

---

## Unintentional Injuries

### Burns from hot liquids and vapours

#### Key points

- Hot water scalding is the most common type of burns injury resulting in hospitalisation of children.
- In 1997, 479 children aged under 15 years were admitted to hospital with burns from hot objects or substances, caustic or corrosive substances and steam.
- The target level for Māori children was nearly achieved in 1997. The target for all children will be achieved if the hospitalisation rate falls by 2.5 percent per year over the period 1998–2000.
- While reductions in hot tap-water temperatures assist in reducing the severity and frequency of hot tap-water burns, there is currently no requirement for existing houses to comply with the water safety provisions of the Building Act 1991. New and modified buildings are required under the Building Act to adhere to maximum safe water temperatures (defined as 45°C for early childhood centres, schools and old people's homes, and 55°C for all other buildings).

#### TARGETS

To reduce the hospitalisation rate for burns from hot objects or substances, caustic or corrosive substances and steam among children aged 0–14 years to 51 per 100 000 or less by the year 2000.

To reduce the hospitalisation rate for burns from hot objects or substances, caustic or corrosive substances and steam among Māori children aged 0–14 years to 80 per 100 000 or less by the year 2000.

#### Target derivation

In 1994 the Public Health Commission published *Water Safety: The Public Health Commission's advice to the Minister of Health 1993–1994* (PHC 1994a). A target relating to the reduction of burns among all children aged 0–14 years from hot tap-water was included in this publication. The target adopted results from one particular study (Waller and Marshall 1993) as the target indicator. Unless this type of study is repeated at regular intervals, the target as originally specified cannot be monitored.

In 1997 the target indicator was revised to include only hospitalised cases of burns from hot liquids and vapours (ICD-9 code E924.0). However, from 1996 a new ICD-9 code (E924.2) has been used in New Zealand to denote burns from hot tap-water. The target indicator has been revised again for this publication to include all hospitalised cases of burns from hot objects or substances, caustic or corrosive substances and steam (code E924). Ninety percent of such cases in the age group 0–14 years were burned by hot liquids and vapours (E924.0) or hot tap-water (E924.2). The target levels for the new indicator are based on the same proportionate decrease as for the former indicator.

The denominator population used in calculating rates for Māori changed in 1996 (see Introduction). Accordingly, the target for Māori has been scaled down by 30 percent (from the old target level of 114 per 100 000 to the new level of 80 per 100 000) as the change in methods of calculating hospitalisation rates for Māori resulted in a 30 percent reduction in all-cause hospitalisation rates.

### Indicator

Hospitalisation rate due to burns from hot objects or substances, caustic or corrosive substances and steam (code E924), for children aged 0–14 years.

### Data source

NZHS National Minimum Dataset (daypatient and inpatient hospitalisations). Data for 1996 and 1997 are provisional.

### Related targets

- Poisonings
- Child abuse

### Health impact

The two most common mechanisms of burns in children are scalding and contact with hot surfaces, the former resulting in more severe injuries, which often require hospital admission (Lyngdorf 1986; Phillips et al 1986; Ytterstad and Sogaard 1995). Burns from hot objects or substances, caustic or corrosive substances and steam (ICD-9 code E924) cause about 10 times as many child hospitalisations as burns from fire and flames (ICD-9 codes E890–E899). Burn and scald injuries often impact severely on children and their families because of pain, ongoing cosmetic and functional problems, repeated surgery and possible psychological problems (Zeitlin 1997).

In 1997 there were 479 hospital admissions of children aged 0–14 years for injuries resulting from burns from hot objects or substances, caustic or corrosive substances and steam. The age group 0–14 years accounted for 57 percent of hospitalisations of all ages for this type of burn injury. The rate for children aged under five years was higher than for any other age group. Females were hospitalised at a rate 41 percent lower than were males in the age group 0–14 years.

