Drowning in Western Australia

A review of best practice,

stakeholder activity,

legislation and recommendations.

Produced by Injury Prevention Unit
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EXECUTIVE SUMMARY

Background

Although death through injury has steadily declined in Australia over the last decade, injury remains a major cause of death, hospitalisation, disability and health care expenditure. In 1996, injury accounted for just under 6% of all deaths in Australia and constituted 11.3% of the total Years of Life Lost (YLL) in that year. Approximately 8.3%, or $2.6 billion, of Australia's total health expenditure in 1993/1994 related to direct health system costs due to injury. In Western Australia, an average of 733 persons die each year through injury, at a rate of 43.5 deaths per 100,000 population. Of the various sources of injury death, intentional harm (suicide), transportation, falls and poisonings are leading causes, accounting for approximately 81% of all injury deaths in Western Australia for 1998.

Objectives

The overall aim of this project was to develop 'evidence-based' recommended interventions for selected sources of injury in Western Australia to assist with the development of statewide priorities and countermeasures. The areas of injury selected for review were: Burns and Scalds, Drowning, Falls in the Elderly, Falls in Children, Poisoning in Children, Road Crashes and Suicide.

The objectives for each of the areas of injury were to:

- Identify the nature and extent of the injury problem,
- Describe major risk factors for the injury problem,
- Identify key stakeholders in Western Australia for the injury problem,
- Report on the current activities of the key stakeholders,
- Identify relevant, existing legislation for the injury problem, and
- Develop recommended interventions for the injury problem in line with published evidence on best practice and effective countermeasures.

Methods

Descriptive information on the extent and nature of the problem was identified from available data. Information on risk factors was identified for the published research literature. Key stakeholders and their injury initiatives were identified via the Injury Research Centre's network of contacts and from print and Internet sources. Interviews were conducted with stakeholders where necessary. Relevant legislation for each area of injury was identified and summarised for brevity. Key recommendations were based on the findings of systematic reviews, meta-analyses and key research articles for each of the injury areas. This information was identified in Medline and the Cochrane Database of Systematic Reviews for injury. Relevant studies have been cited to support the recommended interventions. For some areas of injury, summary reviews have been provided.

Findings and recommendations

Literature searches for each of the areas of injury provided considerable variation in the amount and quality of information concerning identified risk factors.

The review of Western Australian stakeholders and their activities, whilst not exhaustive, revealed a vast array of government and non-government agencies involved in the surveillance, research, prevention and control of injury. Some overlap and duplication of activities was evident.

Legislation for the selected areas of injury varied in terms of state and national responsibilities and the degree of regulation and control. From this, opportunities for legislative and regulatory reform were identified.

The literature search similarly demonstrated considerable variation in the quality and detail regarding the effectiveness of injury countermeasures. Based on this review, a number of recommendations were made for the development of injury countermeasures.

ACKNOWLEDGEMENTS

The Injury Research Centre would like to thank the identified stakeholders who contributed to this report. In particular, we would like to acknowledge the assistance of Dr Sven Silburn, Ms Kate Miller and Ms Stephanie Jackiewicz at the TVW Telethon Institute of Child Health Research.

1. INTRODUCTION

1.1 BACKGROUND

Since 1989, injury deaths in Australia have steadily declined from 51.3 deaths per 100,000 population to 42.4 per100,000 population in 1998 (see Figure 1). Despite this decline, injury remains a major cause of mortality, morbidity and disability in Australia, and places a substantial burden on health care expenditure. In 1996, injury accounted for just under 6% of all deaths and constituted 11.3% of the total Years of Life Lost (YLL) in that year (Mathers et al, 2000). Approximately 8.3%, or $2.6 billion, of total health expenditure in 1993/1994 related to direct health system costs due to injury (Mathers et al, 2000).

