

Chapter 8

Fire

“In Queensland, more than 80 per cent of all home fire deaths in the past year have occurred in homes without smoke alarms” (Purcell 2006:1)

Key issues

- It is unknown whether either of the homes where the 2 fire-related deaths occurred contained a smoke alarm. The Commission’s Child Death Annual Report, 2004–05 noted that, of the 4 residential house fires, 3 houses did not contain a smoke alarm (and it was unknown whether the fourth house had a smoke alarm installed).
- Smoke alarms represent the single most effective fire safety feature in a home. However, alarms must be properly located and maintained to be effective.

Two children and young people died in 2 Queensland residential house fires between 1 July 2005 and 30 June 2006.¹⁵⁵ Fires accounted for 2.2% of all external deaths of children and young people in Queensland during that period.

History of Queensland fire trends

In 1998 the Department of Emergency Services’ (DES) Strategic Management and Policy Unit, in collaboration with the Queensland Fire and Rescue Authority, conducted research into fire fatality trends throughout Australia (Department of Emergency Services 1998:7). The ‘Fire Fatalities: Who’s at Risk?’ project analysed all deaths that occurred as a result of fires in Australia, and for each state, between July 1991 and June 1996. The project found that fire deaths have increased over time in Queensland, with a number of specific trends affecting children and young people (Department of Emergency Services 1998:24). The main findings included that:

- children aged from birth to 4 years were the most at risk for fire fatalities, the majority of which were male
- discarded smoking materials, such as matches, lighters and smouldering cigarette butts, were the most frequent trigger of fire death; child fire play was another cause of fire fatality, particularly for children under 5 years

- most fire deaths occurred in the cooler months (June to September) and pre-Christmas (December)
- most of the fatal fires involving children occurred during the night and early morning (between midnight and 8am), when occupants are usually at home, asleep and unlikely to notice the early stages of a fire
- a higher incidence of fire deaths was found in rental properties than in self-owned homes, and
- smoke alarms were either not installed or not serviceable in 97% of all fatal fires.

In line with the DES findings, the Child Death Annual Report, 2004–05 found that all of the fire deaths reported in the 12-month period 2004–05 occurred in children aged under 5 years. The findings for the current reporting period are detailed below.

Fire trends and patterns, 2005–06

Table 8.1 illustrates the age and gender breakdown for all fire fatalities over the 12-month period examined.

¹⁵⁵ This figure represents those deaths which, first and foremost, were the result of a fire where the cause is not believed to have been deliberate. Incidents such as transport fatalities and fatal assaults where a fire was secondary to the incident will be analysed in Table 8.2. However, these fire incidents have not been included in this figure.

Table 8.1: Fire-related deaths by gender and age

Type of fire	Females <i>n</i>	Males <i>n</i>	Total <i>n</i>
2 years	0	1	1
9 years	1	0	1
Total	1	1	2

Data source: Queensland Child Death Register (2005–06)

Note: 1. Ages were excluded where no children of that age group died in the reporting period.

Gender

As illustrated in Table 8.1, 1 male and 1 female child died in residential house fires during the current reporting period.

Age

One of the children who died in a fire was 2 years of age and the other child was aged 9. Previous research on fire fatalities in Queensland has found that children aged under 5 years are most likely to die in fires (Department of Emergency Services 1998:31). All child fire fatalities recorded in the 12-month period 2004–05 occurred among children aged between birth and 4 years of age (see Chapter 3).

The ‘Fire Fatalities: Who’s at Risk?’ project conducted by the DES (1997:1; 1998:31) found that the majority of infant and toddler deaths occurred as a result of the child’s inability to escape from the fire. Research has indicated that sleeping children are less likely than adults to be woken by a fire as they sleep more deeply. Thus they are unlikely to be woken by smoke or noise (Department of Emergency Services 1998:32). Further, a number of children died when caregivers misjudged the speed of the fires and attempted to rescue some children before returning for others. It is often the case that re-entry and subsequent escape from a burning building are not possible and the best approach to escaping a fire in the home is to evacuate all children at the same time (Department of Emergency Services 1997:1).

Types of fire-related deaths

Over the 12-month period, a number of fire fatalities were the result of other causes, such as traffic incidents. These have not been included in the count of fire deaths. However, all incidents that involved fire have been included in Table 8.2, which illustrates different types of fire-related fatalities by gender.