A 1992–95 study of child injuries in the Eastern Bay of Plenty found that most burns to children occur in the home environment (Edwards 1996). Waller and Marshall (1992) also found that two-thirds of child thermal injury hospitalisations were the result of contact with hot water, and that 19 percent of these were burns from hot tap-water specifically. Hot beverages accounted for a further 32 percent of these burns. The source of the hot water burn injury was not recorded, however, for a further 37 percent of cases.

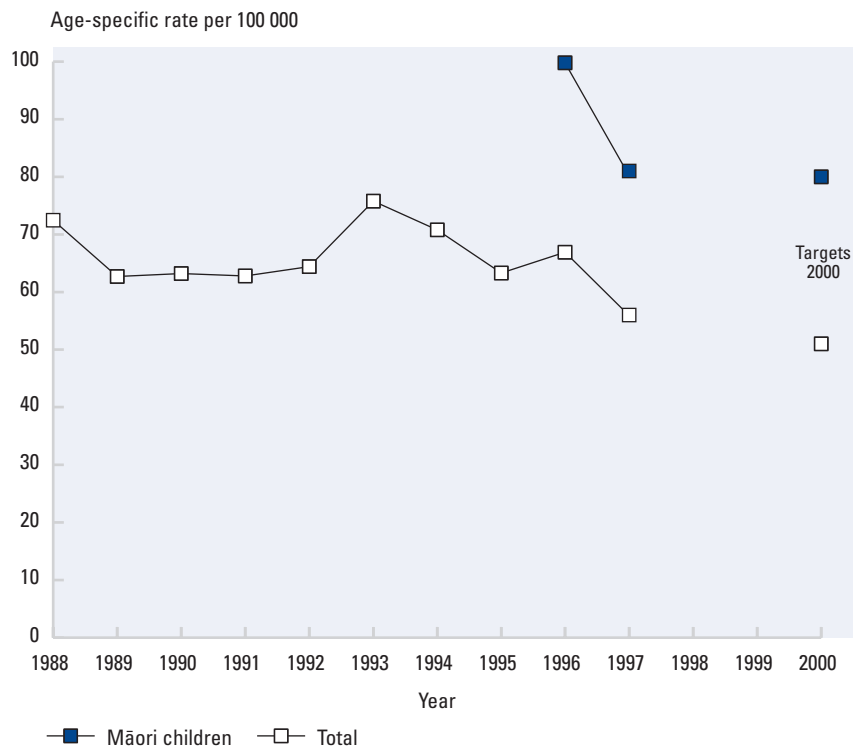
Reductions in hot tap-water temperatures assist in reducing the severity and frequency of hot tap-water burns. A 1990 survey found Dunedin homes with preschool children had a mean hot water supply temperature of 64°C (Waller and Marshall 1993). This decreased to 61°C after national and local educational campaigns were promoted. Similarly, the Child Injury Project 1992–95 tested water temperatures before and after an awareness campaign.

Although the proportion of houses with unsafe temperatures reduced from 46 percent to 32 percent, many thermostats were later turned up again by parents (Edwards 1996).

### Progress toward the targets

In 1997 the hospitalisation rate for all children aged 0–14 years decreased to 56 per 100 000 (Figure 30). Māori children were hospitalised for burns at a rate of 81 per 100 000 (n = 167) and Pacific children at a rate of 58 per 100 000 (n = 49) (Figure 31).

**Figure 30:** Hospitalisations for burns from hot objects or substances, caustic or corrosive substances and steam,\* ages 0–14 years, 1988–97

