the capacity for Māori participation in the health sector at all levels.
10. Enable Māori communities to identify and provide for their own health needs.
11. Recognise the importance of relationships between Māori and the Crown in health services, both mainstream and those provided by Māori.
12. Collect high-quality health information to better inform Māori policy and research and focus on health outcomes.
13. Foster and support Māori health workforce development.

4. A healthy physical environment

14. Support policies and develop strategies and services that ensure affordable, secure and safe housing.
15. Support policies that improve access to public transport.
16. Support policies that ensure access to an adequate supply of nutritious food.
17. Support policies and develop strategies and services that ensure all people have access to safe water supplies and effective sanitation services.
18. Reduce the adverse health effects of environmental hazards.

5. Healthy communities, families and individuals

19. Support and promote community development.
20. Develop and implement healthy workplace programmes.
21. Further develop health-promoting schools.
22. Ensure adequate support for parents and young families.
23. Ensure adequate support for caregivers in families with dependent members.
24. Support policies and programmes that enable people to be cared for in the community.
25. Support policies and programmes that support breastfeeding.
26. Support policies and programmes that promote positive ageing.
27. Reduce the incidence and impact of violence in interpersonal relationships, families, schools and communities.

6. Healthy lifestyles

28. Reduce smoking.
29. Improve nutrition.
30. Reduce obesity.
31. Increase the level of physical activity.
32. Improve sexual and reproductive health.
33. Minimise harm caused by alcohol and illicit and other drug use to individuals and the community.

7. Better mental health

34. Reduce the incidence and impact of stress.
35. Reduce the incidence and impact of depression.
36. Improve the health status of people with severe mental illness.
37. Reduce the rate of suicides and suicide attempts.
38. Reduce stigma and discrimination associated with mental illness.
39. Reduce the impact of dementia.

8. Better physical health

40. Reduce the incidence and impact of cancer.
41. Reduce the incidence and impact of cardiovascular diseases.
42. Reduce the incidence and impact of diabetes.

43. Reduce the incidence and impact of asthma and other lung diseases.
44. Reduce the incidence and impact of musculoskeletal disorders including arthritis.
45. Reduce the incidence and impact of neurological disorders.
46. Improve oral health.
47. Reduce the incidence and impact of infectious diseases.

9. Injury prevention

48. Reduce the incidence and impact of road traffic injuries.
49. Reduce the incidence and impact of falls in older people.
50. Reduce the incidence and impact of injuries (other than traffic) in children and youth.
51. Reduce the incidence and impact of workplace injuries.

10. Accessible and appropriate health care services

52. Ensure access to appropriate secondary care services.
53. Ensure access to appropriate palliative care services.
54. Ensure access to appropriate primary care, maternity and public health services.
55. Ensure access to appropriate child care services including well child and family health care and immunisation.
56. Ensure accessible and appropriate services for young people/rangatahi.
57. Ensure accessible and appropriate services for older people.
58. Ensure access to appropriate mental health services.
59. Ensure access to appropriate services for people living in rural areas.
60. Ensure services are patient-centred.
61. Ensure information about services is accessible for consumers.

Source: New Zealand Health Strategy (King 2000)

Appendix 2: Priority Objectives

The following 13 population health objectives were selected as short- to medium-term priorities:

Objective	Number*
To reduce the incidence and impact of violence in interpersonal relationships, families, schools and communities	27
To reduce smoking	28
To improve nutrition	29
To reduce obesity	30
To increase the level of physical activity	31
To minimise harm caused by alcohol, illicit and other drug use to individuals and the community	33
To improve the health status of people with severe mental illness	36
To reduce the rate of suicides and suicide attempts	37
To reduce the incidence and impact of cancer	40
To reduce the incidence and impact of cardiovascular disease	41
To reduce the incidence and impact of diabetes	42
To improve oral health	46
To ensure access to appropriate child care services including well child and family health care and immunisation services	55

* Objectives are numbered in order of appearance in the 'Goals and Objectives Framework' of the New Zealand Health Strategy (King 2000); order does not imply ranking.

Source: New Zealand Health Strategy (King 2000)

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