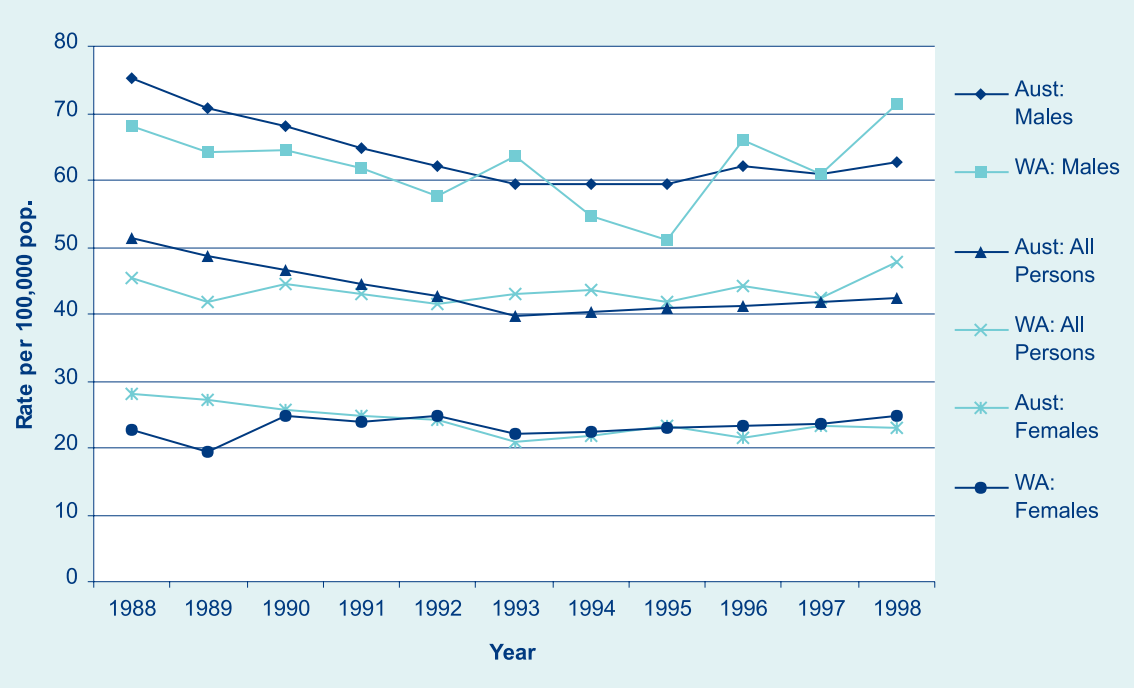

Figure 1: All-cause injury mortality rate for Australia and Western Australia 1989-1998; by all persons, males and females.
(Source: NISU 2002)

In Western Australia, the decline in the rate of injury death for the period 1989-1998 has been less consistent across all persons and genders. Over this period, an average of 733 West Australians (43.5 deaths per 100,000 population) died every year as a result of injury (NISU, 2002). Males and persons aged 15-34 years account for the bulk of the burden of injury, accounting for 72% and 41% respectively of all injury deaths in 1998 (NISU, 2002). Of the various sources of injury death, intentional harm (suicide), transportation, falls and poisonings are leading causes, accounting for approximately 81% of all injury deaths in Western Australia for 1998 (NISU, 2002).

1.2 OBJECTIVES OF THE PROJECT

The overall aim of this project was to develop 'evidence-based' recommended interventions for selected sources of injury in Western Australia to assist with the development of statewide priorities and countermeasures. In consultation with the Injury Prevention Unit of the Health Department of Western Australia, the following areas of injury were selected for review: Burns and Scalds, Drowning, Falls in the Elderly, Falls in Children, Poisoning in Children, Road Crashes and Suicide.

The objectives for each of the areas of injury were to:

- Identify the nature and extent of the injury problem,
- Describe major risk factors for the injury problem,
- Identify key stakeholders in Western Australia for the injury problem,
- Report on the current activities of the key stakeholders,
- Identify relevant, existing legislation for the injury problem, and
- Develop recommended interventions for the injury problem in line with published evidence on best practice and effective countermeasures.

