

# **Population-based Funding Formula**

2003

Citation: Ministry of Health. 2004. *Population-based Funding Formula 2003*.  
Wellington: Ministry of Health.

Published in April 2004 by the  
Ministry of Health  
PO Box 5013, Wellington, New Zealand

ISBN 0-478-28208-7 (Book)  
ISBN 0-478-28211-7 (Internet)  
HP 3787

This document is available on the Ministry of Health's website:  
<http://www.moh.govt.nz>



MANATŪ HAUORA

# Contents

Acknowledgement	vi
Executive Summary	vii
Introduction	1
Background	1
Overview of PBFF Development	3
Calculation of historical cost weights	3
Calculation of additional policy-based weighting for unmet need	5
Rural adjustment	6
Adjustment for overseas visitors	6
Details of PBFF Development	8
Populations	8
NZDep2001 Index of Deprivation	9
Personal Health: Hospital and Community Services	12
Summary	12
Data	12
Methodology	12
Results	14
Personal Health: Primary Health Care	16
Summary	16
Primary Health Organisations	16
Data	16
Methodology	16
Results	17
Disability Support	20
Summary	20
Background	20
Data	20
Methodology	21
Results	22
Mental Health	27
Summary	27
Background	27
Data	28
Methodology	28

Results	29
<b>Unmet Need Adjuster</b>	<b>35</b>
Summary	35
Data	35
Methodology	35
Results	36
<b>Overseas Visitors Adjuster</b>	<b>37</b>
Summary	37
Background	37
Data	38
Methodology	38
Results	43
<b>Rural Adjuster</b>	<b>45</b>
Summary	45
Background	45
Data	45
Methodology	45
Results	46
<b>PBFF Results</b>	<b>47</b>
<b>References</b>	<b>51</b>
<b>Appendix</b>	<b>52</b>

## List of Tables

Table 1:	DHB PBFF and population shares, 2003/04	ix
Table 2:	Proportion of selected population groups by DHB, 2003/04	5
Table 3:	NZDep2001 Index of Deprivation variables in order of decreasing weight	9
Table 4:	Mental health Blueprint cost weights per person, by age group	33
Table 5:	Weighted average adjusters for NZDep2001 quintiles	34
Table 6:	Value of hospital contracts by service type, 2001/02	39
Table 7:	Average DHB expenditure on eligible overseas visitors, 1998/99 to 2001/02	40
Table 8:	Estimated growth of overseas visitor ACC-covered cases, 1999/2000 to 2001/02	40
Table 9:	Determining the cost of 'other' overseas visitor ACC-covered cases	41
Table 10:	Average DHB cost of 'other' overseas visitor ACC cases, 1999/2000 to 2001/02	42
Table 11:	PBFF overseas visitors adjuster by DHB, 2003	43
Table 12:	DHB share of population, share of funding of total PBFF, share of rural adjuster, share of overseas adjuster for 2003/04	49
Table 13:	Publications on population-based funding in New Zealand	52

## List of Figures

Figure 1:	PBFF aggregate cost weights for females of Other ethnicity by age and NZDep2001	x
Figure 2:	PBFF aggregate cost weights for males of Other ethnicity by age and NZDep2001	x
Figure 3:	Population change by DHB, 2003/04–2008/09	9
Figure 4:	Cost weights for personal health (hospital and community services) for female Māori, by age and NZDep2001 quintile	13
Figure 5:	PBFF cost weights for personal health (hospital and community services) for females, by age and NZDep2001 quintile	14
Figure 6:	PBFF cost weights for personal health (hospital and community services) for males, by age and NZDep2001 quintile	15
Figure 7:	PBFF cost weights for personal health (hospital and community services) for Māori-Pacific and Other, by age and NZDep2001 quintile	15
Figure 8:	Comparison of personal health (primary health care) cost weight models for males, by age and NZDep2001 quintile	18
Figure 9:	PBFF cost weights for personal health (primary health care) for females, by age and NZDep2001 quintile	18
Figure 10:	PBFF cost weights for personal health (primary health care) for males, by age and NZDep2001 quintile	19
Figure 11:	Cost weights for residential services, 2000/01–2002/03 by age and sex	23
Figure 12:	Cost weights for community services, 2001/02–2002/03 by age and sex	24
Figure 13:	Cost weights for specialist ATR services, 2000/01–2002/03 by age and sex	25
Figure 14:	PBFF cost weights for age-related DSS by age and sex	26
Figure 15:	Unique client rates for mental health services, 2001/02 by age and NZDep2001 quintile	30
Figure 16:	Episodes of care per unique client, 2001/02 by age and NZDep2001 quintile	31
Figure 17:	Episodes of care per unique client, 2001/02 for Māori and non-Māori, by age and NZDep2001 quintile	32
Figure 18:	MHINC-derived cost weights for mental health services, 2001/02 by age and NZDep2001 quintile	33
Figure 19:	PBFF cost weights for mental health services by age, NZDep2001 quintile, and Māori ethnicity	34
Figure 20:	Distribution of the PBFF unmet need adjuster by DHB, 2003/04	36
Figure 21:	Distribution of the PBFF overseas visitors adjuster by DHB, 2001 and 2003	44
Figure 22:	Distribution of the PBFF rural adjuster by DHB, 2003/04	46
Figure 23:	PBFF aggregate cost weights for females of Other ethnicity by age and NZDep2001	47
Figure 24:	PBFF aggregate cost weights for males of Other ethnicity by age and NZDep2001	48
Figure 25:	PBFF aggregate cost weights for NZDep2001 quintile 3 by age and ethnicity	48

# Acknowledgement

The Ministry of Health would like to acknowledge the Royal College of General Practitioners' research unit in Dunedin, for their valued assistance and advice in providing the primary care data set for this review.

# Executive Summary

This report describes the 2003 review of the population-based funding formula (PBFF) for District Health Boards (DHBs) and presents each DHB's percentage share of available funding as determined by this formula.

The PBFF was developed in 2000 and based on then-available data and population projections. Cabinet approved the formula in November 2002. It directed that the PBFF be reviewed every five years to incorporate updated population projections following each population census. Population projections based on the 2001 Census became available in mid-2003, providing an appropriate opportunity for review. The review also allows the NZDep2001 Index of Deprivation (Salmond and Crampton 2003) to be incorporated. As the structure of the PBFF was finalised in November 2002, the review has not reconsidered any structural issues. Instead, changes have been restricted to the recalculation of cost weights and adjusters.

An interim version of the PBFF was introduced on 1 July 2003 and used to set target funding for each DHB. The results from the 2003 review of the PBFF will be implemented on 1 July 2004. It is envisaged that the next major review will take place after the 2006 Census, most likely in 2007.

The PBFF is an aggregate formula that determines the share of funding to be allocated to different districts of the country, based on the population living in each district. The PBFF does not determine the overall level of funding.

The aim of the PBFF is to fairly distribute available funding between DHBs according to the relative needs of their populations and the cost of providing health and disability support services to meet those needs. The PBFF gives each DHB the same opportunity, in terms of resources, to respond to the needs of its population. According to the PBFF, each DHB's share of health and disability funding is determined by:

1. its share of the projected New Zealand population, weighted according to the national average cost of the health and disability support services used by different demographic groups
2. an additional policy-based weighting for unmet need that recognises the different challenges DHBs face in reducing disparities between population groups
3. a rural adjustment and an adjustment for overseas visitors, each of which redistributes a set amount of funding between DHBs to recognise unavoidable differences in the cost of providing certain health and disability support services.

The 2003 review of the PBFF consists of a set of DHB populations, a set of service-based cost weights for each age, sex, ethnicity and NZDep2001 quintile group, plus the rural and overseas adjustments. The cost weights are based on historical average expenditure per group with further adjustments for unmet need. The rural and overseas adjusters have been based on the Ministry's best estimates of current costs.

The main changes to the PBFF resulting from the 2003 review relate to disability support services (DSS) and public health services. The 2001 modelling of the PBFF included both total DSS and public health services. In 2003 neither of these service areas had been devolved and are therefore excluded from the calculation of DHB funding shares for 2003/04. The devolution of age-related DSS services from October 2003 has led to the inclusion of age-related DSS cost weights in the 2003 review of the PBFF.

As a result of the 2003 review, DHBs' target shares for 2003/04 range from -8 percent to +6 percent of their target shares under the interim PBFF (excluding DSS). Ten DHBs are within  $\pm 1$  percent of their target funding under the interim PBFF, while 16 DHBs remain within  $\pm 3$  percent. These changes are due to the changes in the cost weights, changes to the overseas visitors adjuster, the addition of DSS to the PBFF, and finally to the new population projections. For some DHBs these factors offset each other, while for other DHBs their effects are compounded. For the majority of DHBs the new population projections are the most significant factor in the changes to their target shares.

The review of the cost weights contributes very little to the changes in DHBs' target shares. All DHBs remain within  $\pm 1$  percent of their interim PBFF targets as a result of the updated cost weights. Similarly, the update of the overseas visitors adjuster impacts by less than 0.1 percent on 20 of the DHBs.

The devolution of age-related DSS funding moved 19 DHBs no more than  $\pm 3$  percent from their target shares under the interim PBFF. For 12 of those DHBs, the variance was within  $\pm 1$  percent.

The new population projections move DHBs' target shares from between -6 percent to +3 percent of their target shares under the interim PBFF. The majority (19) of DHBs are within  $\pm 3$  percent of their interim target shares as a result of the new population projections.

Table 1 shows the percentage share of funding allocated to each DHB as a result of the 2003 review of the PBFF. The PBFF shares in the table include the cost weights and all adjustments. Each DHB's share of the population is shown. DHBs may receive slightly more or slightly less funding than suggested by their share of the New Zealand population due to demographic factors, such as the age structure or level of deprivation within their population.

**Table 1:** DHB PBFF and population shares, 2003/04<sup>1</sup>

DHB	PBFF share %	Population share %
Auckland	9.74	10.43
Bay of Plenty	5.45	4.82
Canterbury	11.15	11.33
Capital and Coast	5.91	6.59
Counties Manukau	9.88	10.45
Hawke's Bay	4.06	3.70
Hutt	3.22	3.41
Lakes	2.65	2.52
MidCentral	4.27	4.06
Nelson Marlborough	3.47	3.27
Northland	4.20	3.64
Otago	4.57	4.45
South Canterbury	1.51	1.33
Southland	2.62	2.66
Tairāwhiti	1.31	1.12
Taranaki	2.85	2.62
Waikato	8.53	8.32
Wairarapa	1.11	0.97
Waitemata	10.72	11.92
West Coast	0.92	0.76
Whanganui	1.86	1.61
Total	100.00	100.00

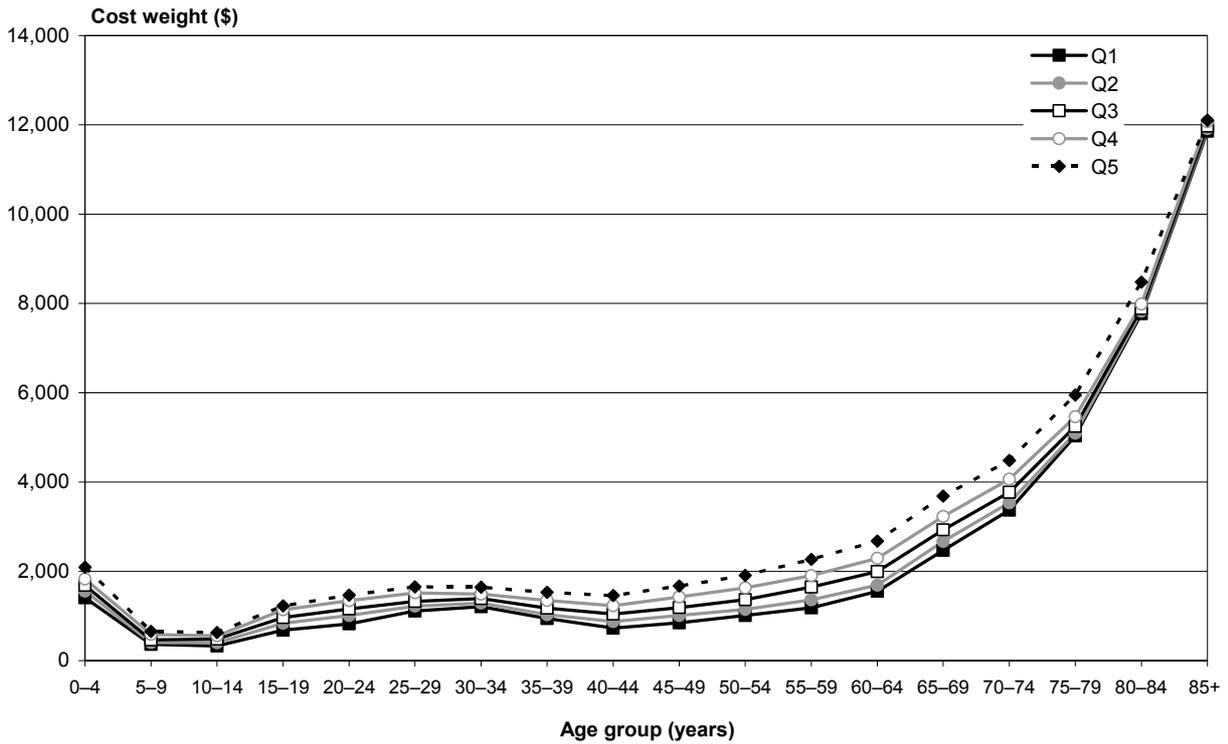
Figure 1 shows the cost weights for female Other ethnicity<sup>2</sup> by age and by NZDep2001 quintiles.<sup>3</sup> The importance of both age and NZDep2001 on the variation in cost weights is clear. Figure 2 shows the cost weights for male Other ethnicity by age and by NZDep2001 quintiles. The cost weights for Māori and Pacific peoples are slightly greater at each age and NZDep2001 quintile than the cost weights for Other ethnicity.

<sup>1</sup> The inclusion of age-related DSS funding means the 2003/04 PBFF shares are not directly comparable with the interim PBFF shares.

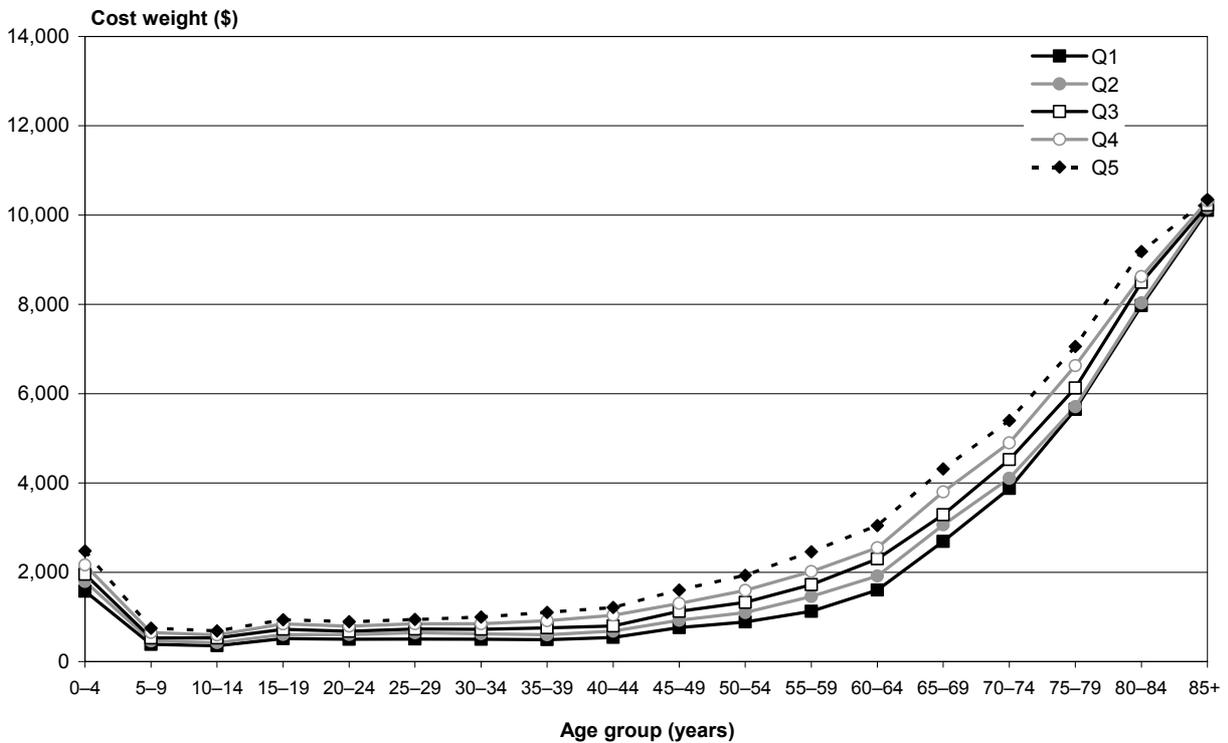
<sup>2</sup> Other ethnicity is defined as non-Māori and non-Pacific peoples.

<sup>3</sup> NZDep2001 is an area-based index of deprivation derived from the 2001 Census. Quintiles divide the population into five groups. A value of 1 represents the least deprived percent; a value of 5 represents the most deprived 20 percent.

**Figure 1:** PBFF aggregate cost weights for females of Other ethnicity, by age and NZDep2001



**Figure 2:** PBFF aggregate cost weights for males of Other ethnicity, by age and NZDep2001



# Introduction

This report describes the 2003 review of the population-based funding formula (PBFF) for District Health Boards (DHBs), and presents each DHB's percentage share of available funding as determined by this formula.

The PBFF was developed in 2000 and based on then-available data and population projections. Cabinet approved the formula in November 2002. It directed that the PBFF be reviewed every five years to incorporate updated population projections following each population census. Population projections based on the 2001 Census became available in mid-2003, providing an appropriate opportunity for review. The review also allows the NZDep2001 Index of Deprivation (Salmond and Crampton 2002) to be incorporated. As the structure of the PBFF was finalised in November 2002, the review has not reconsidered any structural issues. Instead, changes have been restricted to the recalculation of cost weights and adjusters.

An independent audit into the review was successfully carried out, with no concerns raised.

This report begins with a background to the development of the PBFF. The subsequent section presents an overview of the development of the PBFF, while the section titled *Details of PBFF Development* covers the construction of the individual components of the PBFF. Finally, key results are presented.

## Background

This section outlines the background to the development of the interim PBFF with reference to key Cabinet decisions.

Cabinet agreed that DHBs would be funded using a weighted population-based funding formula (CAB (00) M 2/4 refers). This process can be considered in two parts.

1. The move to population-based funding which is where funding is given to DHBs to enable the provision of services for their resident populations.
2. Using a population-based funding formula to determine each DHB's fair share of funding.

Both should occur as part of a managed process in order to minimise risks to service provision, to the financial position of the DHBs and to the Crown.

Cabinet agreed to the aims of the PBFF and the general structure of the PBFF. The Cabinet papers concerning DHB funding are as follows.

