Ombudsman
New South Wales

Biennial report of the deaths of children in New South Wales: 2016 and 2017

Incorporating reviewable deaths of children

A report to Parliament under sections 34G and 43(1) of the *Community Services (Complaints, Reviews and Monitoring) Act 1993.*

nsw cdrt
child death review team

25 June 2019

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Acknowledgements

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The Team also appreciates the contributions we received from agencies and child death review committees in other states and territories and the National Coronial Information System, Victorian Department of Justice.

We acknowledge and appreciate the contribution of expert advisers to the CDRT, who have provided advice and support over the past year – in particular Professor Les White, Dr Daniel Challis, Dr Julie Brown (Neuroscience Australia), Dr Deanna Pagnini (Australian Institute of Health and Welfare), Dr Kairi Kolves (Australian Institute for Suicide Research and Prevention), and Dr Debbie Scott (Turning Point, Monash University).

The Convenor also wishes to thank CDRT members, and in particular Dr Bronwyn Gould, for their regular review of case files and provision of expert advice.

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25 June 2019

The Hon John Ajaka MLC
President
Legislative Council
Parliament House
SYDNEY NSW 2000

The Hon Jonathan O'Dea MP
Speaker
Legislative Assembly
Parliament House
SYDNEY NSW 2000

Dear Mr President and Mr Speaker,

As convenor of the NSW Child Death Review Team (CDRT), I am pleased to present the Biennial report of child deaths in New South Wales in 2016 and 2017 Incorporating reviewable deaths of children, to be tabled in the NSW Parliament.

The report is made under s 34G and s 43 of the *Community Services (Complaints, Reviews and Monitoring) Act 1993* (the Act) and considers the deaths of 981 children who died in 2016 and 2017, including 44 children who died in circumstances of abuse or neglect (20), or while in care (24).

I hereby present the report for tabling and request that you make the report public forthwith.

Yours sincerely

Michael Barnes

Convenor, NSW Child Death Review Team
NSW Ombudsman

Foreword

This report concerns 981 children aged from birth to 17 years who died in NSW in 2016 and 2017. It also considers how child mortality has changed over time in this state.

This the first biennial report produced by the Child Death Review Team, following 20 years of reporting to Parliament each year. It is also the first time that we have combined the Team's report with my specific responsibility for 'reviewable' deaths of children. We have done this to present a holistic understanding of the deaths of all children in NSW, the underlying risk factors that may have contributed to preventable deaths, and what can and should be done to protect children in the future.

It is encouraging that overall, the rate of child deaths has declined in NSW. From 2003 to 2017, the mortality rate declined by 27%, from 41 to 30 deaths per 100,000 children. There are many reasons for this decline, including advances in medical care, safer products, and legislation aimed at better protecting our children.

However, this positive progress is not the case for all groups of children. Children living in the most disadvantaged areas and children living in remote areas have higher mortality rates than those living in the least disadvantaged areas and those living in major cities. While the mortality rate for Aboriginal and Torres Strait Islander children has declined, it is still twice that for non-Indigenous children.

Injury deaths remain a significant concern. Of all deaths of children in NSW each year, one in five results from injury. Mostly this is unintentional – but in the main preventable.

For one in every three children who die as a result of injury, however, that injury is intentional. In 2016 and 2017, 12 children died in circumstances of abuse. Over half of the families of children who died in circumstances of abuse had previously come to the attention of government agencies, including child protection. In the same two year period, 54 school-aged children in NSW died by suicide. In contrast to the significant decline in overall child mortality we have witnessed, the rate for youth suicide has increased and is currently the highest we have seen over the past 15 years.

In 2018, the NSW Parliamentary Committee on Children and Young People concluded its inquiry into the prevention of youth suicide in NSW. That Inquiry made recommendations that provide a clear strategy for arresting the rise in suicide deaths. We support the overall approach proposed by the Committee, and in this report make complementary recommendations.

Our report is accompanied by two additional reviews focused on injury-related deaths, which have informed, and are referenced, in this report.

The first report is a review of suicide clusters and evidence-based prevention strategies relating to school-aged children. The report finds that strategies in place in NSW schools following the suicide death of a child are in line with what is considered current best practice, and that NSW seems to be taking the right steps in this area. In terms of preventing suicide clusters, however, more research is needed.

The second report is a review of the role of seatbelts and child restraints in the passenger deaths of children under the age of 13. The review has identified that one third of the passenger deaths of young children may have been prevented if the children had been properly secured in the vehicle. This is clearly an area where concerted action is needed to help families to protect their children on the road.

The death of a child is a devastating loss, and I extend my condolences to the families and friends of the children who died. I trust the reviews and the information in this report will be considered and applied to prevent deaths of children.