1.3 METHODOLOGY

The methods used in the project are summarised in the following points:

- Descriptive information on the nature and extent of the problem was based on the most recent, available statistical data.
- Relevant risk factors for each of the areas were identified from the research literature.
- Key stakeholders for each of the areas in Western Australia were identified through the Injury Research Centre's network of contacts and relevant published information. Details of the stakeholder's initiatives were obtained from relevant websites and other published materials. Where necessary, key stakeholders were contacted and interviewed to obtain further details on their current injury initiatives. It should be noted that the details of stakeholders and their injury initiatives do not represent a complete audit of this information.
- Legislation relevant to each area of injury was identified and summarised for brevity. Where appropriate, both national and state legislation has been presented.
- To assist with the development of key recommendations, systematic reviews, meta-analyses, and key research articles relevant to the development of injury countermeasures were identified in Medline and the Cochrane Database of Systematic Reviews for injury. These studies have been cited to support recommended interventions. For some areas of injury, summary reviews have also been provided and are presented in the accompanying appendices.

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The following report is an excerpt of the Best Practice document and deals with only one specific injury area. The complete document is available from the Injury Prevention Unit: Phone 9222 2135 Fax: 9222 4100

DROWNING

2.1 NATURE AND EXTENT OF THE PROBLEM

Australia's climate and geographical conditions have contributed to a comparatively high level of water-related activity among this country's population. Unfortunately, these activities can be associated with unintentional drowning or near-drowning incidents.

The location of drowning incidents is influenced by warmer climates. The majority of drownings in such climates occur in private swimming pools, whereas in colder areas, drowning tends to occur in natural bodies of water, such as oceans, rivers and lakes (Waters, 1998).

Drowning is defined as death from suffocation by submersion in a liquid, usually freshwater or seawater. 'Near drowning' is the term used to describe submersion in a liquid in which the victim survives, at least temporarily. In this document, the term 'drowning' will be used to include both drowning and near drowning events.

In Australia, locations such as lakes, rivers and dams remain the most dangerous when it comes to drowning (RLSSA, 2001). Although drowning-related mortality occurs across all age groups, the greatest over-representation is among children younger than five years old (Waters, 1998; Cass et al, 1996; NCIPC, 2001; Nixon et al, 1995; HDWA, 1988). In Australia, drowning is the most common cause of accidental death for children younger than five years old, of whom 70% are aged between one and three years (Fisher and Balanda, 1997; Byard and Lipsett, 1999; Pitt and Balanda, 1991; Blum and Shield, 2000).

Thirty five children younger than five years old died in Australia over the 12 month period between July 2000 and June 2001, and for every drowning death a further three children were admitted to hospital following a serious immersion incident. The consequence of serious immersion incidents is considerable, with up to 20% of children suffering brain damage (RLSSA, 2001).

2.2 RISK FACTORS

Swimming inability

The inability to swim is frequently mentioned as an important risk factor for drowning (Smith and Brenner, 1995).

Lakes, rivers and dams

Studies both nationally and internationally have identified rivers, lakes and dams as a common drowning site for older children, particularly males. Higher fatality rates occur because of the site's isolation and delayed rescue and resuscitation efforts (Waters, 1998).

Bathtubs, fish/garden ponds and wading pools

All recent Australian studies identify bathtubs as the second most common site for childhood drowning, with children less than one year being at greatest risk. In a review of WA infant drowning, all had either been left alone for short periods (two to five minutes) in the care of a sibling, were playing in the bath unsupervised, or the bathtub had not been emptied from a previous occasion. Wading pools still remain a potential hazard if not emptied immediately after use or when an adult does not directly supervise children (Waters, 1998).