- CAB (00) M 42/5 A, District Health Board funding: implementation of population-based funding.
- CAB (00) M 42/5 B, District Health Board funding: appropriations for District Health Boards.
- CAB (00) M 42/5 C, District Health Board funding: structure of the population-based funding formula.
- CAB (02) M 32/14, District Health Board funding: implementation of population-based funding.

The aim of the PBFF is to fairly distribute available funding between DHBs according to the relative needs of their populations and the cost of providing health and disability support services to meet those needs. The PBFF will give each DHB the same opportunity, in terms of resources, to respond to the needs of its population. According to the PBFF, each DHB's share of health and disability funding will be determined by:

1. its share of the projected New Zealand population, weighted according to the national average cost of the health and disability support services used by different demographic groups
2. an additional policy-based weighting for unmet need that recognises the different challenges DHBs face in reducing disparities between population groups
3. a rural adjustment and an adjustment for overseas visitors, each of which redistributes set amounts of funding between DHBs to recognise unavoidable differences in the cost of providing certain health and disability support services.

The PBFF is an aggregate formula that determines the share of funding to be allocated to different areas of the country, based on the population living in each area. The PBFF does not determine the overall level of funding.

# Overview of PBFF Development

This section provides an overview of the development of the structure of the interim version of the PBFF. The structure remains unchanged for the 2003 review of the formula. Further details of the calculations are presented in the following section. All references to Cabinet minutes are to CAB (00) M 42/5 C.

## Calculation of historical cost weights

Cabinet agreed that the structure of the PBFF will have as its starting point the calculation of cost weights based upon the national average cost of the health and disability support services used by different demographic groups. The calculation of the cost weights and choice of demographic groups was based on the results of technical modelling work carried out by the Ministry of Health. The first step in the process was the choice of demographic factors.

Age and sex have a large impact on health expenditure so both were chosen as factors. In choosing which further factors to use the following issues were considered.

- Is there a clear link between the membership of the group and differences in need for health and disability services?
- Is data available to allow us to calculate the difference in the current cost of meeting health and disability needs?
- Is data available on the distribution of the factor within each DHB?

It is also desirable that the model chosen provides a clear link between needs analysis, policy work and funding. This will aid governance of the sector by allowing DHBs to look at their needs analysis and their funding in terms of the same groups. Much of the needs analysis and policy work undertaken in recent years has focused on the following:

- age
- sex
- socioeconomic status, as measured by the New Zealand Index of Deprivation (1996, updated in 2001) or by income or qualifications
- ethnicity, with particular emphasis on Māori and Pacific peoples.

See for example:

- National Health Committee. 1998. *The Social, Cultural and Economic Determinants of Health in New Zealand: Action to improve health*. Wellington: National Health Committee.
- Ministry of Health. 1999. *Taking the pulse: The 1996/97 New Zealand health survey*. Wellington: Ministry of Health.
- Health Funding Authority, Ministry of Health. 1998. *Disability in New Zealand: Overview of the 1996/97 survey*. Hamilton and Wellington: Health Funding Authority, Ministry of Health.

- Ministry of Health. 2000. *Our Health, Our Future – Hauora Pakari, Koiora Roa: The health of New Zealanders 1999*. Wellington: Ministry of Health.
- Minister of Health. 2000. *The New Zealand Health Strategy*. Wellington: Ministry of Health.
- Mental Health Commission. 1998. *Blueprint for Mental Health Services in New Zealand: How things need to be*. Wellington: Mental Health Commission.

These reports demonstrate the links between health status and socioeconomic status and ethnicity. The Ministry has relied on these reports as both a direct source of data and as a check on results derived from other data sources.

After consideration of these factors and after initial analysis, the Ministry chose to use demographic groups defined by age, sex, NZDep2001 quintiles and ethnicity. The ethnic groups chosen were Māori, Pacific peoples and Other ethnicity.

Table 2 shows how the proportions of these demographic groups differ between DHBs. For some DHBs, the different population factors affect funding in opposite ways. South Canterbury, for example, has the highest proportion of older people but the lowest proportion of Māori and Pacific peoples.

Once the demographic groups had been chosen, the Ministry calculated the best estimate of current expenditure on each group to determine the average cost weight per group. For example to get the cost weight for female Māori aged 40 to 45 in NZDep2001 quintile 5 the Ministry estimated the average expenditure for each type of service for that group.

Expenditure does not always vary by all demographic groups. For example, for some services average expenditure does not vary by ethnicity once NZDep2001 has been allowed for.

While historical expenditure has been used as a proxy for need in most of the formula, for mental health expenditure there is limited historical data. The population weightings for mental health were therefore based on the targets in *Blueprint for Mental Health Services in New Zealand: How things need to be* (Mental Health Commission 1998) as a base, with a further adjustment for NZDep2001.

As a result of the 2003 review of the PBFF, cost weights were revised for the following service areas: hospital and community services, and disability support services. The interim PBFF cost weights for primary health care services, based on the Sutton model (2000), were not altered.

**Table 2:** Proportion of selected population groups by DHB, 2003/04<sup>4</sup>

DHB	Percentage of people aged 65+	Percentage of Māori or Pacific peoples	Percentage in NZDep2001 quintile 5 <sup>5</sup>
Auckland	9.5	20.2	20.6
Bay of Plenty	15.0	26.5	27.5
Canterbury	13.3	9.0	10.4
Capital and Coast	10.1	18.4	13.9
Counties Manukau	8.8	36.9	36.6
Hawke's Bay	13.5	27.6	27.7
Hutt	10.9	23.3	19.3
Lakes	11.4	36.8	33.5
MidCentral	13.5	18.6	20.1
Nelson Marlborough	14.3	9.5	7.6
Northland	13.9	34.1	37.5
Otago	14.2	7.7	14.4
South Canterbury	17.5	6.4	9.0
Southland	12.8	12.2	12.3
Tairāwhiti	11.5	49.9	49.4
Taranaki	14.6	16.2	17.8
Waikato	12.0	23.9	24.9
Wairarapa	15.7	16.9	14.9
Waitemata	10.7	16.4	8.5
West Coast	13.7	9.6	17.0
Whanganui	14.7	26.0	32.0
New Zealand average	12.0	20.9	20.4

## Calculation of additional policy-based weighting for unmet need

The greater population weightings for Māori, Pacific peoples and people in the most deprived areas reflects the greater health needs of these groups. However, there are still significant health disparities between Māori and Pacific peoples and Other New Zealanders. There are also significant health disparities between people who live in the most deprived areas in New Zealand and those who live in the least deprived areas. These persistent health disparities indicate that Māori, Pacific peoples and people in the most deprived areas have needs for health services that are not currently being met.

The New Zealand Public Health and Disability Act 2000 requires DHBs to reduce health disparities by improving health outcomes for Māori and other population groups. These are also key objectives in *The New Zealand Health Strategy* (Minister of Health 2000).

<sup>4</sup> Light shading indicates the lowest proportion among DHBs, and dark shading the highest.

<sup>5</sup> People in NZDep2001 quintile 5 reside in the most deprived 20 percent of areas in New Zealand.

Cabinet agreed that 'the population weightings will include an additional 'policy-based' weighting for the unmet needs of demographic groups such as Māori, Pacific people and people living in the most deprived areas, in order to equalise the opportunity across DHBs to address health disparities'.

There is no one right level for this additional unmet need weighting so the redistribution it introduces is a matter of policy. In calculating this additional weighting the Ministry has therefore considered available evidence on health disparities.

The 2003 review of the PBFF resulted in no changes to the adjustment for unmet need.

## **Rural adjustment**

DHBs face unavoidable costs in providing or funding some community services to rural communities because the population in these communities is widely dispersed. Examples of these additional costs are the rural practice bonuses paid to rural general practitioners and the unproductive travelling time spent by district nurses in isolated areas. Cabinet agreed that 'there will be an adjustment in the PBFF for the unavoidable differences in costs that DHBs face in providing or funding some community services to rural communities and for the diseconomies of scale involved in maintaining a reasonable level of access to hospital services for rural communities'. Cabinet also agreed that 'this rural adjustment will be based on the actual extra costs incurred by DHBs in providing these services, as estimated from the most recent year or years'.

In quantifying this adjustment, the Ministry has drawn mainly on the existing rural price premia and the cost of existing rural services.

The update of the PBFF considered the rural adjuster but recommended no material change this year. The current rural adjuster contains rural funding that overlaps with Primary Health Organisation (PHO) rural funding. This cannot be reviewed until PHO funding is brought within the formula. Instead, work should continue separately on the rural adjuster with a view to implementation from 1 July 2005.

## **Adjustment for overseas visitors**

All overseas visitors are eligible for acute care for personal injuries through the Accident Compensation Corporation (ACC). However, while ACC pays the Crown a levy to cover the cost of acute care, funding to the DHBs comes through Vote Health. Visitors from some countries have reciprocal rights to certain publicly funded health services in New Zealand, and New Zealand citizens living overseas (including those from the Cook Islands, Niue and Tokelau) are eligible for all services. DHBs should bear the costs of treating overseas visitors who use services within their geographically defined district as the four HFA regions did, and the regional health authorities and area health boards did before them. The majority of the costs incurred in treating overseas visitors will be hospital costs.

Overseas visitors, however, are not part of the resident population of New Zealand on which the PBFF is based. This would not matter for funding purposes if the use of

services by overseas visitors was reasonably evenly distributed across the country. This is not the case, however, and the main entry points for visitors (Auckland and Christchurch) and popular tourist destinations (like Rotorua and Queenstown) have more overseas visitors than the rest of New Zealand. The DHBs in these places are therefore more likely to incur costs, relative to their overall budget, in treating eligible visitors. Eligible visitors from the Cook Islands, Niue and Tokelau use hospital services almost exclusively in the Auckland region.

Cabinet agreed that ‘there will be an adjustment in the PBFF for the unavoidable differences in costs that DHBs face in providing services to eligible overseas visitors, and that this adjustment will be based on the actual extra costs incurred by DHBs in providing these services, as estimated from the most recent year or years’.

The overseas visitor adjustment has been calculated from the Ministry’s best estimate of current expenditure on eligible overseas visitors. No structural changes have been made. Any major shifts were based on estimated recent expenditure.

## Details of PBFF Development

This section summarises the development of the components of the PBFF. It starts by considering the populations used. It then considers the calculation of average expenditure for each service group. Expenditure was analysed for the following service groups:

- personal health – hospital and community services
- personal health – primary health care
- mental health services
- disability support services.

The calculation of unmet need, and rural and overseas adjusters are also described.

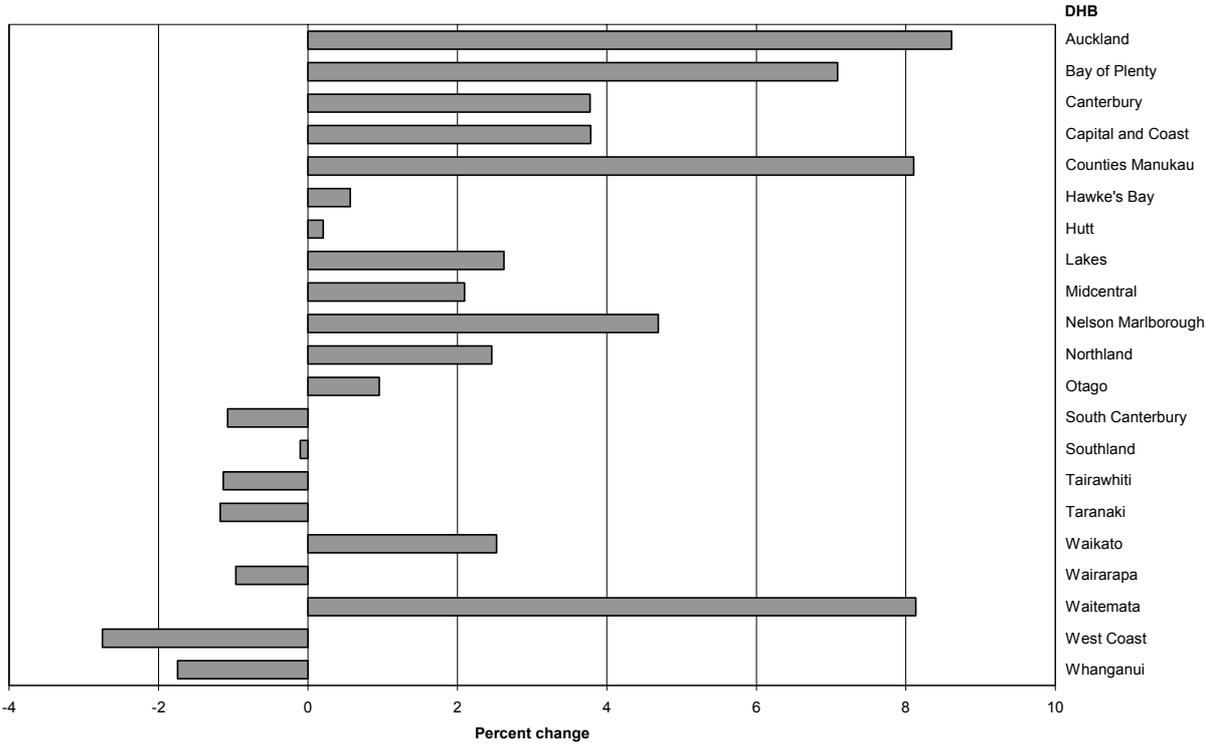
All final calculations have been scaled to the best estimate of costs for the 2003/04 fiscal year, as have final cost weights plotted in figures at the end of each service group.

## Populations

The relative size of each DHB's population is the major determinant of its PBFF share of funding. For each DHB, their population share will determine between 83 percent and 98 percent of funding. Adjustments for demographic factors account for the remainder. The relative growth rates of DHB populations will therefore impose changes on the relative shares of the budget irrespective of the final form of the formula. Figure 3 shows the difference in growth rates expected over the five years between 2003/04 and 2008/09.

For each funding year, the PBFF incorporates population projections for the average resident population in each DHB for that year. The sub-national and ethnic-specific population projections required for the PBFF are not part of Statistics New Zealand's normal suite of projections and were specially commissioned and delivered by them. The projected populations for each DHB district are split by age, sex and ethnicity. NZDep2001 quintiles within these population groups were available from the 2001 Census, and were pro-rated for each of the projected years. The projections will be updated annually if there is material change.

**Figure 3:** Population change by DHB, 2003/04–2008/09



### NZDep2001 Index of Deprivation

The NZDep2001 Index of Deprivation is an updated version of NZDep96 that became available in August 2002. NZDep2001 has been incorporated into the 2003 review of the PBFF.

NZDep2001 was developed by Claire Salmond and Peter Crampton of the Wellington School of Medicine and Health Sciences. The Index combines variables from the 2001 Census that reflect aspects of material and social deprivation, as can be seen in Table 3. A more complete description of the development of the Index may be found in the *NZDep2001 Index of Deprivation User's Manual*. The manual is available at [www.moh.govt.nz/phi](http://www.moh.govt.nz/phi)

**Table 3:** NZDep2001 Index of Deprivation variables in order of decreasing weight

1. Income	People aged 18–59 receiving a means-tested benefit
2. Employment	People aged 18–59 unemployed
3. Income	People living in equivalised households below an income threshold
4. Communication	People with no access to a telephone
5. Transport	People with no access to a car
6. Support	People aged <60 living in a single parent family
7. Qualifications	People aged 18–59 without any qualifications
8. Living space	People living in equivalised households below a bedroom occupancy threshold
9. Owned home	People not living in own home

NZDep2001 divides New Zealand into tenths on the basis of a deprivation score for each meshblock. A meshblock is a geographical unit defined by Statistics New Zealand, with a median of approximately 90 people. An index value of decile 1 represents the meshblocks with the lowest 10 percent (least deprived) of deprivation scores, and decile 10 the meshblocks with the most deprived scores.<sup>6</sup> A value of 10 indicates that the meshblock is in the most deprived 10 percent of meshblocks. It is important to note that the NZDep2001 scores apply to areas rather than individuals.

For PBFF analysis, the NZDep2001 deciles were merged into five quintiles.

- Deciles 1 and 2 become quintile 1.
- Deciles 3 and 4 become quintile 2.
- Deciles 5 and 6 become quintile 3.
- Deciles 7 and 8 become quintile 4.
- Deciles 9 and 10 become quintile 5.

NZDep2001 values were included with the DHB population projections which were based on the 2001 Census. Individuals in each DHB received an NZDep2001 quintile value according to the meshblock in which they lived. For example, 49.4 percent of the population of Tairāwhiti DHB were in quintile 5 in 2003/04, whereas the equivalent figure for Nelson Marlborough DHB was 7.6 percent. The cost weights for individuals varied according to the weighting for each NZDep2001 quintile.

NZDep2001 was used as a measure of deprivation in the calculation of cost weights in three service areas of PBFF analysis: hospital and community services, primary health care and mental health services. Deprivation was not incorporated into the analysis of disability support services. Research conducted as part of the interim PBFF development produced no evidence that the index of deprivation would have a material impact on the cost weights for aged care services. Due to data availability issues the NZDep2001 value for the calculation of cost weights was based on area units that are larger units than meshblocks.

Comparing NZDep2001 with NZDep96 is possible for the purposes of PBFF where the geographical unit of DHBs is large. However the authors note:

area comparisons at the meshblock level, over time, should not be attempted. Comparisons at a higher aggregation, such as Territorial Authorities, or perhaps Area Units, may be less fraught, but we would still urge great caution in the interpretation of changes from one area to another

comparing relationships between deprivation and another variable, over time, may be less fraught, but we would still urge caution (Salmond and Crampton 2002).

<sup>6</sup> NZDep2001 Index of Deprivation decile values should not be confused with the Ministry of Education's school decile system.

Meshblocks can change deprivation values between censuses for a number of reasons. Due to population changes a meshblock may be deleted or split into two new meshblocks. Meshblock boundary changes may also give rise to a different balance of socioeconomic characteristics within that meshblock.

There was also a slight difference in information being added to the NZDep2001 index due to alterations in two variables. Changes to income categories in census forms affected the income variable, while an improved indicator of crowding was also introduced. A full explanation of these technical changes can be found in *NZDep2001 Index of Deprivation User's Manual*.

# Personal Health: Hospital and Community Services

## Summary

Personal health (hospital and community services) cost weights were derived from National Minimum Data set (NMDS) extracts, from the calendar years 2000 to 2002. Options for analysing ethnicity were explored. The final analysis models age, sex and deprivation, and ethnicity. The extra cost of Māori and Pacific utilisation was added as a multiplicative adjustment to the base cost weights (for age, sex and deprivation) of the national population. This represents a change from the interim PBFF where ethnicity was modelled as an additive adjustment to the base cost weights of the national population.

## Data

Personal health (hospital and community services) costs were derived from National Minimum Data set (NMDS) extracts, provided by the New Zealand Health Information Service (NZHIS). The period covered was January 2000 to December 2002. Ethnicity was prioritised into Māori, Pacific and Other groups. Cost estimates were added to individual discharge records using case-weights<sup>7</sup> and 2003/04 standard prices.<sup>8</sup> The New Zealand Index of Deprivation (NZDep2001) was added through the National Health Index number (NHI) and was based on domicile codes.