Michael Barnes
NSW Ombudsman
Convenor, NSW Child Death Review Team

Contents

Executive summary

Introduction

This report brings together the findings and recommendations arising from two statutory functions under the *Community Services (Complaints, Reviews and Monitoring) Act 1993 (CS-CRAMA). It includes:*

- The work of the NSW Child Death Review Team (CDRT) – under Part 5A of the Act.
- Reviews of the deaths of children in care or detention, and children who die in circumstances of abuse or neglect – under Part 6 of the Act.

The report considers the deaths of 981 children that occurred in 2016 and 2017. The deaths of 44 of these children have been determined as deaths reviewable by the Ombudsman because they were the result of abuse or neglect or occurred in suspicious circumstances (20 children), or the child died while they were in care (24 children).

The report also considers trends. For all child deaths, trends are reviewed for the 15-year period 2003-2017. For reviewable child deaths, trends are reviewed for the 10-year period 2008-2017.

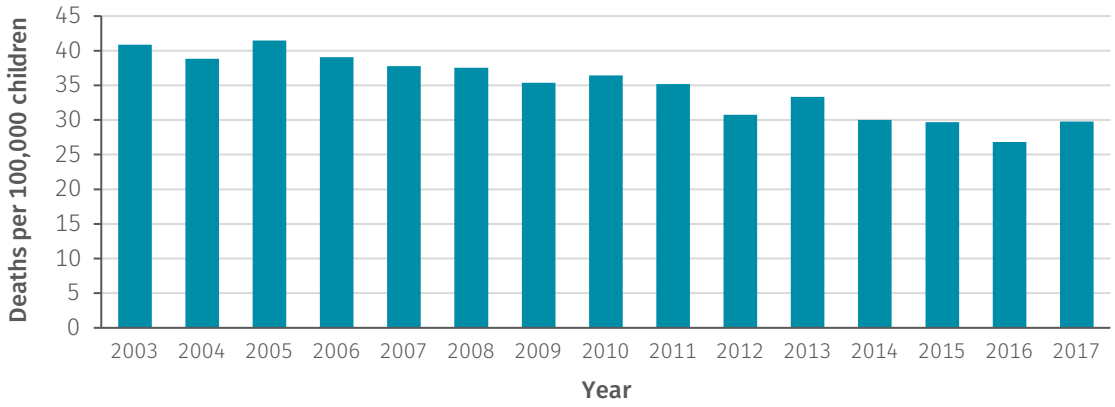
Trends in deaths of children in NSW: 2003-17

Over the 15 years to 2017, the mortality rate for children 0-17 years significantly declined from 41 deaths per 100,000 children in 2003 to 30 deaths per 100,000 in 2017, mostly reflecting a significant decline in the deaths of infants aged less than 12 months.

Trends in the mortality rate varied by gender, Indigenous background, remoteness and socio-economic status. For example, the rate was:

- 1.2 times as high for males as for females
- 2.0 times as high for Indigenous children as for non-Indigenous children
- 1.8 times as high for children in remote areas as for those in major cities
- 2.3 times as high for children in the most disadvantaged areas as for those in the least disadvantaged areas.

Figure 1: Deaths of children aged 0-17 years in NSW, 2003-17



Reviewable deaths of children

Over the 10-year period to 2017 just over 4% of child deaths were reviewable by the Ombudsman. This included:

- 118 children who died in circumstances of abuse (80) or neglect (20), or that were suspicious (18). This included two children who were in care.
- 109 children who died in the care of the state or a service provider. Almost two-thirds of these children died due to natural causes and nearly a third from external causes.

Leading causes of death: 2003-17

Of the 8,567 children who died in the 15 years to 2017, three quarters died from natural causes. Injury-related causes resulted in the deaths of one in five children.

The leading cause of death for all children under 18 years of age – except 15-17 year olds – was natural causes.

Leading cause of death differed by age group:

- For infants – the leading cause of death was perinatal conditions, followed by congenital conditions.
- For children aged 1-4 years – the leading cause of death was cancers and tumours, followed by drowning.
- For children aged 5-9 years and 10-14 years – the leading cause of death was cancers and tumours, followed by transport-related fatalities.
- For children aged 15-17 years – the leading cause of death was transport-related injuries, followed by suicide.

The leading causes of death also differed for Aboriginal and Torres Strait Islander children aged 1-17 years, for whom the top three leading causes of death were all injury-related causes – transport-related injuries, followed by suicide and drowning.

Multiple causes of death: 2003-17

Over the 15 years to 2017, more than three quarters of deaths due to natural causes were reported with an associated cause of death.

Congenital and chromosomal abnormalities were commonly reported with deaths due to perinatal conditions. Diseases of the respiratory system were also commonly associated with deaths due to diseases of the nervous system, and some deaths due to congenital and chromosomal abnormalities.

Deaths from natural causes in 2016 and 2017, and trends

In 2016 and 2017, 731 children aged 0-17 years died in NSW from natural causes. This represents almost 75% of all children who died in NSW over the same period, a rate of 21 deaths per 100,000 children.