Inadequate swimming pool fencing and ineffective safety barriers

The absence of a safety barrier is one of the most frequent factors identified in childhood drowning and near drowning occurring in private swimming pools. Unintended access to a pool was a contributing factor in 86% of drownings in a study of the adequacy of inspections of barriers to private swimming pools in WA. The child was able to gain unintended access due to no barrier between the pool and the house in 50% of all drownings (Stevenson, 2001).

Lack of adult supervision

The lack of adequate adult supervision has been identified as an important causal factor in childhood immersions. The Brisbane Drowning Study identified lack of parental supervision as a contributing factor in 71% of all serious childhood immersions (Waters, 1998). None of the reports considered the parents or carers to be neglectful in regard to their duty of care. According to the study on the adequacy of inspections of barriers to private swimming pools, lack of close supervision by the parent or primary caregiver was reported as a contributing factor in 96% of drownings among children younger than five years old who drowned in private swimming pools in Western Australia (Stevenson, 2001).

Alcohol use

Estimates of alcohol involvement in drowning vary widely because of variable age groupings, incomplete testing rates and failure to account for the production of endogenous alcohol resulting from prolonged immersion of the body. Alcohol can affect both judgment and performance. In the case of drowning, it is believed to have direct physiological effects that may affect survival once a submersion incident has occurred, through mechanisms such as increasing hypothermia and retarding protective laryngospasm (Smith and Brenner, 1995).

KEY STAKEHOLDERS IN WESTERN AUSTRALIA

State Government:

Department of Conservation and Land Management
Department of Health, Injury Prevention Unit
Department of Sport and Recreation
Department of Land Administration
Department of Transport (Marine Safety)
Water and Rivers Commission
Water Corporation

Organisations:

Royal Life Saving Society
Kidsafe
St John Ambulance
Surf Lifesaving

Research Institutions:

Injury Research Centre, UWA

Western Australian Water Police

Local Governments

2.4 CURRENT ACTIVITIES OF KEY STAKEHOLDERS IN WESTERN AUSTRALIA

Initiatives for the prevention of drowning have begun in the following health regions:

- *Great Southern* Residential injury program: undertaken/ongoing regarding drowning in pools and bath-tubs.
- *Midwest* Child safety campaigns targeting schools, with an emphasis on parent education.
- *North Metro* Support of Royal Life Saving Society 'Keep Watch' Program; liaising with local government on residential pool fencing; assisting community nurses with the drowning campaign.
- *Pilbara* Possible capacity building with community nurses for next financial year.
- *South West* A childhood injury prevention needs assessment outlined water safety as an area where training is needed.

The following section gives a brief overview of the drowning prevention strategies of various government and non-government agencies in Western Australia.

Department of Conservation and Land Management (CALM)

Policy Statement No. 53 – Visitor Risk Management guides CALM in risk management as a whole, and by extension includes risk management as it relates to water safety and drowning prevention. Strategies include:

- The preparation and implementation of a safety audit program to ensure procedures are developed to monitor all known risks,
- Ensuring visitor safety and risk management is an integral component in undertaking works programs and capital developments in parks managed by CALM, and
- Providing information to visitors that highlights potentially hazardous areas, activities and appropriate preventative actions and emergency procedures (Section 39).

Royal Life Saving Society

The Society aims to create awareness of the importance of constant vigilance of children in and around pools and other bodies of water in an attempt to reduce the incidence of drowning in WA. This was the thrust behind the 'Keep Watch' media campaign of the Royal Life Saving Society in November 2000.

The Society's business plan for 2001 – 2004 articulates a comprehensive series of programs that focus on achieving:

- An improvement in the home environment (ensuring adequate pool fencing),
- An improvement in the lifestyle/behaviour of the target market (supervision, water familiarisation and resuscitation).

These programs support existing public health policy (pool inspections every four years) and health promotion interventions and aim to create incentives for safer behaviour.