## Methodology

Cost weights for personal health (hospital and community services) were derived from actual costs per population group averaged over 2000–02. The population groups were defined by age, sex, ethnicity and NZDep2001 quintile. Five-year age groups up until 85+ years were used. Some data smoothing between quintiles among 80+ year age groups was necessary.

## Ethnicity

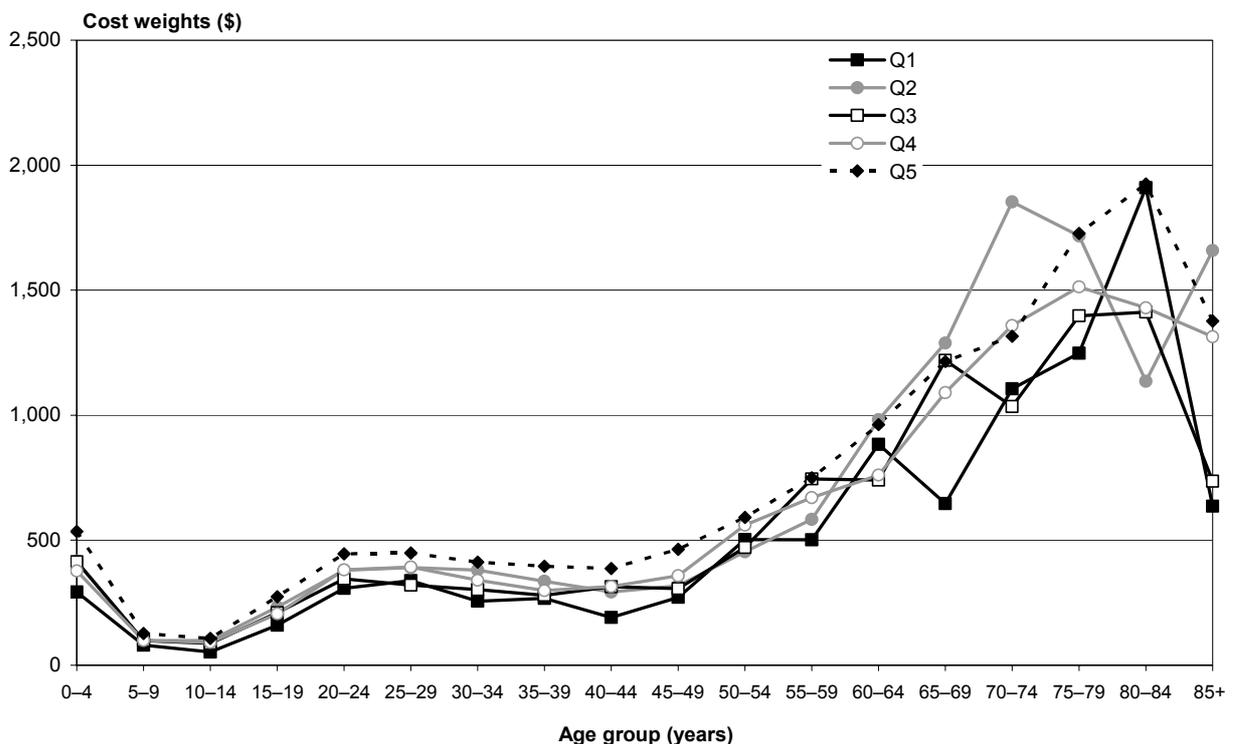
Options for analysing cost weights by ethnicity were explored. Initially, the raw data was analysed by ethnicity. As Figure 4 shows, the resulting small data cells lead to unstable cost weights for the Māori population, particularly among older age groups. A similar result was obtained for the Pacific population.

<sup>7</sup> Individual events are weighted according to the WIES8 case weighting system.

<sup>8</sup> The prices developed for DHBs for paying inter-district transfers.

Examining Māori and Pacific data without incorporating deprivation quintiles (in the numerator or denominator) still suggested problems with ethnicity coding. Differing data sources used to calculate the rates of utilisation (NMDS and population census data) have likely led to an inconsistent application of ethnic group codes. Instead, it was preferable to use a model based on deprivation with an adjustment for ethnicity. Future improvements in ethnic coding may eventually allow this method to be revised. The final analysis models rates by age, sex and deprivation, and scales for the average additional cost for Māori and Pacific peoples. For this purpose, a combined Māori-Pacific population was used to provide greater cost weight stability.

**Figure 4:** Cost weights for personal health (hospital and community services) for female Māori, by age and NZDep2001 quintile



### Cost weight calculation

Cost weights for personal health (hospital and community services) were calculated based on the sum of costs divided by the sum of the population for each age, sex and deprivation quintile. These were then adjusted for ethnicity, as described below. The cost weights were adjusted for the greater utilisation of Māori and Pacific peoples after adjustment for age, sex and deprivation.

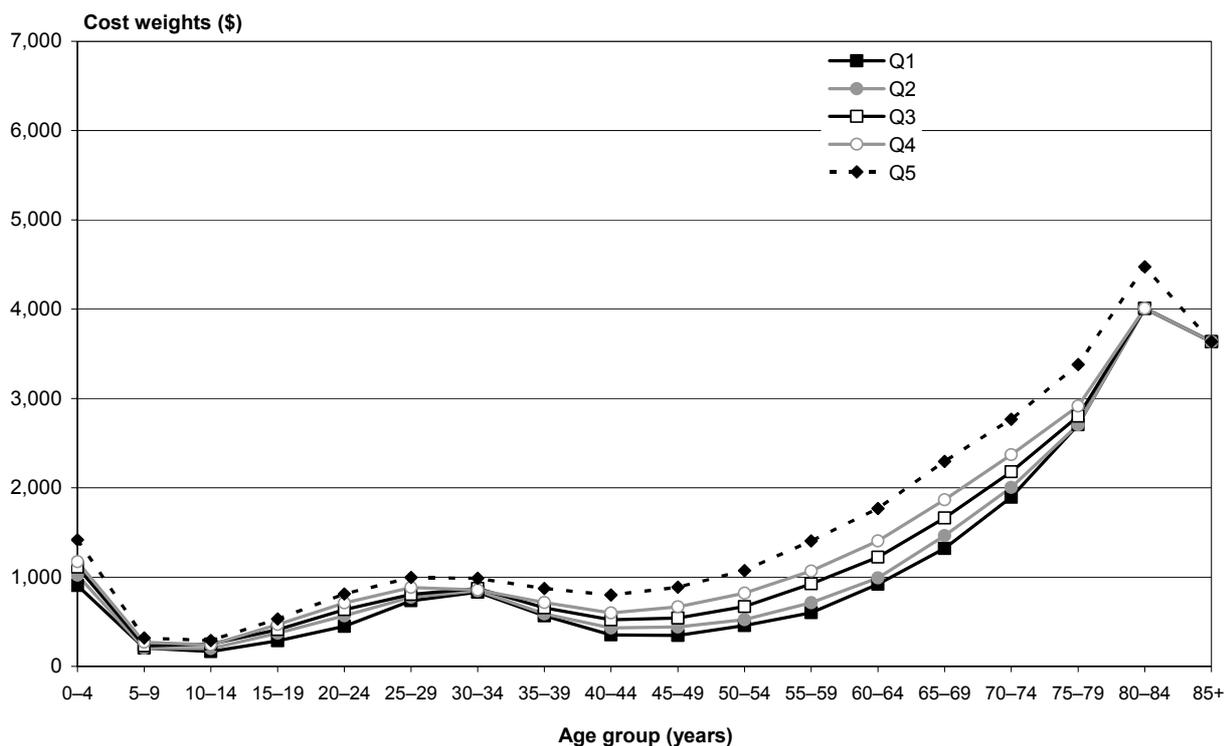
The adjustment was based on Māori-Pacific utilisation. The objective was to establish the percentage increase in utilisation rates for Māori and Pacific people at each age-sex-deprivation quintile group and then to weight this adjustment by Māori and Pacific utilisation at each age-sex-deprivation quintile group to get a single adjuster. The model simulates a correct level of utilisation for the Māori-Pacific population as a whole. It does not necessarily approximate each individual cell. This reflects the objective of funding groups rather than individuals.

The resulting adjustment factors of 1.1437 for Māori-Pacific women and 1.1275 for Māori-Pacific men take into account that the personal health (hospital and community services) model under-represents Māori-Pacific utilisation by an average of 14.37 percent for women and 12.75 percent for men. This method represents a change from the interim PBFF where ethnicity was modelled as an additive adjustment to the base cost weights of the national population. The ratio of Māori and Pacific cost weights to that of the national population was also investigated by age, sex and deprivation. Ultimately, it was decided that a multiplicative adjustment to base cost weights provides a better fit to the data.

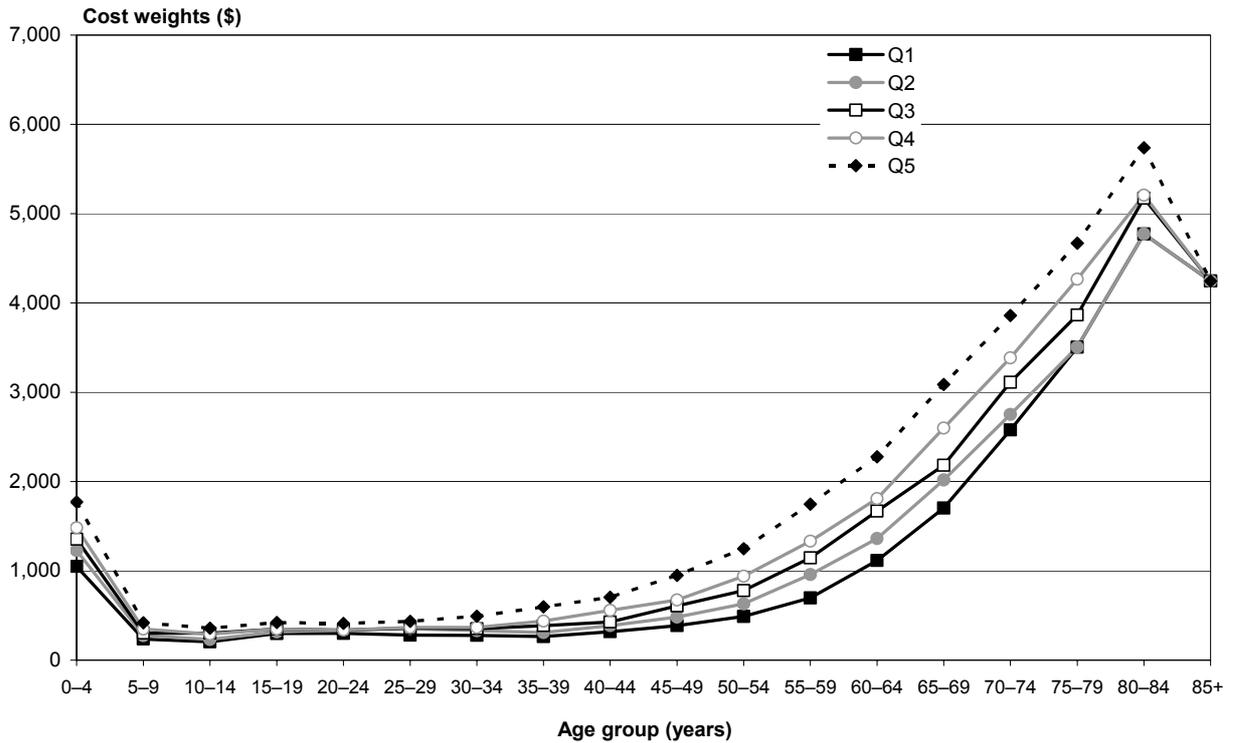
## Results

Figures 5 and 6 show the final cost weights for females and males. The patterns of utilisation illustrate the clear relationship between age, sex and deprivation. There is a strong trend in costs with both age and deprivation, with costs generally increasing with age and among the higher deprivation quintiles recording higher health costs. Figure 7 shows the results for the combined Māori-Pacific population and the Other population group.

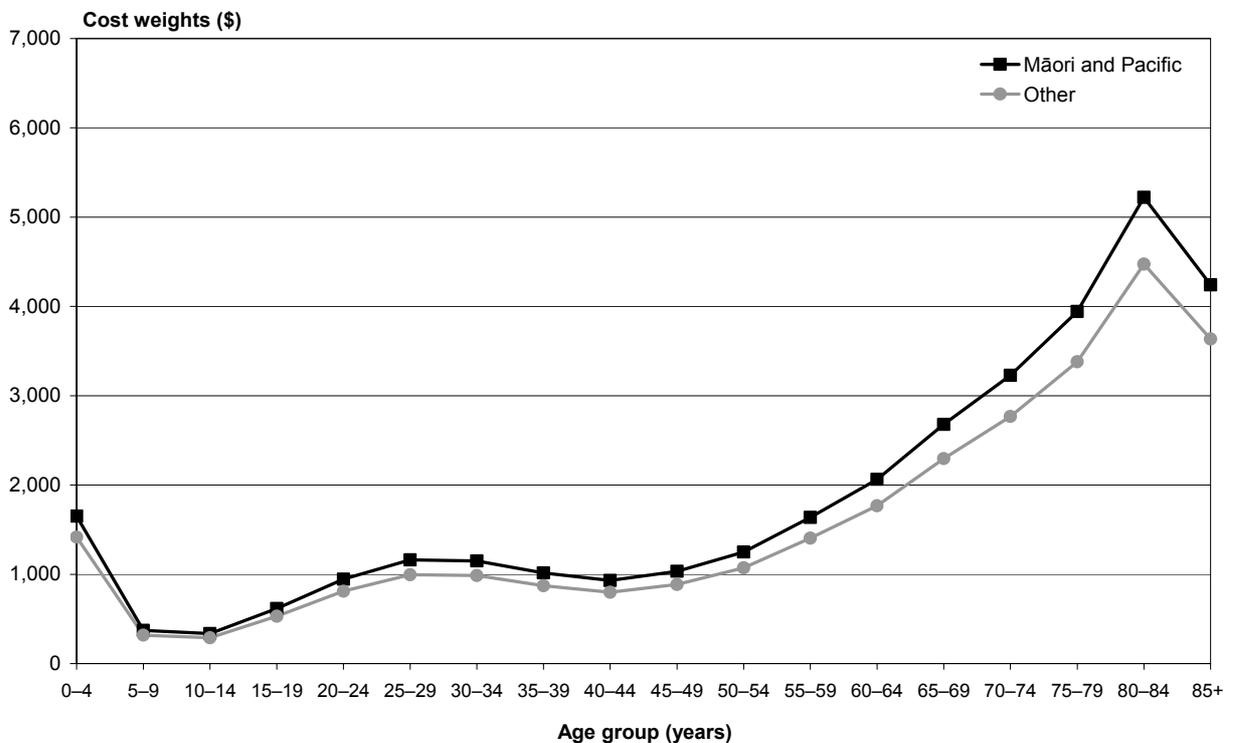
**Figure 5:** PBFF cost weights for personal health (hospital and community services) for females, by age and NZDep2001 quintile



**Figure 6:** PBFF cost weights for personal health (hospital and community services) for males, by age and NZDep2001 quintile



**Figure 7:** PBFF cost weights for personal health (hospital and community services) for Māori-Pacific and Other, by age and NZDep2001 quintile



# Personal Health: Primary Health Care

## Summary

Personal health (primary health care) data from 2000–02 was sampled from the Royal New Zealand College of General Practitioners' (RNZCGP) database as a check on the primary health care utilisation and costs used in the model for the interim PBFF.

As results obtained from the sample were similar to those from the previous PBFF analysis, no changes were made to the interim personal health (primary health care) cost weights model. As Primary Health Organisations (PHOs) become more widely spread geographically during 2003/04, further investigation into personal health (primary health care) cost weights will be carried out in order to facilitate incorporation of PHO funding into the PBFF.

## Primary Health Organisations

PHOs are being established throughout the country as part of the Primary Health Care Strategy (Minister of Health 2001). These organisations are funded on a capitation basis and will impact on the observed per capita cost weights. At present the geographically uneven establishment of PHOs prevents these funding changes from being incorporated into the PBFF. The recommendation is for the PBFF to be adjusted in time for the 2005/06 year, when there will be a more even geographical distribution of PHOs. Until then the additional funding paid to DHBs for the extra costs of PHOs will remain outside the PBFF.

## Data

The RNZCGP research unit at the University of Otago maintains a database of individual GP patient management systems. A sampled data set covering 200,000 individuals over three years from January 2000 to December 2002 was obtained for analysis. The NZDep2001 New Zealand Index of Deprivation was added through encrypted National Health Index (NHI) numbers. This data set was similar to the previous sample in 2001 which comprised 60,000 individuals between 1996/97 and 1998/99. The RNZCGP data is a proxy measure for total primary health care utilisation which includes GP visits, pharmaceuticals and laboratory tests.

The 1996/97 New Zealand Health Survey (Ministry of Health 1999) provides a benchmark study that can be used for broad comparisons.

## Methodology

Forty-three percent of individuals in the RNZCGP data set had no GP visits in any of the three years 2000–02. Individuals without any consultations over the period were filtered from the data set leaving approximately 113,600 people with at least one GP visit between 2000 and 2002.

The filtered RNZCGP data set was grouped by age and sex and compared with the previous sample of RNZCGP data, and with a model from *Population-based Funding for Primary Health Care: Method and results* (2000) by Frances Sutton. Whereas the RNZCGP data sets are based on general medical subsidies (GMS) and pharmaceutical subsidies, the Sutton model covers all government expenditure on primary health care. To allow a comparison, cost weights from both RNZCGP data sets were scaled to the total budget of the Sutton model.