Over the 15 years to 2017, the mortality rate from natural causes declined by 23% – mostly as a result of a significant reduction in the infant mortality rate.

However, a significant difference in the rate persisted between Indigenous and non-Indigenous infants. While the infant mortality rate from natural causes has declined for both Indigenous and non-Indigenous infants, the rate has remained significantly higher for Indigenous infants and was 1.7 times as high in the 2013-17 period.

For particular diseases during the 15-year period the rate:

- Declined for perinatal conditions, congenital and chromosomal conditions, diseases of the nervous system, diseases of the circulatory system, and infectious diseases.
- Remained the same for cancers and tumours, endocrine, nutritional and metabolic disorders, and diseases of the blood and blood-forming organs.
- Slightly increased for diseases of the respiratory system.

Vaccine-preventable infectious disease

Some vaccine preventable infectious diseases are classified as respiratory disease, and well as infectious disease. In 2016 and 2017, eight children died as a result of vaccine preventable infectious disease. Over the 10 years to 2017, 29 deaths were considered preventable or potentially preventable by vaccination. The majority of deaths (21) were due to influenza. From 2018, the NSW government has provided free influenza vaccination to all children aged six months to less than five years.

Sudden Unexpected Deaths of Infants

Deaths in 2016 and 2017, and trends

In 2016 and 2017, the deaths of 83 infants were classified as Sudden Unexpected Death in Infancy (SUDI). Investigations have been completed for 61 infants: 23 died as a result of natural causes, 14 from unintentional asphyxiation, and for 24 infants, no cause could be determined.

For many infants who die suddenly and unexpectedly, a cause of death is never identified. Identifying a cause is important for many reasons, including understanding about how to prevent deaths.

Over the 15-year period to 2017, the NSW child death register classified 771 infant deaths as sudden and unexpected. Trends over that period show that while the rate of SUDI has declined over the past 15 years, this decline has plateaued and the rate has not changed significantly over the past decade. In addition:

- Aboriginal and Torres Strait Islander children were over-represented in SUDI, accounting for almost 20% of the deaths.
- The SUDI mortality rate was 6.9 times higher for infants living in areas of greatest socio-economic disadvantage than for those living in the least disadvantaged areas.
- Almost half (44.5%) of infants whose deaths were classified as SUDI were from families with a child protection history.

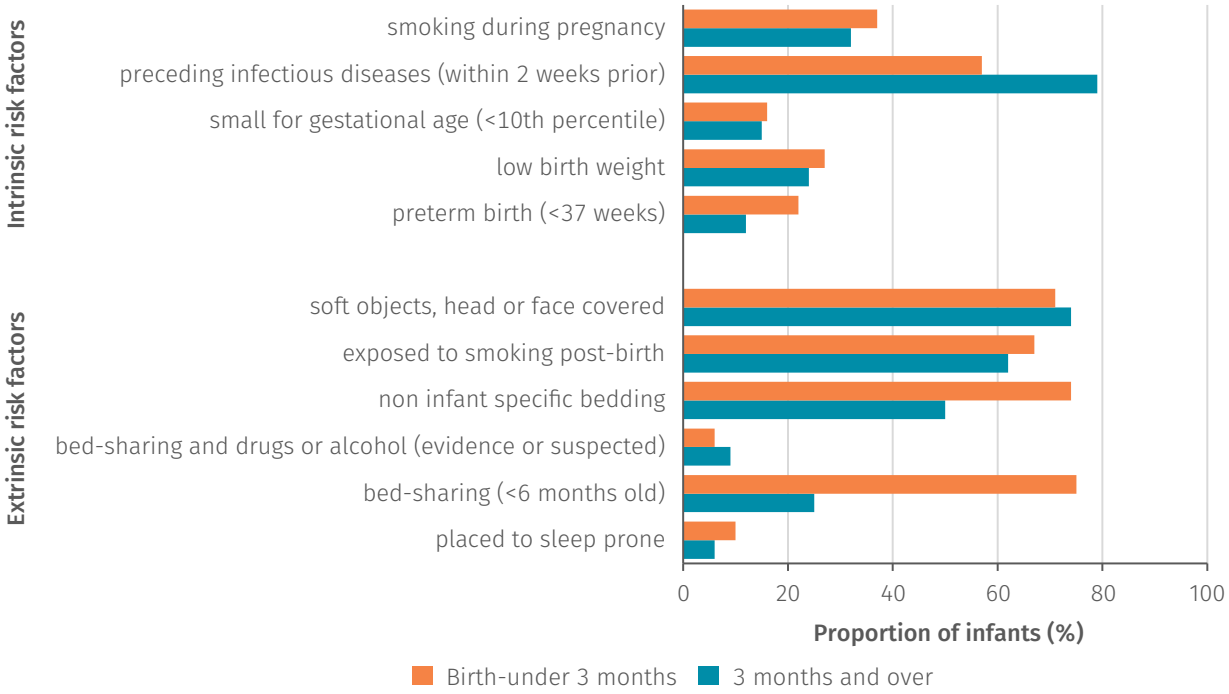
Risk factors associated with SUDI deaths

Risk factors associated with SUDI include both intrinsic (individual) and extrinsic (environmental and modifiable) factors.