The Royal Life Saving Society focuses their public awareness campaigns on four strategies for reducing toddler drowning – supervision, pool fencing, water familiarisation and resuscitation. The Society also runs a 'Swim and Survive' program teaching children swimming and water safety skill.

Water and Rivers Commission

The priority of the commission is to ensure that Public Drinking Water Source Areas (PDWSA) are protected from environmental degradation and that environmental values are preserved for future generations. At this time, the policies of the Water and Rivers Commission do not specifically address drowning prevention.

Water Corporation

Site Security and Public Safety Guidelines – SGO81 (WA) Water Corporation, October 1999. Risk assessments are regularly performed by Water Corporation staff to improve security and safety at public dams. To maintain water quality and reduce access to the public, the Water Corporation has prohibited zones around public dams. These zones have prominent signs indicating that the catchment area is prohibited, as well as fencing to form a barrier from publicly accessible sections of the dam. Rangers also patrol around the dam to ensure that nobody is upstream of the dam. An additional safety feature for dams is grading so that if a person gets past the barriers and slips or falls, there is not a sudden drop into deep water.

Surf Lifesaving

Surf lifesaving in Western Australia is a volunteer based community service association, providing an essential emergency service in the form of surveillance, protection, medical assistance and rescue services at all patrolled beaches in WA.

The association comprises the Surf Life Saving Western Australia Inc. (SLSWA) which primarily governs and co-ordinates surf lifesaving in WA, and 20 Surf Life Saving Clubs strategically located around the Western Australian coastline. They have the primary vision - "Safer Enjoyable Beaches". This is achieved by:

- Offering educational and training courses in surf rescue, first aid and resuscitation to members and the community.
- Offering a sport as a major incentive for the community to join, and members to stay fit and involved.
- Providing activities for junior and youth members as a feeder system into becoming surf lifesavers.

Department of Transport (Marine Safety)

Transport's Recreational Boating Branch is responsible for promoting the Department's policy of boating safety through education, more so than regulation. It is acknowledged that some regulation is necessary, but in general they believe that informed people taking responsibility for their own safety achieve the best results. 'Kids and Boats' and 'BoatSmart' are examples of the Department's initiatives, and are dedicated to improving the boating knowledge and skills of people from primary school age to maturity.

Local Government Pool Inspection Process

Regulation for fencing of swimming pools in Western Australia is legislated by the state and enforced by local government inspections. In response to requests from the Royal Life Saving Society and subsequent support from the WA Municipal Association, the Minister for Local Government introduced changes to the Local Government Act in November 1997.

The changes relate to Section 245A of the Local Government Act which altered the wording in section 245A from an "authorised officer" to an "authorised person". This amendment made it possible for the Royal Life Saving Society Australia to offer a home pool inspection service and so assist local government with the periodic inspection of pools.

Water Police Western Australia Branch

The Western Australian Police Service, in collaboration with Western Australian Transport (Marine Safety) and the Royal Life Saving Society of Australia has commenced the Water and Alcohol Drug Education (WADE) project. This joint initiative is the result of concern regarding the increase in alcohol related drowning and accidents on WA waterways.

The project is based upon the successful Water and Alcohol Safety Project (WASP) that has operated in Queensland since 1997. The objective of WASP was to increase awareness of the dangers of irresponsible consumption of alcohol while engaged in recreational aquatic activities. WADE shares this objective. The target group is males aged between 18 and 54 who represent the group most at risk of drowning while under the influence of alcohol.

The Western Australian Water Police have a strong ongoing relationship with both *The West Australian* newspaper and Channel 7. They hope to use these relationships for the development of the project's promotion. Their marketing strategy involves comprehensive broadcast advertising targeted at the general community for recreation activities, strong editorials and advertising within the print media, and regular publications in the commercial marine industry.

In addition, promotional activities will include:

- Mail-outs utilising the Department of Fisheries database,
- Presence at boat shows and public events displaying logos and information,
- Distribution of promotional resources through the WA Fishing Industry Council, and
- Education through RLSSA learn-to-swim courses.