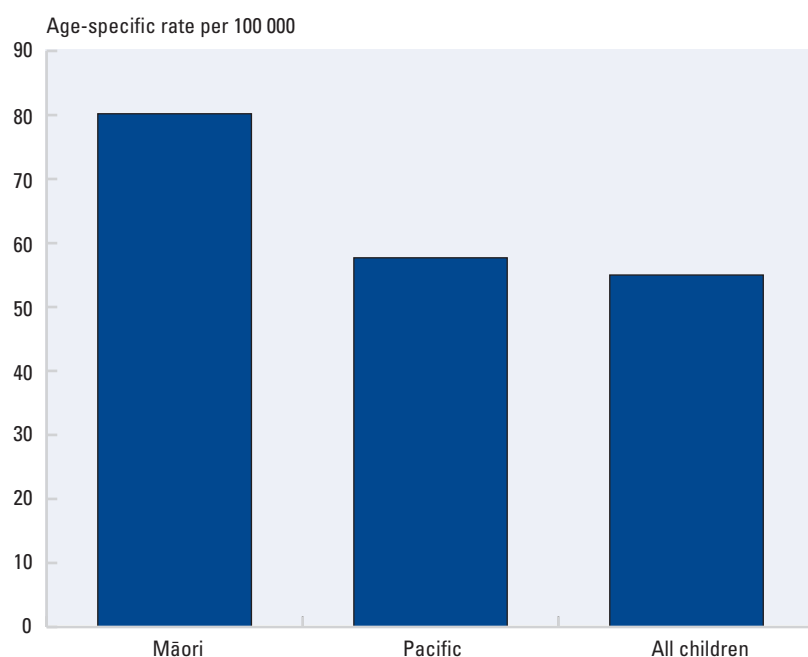


Source of data: New Zealand Health Information Service

Note: Data for 1996 and 1997 are provisional.

\* ICD-9 code E924.

**Figure 31:** Hospitalisations for burns from hot objects or substances, caustic or corrosive substances and steam,\* ages 0–14 years, by ethnic group, 1997



Note: Data are provisional.

\* ICD-9 code E924.

Source of data: New Zealand Health Information Service

## Assessment

### *Data quality*

Quality of burns hospitalisation data specific to Māori children will improve as a time series is developed, as it has been for all children.

### *Limitations of indicator*

Apart from the limitations imposed by changes in coding and admission thresholds, burns hospitalisation rates are a good indicator of childhood thermal injuries.

### *Interpretation of trend*

Burns hospitalisation rates decreased in most years since 1993. A further decrease of just 2.5 percent per year is required to meet the target for all children. This seems likely to be achieved by the year 2000.

The target level of 80 per 100 000 for Māori children has almost been achieved three years early. However, the target for Māori children will continue to be monitored in future years until it becomes clear that the target has been achieved.

## Strategies

Domestic hot-water policies	<p>The Building Act 1991 requires that in all new and modified buildings, and in homes fitting new or changing existing hot water systems where hot water is provided to sanitary fixtures used for personal hygiene, hot water shall be delivered at a temperature that avoids the likelihood of scalding. Maximum safe water temperatures are defined as 45°C for early childhood centres, schools and old people's homes, and 55°C for all other buildings. However, there is no requirement for existing houses to comply with the water safety provisions of the Building Act, and the New Zealand Building Code.</p> <p>To reduce hot-water burn injuries amongst children, the Ministry of Health recommends a tap delivery temperature of 50°C for domestic hot water used for hygiene purposes. However, following a recent review of G12 Water Supplies, the recommended maximum hot water temperature in the Building Code is to remain at 55°C. The Australian/New Zealand Standard for hot water supply systems [AS/NZS 3500.4.2:1997], does however, recommend a 50°C maximum hot water temperature.</p> <p>There is also a need to balance the risk of hot water burns with the risk of <i>Legionella</i> which can contaminate home hot water heaters, although temperatures above 60°C inhibit this organism. In considering this balance for the general population, the Ministry believes that as a first priority domestic hot water must be delivered at a temperature to avoid scalding, that is 50°C, and that a second priority is the storage of hot water at a temperature to control <i>Legionella</i>.</p> <p>Government agencies together with industry groups, plumbers, children's organisations and those concerned with injury prevention, are looking at ways to achieve safe hot water temperatures in the domestic environment. There are a number of issues to be considered which relate to both the technical aspects and cost factors of use of tempering valves to achieve safe hot water temperatures. Under consideration are national campaigns and training programmes to ensure safe hot water in New Zealand homes, which will be directed at the general public, plumbers and building industry groups.</p>
-----------------------------	---

### Target revision

The targets for all children and for Māori children appear challenging but achievable. No revision is required at this stage. However, if in future years it becomes clear that the targets have been achieved, new, lower targets may be set.