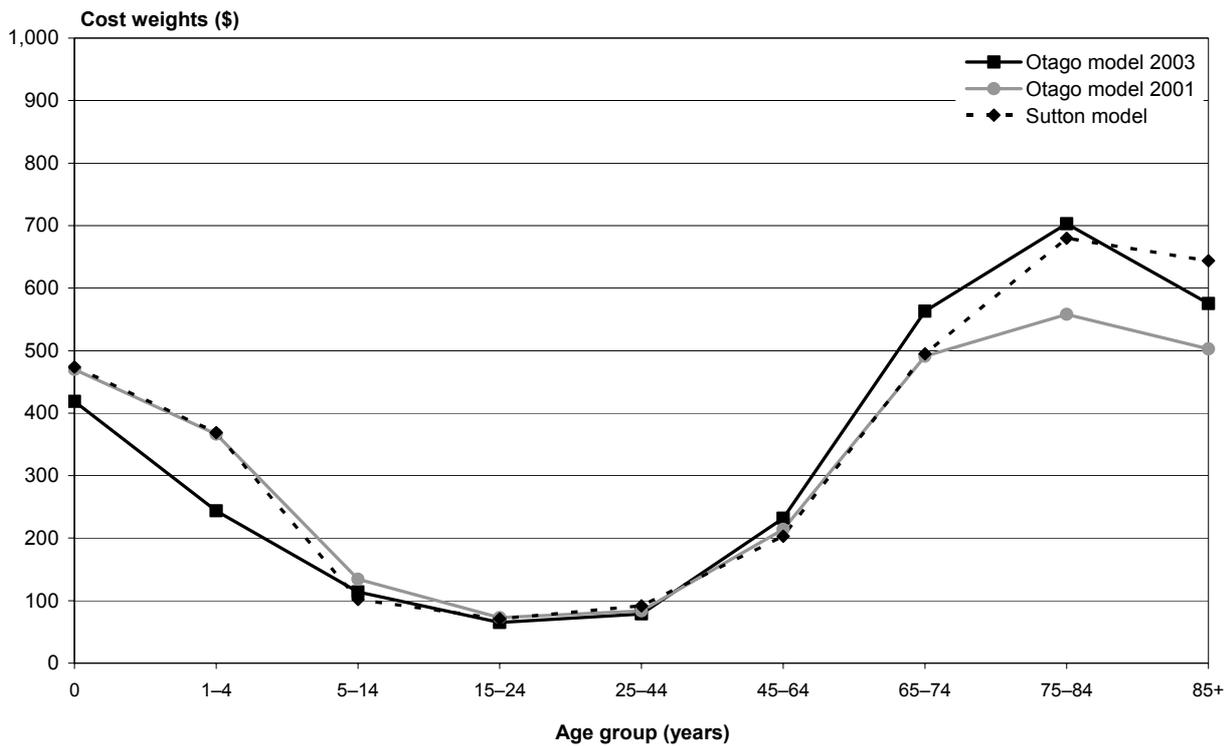
Results were analysed for females and males using NZDep2001 quintiles across age groups. Recreating a clear trend in costs by deprivation quintile was less successful. The sample appeared to show a random association between deprivation and personal health (primary health care) costs which does not reflect the results of the 1996/97 New Zealand Health Survey or the results of the interim PBFF analysis. As in previous models, ethnicity data was not considered to be robust enough to allow analysis.

## Results

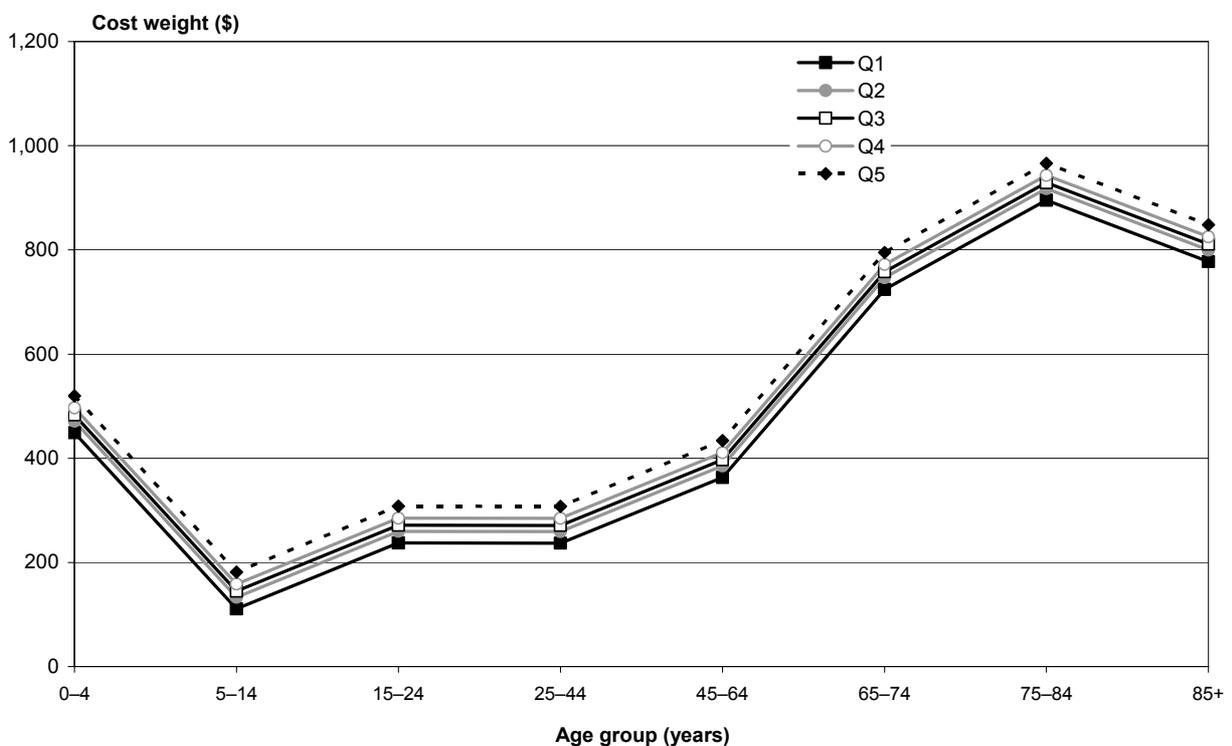
Figure 8 compares the resulting cost weights for males with the previous RNZCGP sample (labelled 'Otago model 2001') and with the Sutton model. The clear trend in the 2003 RNZCGP data confirms the strong relationship between age and sex and personal health (primary health care) costs previously observed in the Sutton model and the 2001 RNZCGP sample. With similar cost weights reproduced from the 2003 RNZCGP data, no changes to the primary health care cost weights model are necessary. As PHOs become more widely spread geographically during 2003/04, further investigation into primary health care cost weights will be required to incorporate PHO funding into the PBFF.

Final personal health (primary health care) cost weights for females and males can be seen in Figures 9 and 10.

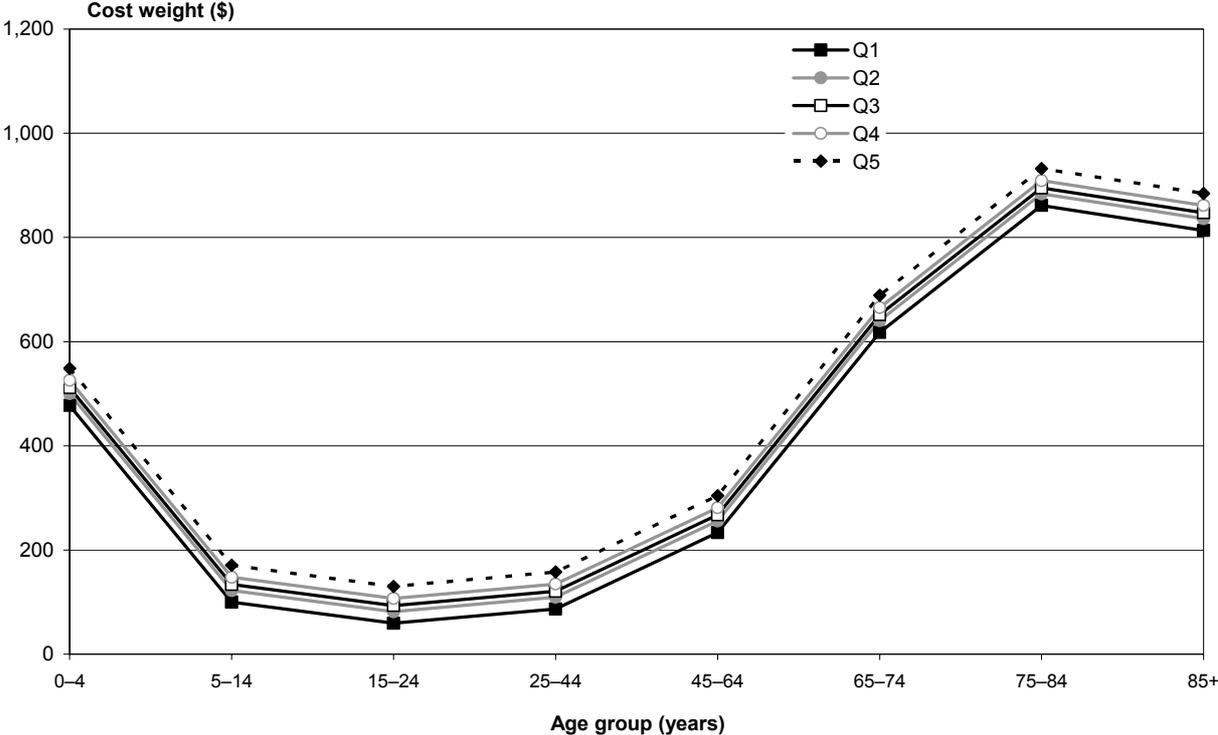
**Figure 8:** Comparison of personal health (primary health care) cost weight models for males, by age and NZDep2001 quintile



**Figure 9:** PBFF cost weights for personal health (primary health care) for females, by age and NZDep2001 quintile



**Figure 10:** PBFF cost weights for personal health (primary health care) for males, by age and NZDep2001 quintile



# Disability Support

## Summary

Disability support services (DSS) expenditure was analysed by three service level groups: residential services, community services and specialist assessment, and treatment and rehabilitation (ATR) services. Average cost weights for each age-sex group were calculated for each of the service groups. These rates were then scaled according to devolved DSS budgets to produce a final set of age-related DSS cost weights. The final rates closely resemble those obtained in the interim PBFF.

## Background

Disability support services funding for people aged 65 years and over was devolved from the Ministry from October 2003. People aged between 50 and 64 years with long-term impairment who have been clinically assessed as being 'close in interest' are also funded by DHBs. Cost weights for disability support services were analysed according to three service level groups: residential services, community services and specialist assessment, and treatment and rehabilitation (ATR) services.

Residential care services include rest homes for older people, dementia rest home facilities, and hospital continuing-care facilities for people with intellectual or physical disabilities. Residential care services account for over half of Crown DSS expenditure.

Community services include both home support and carer support services. Home support services enable people with disabilities to remain in their own home in the community. Carer support services provide relief for full-time unpaid caregivers from the caring role.

Specialist assessment, and treatment and rehabilitation services are multidisciplinary services aimed at restoring the functionality of people with disabilities and/or age-related disorders. Specialist ATR services may be delivered on an inpatient or an outpatient clinic basis.

## Data

Data on both residential service and community service utilisation was sourced from the Client Claims and Processing System (CCPS). CCPS covers 60–70 percent of DSS expenditure and records information at a client level. Residential service utilisation data was obtained for the financial years 2000/01 through to 2002/03, while data for community services was available for 2001/02 and 2002/03. Specialist ATR service utilisation data was sourced through the National Minimum Data set for the period 2000/01 through to 2002/03. Age, sex and cost or purchase unit variables were available for observations in each data set.

Although the collection of ethnicity data in CCPS is improving, historical limitations precluded the use of ethnicity as an analysis variable. Socioeconomic measures, such as the index of deprivation, were also excluded from the analysis. The location of a rest home or hospital was not considered to be a fair indicator of the socioeconomic situation of the residents, given that information about each resident's prior address was not available.

## **Methodology**

Average annual cost weights were calculated for the residential, community and specialist ATR service groups. These rates were scaled to the devolved DSS budgets for 2003/04 and then added together to form a single DSS cost weight for each age-sex group.

DSS analysis was based on five-year age groups for individuals aged 50 years and over, through to 85+ years. Those aged less than 50 were grouped into a single 'under 50' age group. As DSS funding for those under 50 has not been devolved to DHBs, this age group was excluded from the analysis.

The cost weights for the 50–54, 55–59 and 60–64 years age groups included some non-age-related expenditure. It was not possible to define which individuals aged between 50 and 64 years had been clinically assessed as being 'close in interest to persons aged 65 and over' and therefore eligible for DSS funding from DHBs. Instead, the DSS cost weight for individuals aged less than 50 years was assumed to be the base level of non-age-related funding and this was subtracted from the cost weights for each of the three groups aged between 50 and 64 years. All DSS funding for individuals aged 65 years and over is age-related funding.

### **Residential services**

Aggregate residential service costs in each age-sex group were averaged over the three years from 2000/01 to 2002/03. This average annual expenditure was then divided by the average number of people in the national population in each age-sex group over the period.

This review has not modelled for the effects of the proposed Social Security (Long-term Residential Care) Bill. The resulting changes to the income and asset testing policy for residential care will take effect from 1 July 2005, and will be monitored for any impact on the cost weights for DSS residential services.

### **Community services**

Aggregate home support and carer support costs for each age-sex group were averaged over the available financial years of 2001/02 and 2002/03. This average annual expenditure was then divided by the average number of people in the national population in each age-sex group over the period.

## **Specialist ATR services**

The length of stay was derived for each event and the ATR purchase unit price for 2003/04 (\$372.53) applied to each day of treatment. Aggregate specialist ATR service costs for each age-sex group were averaged over the three-year period of 2000/01 to 2002/03. This average annual expenditure was then divided by the average number of people in the national population in each age-sex group over the period.

## **Psychogeriatric services**

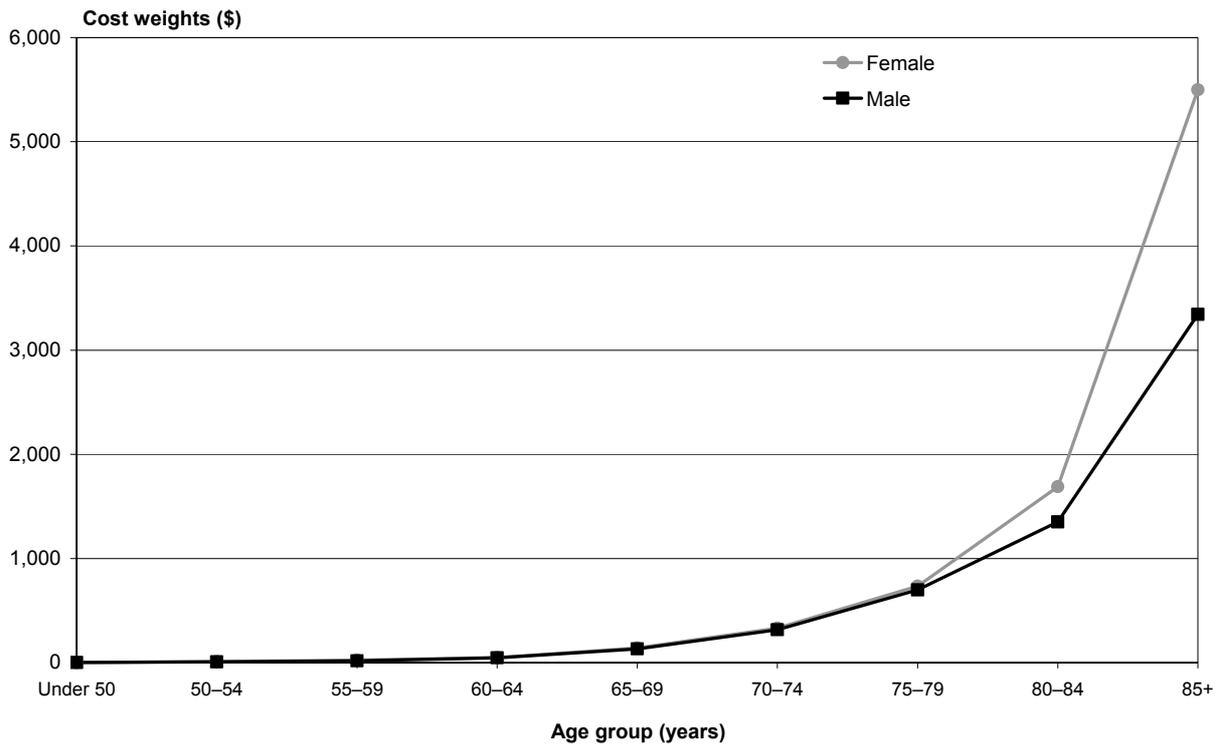
Psychogeriatric services are psychiatric services provided to older people with functional and organic mental disorders (including people with dementia) and may be funded as part of residential care or specialist ATR services. For historical reasons, psychogeriatric services for the central and southern regions have been funded through DSS, while the northern and midland regions have been included in mental health funding. The funding of mental health services according to the Mental Health Commission's Blueprint has meant that it is difficult to separate psychogeriatric funding out from other mental health services. For these reasons, psychogeriatric funding was removed from DSS analysis and included with mental health funding.

## **Results**

### **Residential services**

Figure 11 shows that from age 65 onward, average cost weights for residential services for both sexes more than double from one five-year age group to the next. Females and males have similar cost weights up until the 75–79 age group, after which females have a higher rate of funding with females aged 85 years and over costing around two-thirds more than their male counterparts. Given the longer life expectancy of females, males aged 65 years and over are more likely to be living at a home with a partner (who may also be a caregiver) than females, who are more likely to be living alone or in residential care.

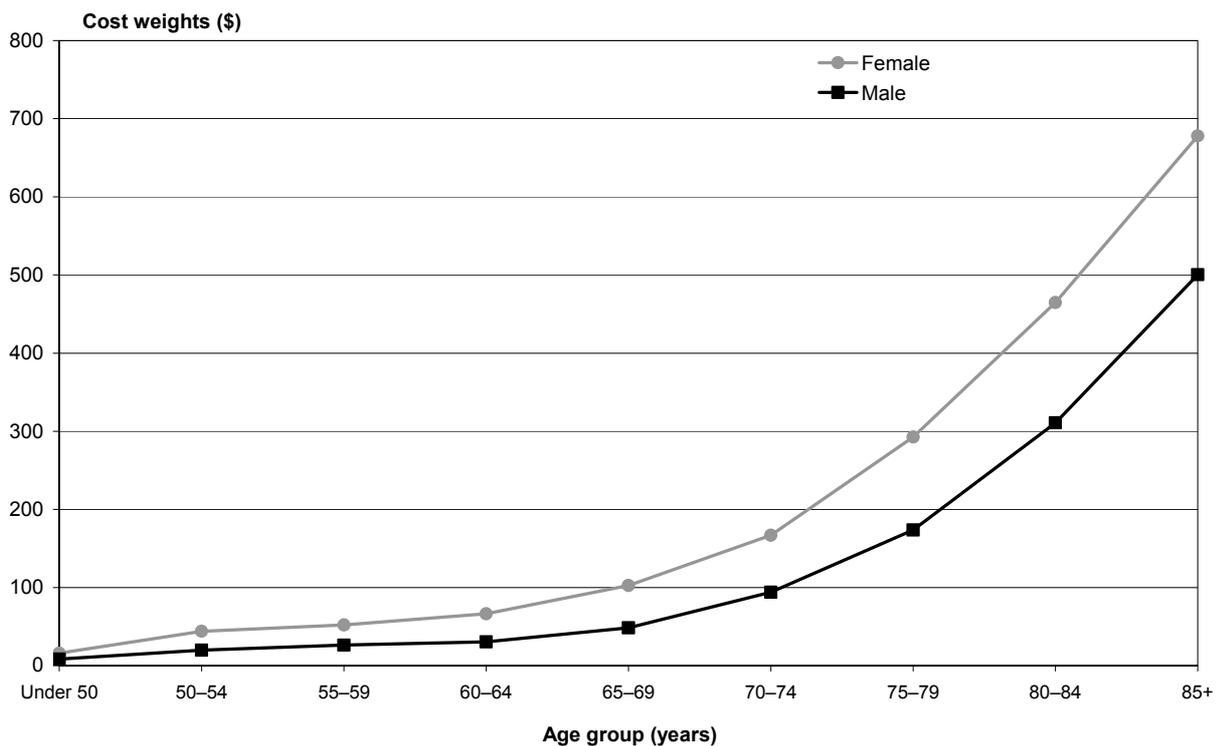
**Figure 11:** Cost weights for residential services, 2000/01–2002/03, by age and sex



## Community services

Community services cost weights increase significantly from 65–69 years, as can be seen in Figure 12. The average cost weight for females aged 85 years and over is more than six times greater than for females aged 65–69 years. Similarly, the average cost weight for males aged 85 years and over is more than ten times the rate for males aged 65–69 years. On average, females have higher costs than males across each age group, costing up to a third more at the 85+ years age group. The cost weight trend is similar to that obtained in the analysis for the interim PBFF. Again the difference in life expectancy contributes to females being more likely than males to be living alone in their own home and receiving home support funding.