The administration of the project has been funded through the National Drug Strategy Law Enforcement Fund. The project is based within the Water Police office at Fremantle and has developed stakeholder relationships with other interested government and corporate entities. The project is seeking to initiate the second phase of collaboration between the Water Police and a corporate sponsor that will represent a unique and high profile promotional opportunity.

This project maintains a fully collaborative approach with stakeholders in order to gain the best outcome. This involves keeping a high public profile for the project in order to ensure that the message is delivered to and retained by the target group. It is hoped that through this project, the target group may be able to make better-informed decisions about their safety and the safety of others on Western Australia's waterways.

Injury Research Centre (IRC)

The Department of Health in collaboration with the Department of Local Government and Regional Development initiated a research project in May 2001, conducted by the IRC, in order to further elucidate the causes of child drowning in private swimming pools. In particular, these Departments wanted to identify opportunities to improve the inspection and enforcement of current legislation related to the enclosures surrounding private swimming pools (Stevenson, 2001).

St. John Ambulance

During 2000, St John in Western Australia formed the College of Pre-Hospital Care to encompass all aspects of first aid and ambulance training provided by St John in the state. The College provides training for both paid and volunteer ambulance officers under the banner of the Ambulance Training Centre (St John Ambulance, 2000).

2.5 RELEVANT LEGISLATION

Western Australian legislation for swimming pool barriers

Prior to 1989 in Western Australia, private swimming pools were subject to the Western Australian Uniform Private Swimming Pool By-laws (HDWA, 1988). Amendments to Part 10 of the Building Regulations (1989) (Local Government Act, 1960) instituted additional requirements including adherence to Australian Standards AS 1926.1 for pool fencing, and asserted that for pools installed after 28 July 1989, the pool gate must open away from the pool.

Section 38B covers the enclosure requirements for private swimming pools. Under this section, the owner or occupier is required to install or provide around the pool an enclosure suitable to restrict access by young children (younger than five years old) to the pool.

Section 38C concerns access to the pool from the building (residence). This section states that if a swimming pool is a pre-July 1992 pool, its enclosure may include a wall that contains a door or window permitting direct access between the enclosed area and the residence. A swimming pool installed after July 1992 can be either isolated from the residence, or its enclosure may include a wall that contains a door or window permitting access if that door or window satisfies the requirements of the Australian Standard AS 1926.1 (Stevenson et al, 2001).

Also, as part of the Australian Standard, it is required that all barriers surrounding private swimming pools must be inspected once every four years.

Currently, the WA State Government is in the process of implementing changes to the existing legislation. The legislative changes will require new and existing pool owners to adhere to more stringent barrier requirements. Prior to the amendments, new pool owners could comply with the requirements by ensuring that doors or windows that accessed the pool area were self-closing and locking.

New pool owners are now required to have an isolation fence around the pool that satisfies the legislative requirements. This means that the fence must isolate the pool from the residence and restrict access from outside the property. The requirements for older pools have also been amended, which brings pre-July 1992 pools into line with other pools installed prior to the 5th of November 2001. The minimum requirement for these pools is to ensure that doors or windows accessing the pool area are self closing and locking, and that they also deny access to young children (under five years) from outside the property. Further legislative details are included in the Appendix.

2.6 RECOMMENDED INTERVENTIONS

(1) Increase public awareness of the legislation

Comprehensive public education is necessary to raise awareness of the legislation (as well as other safety issues) among swimming pool owners. There is a role for retailers and other industry partners to participate in the public education (Stevenson et al, 2001).

(2) Public education

Regular extensive public education on the risks of toddler drowning and the need for secure barriers around private swimming pools is important in prevention of toddler drowning (Stevenson et al, 2001).

(3) Control of alcohol use

Increased awareness of the hazards of alcohol use on the water and restricting alcohol sales in aquatic settings may to help reduce the number of alcohol-related drownings (Smith and Brenner, 1995).