In 2016 and 2017, and consistent with previous years, our reviews found at least one risk factor was evident in the vast majority of SUDI. Only three of the 83 infants who died suddenly and unexpectedly had no documented evidence of risk.

The majority of the infants (71 of 83) were exposed to at least one avoidable risk, and for most of these children (53), a cause of death could not be determined – or was associated with accidental suffocation.

Figure 50. Key reported risk factors identified for SUDI by age group, 2016-17[1]



Observations and recommendations

- The rate of SUDI is not declining. A disproportionate number of SUDI occur in vulnerable families and/or those living in disadvantaged areas.
- Many of the risks to which infants were exposed are avoidable. There is a need for multi-faceted preventive approaches, and for interventions to be 'relatable' to the target group.
- Early recognition of illness in infants is an important prevention strategy. A preceding infectious illness was present for more than half the infants who died suddenly and unexpectedly, and for some infants undiagnosed illness was fatal.

In the context of these observations, we recommend that NSW Health should:

- Develop and implement strategies to promote safe infant sleep practices to vulnerable families.
- Undertake a campaign to promote resources to assist parents and carers to identify illness in infants.

Injury-related deaths

Over the two-year period 2016-2017, 185 children aged 0-17 years died from injury-related causes in NSW. This represents almost one in every five children who died. Twenty of the deaths were reviewable.

- Almost two thirds of the deaths were due to unintentional injury.
- One third of the children died as a result of suicide (54) or abuse (12).
- Over the 15 years to 2017, there was a decline in the rate of unintentional injury-related fatalities; however, there has not been a decline in the rate of intentional injury causes.
- Aboriginal and Torres Strait Islander children, children living in remote areas, families with a child protection history, and children living in the most disadvantaged areas of NSW are over-represented in injury-related deaths.

1. For bed-sharing (<6 months old), infants above 6 months of age have been excluded. Non-infant specific bedding was also significant however, at a 10% level. Refer to methodology for further detail.

Transport-related deaths

Deaths in 2016 and 2017, and trends

In 2016 and 2017, 66 children died in vehicle crashes. Twenty-seven of the children were passengers in a vehicle, 20 children were in control of a vehicle, and 19 children – mainly pedestrians – were struck by a vehicle.

A transport-related injury was the second leading cause of death for young people aged 15-17 years, in the two-year period. However, over the 15 years to 2017, transport fatalities were the leading cause of death for young people aged 15-17 years.

The mortality rate from transport injuries declined by almost half between 2003 and 2017 – from 3.6 to 2.0 deaths per 100,000 children. However, the rate has not changed significantly since 2008.

Remoteness is a key factor in transport deaths – the mortality rate for children from remote areas was more than double that of children from regional areas, and almost seven times as high as that of children from major cities. Children from socio-economically disadvantaged areas were also more likely to die in transport incidents than children from the least disadvantaged areas.

Risk factors associated with transport-related deaths

In relation to the 66 deaths of children in 2016 and 2017:

- Speeding was identified through crash investigation as a contributing factor in at least 18 of the collisions. Speeding was generally coupled with other risk factors, such as inexperience and drug or alcohol use.
- Drug and/or alcohol use was a factor in 10 collisions. In all cases, drug and/or alcohol use was present with at least one other risk factor.
- Fatigue was a factor in 14 crashes. Drug and/or alcohol use was also involved in a number of these crashes.
- Inappropriate use, or the lack of a restraint, was a factor in the deaths of nine children. Four of the children were unrestrained.

Driver distraction, road and environmental conditions, and inexperienced drivers were also noted risk factors.

Role of seatbelts and child restraints in transport fatalities

In 2017, we commissioned a 10-year review of 66 passenger fatalities of children aged less than 13 years in NSW.

The full report is available at: www.ombo.nsw.gov.au

The review found that just over half (35) of the 66 children who died in crashes over the 10-year period to 2016 were not properly restrained in the vehicle – that is, they were not using a restraint or seatbelt, were not using an age appropriate restraint, or were using an incorrectly fitted restraint.

The review also identified that more than two thirds of the children were from families living in the lowest socio-economic areas of NSW.

Overall, the review found that lack of, or inappropriate use of, seatbelts or restraints played a primary role in the death of almost one-third (20) of the children, and that deaths could likely have been prevented if the children had been properly buckled up.