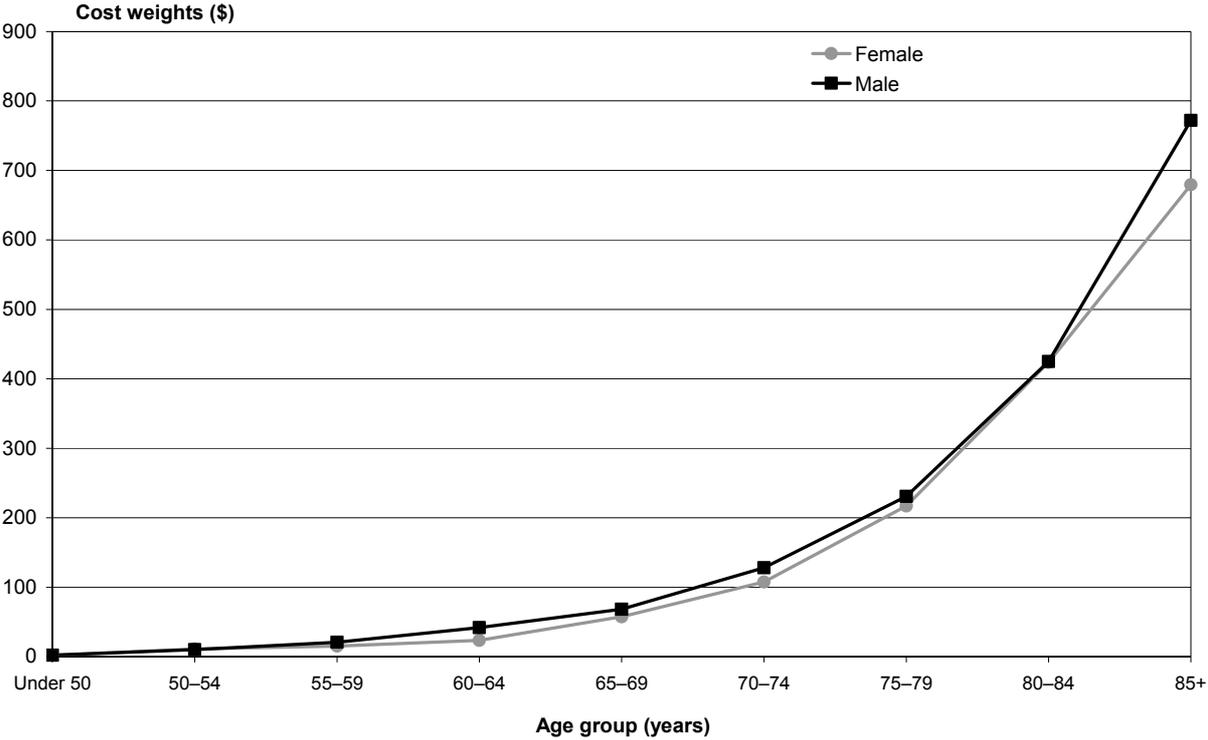
**Figure 12:** Cost weights for community services, 2001/02–2002/03, by age and sex



### Specialist ATR services

Cost weights for specialist ATR services rise significantly from age 70, as shown in Figure 13. Specialist ATR services cost weights for males and females aged 70 years and over are more similar than for residential or community services with males receiving slightly higher rates of funding than females.

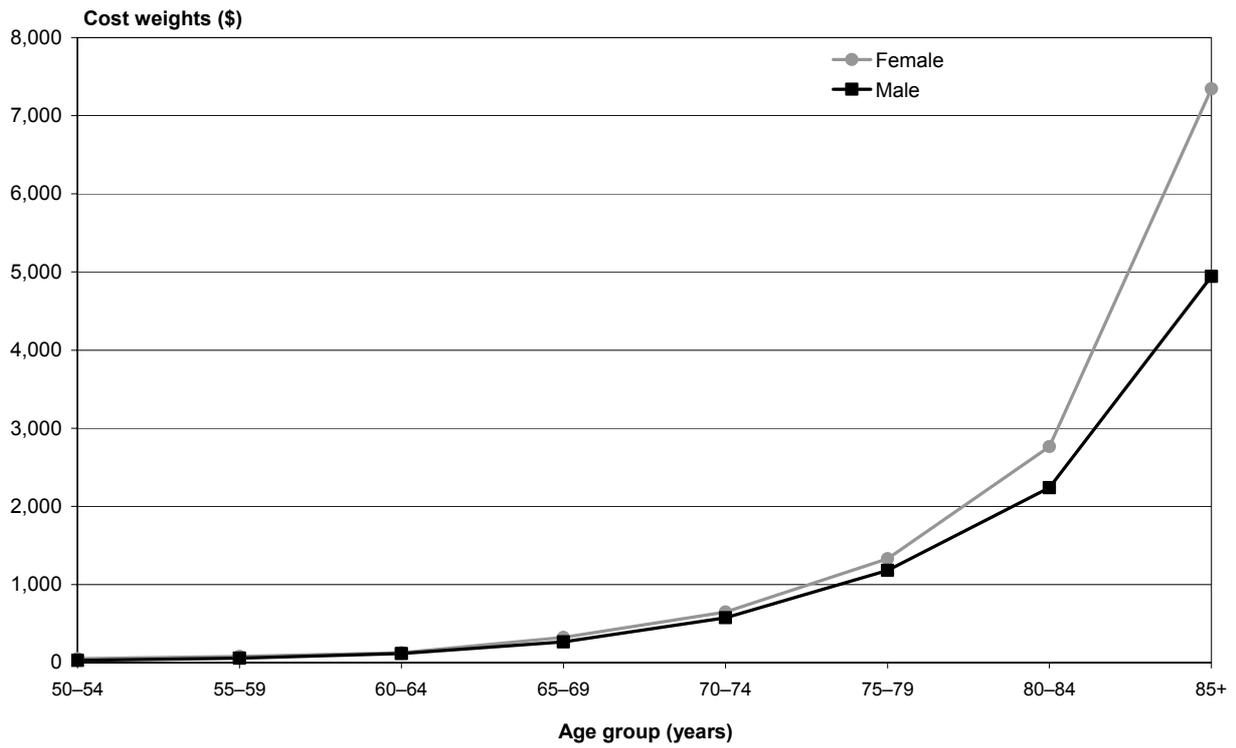
**Figure 13:** Cost weights for specialist ATR services, 2000/01–2002/03, by age and sex



**Age-related DSS cost weights**

The final cost weights for age-related DSS funding are presented in Figure 14. As would be expected, there is a sharp increase in the cost weights for both females and males from the age of 70 years. Cost weights for females are generally higher than for males.

**Figure 14:** PBFF cost weights for age-related DSS, by age and sex



# Mental Health

## Summary

As in the interim PBFF, cost weights for mental health services for each age group were derived from the target access rates in the Mental Health Commission report, *Blueprint for Mental Health Services in New Zealand: How things need to be* (1998).

Mental health service utilisation (using a Mental Health Information National Collection (MHINC) extract covering 2001/02) was analysed using unique clients, episodes of care,<sup>9</sup> and the volume of contacts as measures. Each measure reaffirmed deprivation as a factor in the utilisation of mental health services. To take into account deprivation, a weighted average adjuster for each NZDep2001 quintile was derived from the MHINC-based analysis of episodes of care. These adjusters were applied to the Blueprint-derived age group cost weights to provide final cost weights for each age-NZDep2001 group. The final results were similar to the interim version of the PBFF.

The analysis of episodes of care for Māori clients supported the Mental Health Commission recommendation that access for Māori be set at twice that for the rest of the population. Accordingly, the final cost weights for Māori in the PBFF have been set at twice those of the corresponding age group among the non-Māori population.

## Background

The Mental Health Commission report *Blueprint for Mental Health Services in New Zealand: How things need to be* (1998) established target access rates for the following age groups: 0–14, 15–19, 30–64 and 65+ years. The commission recommended that access rates for Māori be set at twice the level of the national population. The Blueprint access targets are based on sector inputs, rather than on the PBFF's outcome-based modelling. However, the Government's commitment to increase mental health funding to meet the Blueprint access targets indicates that these will be the benchmark against which the sector's performance will be measured in the short to medium term. There is also a reasonably close match between the per-person relativities derived from the Blueprint targets and those that could be derived from utilisation.

## Psychogeriatric funding

Psychogeriatric services are psychiatric services provided to older people with functional and organic mental disorders (including people with dementia). For historical reasons, psychogeriatric services for the central and southern regions have been funded through disability support services, while the northern and midland regions are included in mental health funding. For this reason, psychogeriatric funding was removed from the analysis of disability support services and included in mental health funding.

<sup>9</sup> 'Episode of care' refers to the period during which a client receives a mental health service. A client may have had more than one episode of care.

## Data

Data from the Mental Health Information National Collection (MHINC) was incorporated into the PBFF for the first time. An MHINC extract covering the 2001/02 financial year was provided by the New Zealand Health Information Service. The MHINC provides a more complete picture of mental health service utilisation than the National Minimum Data Set extract previously used in the interim PBFF. As well as basic demographic variables (age, sex, ethnicity), the data set also included MHINC-specific variables such as service type, team type and setting. NZDep2001 was added by NZHIS. Although MHINC does not include expenditure on services, it was possible to derive a list of purchase units and apply contracted prices.

## Methodology

The utilisation of mental health services was analysed using unique clients, episodes of care,<sup>10</sup> and the volume of contacts as measures.

Initially, the number of people with one or more visits per annum was identified. Unique clients were analysed by age and NZDep2001 quintile. The age groups were based on those used in the Blueprint; 0–14, 15–19, 20–64, and 65 years and over. Using census data, unique client rates were calculated for each age-NZDep2001 group. The unique client rate is equivalent to the proportion of each age-NZDep2001 group receiving one or more episodes of care from a mental health service in 2001/02.

An individual client may have more than one episode of care within a year, either concurrently or successively. The average number of episodes of care for unique clients was calculated for each age group by NZDep2001 quintile by using unique clients in the MHINC sample as the population. Episodes of care were also analysed by ethnicity as a measure of access for Māori. The sample size allowed ethnicity to be grouped into Māori and non-Māori categories and a comparison made.

As well as the average number of episodes of care per unique client, an episode of care rate was calculated for the national population. A rate of episode of care is a combination of unique client rates and episodes of care per unique client. This measure was chosen as the best means of determining the relativities in utilisation between the population groups.

<sup>10</sup> 'Episode of care' refers to the period during which a client receives a mental health service. An episode of care may involve ongoing contacts with the service.

An episode of care may have numerous contacts (day contacts or bed nights). For comparative purposes, the volume of these contacts was costed for each age-NZDep2001 group and a set of MHINC-derived cost weights developed. Expenditure was first estimated by multiplying the volume of contacts (a combination of day contacts and bed nights) by an assigned contact price for each purchase unit. Purchase units were derived from a combination of service code (the type of mental health service a client receives), team type (the primary function of a mental health care team) and setting (location of clinician providing the service). Purchase unit prices were derived from 2001/02 contracted prices and/or actual expenditure data. Census data was used to calculate cost weights for each age-NZDep2001 group.

## Results

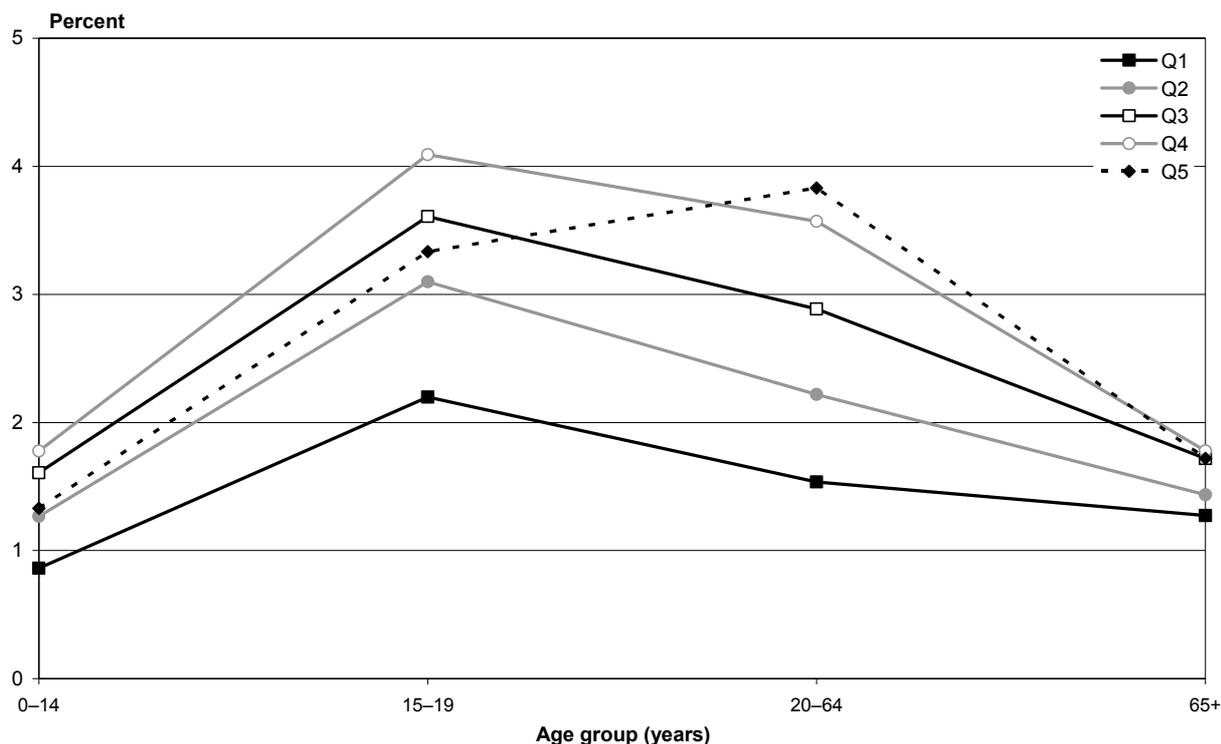
### Unique client rates

Figure 15 shows the proportion of mental health service clients in each age-NZDep2001 group, as recorded in MHINC over 2001/02, as a proportion of the total population in that group.

The overall pattern of unique client rates among the age groups matches the Blueprint target access rates, with the exception of the most-deprived NZDep2001 quintile. The relatively low unique client rate for individuals in quintile 5 suggests a level of unmet need, particularly in the 0–14 and 15–19 age groups.

As in the Blueprint, the 15–19 age group has the highest proportion of individuals accessing mental health services. Deprivation appears to be a contributing factor as the client rate for individuals aged 15–19 in quintile 4 (4.1 percent) is almost double that of their counterparts in quintile 1 (2.2 percent). The relationship between age and deprivation can most clearly be seen among adults aged 20–64 years.

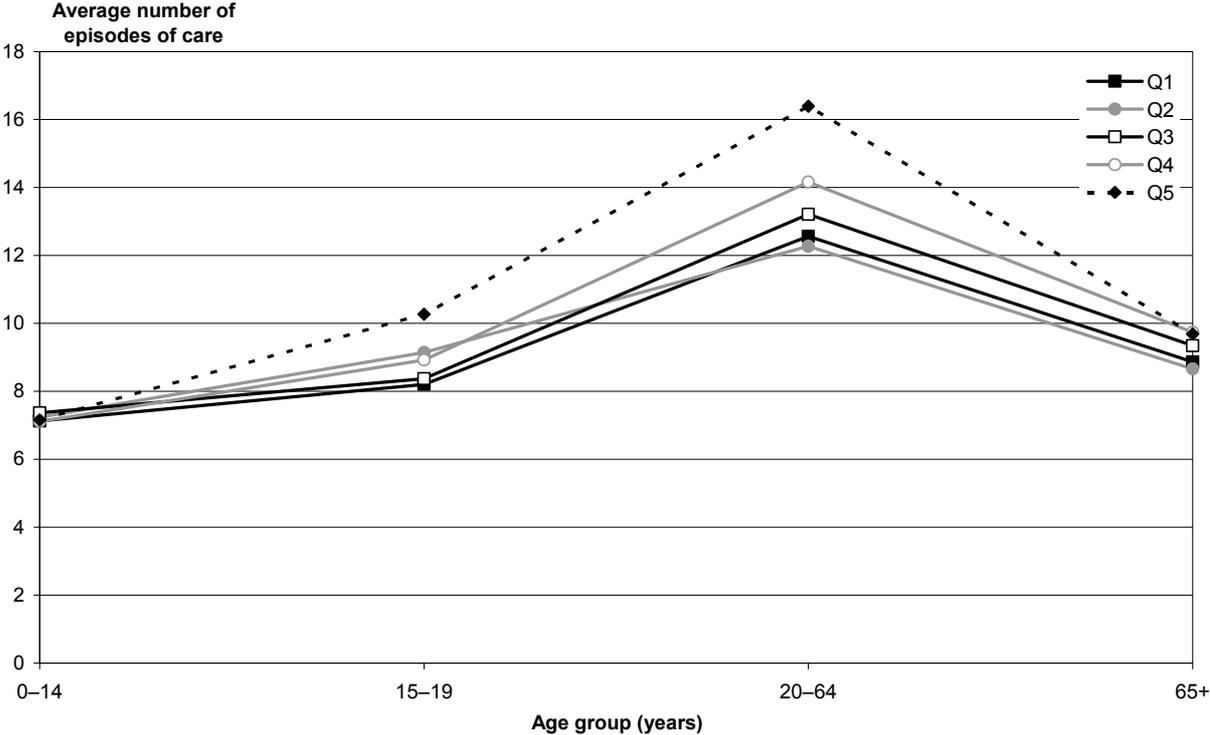
**Figure 15:** Unique client rates for mental health services, 2001/02, by age and NZDep2001 quintile



### Episodes of care per unique client

A clear relationship between age, deprivation and utilisation of mental health services can be also seen in Figure 16. The average number of episodes of care per unique client increases through the younger age groups with the highest numbers observable among adults aged 20–64 years. The relationship between the deprivation quintiles is strongest for adults aged 20–64 years, where average number of episodes of care for quintile 5 (16.4 percent) is clearly higher than for quintile 1 (12.6 percent). Older people living in residential care is a likely contributing factor to the lower averages for those aged 65 years and over.