## Drownings

### Key points

#### *Preschool drownings in private swimming or spa pools*

- Drowning is the second most common cause of death from unintentional injury in the 0–4-years age group.
- In 1997, five children aged 0–4 years drowned in private swimming or spa pools. The rate for 1995–97 (1.64 per 100 000) was higher than the target of 1 per 100 000.

- Following the introduction of the Fencing of Swimming Pools Act 1987, it took several years before rates of preschool drownings declined. The law, while supported by a range of agencies, has been inconsistently enforced and compliance remains an important issue, with unnecessary deaths still occurring.

### All unintentional drownings

- For all age groups, death by unintentional drowning is the third most common cause of unintentional injury death after road traffic crashes and falls.
- During 1997 the lowest drowning toll (since computerised Water Safety New Zealand (WSNZ) records began in 1980) was recorded: 108 drownings, a decrease of 12 percent on 1996. Overall the number of drownings has fluctuated during the past six years. Males and non-Māori made up 82 and 78 percent of these drownings respectively.
- WSNZ is the lead agency for water safety and has been working for 50 years promoting water safety and safe behaviour in and around water.

### TARGETS

To reduce the rate of drownings in private swimming or spa pools among preschool children to 1.0 per 100 000 per year or less by 2002.

To reduce the number of deaths due to unintentional drowning to 98 deaths or less per year by the year 2000. (Unintentional drownings exclude drownings due to suicide and homicide.)

### Target derivation

The Public Health Commission published *Water Safety: The Public Health Commission's advice to the Minister of Health 1993–1994* in 1994, where one target was set to monitor the rate of preschool drowning in private swimming or spa pools (PHC 1994o). Data from the WSNZ were used to set this target, with the average annual rate over the years 1989–91 (2.7 per 100 000 preschoolers) used as a baseline. In 1992 the rate for that year was 0.7 per 100 000, meaning the target had already been met. The target was originally set for 1996, and was apparently exceeded. The level at which the target was set was considered to be challenging but achievable, given that very few drownings should occur if the Fencing of Swimming Pools Act is fully enforced. The target year was reviewed and set for 2002. The preschool drowning trend is difficult to interpret due to the small actual number of deaths, hence the variation in interpretation. Therefore a three-year rolling average is now used to assess the target.

A later report (PHC 1995h) recognised that although the target for swimming pool drownings had apparently been achieved, and should continue to be monitored, it was also appropriate to monitor the number of unintentional drownings in all age groups. Thus, an additional target was developed to reduce by 30 percent the 141 unintentional drowning deaths recorded for the 1989–91 baseline.

### Indicators

Age-specific mortality rate from drowning in private swimming and spa pools for children aged 0–4 years.

Number of deaths due to unintentional drownings for all ages.

## Data source

Water Safety New Zealand (WSNZ) maintains the official New Zealand drowning database, DrownBase. This information is provided to the Ministry of Health by the WSNZ. The most recent data are for 1997. Data are updated regularly, and are cross-referenced against coroners' reports and therefore may show some fluctuation between individual years.

## Related target

- Alcohol

## Health impact

### *Preschool drownings*

Drowning is the second major cause of unintentional injury death in the 0–4-years age group. In 1996, 15 of the 57 unintentional deaths in this age group were from drowning. A study in 1983 of children aged one to three years found that the single most common water hazard to children in this age group was domestic swimming pools (39 percent of all hazards) (Geddis 1984). Baths were not included as a water hazard in this calculation given that most children are regularly exposed to baths. Data from WSNZ for 1980–97 shows that 43 percent of drownings of children aged one to three years occurred in private swimming pools.