(4) Barriers around private swimming pools

The study on the adequacy of inspections of barriers to private swimming pools estimated that there is almost a two-fold increased risk (approximately 78% increased risk) of a child drowning in a swimming pool with perimeter versus isolation fencing.

The majority of these drownings could have been prevented by a change in legislation from perimeter to isolation fencing, or at least by uniform legislation requiring a secured access from the residence with three-sided fencing, as unintended access to the pool was a contributing factor in 86% of drownings. The findings from this study suggest that uniform legislation for barriers between the house and the pool installed prior to July 1992 is necessary (Stevenson et al, 2001).

Tourist operators may need to consider providing interpreters or written instructions regarding water safety in the relevant languages.

There are a number of government and non-government agencies which deal with water related issues including the Department of Health, Department of Conservation and Land Management, Royal Life Saving Society, Local Government, Department of Transport, Department of Sport and Recreation, Water Corporation, Department of Land Administration and Water and Rivers Commission. The role of each agency needs to be defined to avoid overlapping to ensure that available resources are put to the best use.

2.7 EMERGING ISSUES AND FUTURE DIRECTIONS

Swimming ability
The relationship of swimming ability and drowning risk is obviously complex and more research is needed on swimming instruction, perception of swimming ability, exposure to water and risk-taking, and the relationship to drowning risk (Smith and Brenner, 1995).

Maintenance of swimming pool barriers
Extensive public education on the need for isolation fencing with functioning self-closing/lacking pool gate mechanism is necessary (Stevenson et al., 2001).

Legislation assessment
Evaluation of the implementation and effectiveness of the legislative changes regarding pool fencing is required. This should include an evaluation of the knowledge, attitudes and behaviour of pool owners and a review of outcomes in respect to drowning and near drowning events.

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3.8 APPENDICES

Standards and Legislation

Regulation for fencing of swimming pools in Western Australia is legislated by the state and enforced by local government inspections. The State Government has introduced new legislation (March 2002) which requires that all new private swimming pools must have isolation fencing. This means that the fence must isolate the pool from the residence and restrict access from outside the property.

The relevant legislation and standards are listed below.

WESTERN AUSTRALIA

Local Government (Miscellaneous Provisions) Act 1960
Building Regulations 1989
Part 10 – Private swimming pools
The owner or occupier of premises on which there is a swimming pool shall install or provide around the pool an enclosure suitable to restrict access by young children to the pool.

Local Government (Miscellaneous Provisions) Act 1960
Part VII – Private swimming pools
254A Private swimming pools
Local laws may be made for requiring the owner or occupier of land on which there is a swimming pool to install or provide such structures or devices as are prescribed for the protection of the safety of persons who may, with or without the knowledge or consent of the owner, enter upon that land.

- Local government can have an authorised person inspect the pool periodically so that a period of not more than four years elapses between inspections.
- An authorised person can serve a notice to ensure these requirements are met within a time that is deemed reasonable.
- If the owner/occupier does not comply with the requirements after being served a notice the authorised person may take measures they consider necessary in order to prevent the swimming pool from being a danger to the public, the costs of which can be recovered from the owner/occupier.

Australian Standards
AS 1926.1-1993
Swimming pool safety
Part 1: Fencing for swimming pools
This standard specifies requirements for the design, construction and performance of fences, gates, retaining walls, windows, door sets and balconies intended to form part of a barrier that will restrict the access of young children to swimming pools.

Australian Standards
AS 1926.2-1995
Swimming pool safety
Part 2: Location of fencing for private swimming pools
This standard sets out options for the location of fencing that provides an effective barrier which will restrict the access of young children to private swimming pools.

Australian Standards
AS 2818-1993
Guide to swimming pool safety
This standard provides guidance on the prevention of accidental drownings and injuries in private swimming pools and spa pools and identifies potential hazards in the use and maintenance of private swimming pools.