**Figure 16:** Episodes of care per unique client, 2001/02, by age and NZDep2001 quintile

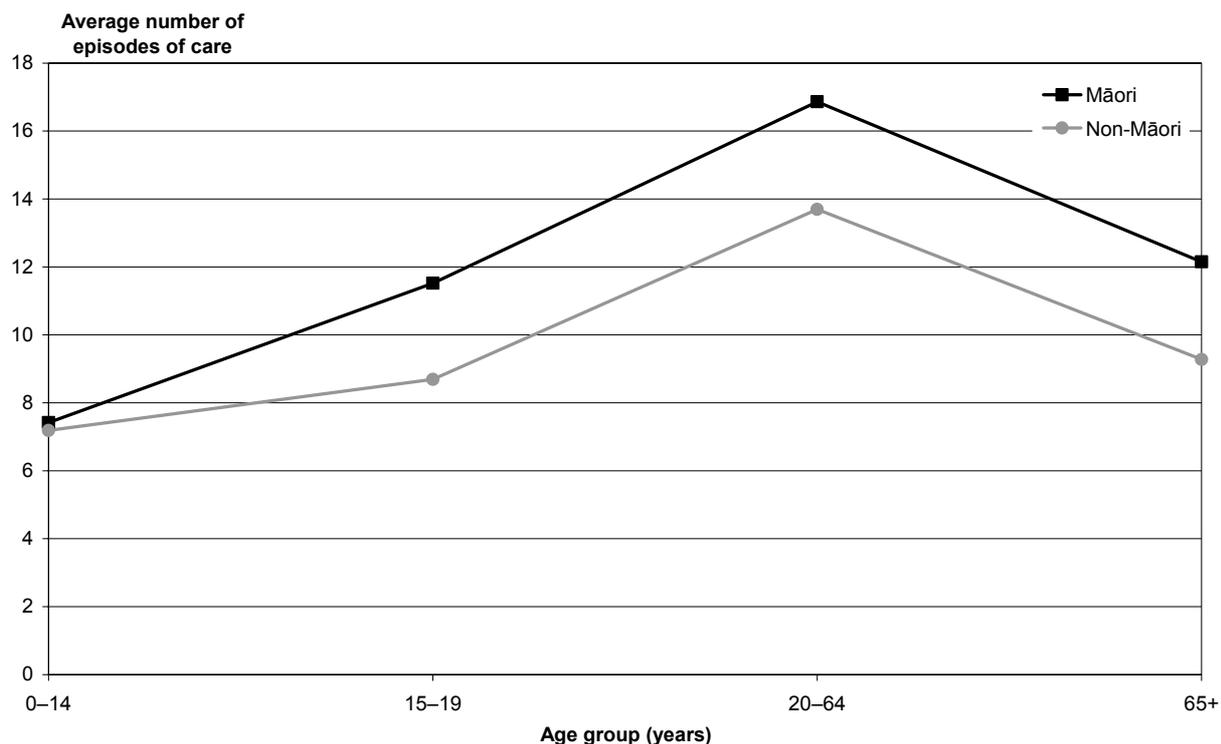


**Māori episodes of care**

Adult Māori have a higher average number of episodes of care than the adult non-Māori population. As can be seen in Figure 17, the average number of episodes of care for Māori aged 20–64 years is almost a quarter higher than that of the non-Māori population in the same age group (16.9 percent and 13.7 percent, respectively). Among those aged 15–19 years, the equivalent figure for Māori is almost a third higher than that of the non-Māori population (8.7 percent and 11.2 percent, respectively). In contrast, average numbers of episodes of care among the 0–14 year age group are similar for the Māori and non-Māori population, possibly reflecting issues of access and awareness among young Māori.

The high average number of episodes of care among adult Māori supports the Mental Health Commission’s recommendation that access for Māori be set at twice that for the non-Māori population. Accordingly, the final weights for Māori in the PBFF model have been set at twice those of the corresponding age group among the non-Māori population.

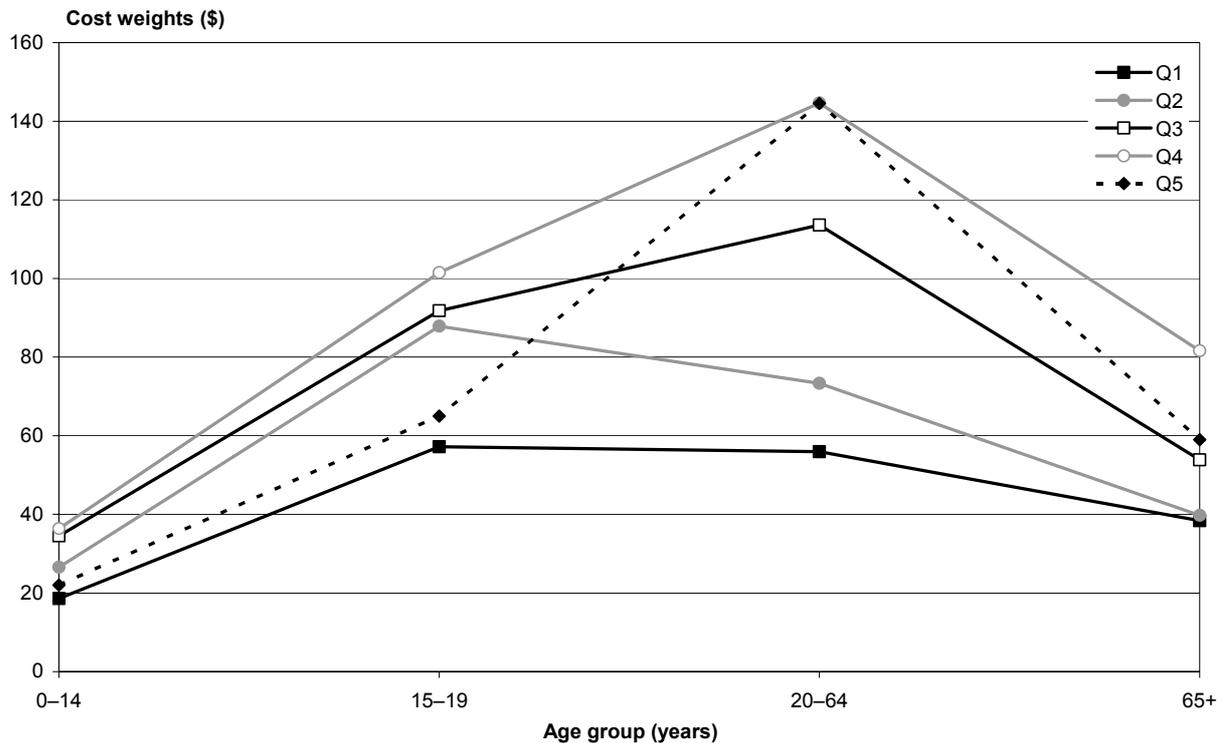
**Figure 17:** Episodes of care per unique client for Māori and non-Māori, 2001/02, by age and NZDep2001 quintile



### MHINC-derived cost weights

Analysis of the MHINC-derived cost weights reinforces deprivation as a factor in the utilisation of mental health services. The pattern of mental health service utilisation shown by the average numbers of episodes of care is also reflected among the MHINC-derived cost weights. Figure 18 shows that for age groups 15–19, 20–64 and 65+ quintiles 4 and 5 have the highest rates of funding. The impact of deprivation is clearest for the 20–64 age group although the cost weight for quintile 5 is slightly lower than might be expected in comparison with episodes of care.

**Figure 18:** MHINC-derived cost weights for mental health services, 2001/02, by age and NZDep2001 quintile



## Final mental health cost weights

The final mental health cost weights are based on the age group cost weights derived from the access targets in the Blueprint (see Table 4).

**Table 4:** Mental health Blueprint cost weights per person, by age group

Age group	Blueprint cost weights per person
0-14	68.15
15-19	212.95
20-64	188.60
65+	140.28

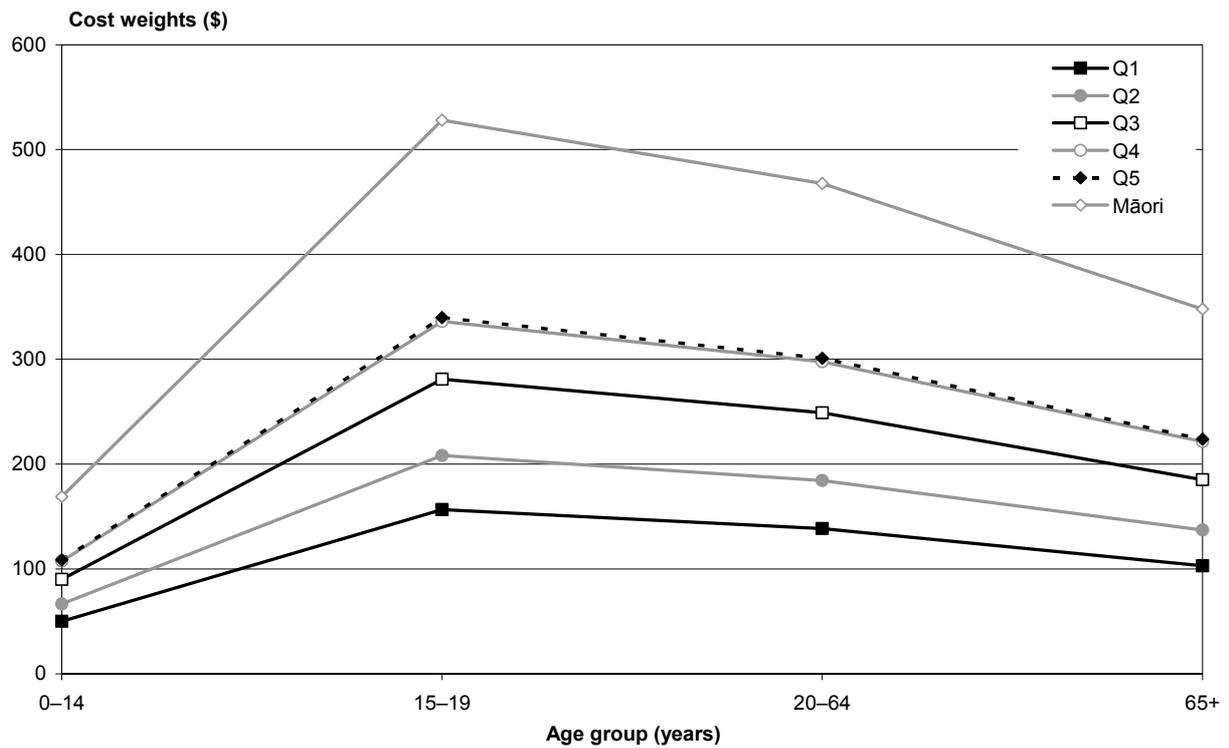
The final weighting analysis for deprivation was derived from the rates of episode of care. Episodes of care are considered to be a more accurate measure than the MHINC-derived cost weights as some service categories were dropped from the cost weights due to a lack of pricing data.

A weighted average adjuster for each NZDep2001 quintile was calculated from the rates of episode of care. The adjusters are shown in Table 5. Figure 19 shows the final mental health cost weights.

**Table 5:** Weighted average adjusters for NZDep2001 quintiles

Q1	Q2	Q3	Q4	Q5
0.59	0.79	1.06	1.27	1.29

**Figure 19:** PBFF cost weights for mental health services by age, NZDep2001 quintile, and Māori ethnicity



# Unmet Need Adjuster

## Summary

A simple policy-based formula was devised to shift money from general health based on expenditure to a flat rate addition to the cost weights for Māori, Pacific peoples and Others in NZDep2001 quintile 5 in a DHB's population. An amount set at half this rate was added to the cost weights for Other ethnicity in NZDep2001 quintile 4. The adjustment was calculated on the assumption that \$120 million was reallocated from general health expenditure to the target groups.

## Data

The Ministry based its recommendations on the weighting for unmet need on analysis and data from the following reports:

- National Health Committee. 1998. *The Social, Cultural and Economic Determinants of Health in New Zealand: Action to improve health*. Wellington: National Health Committee.
- Ministry of Health. 1999. *Taking the Pulse: The 1996/97 New Zealand health survey*. Wellington: Ministry of Health.
- Ministry of Health. 2000. *Our Health, Our Future – Hauora Pakari, Koiora Roa: The health of New Zealanders 1999*. Wellington: Ministry of Health.
- Minister of Health. 2000. *The New Zealand Health Strategy*. Wellington: Ministry of Health.

## Methodology

The PBFF includes an additional weight for unmet need. The target groups chosen for the additional weight are Māori, Pacific peoples, and Other ethnicity in NZDep2001 quintiles 4 and 5. The target groups were chosen after reviewing the objectives in the New Zealand Health Strategy and considering differentials in risk factors and incidence rates for the diseases targeted by the objectives.

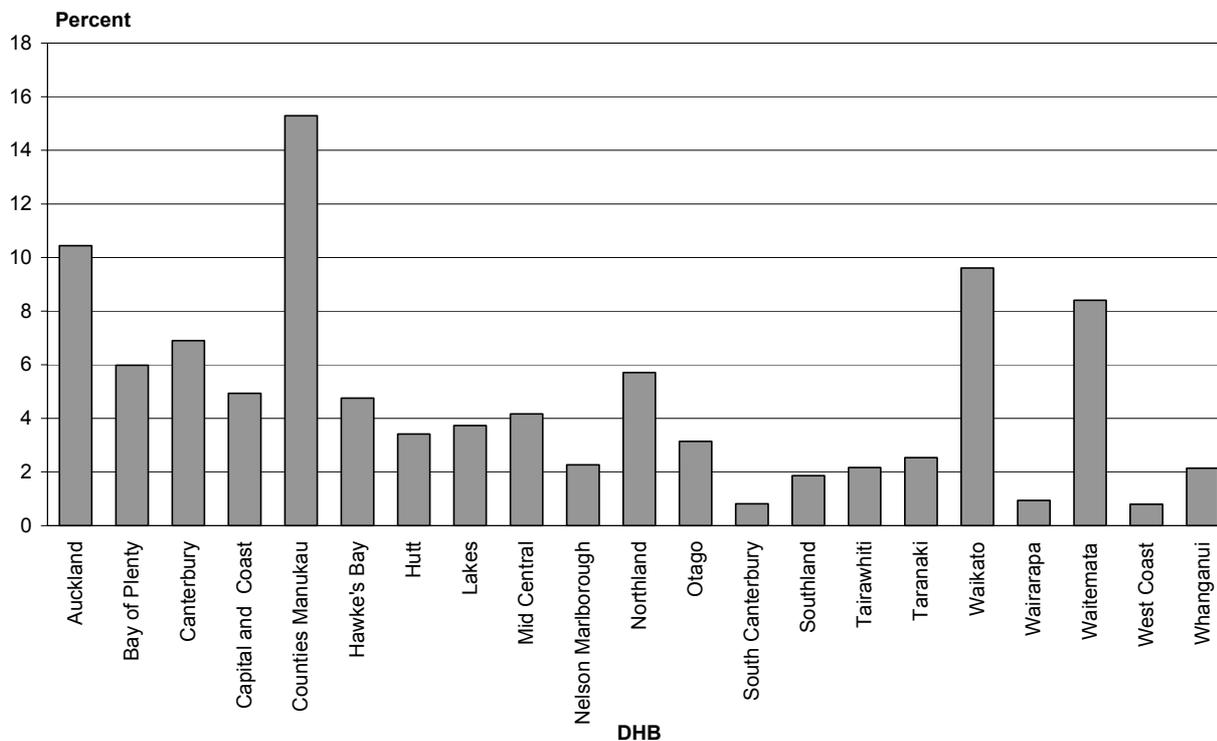
A simple policy-based formula was devised that shifts money from general health expenditure to target an additional flat rate addition to the cost weights for Māori, Pacific peoples and Other ethnicity in NZDep2001 quintile 5. An amount set at half this rate was added to the cost weights for Other ethnicity in NZDep2001 quintile 4. The additional weight was calculated on the assumption that \$50 million was reallocated from general health expenditure to the target groups.

Cabinet chose the \$120 million adjustment in recognition of part of the additional costs that some DHBs face in addressing health and disability disparities.

## Results

Figure 20 shows the distribution of the unmet need adjuster across the DHBs. The greatest share of the unmet need adjustment goes to Counties Manukau. This partly reflects population size and partly reflects the population profile.

**Figure 20:** Distribution of the PBFF unmet need adjuster by DHB, 2003/04



# Overseas Visitors Adjuster

## Summary

The overseas visitors adjuster is the component in the PBFF that accounts for the unavoidable differences in costs that DHBs face in providing services to eligible overseas visitors. The adjuster is required because the PBFF is based on the resident New Zealand population which excludes overseas visitors. The five categories of overseas visitor included in the adjuster are:

- non-resident New Zealand citizens visiting New Zealand temporarily
- non-resident citizens from the Cook Islands, Tokelau and Niue
- overseas visitors covered by reciprocity agreements for Australian and British nationals
- all overseas visitors receiving treatment under the Injury Prevention, Rehabilitation and Compensation Act 2001
- refugees.

The adjustment has been calculated by averaging inpatient costs incurred by each DHB for eligible overseas visitors over the financial periods from 1998/99 to 2001/02. Outpatient and emergency department costs were estimated as a proportion of inpatient costs. The total cost of eligible overseas visitors was top-sliced off available funding and proportionately distributed among the DHBs according to costs incurred. The average value of the overseas visitor adjuster over the period 1998/99 to 2001/02 was calculated to be \$19.9 million (GST inclusive).

## Background

Overseas visitors are not part of the resident New Zealand population on which the PBFF is based yet DHBs bear the costs for treating eligible overseas visitors who require care within their boundaries. It is also clear that DHBs with international arrival and departure points (Auckland and Christchurch) and main tourist attractions (such as Rotorua and Queenstown) are likely to incur a higher proportion of costs associated with treating these visitors. The overseas visitors adjuster is the component of the PBFF that takes into account these unavoidable differences in costs that DHBs face in providing services to eligible visitors.

There are five categories of overseas visitor included in the adjuster. Both New Zealand citizens living overseas and non-resident citizens from the Cook Islands, Tokelau and Niue are eligible for health services in New Zealand. Visitors from Australia and the United Kingdom (UK) have reciprocal rights to certain publicly funded health services in New Zealand. All overseas visitors to New Zealand are eligible for acute care for personal injury through ACC, as stipulated by the Injury Prevention, Rehabilitation and Compensation Act 2001. Refugees – not initially part of the resident population – also tend to have high health costs on arrival, and this is factored into the adjuster.

