Target revision

The target for repeat admissions will be reassessed over the next year. There is a problem in defining a repeat admission as a true recurrence or as a readmission for the same episode. It may be more appropriate to have recurrences expressed as a population rate, so that the target is not tied to the incidence of initial attacks of acute rheumatic fever.

When more ethnic group data are available it will be possible to assess whether further scaling of the target needs to be undertaken to account for changes in ethnic-specific data.

Stroke

Key points

- In New Zealand stroke is the third leading cause of death and a leading cause of adult disability.
- The Auckland Region Coronary or Stroke study (ARCOS) (1991–92) showed that stroke incidence rates rise steeply with increasing age in both men and women from 1132 per 100 000 (men aged 65–74) to 1665 per 100 000 (men aged 85+); and from 712 per 100 000 (women aged 65–74 years) to 3287 per 100 000 (women aged 85+ years). The prevalence of stroke-related disability was estimated to be 173 per 100 000 adults in this study.
- The most important modifiable risk factors for stroke are high blood pressure, smoking, physical inactivity, fat intake, heavy alcohol consumption, diabetes mellitus, atrial fibrillation and severe (greater than 75 percent) carotid artery stenosis.
- Population-based stroke prevention strategies include health promotion and education on modifiable risk factors, and also health protection strategies, eg, tobacco control measures such as taxation and smokefree legislation. Strategies effective in high-risk groups (people who have already had a transient ischaemic attack or a stroke) include drug treatment to reduce high blood pressure, anticoagulation for people with atrial fibrillation and endarterectomy for severe carotid stenosis.

<table>
<thead>
<tr>
<th>TARGETS</th>
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<tr>
<td>To reduce the age-standardised stroke mortality rate in men aged 65 years or more to 301 per 100 000 in 2010.</td>
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<tr>
<td>To reduce the age-standardised stroke mortality in women aged 65 years or more to 301 per 100 000 in 2010.</td>
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<tr>
<td>To reduce the age-standardised stroke mortality rate in Māori men aged 55 years or more to 116 per 100 000 in 2010.</td>
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<tr>
<td>To reduce the age-standardised stroke mortality rate in Māori women aged 55 years or more to 125 per 100 000 in 2010.</td>
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Target derivation

The issue-based policy document The Health and Wellbeing of Older People and Kaumātua (Ministry of Health 1997d) provides guidance for health service funders and providers on policies and programmes to promote healthy ageing, including a new outcome target for reduction of stroke among older people. A target for stroke was chosen because of its importance as a major cause of death, hospitalisation and disability in older people and the potential for modifiability of risk factors through population-based programmes. Based on consultation on the policy document, the proposed hospitalisation target has been replaced by a target for mortality for the following reasons.

- A substantial proportion (24–28 percent) of people with non-fatal stroke events are not admitted to a public hospital for a number of reasons:
  - they are frail older people who choose to remain living at home
  - they experience a minor stroke or transient ischaemic attack which resolves
  - they are older people in rest homes or private hospitals
  - lack of available public hospital beds.

- There are coding problems for stroke as a reason for hospital admission. Only 65 percent of hospital admissions for stroke met the clinical criteria for an acute stroke event in the 1991–92 Auckland stroke study (Bonita et al 1995).

- There are new changes to hospital admission practices for stroke. Recommendations from the Stroke Foundation, in line with other countries, suggest all patients with stroke be admitted to hospital early, to gain improvements from early intervention strategies.

- Hospital statistics do not differentiate between admissions moved between different hospitals (common because of the need for rehabilitation).

- A small but changing proportion of people with stroke (about 6 percent) die early before admission to hospital.

Indicators

Mortality rates for stroke (ICD-9 codes 430–438) for the population aged 65+ years, males and females.

Mortality rates for stroke (ICD-9 codes 430–438) for the Māori population aged 55+ years, males and females.

Data source

Mortality data are obtained from the National Minimal Dataset managed by the NZHIS. The most recent data are provisional for 1996.