Observations and recommendations

- Unsafe driver behaviours – including speed, driver drug and alcohol use, driver fatigue and driver distraction – remain the key contributing factors in transport crashes. In most incidents, more than one risk factor was present.
- Over half of at-fault drivers were novice drivers.
- The majority of deaths involved older, less safe vehicles.
- Lack of a seatbelt or child restraint, use of an age inappropriate restraint, or use of an incorrectly fitted restraint contributed to the deaths of some children.
- At least two children each year die in low-speed run-over incidents.
- Adult quad bikes and side-by side vehicles are inherently dangerous for children and it is recommended they not be ridden by a child under 16 years, however this is not legislated.

In the context of these observations, we recommend that Transport for NSW:

- Target advice promoting the safest vehicles to purchase in a range of price brackets to young drivers.
- Implement a range of strategies to improve the appropriate use of child restraints, including (with NSW Health) crash research and surveillance, and education and other programs – particularly targeting low income and culturally diverse communities - to improve restraint use practices.
- Consider further education and promotion of good practice to prevent low speed vehicle run-over incidents.

We recommend that Safe Work NSW:

- Strongly promote the message that children under 16 years of age should not operate, or be a passenger on, an adult quad bike under any circumstances or for any reason.

Drowning deaths

Deaths in 2016 and 2017, and trends

In 2016 and 2017, 22 children died as a result of drowning. Most of the children were aged less than five years. The most common location was private swimming pools, in which eight children drowned.

Over the 15 years to 2017, 212 children drowned in NSW. Children aged under five years accounted for over two thirds of the deaths. Male children were also more likely to drown than female children.

The mortality rate from drowning has gradually declined over the past 15 years. However, drowning remains the leading cause of unintentional injury-related death for children aged 1-4 years in NSW.

Risk factors associated with drowning deaths

Our reviews show that a drowning death often follows a chain of events – a faulty pool gate left unsecured, carer distraction, unclear delegation for supervision, and the child able to leave the house unseen.

Reviews particularly underscored the critical link between lack of direct supervision of young children, even for very short periods of time, and inadequate (faulty or absent) child resistant barriers.

Consistent with previous years, the majority (16) of the 22 children who died in 2016 and 2017 were aged under five years and gaps in supervision and unprotected access to water were critical factors. The majority of deaths occurred in bodies of water within or near homes.

Observations and recommendations

- Seven of the eight private swimming pools in which a child drowned were non-compliant with child safety barrier fencing requirements; almost all had reported faults with gate or latch mechanisms that meant the gate did not self-close.
- NSW councils are showing improvements in publishing information on private swimming pool inspections and compliance certificates, but aggregated data on the results of the council inspection program is not publically available.
- Carer supervision is a critical protective factor at public swimming pools. In 2016 and 2017, two children drowned in public swimming pools.
- Drowning hazards were not readily identified for children under five years. Five children under five years died in water hazards located at homes or near to homes that may not have been readily identified as potential hazards. Fishponds, dams, canals and even household water containers can pose a risk – particularly to very young children.

Noting the range of initiatives underway, we have made no new recommendations relating to drowning prevention. We will continue to monitor our earlier recommendation that analysis of annual data from the Swimming Pool Register be published, to enable examination of the effectiveness of the swimming pool inspection regime.

Other unintentional injury deaths

In 2016 and 2017, 17 children died from a range of injury-related causes – other than road crashes, drowning or accidental suffocation of an infant. These injuries included poisoning, falls and fire.

Lack of supervision and access to hazards are particular risks for children under five years of age. Older children and teenagers are more involved in the physical environment, and alcohol and other drug use and risk-taking behaviours can also contribute to serious injury.

Suicide deaths

Deaths in 2016 and 2017, and trends

In 2016 and 2017, 54 young people under the age of 18 died by suicide in NSW.

Consistent with previous years, the majority (40) of the 54 young people who died were male, and 14 were female. Most (42) were aged between 15 and 17 years.

Over the 15-year period to 2017, 281 school-aged children died by suicide. Since 2003, there has been a significant increase in the suicide rate of young people. The rate in 2017 (3.8 deaths per 100,000 young people) was the highest observed in this period.

The suicide rate for Aboriginal and Torres Strait Islander young people increased from 5.6 deaths per 100,000 young people in 2008-12 to 9.1 in 2013-17. In 2017, the suicide rate was 3.8 times as high for Indigenous young people as for non-Indigenous young people.