It has been suggested that when a young child falls into a pool, with no supervision, there is a 50 percent chance of drowning (Barry et al 1982). The same paper also suggested there was severe morbidity among the survivors, with brain damage occurring in about 20 percent. Toddlers are especially vulnerable to drowning because of poorly developed perceptual skills and their natural curiosity about their environment.

In 1997, five children aged 0–4 years drowned in private swimming or spa pools, considerably fewer than the 17 children who drowned under the same circumstances during the peak in 1981. Prior to the introduction of the Fencing of Swimming Pools Act in 1987, around nine children aged 0–4 years drowned each year in private swimming or spa pools. Following the introduction of the Act in 1987 the average number of deaths each year has decreased to fewer than six.

### *All unintentional drownings*

For all age groups, death by unintentional drowning is the third most common cause of unintentional injury death, after road traffic crashes and falls. During 1996, 1124 New Zealanders died of unintentional injury, and 123 of these were by drowning. Unintentional deaths exclude suicide and homicide.

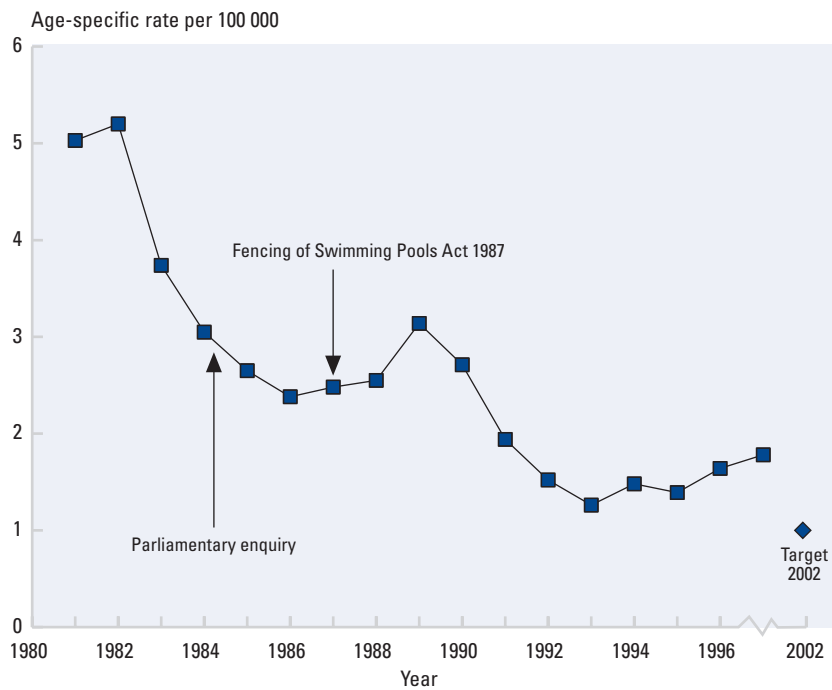
During 1997, 108 people died from unintentional drowning, the lowest toll for unintentional drownings since 1980. Drowning is much more common among males and non-Māori (making up 82 and 78 percent respectively of all drownings in 1997). Nevertheless, Māori rates are higher than non-Māori rates (4.6 per 100 000 and 2.7 per 100 000 respectively in 1997). One third of these drownings (33 percent) occurred among persons aged 15–29 years of age.

For total drownings (including those due to suicide and homicide), 1997 recorded the second lowest toll on record, with a total of 131.

## Progress toward the targets

Rates for preschool drownings in private swimming or spa pools have fluctuated over the past 18 years. The steepest decline was from the highest rate of 5.2 per 100 000 for 1981–83 to 2.4 per 100 000 for 1985–87. Thereafter rates fluctuated until reaching an all-time low of 1.3 per 100 000 for 1992–94. Since then, rates have been slowly rising again with a rate of 1.64 per 100 000 for 1995–97 (Figure 32).