Related targets

- Food and nutrition
- Physical activity
- Tobacco
- Alcohol
• Diabetes
• Ischaemic heart disease

Health impact

Definition

Stroke is defined by the World Health Organization as a condition characterised by rapidly developing symptoms and signs of a focal brain lesion, with symptoms lasting for more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Transient ischaemic attacks (TIAs), where symptoms last less than 24 hours, are not included in the definition of stroke, although they have a common cause. TIAs may be a precursor of a stroke (WHO MONICA Project 1988).

Stroke encompasses two major categories: ischaemic stroke (which includes embolic and thrombotic subtypes) and haemorrhagic stroke (which includes subarachnoid and intracerebral subtypes), although it is difficult to distinguish between the two without more detailed investigation. Ischaemic stroke is the most common form, accounting for more than two-thirds of all stroke events (Bronner et al 1995).

Mortality

Stroke is the third-ranked cause of death in New Zealand after ischaemic heart disease and cancer, and a leading cause of hospital admission and long-term disability in most of the developed world. The majority (75 percent) of stroke cases occur in people over 65 years, with 50 percent involving people over 75 years (Bonita 1992). One in twelve of all deaths in men and one in eight deaths in women can be attributed to strokes (Bonita and Beaglehole 1998). Stroke mortality has been declining considerably for several decades (Figure 63), which could be due to a combination of lower incidence and a change in the severity of strokes, or better management in the acute phase. It is likely that changes in some risk factors, eg, reduced smoking and improved diet, are involved in the decline of stroke, although data from the Auckland Stroke Study found no reduction in incidence over the decade of the 1980s (Bonita, Solomon et al 1997).
Figure 63: Stroke mortality among older people, by age group, 1980–96

Disability

Stroke-related disabilities include difficulties with speech and communication, weakness or paralysis of arms and legs, cognitive impairment, incontinence, and difficulties swallowing. These consequences can be devastating for individuals and their carers, particularly when assistance is required with mobility, personal care and other activities of daily living. About 15 percent of all acute stroke events in a year will result in difficulties with self-care (Bonita et al 1987).

In developed countries stroke is the leading cause of adult disability. In New Zealand, the prevalence of stroke-related disability has been estimated from the Auckland stroke studies (Bonita, Solomon et al 1997): 173 per 100 000 population 15 years and over require assistance in at least one self-care activity as a result of stroke.

In the Global Burden of Disease Study, stroke was estimated to account for 6.4 percent of all disability-adjusted life years (DALYS) for females and 4.4 percent for males in the ‘established market economies’ (Ebrahim and Kalache 1996).

In New Zealand, stroke care consumes more hospital resources than any other disease entity (about $54 million 1993–94); the cost of community care and the burden of informal care on families has not been measured. In 1992 stroke patients consumed 8.95 percent of all hospital bed days in New Zealand (Scott 1994).
**Incidence**

Stroke incidence (new events) and event rates (all events occurring in a year) across all age groups, have been measured in Auckland as part of the ARCOS study, at two points in time: 1981–82 and 1991–92 (Bonita et al 1993). The study used criteria and methods of the WHO MONICA Study (Tunstall-Pedoe 1985). This has allowed comparison of trends over a 10-year period. In the period 1981–91 no overall decrease in incidence of stroke was found.

The ARCOS study showed that stroke rates rise steeply with increasing age in both men and women, and are higher in men than in women in the age group 65–74, similar in the age group 75–84, and higher in women than in men at the oldest age group (85 years and above), as shown in Figure 64.

**Figure 64: Age-specific stroke event rates, for men and women aged 65 or more years**

Stroke incidence (and case fatality rate) has been shown to be higher in Māori and Pacific peoples, compared with the remainder of the population (Bonita, Broad et al 1997). Another major finding of this study was the high rate of stroke in Pacific men. A possible explanation for higher incidence rates could be related to risk profiles, including higher smoking rates, diabetes and obesity.