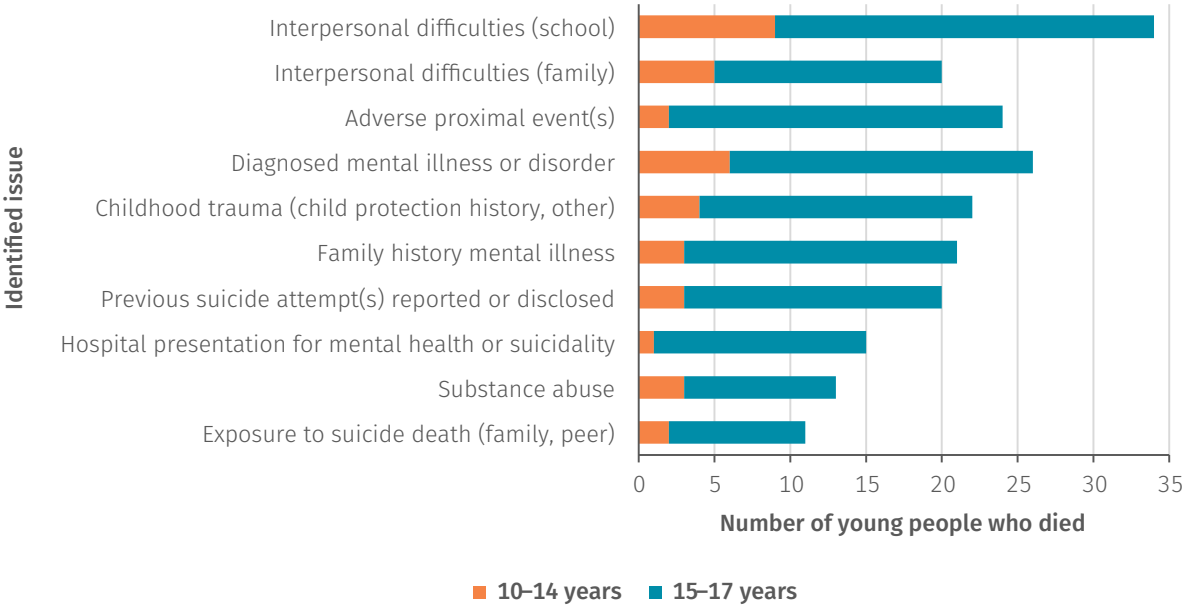
Children and young people with a child protection history are at higher risk, and young people in care are particularly vulnerable. Based on the 15 years to 2017, young people in care were 2.9 times more likely to die from suicide than those not in care.

Risk factors associated with deaths by suicide

Risk factors for young people relate to four key domains; individual factors, family factors, school and peer-related factors, and community and societal factors. No one risk or combination of risks predicts suicide.

Most of the 54 young people who died were facing numerous difficulties across different areas of their lives. The figure below describes some of the most common issues and adverse events identified for the young people, and illustrates that multiple risks were often present.

Figure 87. Select risk factors identified for young people who died from suicide, 2016-17



Of the 54 young people:

- One in four (14) of the young people who died by suicide were identified as having complex needs and chronic difficulties.
- Just under half (24) of the young people who died by suicide were identified as having some mental health or related support needs and/or interpersonal issues. These young people had not been identified as being at acute risk of suicide.
- Sixteen young people gave little indication to family, teachers or other professionals that they were experiencing significant problems. However, for five of the young people, police inquiries after their death identified emerging concerns including depressive symptoms.

Parliamentary inquiry into the prevention of youth suicide in NSW

The NSW Parliamentary Committee on Children and Young People conducted an inquiry into current approaches aimed at preventing youth suicide in NSW. The final report of the inquiry was tabled in the NSW Parliament in October 2018.

The inquiry acknowledged significant work underway in NSW to assist young people with mental health problems and to prevent youth suicide. However, it also identified areas requiring change and improvement – including the need for improved governance and coordination of services available to young people, monitoring and evaluation of major prevention initiatives, better access to services, improved data on and understanding of youth suicide and self-harm, and the development of specific strategies to address the needs of vulnerable young people.

Overall, the inquiry's conclusions reflect many of the findings of our reviews.

Observations and recommendations

- There is no focused suicide prevention plan for young people in NSW. The inquiry into youth suicide found that the specific needs of children and young people provide valid reasons for a youth specific response. The committee recommended the development of a youth specific suicide prevention plan, and an Aboriginal and Torres Strait Islander specific youth suicide prevention plan. We support these recommendations.
- Identification of suicide risk in young people must be supported by effective strategies to manage and contain risk. This includes addressing gaps in the delivery of appropriate specialist mental health services for children and young people in NSW.
- Suicide prevention and intervention strategies should be subject to ongoing monitoring and evaluation. The role of schools is critical in developing strategies to prevent suicide. Strategies should be evidence-based and subject to ongoing monitoring and evaluation. Major prevention strategies – such as LifeSpan in NSW – should be evaluated for their appropriateness and effectiveness for young people.
- Learning from missed opportunities and using that understanding to frame future practices should be a key strategy in improving the capacity of agencies to develop effective prevention strategies.

In the context of our findings and support for the recommendations of the Inquiry into youth suicide, we recommend:

The NSW Government should:

- Through a suicide prevention plan, target specific measures to school-aged children across the spectrum of need, including universal services, early intervention and sustained therapeutic support.
- Address gaps in the delivery of appropriate specialist mental health services for children and young people in NSW.