## Data

The analysis was based on inpatient cases from the National Minimum Data Set (NMDS) for the financial periods 1998/99 to 2001/02. Eligible overseas visitors using inpatient services were identified by a combination of the overseas domicile code, residency flag and ethnicity code. Events were weighted according to the standard WEIS8 cost weight system, and costs were calculated at the 2003/04 national price of \$2728.55. Costs of outpatient and emergency services were estimated as a proportion of inpatient costs, based on the ratio of outpatient and emergency service costs in hospital contracts for 2001/02. Statistics New Zealand data on overseas visitor arrivals was also used in estimating the proportion of Australian and British visitors.

## Methodology

This section outlines the methods used to identify and estimate treatment costs for the five categories of overseas visitor covered under the adjuster.

The overseas visitors adjuster was calculated using the best available estimate of recent annual expenditure on eligible overseas visitors. The National Minimum Data Set was used to approximate expenditure by each DHB on inpatient services for eligible overseas visitors. The financial periods 1998/99 to 2001/02 were chosen as the most suitable period for analysis, with the four-year span allowing recent trends and fluctuations in volume to be averaged.

### Identifying non-resident New Zealand citizens

Inpatients were identified as New Zealand citizens living overseas where the resident flag = 'Y' (indicating 'permanent resident' or 'NZ citizen') and where the domicile code = '9999' (indicating an overseas domicile).

### Identifying residents of the Cook Islands, Niue and Tokelau

Inpatients were identified as New Zealand citizens of the Cook Islands, Niue or Tokelau where the ethnic code = '32', '34' or '35' (indicating Cook Island Māori, Niuean or Tokelauan ethnicity) and *either* where the domicile code indicated an overseas domicile ('9999') *or* the resident flag indicated a non-New Zealand resident.

### Estimating Australian and UK visitors

Identifying Australian and UK nationals eligible under reciprocal arrangements was less straightforward, with high levels of bias apparent in the coding of country of origin. Statistics New Zealand data on overseas arrivals indicated that between 1998 and 2002 visitors from Australia and the UK accounted for 36.55 percent of all arrivals (among those who were intending to remain in New Zealand for less than a year). This proportion was used as a more appropriate measure of Australian and UK nationals among overseas visitors recorded on the NMDS. Overseas visitors were identified where the resident flag indicated that the person was not a citizen or permanent resident, and where the domicile code indicated an overseas domicile.

## Estimating outpatient and emergency services

Costs arising from providing outpatient services and emergency services for each of these categories also needed to be taken into account. As NMDS information does not generally cover outpatient and emergency services, the value of hospital contracts was used as a proxy. The ratio of outpatient and emergency service contracts to inpatient contracts in 2001/02 can be seen in Table 6. The value of hospital contracts for outpatient services for the 2001/02 financial year was \$385.4 million, while contracts for emergency services totalled \$105.7 million. The combined value of these outpatient and emergency department contracts equated to 36 percent of the value of inpatient contracts in 2001/02.

**Table 6:** Value of hospital contracts by service type, 2001/02

Hospital service category	Amount
Inpatient services	\$1,363,301,222
Outpatient services	\$385,383,880
Emergency services	\$105,699,930
Total outpatient and emergency services	\$491,083,810
Outpatient and emergency services as a proportion of inpatient services	36%

Accordingly, a further 36 percent was added to the average NMDS inpatient expenditure over 1998/99–2001/02 to provide a full estimate of average DHB expenditure on eligible overseas visitors during this period. Table 7 shows the average inpatient costs for each DHB for these categories of overseas visitor between 1998/99 and 2001/02. Estimated costs for outpatient and emergency services are also shown.

**Table 7:** Average DHB expenditure on eligible overseas visitors, 1998/99–2001/02

DHB	New Zealand citizens overseas			Cook Island, Niuean, Tokelauan residents			Overseas visitors covered by reciprocal agreements			
	Inpatient	Outpatient and emergency services	Total	Inpatient	Outpatient and emergency services	Total	Inpatient	Outpatient and emergency services	Total	Australian and UK visitors @ 36.55%
Auckland	1,379,527	496,630	1,876,157	252,108	90,759	342,867	1,073,523	386,468	1,459,991	533,627
Bay of Plenty	47,367	17,052	64,420	4,894	1,762	6,656	545,693	196,449	742,142	271,253
Canterbury	111,540	40,154	151,694	162	58	220	1,194,258	429,933	1,624,191	593,642
Capital and Coast	91,026	32,769	123,795	9,614	3,461	13,075	579,846	208,745	788,591	288,230
Counties Manukau	433,012	155,884	588,896	112,688	40,568	153,256	3,731,758	1,343,433	5,075,191	1,854,982
Hawke's Bay	39,335	14,161	53,496	967	348	1,315	166,200	59,832	226,032	82,615
Hutt	7,343	2,643	9,986	2,840	1,022	3,862	256,799	92,448	349,247	127,650
Lakes	88,586	31,891	120,477	1,047	377	1,424	320,621	115,424	436,045	159,374
MidCentral	15,716	5,658	21,374	1,153	415	1,568	220,357	79,329	299,686	109,535
Nelson Marlborough	28,721	10,340	39,061	–	–	–	214,527	77,230	291,757	106,637
Northland	120,425	43,353	163,777	1,149	414	1,563	311,570	112,165	423,735	154,875
Otago	128,094	46,114	174,207	5,630	2,027	7,657	674,474	242,811	917,284	335,267
South Canterbury	29,216	10,518	39,733	–	–	–	118,555	42,680	161,234	58,931
Southland	8,902	3,205	12,106	178	64	242	380,133	136,848	516,980	188,956
Tairāwhiti	15,464	5,567	21,031	–	–	–	63,597	22,895	86,492	31,613
Taranaki	20,739	7,466	28,206	–	–	–	150,562	54,202	204,765	74,842
Waikato	78,430	28,235	106,665	2,371	853	3,224	859,195	309,310	1,168,505	427,089
Wairarapa	13,979	5,033	19,012	–	–	–	40,813	14,693	55,506	20,287
Waitemata	119,756	43,112	162,868	23,378	8,416	31,794	2,254,034	811,452	3,065,486	1,120,435
West Coast	2,037	733	2,770	–	–	–	122,608	44,139	166,747	60,946
Whanganui	20,712	7,456	28,168	2,583	930	3,513	98,021	35,287	133,308	48,724
Total (GST exclusive)	2,815,614	1,013,621	3,807,898	420,762	151,474	572,237	13,377,144	4,815,772	18,192,915	6,649,511

## ACC-covered cases

The identification of ACC-covered cases required a measure of approximation. Due to problems encountered in identifying ACC-covered cases in NMDS, the results from the interim PBFF (based on 1999/2000 data) were adjusted to take into account recent changes in both volume and price. Outpatient and emergency services costs were also included in the interim base figure. The final results were split among DHBs using the same proportions as interim PBFF.

Volume increase in ACC-covered cases was linked to the increase in overseas visitors over the equivalent period, as measured by Statistics New Zealand. Table 8 shows the estimated average ACC-covered costs for inpatients between 1999/2000 and 2001/02.

**Table 8:** Estimated growth of overseas visitor ACC-covered cases, 1999/2000–2001/02

1999/2000	2000/01	2001/02	Average cost 1999/2000–2001/02
\$6,239,935	Add estimated volume growth @ 8.9%	\$6,795,289	Add estimated volume growth @ 7.0%
		\$7,270,959	\$6,768,728 (GST exclusive)

The estimated average costs of ACC-covered cases were also adjusted to take into account price growth over the period. Price adjustment was based on a 9.705 percent increase in the national price between 2000/01 (the original price used) and 2003/04.

The total average cost for ACC-covered cases between 1999/2000 and 2001/02 was \$7.4 million. However, to avoid 'double counting' inpatient cases, it was necessary to deduct cases already counted in the three categories of New Zealand citizens living overseas, citizens from the Cook Islands, Niue and Tokelau, and Australian and UK nationals covered under reciprocal agreements. The interim PBFF found that ACC-covered cases formed 23.54 percent of overseas inpatients. Accordingly, this proportion of the total costs of each of these categories was deducted from the ACC total. Table 9 illustrates this.

**Table 9:** Determining the cost<sup>11</sup> of 'other' overseas visitor ACC-covered cases<sup>12</sup>

Average ACC-cover cost 1998/99–2001/02	\$6,768,728
Add % inflation for national price 2000/01–2003/04	9.71%
Interim total	\$7,425,663
Less 23.54% of costs of New Zealand citizens resident overseas	\$896,379
Less 23.54% of costs of Cook Island/Niue/Tokelau residents	\$134,705
Less 23.54% of costs of Australian/UK reciprocity	\$1,565,295
<b>Total</b>	<b>\$4,829,285</b>

The final ACC-covered component of \$4.8 million was distributed among the DHBs on the same basis as the interim PBFF (based on 1999/2000 data). Table 10 shows this distribution.

<sup>11</sup> Original costs were based on 2000/01 national price of \$2487.16. The new inflation-adjusted price for 2003/04 is \$2728.55 (GST exclusive).

<sup>12</sup> Excludes ACC-covered cases among New Zealand citizens resident overseas, New Zealand citizens from the Cook Islands, Niue and Tokelau, and Australian and British nationals.

**Table 10:** Average DHB cost of 'other' overseas visitor ACC cases, 1999/2000–2001/02<sup>13</sup>

<b>DHB</b>	<b>1999/2000 cost (\$)</b>	<b>1999/2000 share (%)</b>	<b>1998–2002 average cost (\$)</b>
Auckland	841,876	13.5	651,555
Bay of Plenty	228,142	3.7	176,566
Canterbury	572,229	9.2	442,866
Capital and Coast	225,214	3.6	174,300
Counties Manukau	1,869,376	30.0	1,446,770
Hawke's Bay	50,254	0.8	38,893
Hutt	105,053	1.7	81,304
Lakes	205,028	3.3	158,678
MidCentral	59,047	0.9	45,698
Nelson Marlborough	70,111	1.1	54,261
Northland	155,292	2.5	120,185
Otago	612,911	9.8	474,352
South Canterbury	58,520	0.9	45,291
Southland	236,711	3.8	183,198
Tairāwhiti	23,222	0.4	17,972
Taranaki	85,469	1.4	66,147
Waikato	474,862	7.6	367,511
Wairarapa	11,651	0.2	9,017
Waitemata	133,381	2.1	103,228
West Coast	151,427	2.4	117,194
Whanganui	70,156	1.1	54,296
<b>Total</b>	<b>6,239,932</b>	<b>100.0</b>	<b>4,829,285</b>

## Refugees

Refugees are the fifth category of eligibility in the overseas visitors adjuster. The value of this category was calculated by identifying the value of refugee-related contracts held by DHBs. Contracts for health services for refugees in 2001/02 were held by six DHBs: Northland, Auckland, Waitemata, Counties Manukau, Capital and Coast, and Canterbury. The combined value of these contracts totalled \$1.79 million in 2001/02.

<sup>13</sup> 1999/2000 figures include ACC costs incurred by other categories of eligible overseas visitors.

## Results

The overseas visitors adjuster, based on the 1998/99 to 2001/02 period, was calculated to be \$19.9 million (GST inclusive) – the same amount as the 2001 adjuster (\$19.9 million, based on 1999/2000 data). However, there are some changes in the relative distribution of the adjuster among DHBs.

Average expenditure on New Zealand citizens resident overseas (and temporarily in New Zealand) was calculated to be \$4.3 million (GST inclusive). Over the same period, average expenditure on non-resident New Zealand citizens from the Cook Islands, Tokelau and Niue was calculated to be \$644,000 (GST inclusive). Reciprocal arrangements with Australia and the United Kingdom accounted for \$7.5 million. ACC-covered cases, where patients were not part of these categories, equated to \$5.4 million. Services for refugees were calculated to cost \$1.8 million (GST inclusive).

Table 11 shows each DHB's final share of the overseas visitors adjuster. As in the interim PBFF, nearly 60 percent of funding is allocated to the three Auckland DHBs: Waitemata (8.8 percent), Auckland (20.1 percent) and Counties Manukau (28.1 percent).

**Table 11:** PBFF overseas visitors adjuster by DHB, 2003

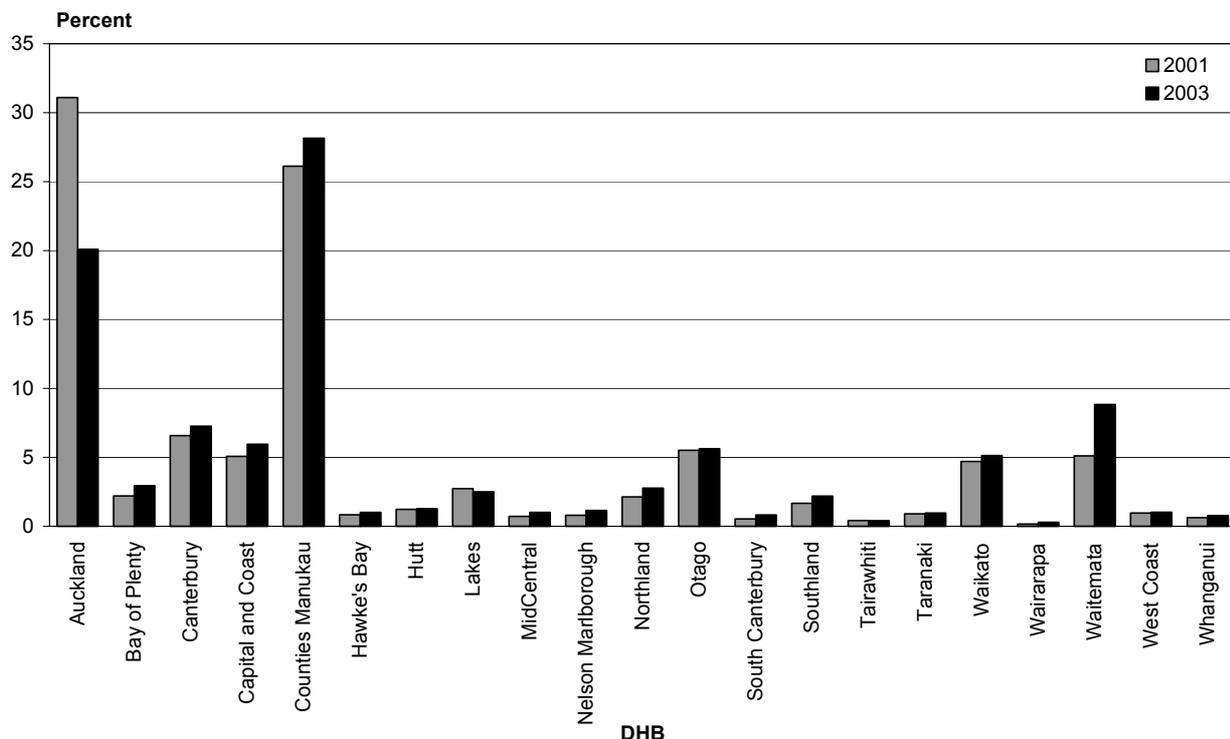
DHB	Amount (\$ GST inclusive)	Proportion (%)
Auckland	3,987,546	20.1
Bay of Plenty	583,757	2.9
Canterbury	1,442,185	7.3
Capital and Coast	1,180,657	5.9
Counties Manukau	5,586,779	28.1
Hawke's Bay	198,359	1.0
Hutt	250,651	1.3
Lakes	494,948	2.5
MidCentral	200,448	1.0
Nelson Marlborough	224,954	1.1
Northland	548,056	2.8
Otago	1,115,419	5.6
South Canterbury	161,949	0.8
Southland	432,566	2.2
Tairāwhiti	79,443	0.4
Taranaki	190,344	1.0
Waikato	1,017,550	5.1
Wairarapa	54,356	0.3
Waitemata	1,753,430	8.8
West Coast	203,525	1.0
Whanganui	151,539	0.8
Total	19,858,459	100.0

For the majority of DHBs, the overseas visitors adjuster has increased slightly, as Figure 21 illustrates. Waitemata and Counties Manukau experienced the largest increases of \$740,000 and \$400,000 respectively, while Northland, Bay of Plenty, Capital and Coast, Canterbury and Southland DHBs all experienced increases of more than \$100,000.

Auckland DHB experienced the largest decrease with its proportion of the adjuster declining by 40 percent (\$2.2 million). This drop reflected the decline in recorded overseas inpatients over the period from almost 1400 overseas inpatients in 1998/99 to 700 in 2001/02. Auckland DHB's share of the overseas visitors adjuster in the interim PBFF was based on 1998/99 data instead of 1999/2000 data (as in the case of all other DHBs). At that stage it was unclear whether the decline in overseas inpatient volume in the Auckland DHB between 1998/99 and 1999/2000 was an aberration or the beginning of a permanent shift. An examination of available data from the first half of 2002/03 confirmed the continuation of this change with a half-year total of 300 overseas inpatients.

Other large changes in the distribution of the adjuster mirror the overall numbers of overseas inpatients recorded by these DHBs over the period. Waitemata recorded a four-fold increase in overseas inpatients from nearly 600 in 1999/2000 to 2800 in 2001/02.

**Figure 21:** Distribution of the PBFF overseas visitors adjuster by DHB, 2001 and 2003



# Rural Adjuster

## Summary

The review considered the rural adjuster but recommends no material change. The complexity of the issues involved in determining the rural adjuster are such that it was not possible to complete a full review by the end of 2003. Instead, the Ministry intends that work should continue on the rural adjuster in 2004 with a view to making changes from 1 July 2005.

## Background

There is an adjustment in the current PBFF for the unavoidable differences in costs DHBs face in providing services to rural populations. This adjustment was calculated by estimating the actual costs incurred by DHBs in providing these services. The total sum of these costs has been top-sliced off the available funding for DHBs and distributed according to a measure of the remoteness of each DHB's population.

## Data

All the costs were derived from either Health Funding Authority contracted expenditure for the 2000/01 fiscal year or funding levels agreed by the Ministry for the 2001/02 fiscal year.

## Methodology

In quantifying this adjustment, the Ministry has drawn mainly on existing rural services and price premia under provider contracts in place to alleviate an access or potential access issue.

The greatest contribution to the adjustment (just over 50 percent) is the rurality premium and diseconomies of scale payments to DHBs. These payments recognise the additional costs related to diseconomies of scale for small hospitals in remote/rural locations, and for providing hospital and some community services in rural or remote areas.