The ARCOS study showed that ‘in a population of 1 million, 1250 people will experience their first ever stroke each year, and an additional 350 people will have a recurrent episode. Of these 1600 people, only 880 will survive 6 months; 640 will be living in a private residence and the remainder, mostly heavily dependent elderly patients, will be in long-term care.
institutions’ (Bonita 1992). The lifetime risk of having a stroke for people aged 45 years is about one in four for men and nearly one in five for women (Bonita 1992).

**Risk factors and prevention**

There is increasing evidence that stroke is preventable (Marmot and Poulter 1992; Gorelick 1995). The risk factors for ischaemic and haemorrhagic stroke are not identical but there are many areas of overlap. The most important modifiable risk factors include (Kalache and Aboderin 1995; Marmot and Poulter 1992):

- high blood pressure
- lifestyle (smoking, physical inactivity, fat intake, and heavy alcohol consumption)
- diabetes mellitus
- atrial fibrillation
- carotid artery stenosis greater than 75 percent.

For people of all ages and both sexes, high blood pressure (both systolic and diastolic) is generally considered the most important modifiable risk factor for stroke. The relative risk of stroke among people with high blood pressure is approximately three to four times greater than for people without high blood pressure (Wolf et al 1992a; Davis et al 1987). The risk of stroke rises proportionately with increasing blood pressure. People in the highest category of diastolic blood pressure (mean 105 mmHg) have been reported to have a 10–12-fold increase in the risk of stroke (MacMahon et al 1990).

Smoking is a major cause of both ischaemic and haemorrhagic stroke. Stroke risk increases in a dose-response manner with the number of cigarettes smoked daily. With cessation of smoking, stroke risk returns to baseline after two to five years (Wolf et al 1988).

Physical activity provides substantial physical and psychological health benefits for those at risk for stroke, and favourably affects risk factors for cardiovascular disease (Kiely et al 1995; Wannamethee and Shaper 1992). Lack of activity in early adulthood may be a determinant of fatal stroke later in life (Shinton and Sagar 1993).

There is evidence that blood lipid levels may be linked to ischaemic stroke (Qizilbash et al 1992). Hypercholesterolaemia remains an important modifiable risk factor for coronary heart disease. Many studies have also found a positive association between obesity and the risk of fatal and non-fatal stroke (the relative risks generally range from 1.5 to 2.0) (Bronner et al 1995).

The association between diabetes and stroke may be mediated via common risk factors, although some studies have observed an independent association (Burchifiel et al 1994; Manson et al 1991).

Heart disease is another risk factor for stroke. Coronary heart disease, congestive heart failure and atrial fibrillation are independent predictors of stroke (Wolf et al 1992b). Atrial fibrillation is of particular importance as a cause of embolic stroke, preventable through anticoagulation. Asymptomatic carotid artery stenosis greater than 75 percent has been found to be associated with a stroke rate of 3.3 percent compared with a rate of 1.3 percent for stenosis of 75 percent or less (Gorelick 1995).
Primary prevention of stroke, in which lifestyles are modified, are more effective than secondary prevention for the majority of the population (Luepker et al 1994; D’Agostino et al 1994).

**Progress toward the target**

Stroke mortality rates for all ethnic groups have steadily decreased by about 45–50 percent, from 870 and 783 per 100 000 in 1980, to 455 and 420 per 100 000 in 1996 for males and females respectively (Figure 65). A further reduction of 3 percent is proposed for the year 2010.

**Figure 65: Stroke mortality, males and females aged 65 or more years, 1980–96**

Note: Rates are age standardised to Segi’s world population.