The NSW Department of Education should:

- Evaluate postvention initiatives in government schools, and establish a process of review following the suicide death of any young person attending a public school.
- Catholic and Independent schools should review of the adequacy of suicide prevention, postvention and mental health and wellbeing programs in non-government schools.

The Department of Family and Community services should:

- Advise how changes to policy will assist staff in responding to reports of mental health problems or suicide risk for young people in care.

Abuse and neglect-related deaths

Deaths in 2016 and 2017, and trends

In 2016 and 2017, 20 children died in circumstances of abuse (11) or neglect (2) or in suspicious circumstances (7). Four of the children died in murder-suicide incidents. Three teenagers were killed by unrelated individuals.

Over the ten years to 2017, 118 children died in circumstances of abuse or neglect in NSW:

- Very young children were most vulnerable to fatal abuse and neglect, with children under five years accounting for half of all abuse and neglect-related deaths.
- More than half the families of children who died in circumstance of abuse or neglect had a child protection history.
- One in five of the children who died in circumstances of abuse or neglect were Indigenous.

Risk factors associated with abuse and neglect-related deaths

Most (17 of the 20 children) died in the context of familial abuse or neglect. The majority of persons of interest in these deaths were parents or a person acting in a parental role.

Of the familial persons of interest:

- Just over one third were identified as having a previously diagnosed mental health condition. Carer mental illness was a significant factor in the abuse-related deaths of four children, and a likely contributing factor in the death of another child.
- Nearly one third were known to police as perpetrators of violence before the child's death.
- More than one third of the families were known to government agencies for current and/or previous drug or alcohol abuse. Post death investigations identified some persons of interest were affected by substances at the time of the fatal incident.

Child protection

Ten of the families had a child protection history, and most had been the subject of a report assessed by FACS to indicate risk of significant harm relating to the child who died and/or their siblings within the three years prior to the child's death. Half of the families received a face-to-face response from FACS at some time in the three years before the child's death – three of these families were seen in the 12 months before.

Six families did not have a child protection history. In these families, the children who died were very young; four were infants aged less than one year, including two newborn children.

NSW Health had significant involvement with many of the 17 families where children died in the context of familial abuse or neglect. In a number of cases, this contact included the involvement of specialist mental health and/or drug and alcohol services.

Observations and recommendations

- Risk was not consistently recognised or responded to by the child protection system. The families of seven children who died in circumstances of familial abuse or neglect in 2016 and 2017 had a child protection history. A number of reports received about the families received no response from FACS due to competing priorities. FACS continues to face critical capacity issues in relation to the low face-to-face response rates for ROSH reports, with around one third of children reported at risk of significant harm receiving a face-to-face assessment.
- The principles of the NSW Health policy *Children of Parents with Mental Illness were not consistently applied. In relation to the deaths of four children, we identified:*
  - A lack of visibility of the child in mental health assessments – the safety and wellbeing of children was not always considered, or the risks to dependent children understood, by mental health services working with parents.
  - Information sharing and communication across services – in some cases a lack of communication affected the accuracy of assessments, the understanding of roles and responsibilities, an awareness of risks present for a child, and ultimately the effectiveness of treatment and intervention.
  - Connecting with and seeking information from family and friends – in a number of cases, our reviews emphasised the need for services to seek information from family and friends who were in close contact with parents caring for dependent children.

NSW Health are in the process of finalising a review of the current *Children of Parents with a Mental Illness (COPMI) Framework for Mental Health Services 2010-2015*, and have established an expert advisory group to oversee the development of the next framework document.

We have recommended that NSW Health evaluate the planned *Family Focused Recovery Framework 2019-2023*.

Recommendations

Recommendations 2019

This section lists the recommendations made in the report.

Sudden Unexpected Death in Infancy

Section 6.7

1. NSW Health should develop and implement strategies to promote safe infant sleep practices to vulnerable families. In particular, NSW Health should target:
   - In consultation with the Department of Family and Community Services, families known to child protection services
   - Families living in remote areas of the state, and
   - Families living in areas of greatest socio-economic disadvantage.
2. NSW Health should undertake a campaign to promote resources (including fact sheets, websites, apps and phone lines) that aim to assist parents and carers to identify illness in infants. The campaign should focus on resources that are evidence-based and have been subject to evaluation.