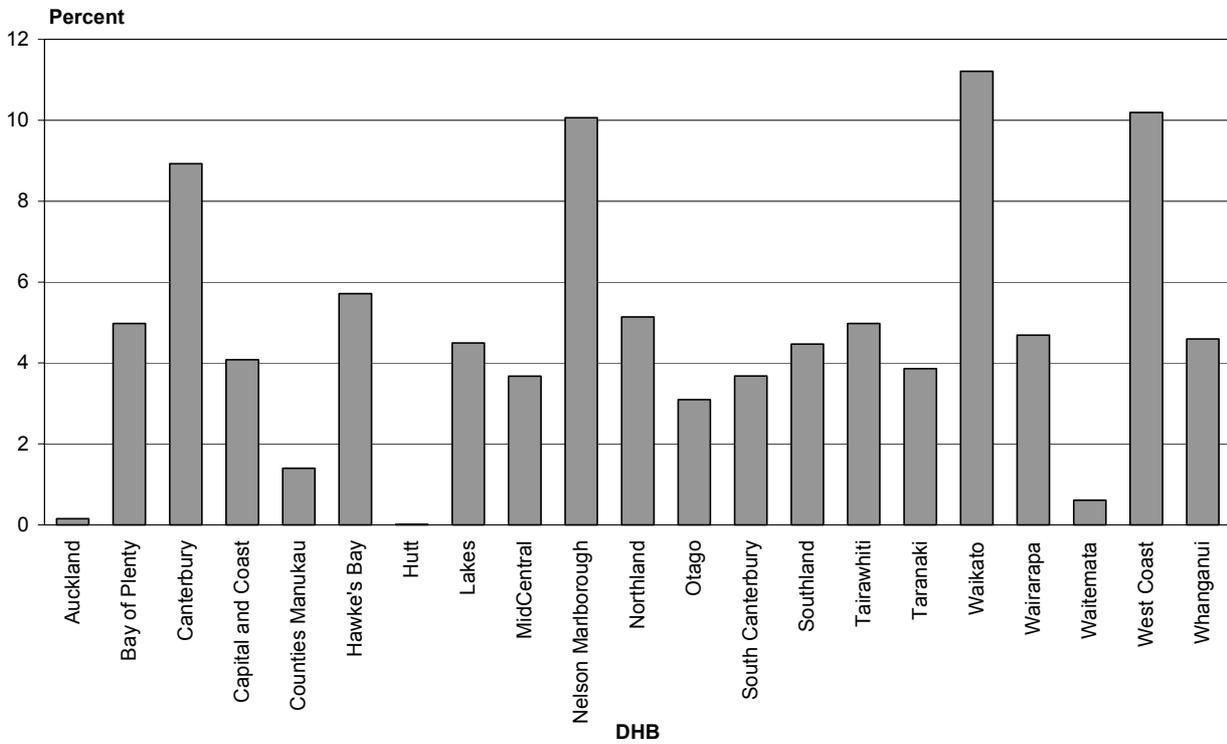
A variety of community and primary health care-based rural payments under existing provider contracts have also been included in the rural adjuster. In particular, payments made to practices in rural areas to assist in GP recruitment and retention have been included.

The rural adjuster also includes price premia paid to rural maternity providers where the volume of births is below the threshold level expected of a metropolitan maternity provider.

# Results

The rural adjuster was set at \$77 million. Adding cost growth increases this figure to \$80 million. Figure 22 shows the distribution of the rural adjuster across the DHBs.

**Figure 22:** Distribution of the PBFF rural adjuster by DHB, 2003/04



# PBFF Results

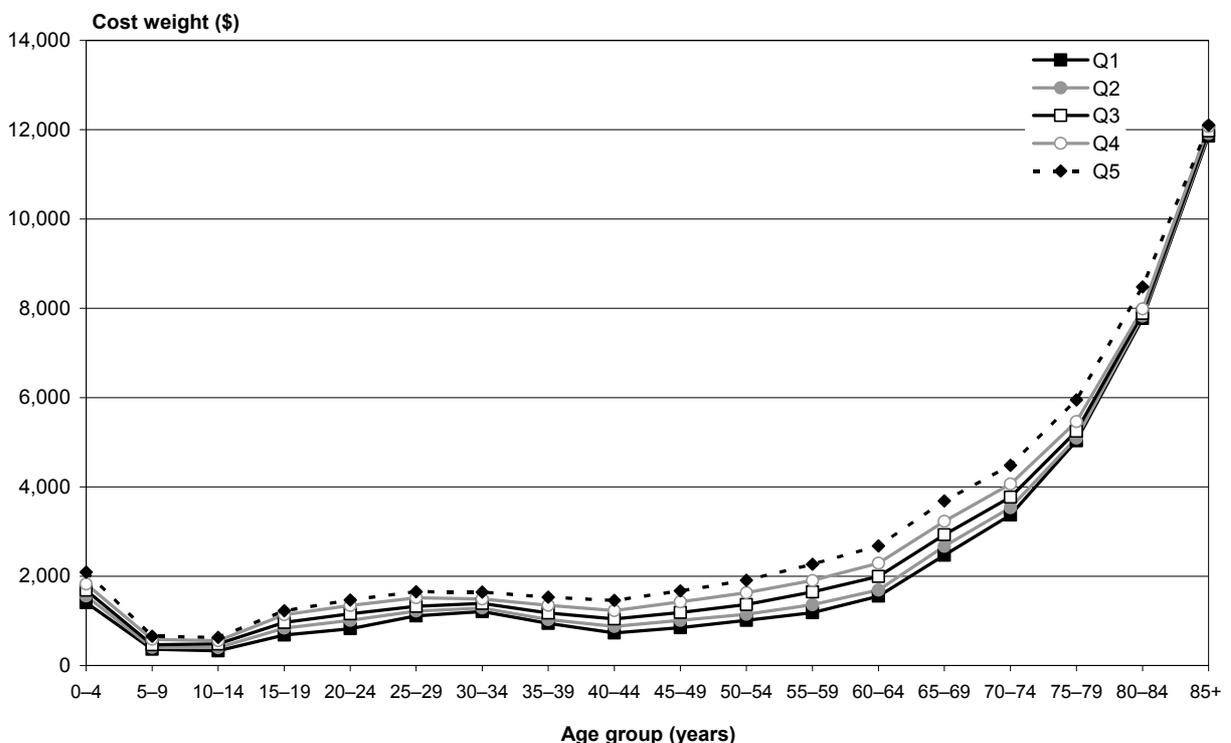
The 2003 review of the PBFF consists of a:

- set of population projections by DHB split by age, sex, ethnicity and NZDep2001 quintiles
- set of cost weights split by age, sex, ethnicity and NZDep2001 quintiles
- list of shares by DHB of the funding available for rural and overseas visitors.

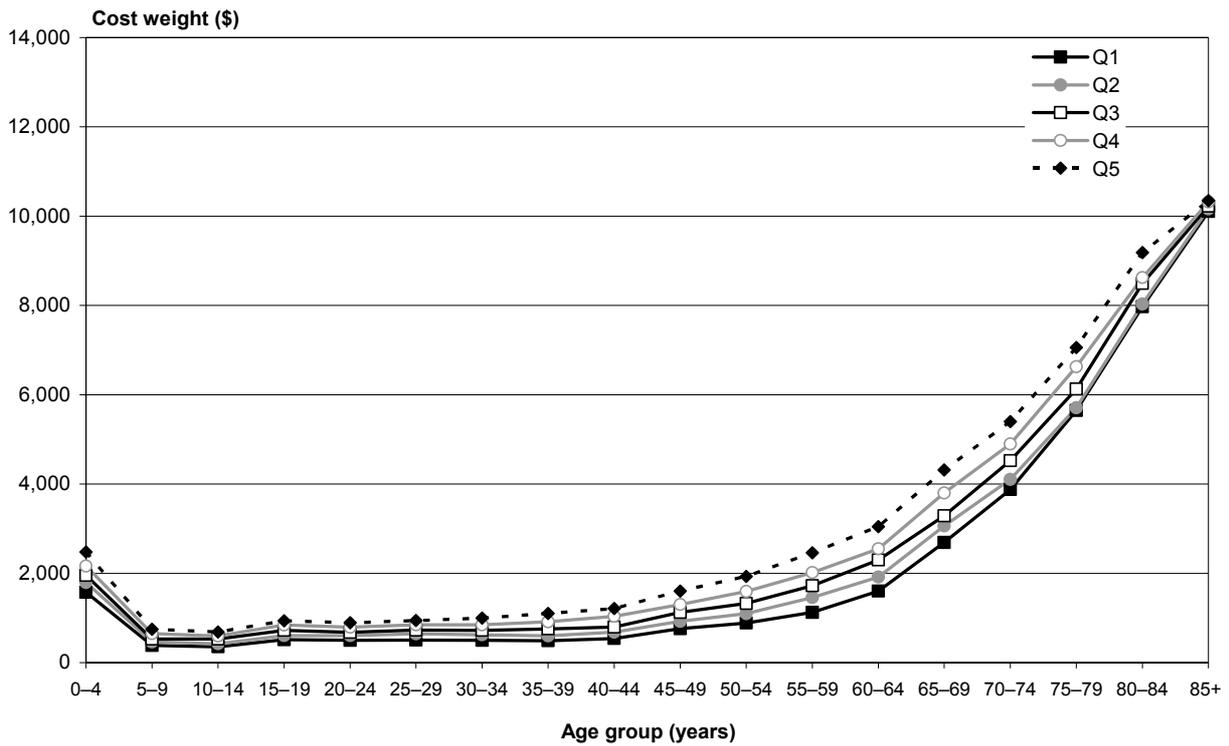
The cost weights are based on historical average expenditure per group with further adjustments for unmet need. Figure 23 shows the cost weights for female Other ethnicity by age and by NZDep2001 quintile. The importance of both age and NZDep2001 on the variation in cost weights is clearly apparent. Figure 24 shows the cost weights for male Other ethnicity by age and by NZDep2001 quintile.

The cost weights for Māori and Pacific peoples are slightly greater at each age and NZDep2001 quintile than the cost weights for Other. This can be seen in Figure 25 where the cost weights for male Other in NZDep2001 quintile 3 are compared to those for male Māori and Pacific peoples in NZDep2001 quintile 3. This shows the extra weight additional to the weight for NZDep2001. As Māori and Pacific peoples have a higher than average NZDep2001 profile than those of Other ethnicity their average cost weights are higher compared to Other than can be shown by a simple comparison of cost weights.

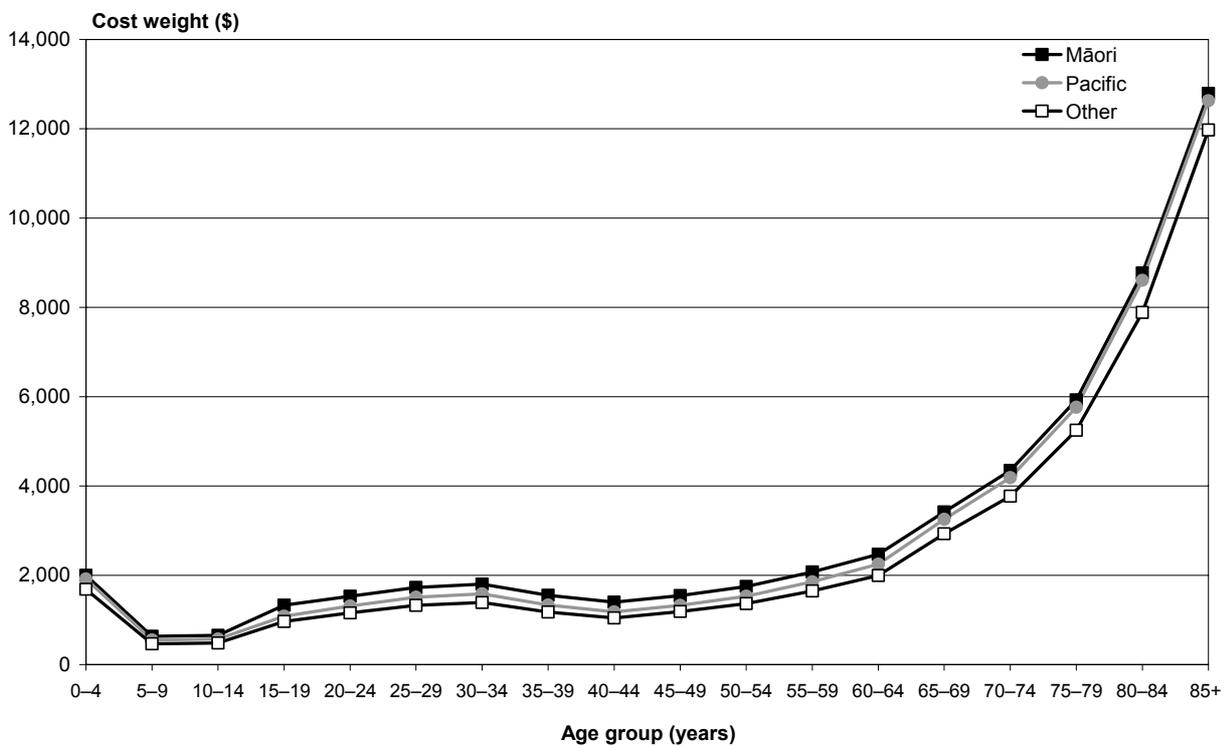
**Figure 23:** PBFF aggregate cost weights for females of Other ethnicity, by age and NZDep2001



**Figure 24:** PBFF aggregate cost weights for males of Other ethnicity, by age and NZDep2001



**Figure 25:** PBFF aggregate cost weights for NZDep2001 quintile 3, by age and ethnicity



A DHB's share of funding in any year is then determined by multiplying its population by the cost weights and adding on the rural and overseas adjusters. The results presented here are based on the average population in the 2003/04 fiscal year.

Table 12 shows the percentage share of funding allocated to each DHB by the interim PBFF. This includes both the cost weights and all adjustments. For comparison, each DHB's share of the population is also shown.

Some DHBs will get slightly more funding than suggested by their share of the New Zealand population because they have a relatively older or more deprived population.

**Table 12:** DHB share of population, share of funding of total PBFF, share of rural adjuster, share of overseas adjuster for 2003/04

DHB	Population share (%)	PBFF share (%)	Rural adjuster share (%)	Overseas adjuster share (%)
Auckland	10.43	9.74	0.15	20.08
Bay of Plenty	4.82	5.45	4.98	2.94
Canterbury	11.33	11.15	8.92	7.26
Capital and Coast	6.59	5.91	4.08	5.95
Counties Manukau	10.45	9.88	1.40	28.13
Hawke's Bay	3.70	4.06	5.71	1.00
Hutt	3.41	3.22	0.02	1.26
Lakes	2.52	2.65	4.49	2.49
MidCentral	4.06	4.27	3.67	1.01
Nelson Marlborough	3.27	3.47	10.06	1.13
Northland	3.64	4.20	5.14	2.76
Otago	4.45	4.57	3.10	5.62
South Canterbury	1.33	1.51	3.68	0.82
Southland	2.66	2.62	4.47	2.18
Tairāwhiti	1.12	1.31	4.98	0.40
Taranaki	2.62	2.85	3.86	0.96
Waikato	8.32	8.53	11.21	5.12
Wairarapa	0.97	1.11	4.69	0.27
Waitemata	11.92	10.72	0.61	8.83
West Coast	0.76	0.92	10.19	1.02
Whanganui	1.61	1.86	4.59	0.76

As a result of the 2003 review of the PBFF, DHBs' target shares for 2003/04 range from -8 percent to +6 percent of their target shares under the interim PBFF (excluding DSS). Ten DHBs are within  $\pm 1$  percent of their target funding under the interim PBFF, while 16 DHBs remain within  $\pm 3$  percent. These changes are due to the changes in the cost weights, changes to the overseas visitors adjuster, the addition of DSS to the PBFF, and finally to the new population projections. For some DHBs these factors offset each other, while for other DHBs their effects are compounded. For the majority of DHBs the new population projections are the most significant factor in the changes to DHBs' target shares.

The review of the cost weights contributes very little to the changes in DHBs' target shares. All DHBs remain within  $\pm 1$  percent of their interim PBFF targets as a result of the updated cost weights. Similarly, the update of the overseas visitors adjuster impacts by less than 0.1 percent on 20 of the DHBs.

The devolution of age-related DSS funding moved 19 DHBs no more than  $\pm 3$  percent from their target shares under the interim PBFF. For 12 of those DHBs, the variance was within  $\pm 1$  percent.

The new population projections move DHBs' target shares from between -6 percent to +3 percent of their target shares under the interim PBFF. The majority (19) of DHBs are within  $\pm 3$  percent of their interim target shares as a result of the new population projections.

## References

- Health Funding Authority and Ministry of Health. 1998. *Disability in New Zealand: Overview of the 1996/97 Survey*. Hamilton and Wellington: Health Funding Authority and Ministry of Health.
- Mental Health Commission. 1998. *Blueprint for Mental Health Services in New Zealand: How things need to be*. Wellington: Mental Health Commission.
- Minister of Health. 2000. *The New Zealand Health Strategy*. Wellington: Ministry of Health.
- Minister of Health. 2001. *The Primary Health Care Strategy*. Wellington: Ministry of Health.
- Ministry of Health. 1995. *Disability Support Services Funding Formula 1996/97: Technical guide*. Wellington: Ministry of Health.
- Ministry of Health. 1995. *Personal Health Funding Formula 1996/97: Technical guide*. Wellington: Ministry of Health.
- Ministry of Health. 1996. *Public Health Funding Formula 1997/98: Technical guide*. Wellington: Ministry of Health.
- Ministry of Health. 1999. *Taking the Pulse: The 1996/97 New Zealand health survey*. Wellington: Ministry of Health.
- Ministry of Health. 2000. *Our Health, Our Future – Hauora Pakari, Koiora Roa: The health of New Zealanders 1999*. Wellington: Ministry of Health.
- National Health Committee. 1998. *The Social, Cultural and Economic Determinants of Health in New Zealand: Action to improve health*. Wellington: National Health Committee.
- Salmond C, Crampton P. 2002. *NZDep2001 Index of Deprivation*. Wellington: Wellington School of Medicine and Health Sciences.
- Sutton F. 2000. *Population-based Funding for Primary health care: Method and results*. Wellington: Health Funding Authority.

## Appendix

Population-based funding has a long history in the New Zealand health system. The following is a chronological list of publications that detail its development.

**Table 13:** Publications on population-based funding in New Zealand

Year	Publication	Agency
1980	<i>The Equitable Distribution of Finance to Hospital Boards: A report to the Minister of Health, the Hon George F Gair.</i>	Advisory Committee on Hospital Board Funding
1981	<i>Supplement to the Report: "The Equitable Distribution of Finance to Hospital Boards".</i>	Advisory Committee on Hospital Board Funding
1984	<i>The Hospital Board Funding Formula.</i>	Department of Health
1986	<i>Report on the Review of the Population-Based Method of Funding Hospital Boards: A report to the Minister of Health, the Hon Dr M Bassett.</i>	Advisory Committee on Hospital Board Funding
1989	<i>Working Party Reports on Population-Based Funding for Area Health Boards.</i>	Department of Health
1990	<i>Area Health Board Population Based Funding Formula.</i>	Department of Health
1992	<i>Population Based Funding of Regional Health Authorities for the Purchase of Core Personal Health Services.</i>	Health Reforms Directorate
1995	<i>Personal Health Funding Formula 1996/97: Technical Guide.</i>	Ministry of Health
2001	<i>Interim Population-Based Funding Formula: Background Technical Report, 2001.</i>	Ministry of Health