Table 8.2: Types of fire-related deaths by gender

Type of fire	Females <i>n</i>	Males <i>n</i>	Total <i>n</i>
Residential house fire	1	1	2
Fire deliberately started ¹⁵⁶	1	1	2
Result of a motor vehicle collision ¹⁵⁷	0	2	2
Total	2	4	6

Data source: Queensland Child Death Register (2005–06)

Residential house fires accounted for one-third of fire-related deaths, with 2 children dying in 2 separate fire incidents.

Two children were killed in deliberately lit fires and 2 young people died after being trapped in a motor vehicle after a crash. For 3 of these deaths, smoke inhalation or incineration was believed to have caused death. One child was found to have died before one of the fires was deliberately lit.

While it has been noted that fires rarely occur in motor vehicles as the result of crashes, incidents which breach the fuel tank of a vehicle, or leave it upside-down or sideways, are more likely to cause a fire (Maynard n.d.:6). In both transport deaths noted above, the cars rolled or flipped at least once.

Aboriginal and Torres Strait Islander status

In the reporting period, 1 of the 2 children who died in residential house fires was of Aboriginal origin. In the 12-month period between July 2004 and June 2005, the Commission observed that 3 of the 4 children who died in fires were Indigenous (refer to Chapter 3).

156 Fire-related deaths in this category are included in Chapter 11, ‘Fatal Assault’, as the death was the result of an individual deliberately lighting the fire.

157 Fire-related deaths in this category are included in Chapter 6, ‘Transport’, as the deaths were secondary to a motor vehicle collision.

In 2003, the Australian Bureau of Statistics (ABS) found that Indigenous people were more than twice as likely to be living in a rental property compared with non-Indigenous people (63% compared with 27%). A further 15% of Indigenous households were considered overcrowded, compared with only 4% of non-Indigenous households, and 25% of Indigenous people resided in remote or very remote areas, compared with only 2% of non-Indigenous people (Australian Bureau of Statistics 2003). In its 'Fire Fatalities: Who's at Risk?' report, the DES identified overcrowding, remoteness and rental accommodation as factors that increase the risk of fire fatalities in Queensland. It may therefore be the living conditions of many Aboriginal and Torres Strait Islander people which increase their risk of fire fatalities.

Cause of death

The cause of death for 1 child was smoke inhalation, while the other was incineration. The Child Death Annual Report, 2004–05 found that children in Queensland were more likely to die as a result of burns/incineration than smoke inhalation.

In the past, the cause of death for Queensland fire victims has been equally attributed to smoke inhalation and burns/incineration (Department of Emergency Services 1997:4; 1998:35). This finding differs from all other Australian states, where victims were more likely to die from smoke inhalation. The difference between Queensland's major cause of death and that in other states has been attributed to victims being involved in, or close to, the activity that caused the fire.

Geographical distribution (ARIA+)

One death occurred in a regional area and the other was in a remote area. Findings for the 12-month 2004–05 period were that 3 out of the 4 children who died in fires resided in regional areas. The fire literature identifies living in rural areas as a risk factor for fire fatalities in Queensland (Department of Emergency Services 1998; 2004b).

Socio-economic status (SEIFA)

One child who died in a fire resided in a low socio-economic area, while the other child was living in a high socio-economic area. Of the 4 children reported in the 12-month period last year, 2 children each resided in very low and moderate socio-economic areas. Research suggests that people with low socio-economic status, and those from poorer backgrounds, are more at risk of fire fatality (Istre et al. 2002:128; Pirrallo & Cady 2004:171).

Child protection population

Neither of the children who died in fires between 1 July 2005 and 30 June 2006 was known to the DChS in the 3 years before their death. In contrast, last year the Commission found that 2 children who died in house fires were known to the DChS (see Chapter 3).

Circumstances of fire fatalities

Smoke alarms

Of the 2 residential house fires that occurred between July 2005 and June 2006, it is unknown whether either of the homes contained a smoke alarm, although it is suggested that at least 1 of the residences did not (Moorton 2005:5). In contrast, the Commission's Child Death Annual Report, 2004–05 found that, of the 4 residential house fires, 3 houses did not contain a smoke alarm (and it was unknown whether the fourth house had a smoke alarm installed).

In Queensland more than 80% of all fire fatalities over the past year have occurred where there were no smoke alarms (Purcell 2006:1). This finding reinforces the importance of all residences containing properly installed and regularly maintained smoke alarms. New legislation has been introduced in Queensland that will make it compulsory for all homes to have a working smoke alarm (Purcell 2006:1; see the 'Prevention and intervention' section later in this chapter for more details of the new legislation).