Source of data: New Zealand Health Information Service

Note that stroke mortality rates for Māori are for the age group 55 years and over. This recognises that Māori face age-related disability at a younger age, and also takes into account the definition of the term ‘kaumātua’ (Ministry of Health 1997d). In 1996 the stroke mortality rate for Māori males was 257.9 per 100 000 (n = 43), and 261.2 per 100 000 for Māori females (n = 50) (Figure 66). Ethnicity coding on death certificates changed part-way through 1995, hence rates are not calculated for that year and rates before and after 1995 are not comparable (see Use of Ethnicity Data section for more information).
Figure 66: Stroke mortality for Māori, all ethnic groups, and target for year 2010, by sex, ages 55 years and over, 1996

Note: Rates are age standardised to Segi’s world population.
Source of data: New Zealand Health Information Service.

Assessment

Data quality

Death certificate coding has been found to be accurate to within 10 percent for IHD diagnoses (Jackson et al 1988), and this is likely to be similar for stroke.

Limitations of measure

Mortality data alone are insufficient to assess the effects of prevention strategies on stroke. Community studies are required for assessing trends in incidence and case fatality and the effects of primary prevention strategies on stroke incidence.

Interpretation of trend

Stroke mortality has approximately halved since 1980. This change may largely reflect improved medical care but also the effects of primary prevention strategies. The mortality targets can be achieved by reducing the incidence rate of stroke through primary prevention strategies, and by reducing the stroke case-fatality rate (secondary prevention).

No comment can be made on trends in Māori men and women because of the 1995 changes in coding of ethnic data in health statistics (see section on Use of Ethnicity Data).
## Strategies

| Primary health care services | The National Health Committee’s *Guidelines for the Management of Mildly Raised Blood Pressure in New Zealand* (National Health Committee 1995) provide guidance for sound practice based on estimates of risk and benefits of treatment, and assessment of all major cardiovascular risk factors.  
  
The National Health Committee’s paper *Primary Prevention of Cardiovascular Disease in Older New Zealanders* (Bonita and Beaglehole 1998) reviews the evidence for effective interventions for cardiovascular disease (CVD), which includes ischaemic heart disease and stroke. There is good evidence that lifestyle changes (smoking cessation, adopting healthy eating patterns, physical activity and controlling weight) are beneficial for reducing CVD and improving overall health in all age groups through population- and high-risk approaches. |
|---|---|
| Healthy nutrition | A range of food and nutrition programmes promoting healthy nutrition to reduce the incidence of ischaemic heart disease are also relevant for stroke prevention. Programmes that support the *Food and Nutrition Guidelines for Healthy Older People* (Ministry of Health 1997c) include those run by the National Heart Foundation, Te Hotu Manawa Māori, the Cancer Society and HHS public health services.  
  
The guidelines, which recommend limiting salt intake and maintaining a healthy weight through a varied diet and regular physical activity, provide a basis for specific information for older people in a variety of settings, including home, community, marae, and institutions. |
| Physical activity | The Hillary Commission, in partnership with local authorities and Regional Sports Trusts, promotes a number of activities such as Fifties Forward, aqua fitness, walking and gentle exercise through their *Kiwi Seniors Programme* (Hillary Commission 1997a).  
  
The HFA and the Hillary Commission support the Green Prescription programme, which provides individuals with written personalised advice from their GP to encourage physical activity. This programme is for the whole population, including older people. |
| Health education and promotion | The Ministry of Health and HFA will be reviewing a series of food and nutrition education pamphlets for older people, which are available free of charge through the HHS authorised providers.  
  
The Hillary Commission and Te Puni Kōkiri support the establishment of Whare Oranga as part of He Oranga Poutama to promote health and wellness through physical leisure activities. This initiative is for all age groups, including older people.  
  
The Stroke Foundation NZ Inc has developed best practice guidelines for rehabilitation after stroke that also include information about stroke prevention (Baskett 1996). A range of material (including videos and pamphlets) on stroke prevention, life after a stroke and stroke support groups is also available on request from the Foundation. |
| Smoking cessation | Refer to Tobacco section for strategies to support smoking cessation. |

## Target revision

The stroke mortality targets are new and were only set in 1998. Further work may be required to assess the appropriateness of these targets, with consideration given to the inclusion of a mortality target for people aged 75 and over as at least 50 percent of strokes occur in this age group.