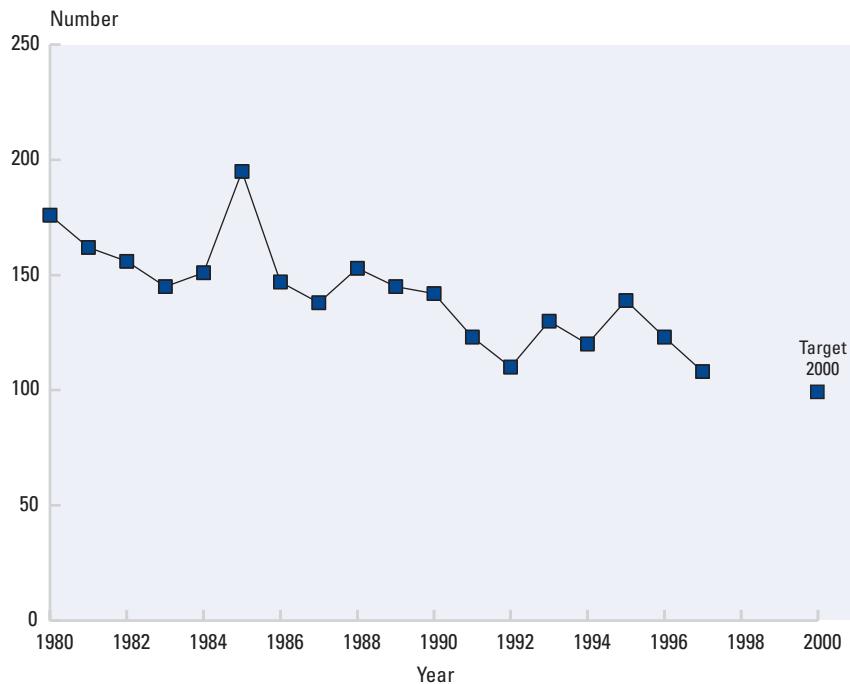
**Figure 32:** Drownings in private swimming or spa pools, ages 0–4 years, 1980–97



Note: Rolling three-year averages are used.

Source of data: Water Safety New Zealand

**Figure 33:** All deaths due to unintentional drownings, 1980–97



Note: Excludes drowning deaths from suicide and homicide.

Source of data: Water Safety New Zealand

The total number of deaths due to all unintentional drownings (that is, excluding suicides and homicides) has been steadily declining since 1980, though deaths peaked to 195 in 1985 (Figure 33). In 1997, 108 people died from unintentional drowning.

## Assessment

### *Data quality*

All drowning information on the WSNZ database is collected from the New Zealand Police and confirmed against coroners' reports. The data reported by WSNZ are higher than those from official NZHIS statistics for drowning. Recent work has shown that around 21 percent more cases of drowning occur than are classified as such using ICD-9-CM E-codes for drowning in the National Minimum Dataset held by the NZHIS (Langley and Smith 1996). The majority (65 percent) of drownings not coded as such were coded as motor vehicle traffic deaths, primarily single-vehicle crashes where the vehicle entered the water.

### *Limitations of indicator*

WSNZ data is appropriate for monitoring these targets as they seem to have a higher capture rate than NZHIS. Data may change from year to year based on results of cross-referencing data with coroners' reports.

### *Interpretation of trend*

Following the introduction of the Fencing of Swimming Pools Act 1987, rates did not begin falling sharply until 1990. The lowest rates were seen in 1992–94 and have begun to rise again, moving away from the target for 2002. The number of drownings, while important, is

very small, which means that a difference of one or two drownings may influence the target significantly.

Before the passing of the Act, 75 percent of children drowned in unfenced pools. Since the Act 53 percent drowned in unfenced pools. Had these pools been fenced, and had the fenced pools been in compliance with the Act, eg, gates closed and locks effective, most children would not have drowned (Personal communication, WSNZ 1998).