Smoke alarms are the single most effective fire safety feature in a home (Department of Emergency Services 2004b:4). However, alarms must be properly located and maintained to be effective (Department of Emergency Services 1997:4). Poor installation and placement, and the selection of an inappropriate type of smoke alarm, can cause nuisance alarms which prompt people to disconnect their batteries (Bunker 1998:5). A number of campaigns run by the Queensland Fire and Rescue Service (QFRS), such as ‘Don’t be a fool – change your smoke alarm battery’ day, encourage regular replacement of smoke alarm batteries and promote the correct placement of smoke alarms (as in Operation Safehome; see the ‘Prevention and intervention’ section of this chapter). The QFRS also educates the community on regular smoke alarm maintenance and reinforces the importance of not removing batteries from alarms (Queensland Fire and Rescue Service 2005e).

Month of year

The fire responsible for one of the child deaths in the reporting period occurred in winter (June) while the other occurred in autumn (April).

The majority of fire deaths in Queensland have been found to occur during two distinct periods: the cooler months (June to September) and pre-Christmas (December) (Cummins 2005; Department of Emergency Services 1997:2; 1998:27). In Queensland, the DES (1998) found that most fires in the winter months could be attributed to electrical incidents, including electrical faults and overloading power outlets. The causes of both of the fatal fires in the current reporting period are unknown.

Time of day

Both fire fatalities occurred in the middle of the night, between 12am and 6am, when all occupants were most likely asleep. This finding is consistent with previous Queensland research, which has found that most fire deaths occur in the middle of the night or early in the morning when people are usually at home sleeping (Child Death Annual Report, 2004–05; Department of Emergency Services 1997:2).

Location at death

The location of death for both children in the current period was their bedroom. However, it is not known if the child’s bedroom was in the immediate vicinity of where the fire started. Conversely, the location of deaths for children reported in the Child Death Annual Report, 2004–05 varied across all deaths.

Cause of fire

The cause of the fire was unknown for both of the deaths recorded during this period.

Childhood fire-related injuries

During the 2004–05 financial year, Queensland Injury Surveillance Unit (QISU) recorded 60 children injured as a result of fire, flames or smoke. Given that this does not represent all emergency departments, the real figure is likely to be higher.¹⁵⁸ Although deaths from fire are relatively infrequent, these data illustrate that there is a high incidence of fire-related injuries. The details of the QISU data are as follows.

Demographics

The majority of presentations were of males, representing 79.5%. The data also indicated that a third of the fire-, flame- and smoke-related injuries were of young people aged 10–14 years (20 injuries, 33.3%), followed by 5–9 year olds (17 injuries, 28.3%).

Type of injury

The most common nature of injury was a burn (or corrosion), which represented 80% of the presenting fire-, flame- and smoke-related injuries (48 injuries). The part of the body most likely to have been injured was an unspecified body location (15 injuries, 25%), followed by injuries to multiple parts of the body (13 injuries, 21.7%). The next most common type of injury occurred to children’s hands (and fingers), representing 18.3% of injuries.

158 The QISU currently collects data from 14 hospitals in Queensland, which take in 3 sample regions: metropolitan (South Brisbane), regional (Mackay and Moranbah Health Districts) and remote (Mt Isa).

Place of injury

The most frequent place of a fire related injury was a free-standing house (33 injuries, 55.0%).

Time of injury

Fire, flame and smoke injuries occurred most frequently on Saturdays (20 injuries, 33.3%) and Sundays (16 injuries, 26.7%). Injuries were also most likely to occur in autumn months, representing 35.0% of injuries, with the month of May recording the greatest number of injuries (12 injuries, 20.0%). The reported time of day when most injuries occurred was between 3 and 4pm in the afternoon (17 injuries, 28.4%).

Injury factors

Open fire and flames were the leading mechanism of injury, representing 73.3% of injuries (44 injuries). The most common injury factor was noted as other or unspecified (21 injuries, 35.0%). However, the next most common was petrol (or petroleum related), with 8 injuries recorded, followed by other or unspecified chemical substances, with 4 injuries.

Triage and mode of separation

Half of the children with fire-, flame- and smoke-related injury presentations were admitted to hospital, while the other half were discharged. Specifically, 30 children (50.0%) were discharged home, compared with 29 who were admitted to hospital (48.3%). The majority of children and young people attending hospital were assigned a triage status of 'urgent' (24 injuries, 40.0%); 35.0% were allocated a 'semi-urgent' status (21 injuries).

Prevention and intervention

Queensland legislation

The State Government is extending its fire alarm legislation to older homes to target almost 20% of Queensland residences that do not have smoke alarms installed (Chalmers 2005). While it is already mandatory under the Building Code of Australia to

have hard-wired smoke alarms installed in all new residential homes built or significantly renovated (implemented 1 July 1997), from 1 July 2007 it will be compulsory for owners of all houses and units in Queensland to install at least one battery-powered smoke alarm (Department of Emergency Services 2006a:1).