Australian Standards
AS 2820-1993
Gate units for private swimming pools
This standard sets out the requirements for the design, construction and performance of gate units intended to be installed as part of a fence which complies with the requirements of AS 1926.1, which will restrict the access of young children to private swimming pools.

NATIONAL

Trade Practices Act 1974
Sections 65(B), 65(C), 65(E), 65(F), 65(L), 65(Q) and 65(R)
Product Safety Standards
These sections state that the Minister is able to publish a notice in the Gazette to notify of products under investigation that cause injury and the risks involved in the use of these products; declare prepared or approved standards regarding consumer products that may have or have the potential to cause injury; and Gazette goods without delay that pose an imminent risk of death, serious illness or injury.

The Minister also has the power to recall a product that may cause injury, goods that do not comply with prescribed safety standards and goods where the supplier has not taken satisfactory action to prevent these goods causing injury to any person.

Building Code of Australia
Section G.1.1
Swimming pools
Provides that swimming pools associated with Class 1, 2 and 3 buildings, with a depth of over 300mm, must have suitable barriers to restrict access by young children to the immediate pool surrounds, of safety fencing in accordance with AS 2818 and AS 1926.1.

Australian Standards
AS 2416-1995
Design and application of swimming pool signs
This standard sets out requirements for the design and application of flags and safety signs, including signs incorporating graphic symbols, intended for use where water sports may be undertaken or where there are other activities close to bodies of water such as the seaside, rivers, creeks, dams and open drains.
Australian Standards
AS 1900-1991
Flotation toys and swimming aids for children
This standard specifies requirements for flotation toys and swimming aids which are either worn on the body or unattached, and are likely to be used by children aged up to 15 years in recreational activities and to assist in swimming tuition. This standard does not deal with personal flotation devices which would otherwise come within the terms of this standard but have been approved by marine authorities as being suitable for use on boats, nor with articles which would otherwise come within the terms of this standard but are designed only for therapeutic use or use by disabled persons.

Australian Standards
AS 2259-1996
General requirements for buoyancy aids
This standard specifies general requirements applicable to buoyancy aids specified in the following Australian Standards: AS 1499 Personal flotation devices type 2
AS 1512 Personal flotation devices type 1
AS 2260 Personal flotation devices type 3
AS 2261 Rescue buoys
AS 2262 Float-off buoyancy aids.

Australian Standards
AS 1512-1996
Personal flotation devices – type 1
This standard specifies requirements for personal flotation devices intended to maintain the wearer in a safe floating position. It is applicable to devices intended for use aboard pleasure boats in waters where early rescue may be expected.

Australian Standards
AS 1499-1996
Personal flotation devices – type 2
Specifies requirements for personal flotation devices designed to assist flotation during short term immersion in sheltered waters during daylight hours, and intended for participants in aquatic sports such as canoeing or sailboarding where the wearer requires freedom of movement and is able to swim in the event of capsize or immersion. Appendices include comparative test methods for adequately supporting the wearer in water.

Australian Standards
AS 2260-1996
Personal flotation devices – type 3
This standard specifies requirements for personal flotation devices intended for use in supervised situations to assist flotation during short-term immersion in sheltered waters during daylight hours.

It is applicable to devices intended to be used in water sports or as clothing for special situations, and may not be in the high visibility colours required for PFD type 2s. NOTE: Marine authorities have regulations covering pleasure boating and related activities, including the type of PFDs which need to be worn or carried on board when using various waterways.

Australian Standards
AS 2261-1990
Rescue buoys
This standard specifies the requirements for rescue buoys intended to be thrown or dropped to a person in water to assist in effecting rescue. It does not apply to lifebuoys required to be carried by commercial vessels.

Australian Standards
AS 1926.3-1993
Swimming pool safety – water recirculation and filtration systems
This standard sets out requirements for skimmer boxes, and other permanent water inlets and outlets in swimming pools.