The number of deaths from unintentional drownings has shown an overall decline since 1980 of 39 percent. While the average annual rate of decrease has fluctuated, over the past two years drownings have decreased at a rate of around 12 percent. If the rate continues to decline, as over the past few years, the target will be met.

## Strategies

Water safety promotion	<p>WSNZ is the lead agency for water safety and is non-government funded. It promotes public awareness and education both directly and through the 23 members. Members range from aquatic sports and recreation organisations to others with a national overview of water safety in general.</p> <p>WSNZ has been working for 50 years promoting water safety and safe behaviour in and around water. Its public education campaigns cover a range of issues, including learn to swim and personal survival, boating safety, education and beach education.</p> <p>There has been recent debate, however, about the effectiveness of teaching swimming and water skills to very young children as a strategy to prevent drowning (Barrs 1995; Smith GS 1995).</p>
Legislation	<p>One of the key areas of concern over the last decade was the high number of preschool children drowning in unfenced private swimming pools. A range of agencies supported the enactment of the Fencing of Swimming Pools Act 1987. However, while the number of preschool drownings in private pools has reduced, the law has been inconsistently enforced (Morrison et al 1997) and compliance remains an important issue.</p> <p>In 1995, WSNZ invited representatives from a range of organisations (including government policy agencies, industry and research groups, child health groups and local government) to meet as a consultative group to discuss the issue of the Fencing of Swimming Pools Act. This group commissioned the Injury Prevention Research Unit at University of Otago to survey territorial authorities on the enforcement and compliance of the Act. The survey found that nearly 50 percent of the approximate 58 000 known private swimming pools do not comply with the legislation. In addition, four enforcement issues were identified: interpretation of the Act, locating existing pools, and administration costs and pool owner resistance. The key recommendation was for WSNZ to approach the Department of Internal Affairs regarding an update of the Guidelines for Territorial Authorities on the Fencing of Swimming Pools Act. WSNZ are currently negotiating with the Department of Internal Affairs regarding this review.</p>

## Target revision

While ethnicity data are now available for the past five years, in each of those years Māori and non-Māori rates have either both increased or both decreased. While the percentage change has differed, the overall trends are similar and separate targets are not warranted.

No revision of the targets is recommended at this stage.

---

## Child Abuse

### Key points

- For the period 1993–96 there was an average of 8.75 deaths per annum among children aged 0–14 years from injury purposely inflicted by other persons (a rate of 1.06 per 100 000). Insufficient data are available to assess recent trends at this stage.
- Child abuse can involve neglect and deprivation, emotional harm, sexual harm and physical harm.
- There were 209 cases of physical harm that resulted in hospitalisation in 1997 (a rate of 24.5 per 100 000). Hospitalisation is more common in males (1.6 times) and in Māori (1.5 times) than in the total population.
- Key strategies to prevent child abuse or minimise the resultant harm include intersectoral government initiatives led by the Department of Social Welfare, programmes provided by personal and public health services, school-based programmes, home visits and providing support for victims.

### TARGET

To reduce the mortality rate among children aged 0–14 years from injuries inflicted by other persons to 1 per 100 000 or less by the year 2002.

### Target derivation

Targets were first set in 1996 by the Ministry of Health (1996b), but were changed in 1997 to produce a single target. This was done to increase the stability of the indicator by using the full category of relevant codes (E960–E969) and by extending the time period for measurement to five years. The baseline period is for the years 1988–92 (annual rate of 1.23 per 100 000), and the target is for the period 1998–2002. The target represents a 20 percent reduction (approximately) from the baseline rate. No separate targets were set by gender or ethnicity because of the low numbers: 4–5 female deaths and 1–2 Māori deaths per year on average.

Other indicators considered for use in target development but rejected for various reasons have included the following:

- Department of Social Welfare data on alleged cases of child abuse reported to social workers (not all allegations are proven)
- Police data and Ministry of Justice data on sexual offences against children (these are influenced by variable reporting rates (Ministry of Justice 1995))