As a legal minimum requirement, a smoke alarm must be installed on or near the ceiling on any storey:

- between any area containing bedrooms and the rest of the house or unit, for example in hallways, and
- on a storey not containing bedrooms, on the most likely evacuation route from the storey.

The new laws will be tied to home sales, so that owners must ensure that they have alarms installed before they sell their properties. The legislation will require that sellers be able to notify the purchaser that the home being bought contains the required number of smoke alarms and that they are in good working order (Chalmers 2005). This will mean that checking of smoke alarms installed will be part of buying and selling residences in Queensland. To ensure compliance with the laws, a person selling a property will be required to lodge a form with the Queensland Land Registry stating that operational smoke alarms are installed in the property. Compliance will be monitored by means of an audit of these forms (Department of Emergency Services 2006a:2). Fire officers will also investigate complaints received about residential non-compliance (Department of Emergency Services 2006a:3).

The implications for non-compliance with this new law include a maximum fine of \$375 (Chalmers 2005; Department of Emergency Services 2006a:3). The new legislation also carries with it the possibility that insurance companies may be making changes to fire insurance conditions for homes where appropriate precautions have not been taken in relation to installing smoke alarms (Chalmers 2005).

Legislation in other states

Smoke alarms are currently compulsory in South Australia, Victoria and New South Wales (Department of Emergency Services 2006a:3; Australian Consumers Association 2006). Queensland's new laws are similar to arrangements in New South Wales and Victoria, which allow householders to install any smoke alarm that complies with Australian Standards (Department of Emergency Services 2006a:3).

Queensland Fire and Rescue Service

More than \$300 million of the State Budget was allocated to the QFRS to boost fire and rescue services across Queensland in 2005 (Cummins 2005). The budget represents a significant commitment to ensure that Queenslanders live in safe and secure communities. The QFRS has a number of new and ongoing initiatives aimed at reducing the incidence of fire fatalities throughout Queensland, particularly among high-risk groups. These are detailed below.

Fire Ed

This strategy educates children about fire safety and evacuation processes (Queensland Fire and Rescue Service 2005d). The messages include the difference between good fires and bad fires and the promotion of home evacuation plans. Additionally, information packs and resources are given to schools so that teachers can continue to reinforce fire messages. Research has shown that the information is well understood and retained by children (Queensland Fire and Rescue Service 2005d).

Fire SignEd

In December 2005, the QFRS launched its 'Fire SignEd' fire education program for deaf and hearing-impaired children. This program was adapted from the existing 'Fire Ed' program currently delivered to all Year 1 children in Queensland schools and incorporates the key messages of 'good fires and bad fires'; 'get down low and go, go, go'; 'stop, drop

and roll'; 'get out and stay out'; and 'fire fighters are your friends' (Purcell 2005). The Fire SignEd program is being delivered to Year 1 and preschool groups in Queensland's 31 Special Education Developmental Units.

Rural operations

An integral part of the QFRS, Rural Operations plays a vital role in supporting volunteer Rural Fire Brigades in Queensland. Rural operations is responsible for developing and supporting community-based approaches to fire management in rural and rural-urban interface areas throughout the state (Department of Emergency Services 2004a). Rural operations is a partnership between Queensland's Rural Fire Brigade volunteers and local and state authorities in protecting rural, remote and provincial Queensland (Department of Emergency Services 2004a).

Juvenile Arson Offenders Program (JAOP)

This program is a new initiative being trialled in the south-east corner of Queensland, focusing on young people who have come to the attention of the police or the judicial system in relation to arson (Queensland Fire and Rescue Service 2005a). The program helps to rehabilitate juvenile offenders by focusing on the consequences of their actions and improving their self-esteem. It is reported that the program has been found to have benefits beyond altering the offender's fire-setting behaviour (Queensland Fire and Rescue Service 2005a).

Operation Safehome

This is a free initiative to help householders reduce fire and safety hazards around the home. Firefighters inspect homes, advise on the correct positioning of smoke alarms and discuss general fire safety concerns (Queensland Fire and Rescue Service 2005c).

'Don't Be a Fool' campaign

The QFRS and the battery manufacturer Duracell have joined forces in a community education

campaign to encourage Queenslanders to replace batteries in household smoke alarms (Queensland Fire and Rescue Service 2005b). The campaign uses the slogan ‘Don’t be a fool – change your smoke alarm battery’ to coincide with April Fool’s Day. Research has shown that, although 80% of Queensland homes have a smoke alarm installed, only 72% are actually working because batteries have been removed or have gone flat (Queensland Fire and Rescue Service 2005b).

AAMI Firescreen Index

On an annual basis, the insurance company AAMI conducts an independent study of Australians’ attitudes and experiences of fire in the home. The Firescreen Index aims to raise awareness about the common locations and causes of fire in the home and steps to prevent fires occurring in the home (AAMI 2006:2). It also offers important insights into the preparedness of Australians in the event of a fire and highlights the need for families to take appropriate safety measures around the house. Some of the key findings from AAMI’s survey (2006) were:

- one in 8 people were not confident they would know what to do if they were confronted by a house full of smoke
- eight percent of Australian homes have no fire safety equipment
- one in 8 Australians admit that, given the current condition of their home, they believe it is a fire risk, and
- almost one-third of parents say either that their children would not know what to do in case of a fire breaking out in the home, or that they are unsure whether or not their children would know what to do.

Smoke alarms

It has been found that the early warning of smoke and fire is the most critical factor affecting safety in the event of a fire (Department of Emergency Services 1997:4). Therefore properly installed

and maintained smoke alarms provide the best mechanism for reducing fire-related injuries and deaths (Department of Emergency Services 1997:4; Thompson et al. 2004:171). This is particularly important given that most fatalities occur at night when the occupants are asleep (Public Health Association of Australia 2005:1). It is estimated that the risk of death from fire in a home is up to 3 times higher in homes without smoke alarms when compared with homes with smoke alarms.

The function of a smoke alarm is to ensure that occupants are alerted to a fire at the earliest opportunity (Squires & Busuttil 1995:870). It is a passive safety device which does not prevent fire starting but reduces the risk of harm in the event of a fire by sounding an alarm (Department of Emergency Services 2006b). Inhaling carbon monoxide produces a rapid deterioration of awareness and physical competence and, if the atmospheric concentration is sufficiently high, will produce death within minutes (Squires & Busuttil 1995:870). A smoke alarm alerts occupants and enables early escape efforts to be implemented. In fires involving young children, these few minutes are particularly crucial as a young child is unlikely to escape a fire without assistance (Squires & Busuttil 1995:871). Consequently, smoke alarms represent the most effective fire safety feature to prevent fatalities in fires (Department of Emergency Services 2004b:4). Effective fire safety practices in the home, such as the proper installation and positioning of smoke alarms, and a well-prepared evacuation plan, also help to reduce the vulnerability of householders (Department of Emergency Services 1998:28; Istre et al. 2002:131).

Types of alarms

There are two main types of smoke alarms for home use – ionisation and photoelectric alarms. Ionisation alarms detect invisible particles of combustion and are best suited to detecting fast-flaming fires that give off little visible smoke (Australian Consumers Association 2006). Advantages include that they are

cheaper than other smoke alarms and are less prone to false alarms caused by dust and insects. However, a number of disadvantages have been identified, including that they are very susceptible to nuisance alarms (for example, those caused by cooking), may be slow to respond to slow, smouldering fires and contain radioactive material (Australian Consumers Association 2006; Department of Emergency Services 2006a).

In contrast, photoelectric alarms detect visible particles of combustion and are reportedly much faster at detecting a wide range of fires, particularly smouldering fires and dense smoke (Department of Emergency Services 2006a). Also, photoelectric alarms are not as prone to nuisance alarms when cooking and contain no radioactive material. Disadvantages include that they are more expensive than ionisation alarms and that they must be kept clean, as they are prone to nuisance alarms from dust and insects (Australian Consumers Association 2006). Photoelectric smoke alarms also have a number of other functions available, including alarms for the hearing-impaired, alarms with emergency lights, special models for kitchens and caravans, and interconnectable models which sound alarms in all connected units (Department of Emergency Services 2006a).

Further studies have shown that photoelectric alarms typically respond to smoky fires within about 3–5 minutes – when the level of smoke is still fairly low and escape is relatively easy. In contrast, most ionisation alarms take much longer (up to 20 minutes or more), by which time there is enough smoke to significantly reduce visibility, making escape much more difficult (Australian Consumers Association 2006). In addition, the fast-flaming, relatively smokeless fires that ionisation alarms detect are not as common in most domestic house fires (Australian Consumers Association 2006). Consequently, the QFRS recommends using photoelectric alarms whenever possible (Department of Emergency Services 2006a:1).

The Commission supports and commends all of the above Queensland initiatives and will continue to monitor programs and campaigns aimed at reducing the morbidity and mortality of children and young people as a result of fires.