Transport

Section 8.6

3. Transport for NSW (Centre for Road Safety) should include, as part of the *Safer Vehicle Choices Save Lives* campaign website, a page targeted at young drivers purchasing a new vehicle. This should detail the features and vehicles to consider when purchasing the safest car in a range of price brackets – similar to the '*how safe is your first car?*' website (Victorian Transport Accident Commission).
4. Transport for NSW should undertake a study of child restraint practices in NSW. The study should have a particular focus on areas of socio-economic disadvantage and those outside major cities.
5. NSW Health and Transport for NSW should use their data linkage system for regular surveillance and monitoring of crash injuries and fatalities of children under the age of 13.
6. Transport for NSW (Centre for Road Safety) should actively promote information on best practice for restraining children over the age of seven years. Promotion activities should particularly target culturally and linguistically diverse (CALD) communities, Aboriginal and Torres Strait Islander communities, and areas of low socio-economic status.
7. Transport for NSW should fund a comprehensive and ongoing program to increase the correct and age-appropriate use of motor vehicle child restraints in NSW. The program should draw on the learnings of the Buckle-Up Safely program and incorporate a range of settings. It should provide education about safe travel for children, access to appropriate restraints (including subsidies for low-income families), and expert fitting of child restraints.
8. Transport for NSW (Centre for Road Safety) should, in the context of the evaluation of 'They're counting on you', consider further action to prevent low speed vehicle run-over incidents through promoting good practice and carer education.
9. Safe Work NSW should establish a specific focus on children within the *Quad Bike Safety Improvement Program*. The program should strongly promote the message that children under 16 years of age should not operate, or be a passenger on, an adult quad bike under any circumstances or for any reason.

Suicide

Section 11.6

10. The NSW Government should include in any suicide prevention plan specific measures targeted to school-aged children and young people across the spectrum of need. In particular, this should include:
    a. universal strategies that promote wellbeing in children and young people
    b. early intervention designed to arrest emerging problems and difficulties
    c. the provision of targeted, sustained and intensive therapeutic support to young people at high risk – including strategies for reaching those who are hard to engage.
11. The NSW Government should direct funds associated with the Strategic Framework for Suicide Prevention in NSW 2018 – 2023 to address gaps in the delivery of appropriate specialist mental health services for children and young people in NSW.
12. The NSW Department of Education should evaluate postvention initiatives in NSW government high schools, particularly the effectiveness of such initiatives in preventing suicide clusters.
13. Catholic Schools NSW should work with and assist member schools to examine the adequacy of suicide prevention, postvention and mental health and wellbeing programs currently provided to students in NSW Catholic Schools.
14. The Association of Independent Schools of NSW should work with and assist member schools to examine the adequacy of suicide prevention, postvention and mental health and wellbeing programs currently provided to students in NSW Independent Schools.
15. The NSW Department of Education should establish a process of review after the suicide death of a child or young person in a public school. The process should involve considering, with the local school and district, the involvement of the school with the young person and their family – particularly in terms of identifying and responding to mental health or suicidal risk behaviours. Outcomes of the reviews should inform future practice and policy.
16. FACS provide a copy of the finalised Alternate Assessment Tool, including advice as to how changes will assist FACS's staff to understand and respond to reports of risk of significant harm for children and young people in care, where those reports raise concerns about mental health, self-harm and/or suicidal behaviours.

Abuse and Neglect related deaths

Section 12.7

17. NSW Health, as part of the planned implementation of the *Family Focused Recovery Framework 2019-2023*, should develop an evaluation strategy to ensure the benefits of the framework can be measured and adjusted as needed.

Monitoring previous recommendations

In addition to the recommendations made above, we continue to monitor agency progress in implementing some of our earlier recommendations. The NSW Child Death Review Team Annual Report 2017-18 provides detailed information about the progress agencies reported to us in 2018 in relation to CDRT recommendations.[2]

NSW Family and Community Services systemic issues – such as responding to reports of risk of significant harm – are monitored through the NSW Ombudsman/FACS integrated governance framework.

https://www.ombo.nsw.gov.au/news-and-publications/news/joint-ombudsman-and-facs-report-card

Appendix 2 details the recommendations from earlier reports which we continue to monitor.

2. NSW Child Death Review Team 2018. CDRT annual report. NSW Ombudsman, Sydney.

Chapter 1. Introduction

This report brings together the findings and recommendations arising from two statutory functions under the *Community Services (Complaints, Reviews and Monitoring) Act 1993 (CS-CRAMA) for reviewing and maintaining a register of the deaths of children in NSW. It includes:*

- The work of the NSW Child Death Review Team (CDRT) – under Part 5A of the Act.
- Reviews of the deaths of children in care or detention, and children who die in circumstances of abuse or neglect – under Part 6 of the Act.

1.1. The NSW Child Death Review Team

The purpose of the NSW CDRT is to prevent or reduce the deaths of children in NSW. The main functions of the CDRT are to:

- maintain a register of child deaths in NSW
- identify any trends and patterns relating to the deaths of children in NSW
- undertake or support research and make recommendations that may assist in preventing or reducing the likelihood of child deaths.

The CDRT consists of experts in health care, child development, child protection and research, as well as representatives of key government agencies (see Appendix 1). The NSW Ombudsman is the Team's Convenor and Ombudsman staff provide support and assistance for its work.

Until 2015, the CDRT was required to prepare an annual child death review report and provide this report to the NSW Parliament. Following legislative change, the report is now provided every two years.

1.2. 'Reviewable' deaths of children

Under Part 6 of the Act, the NSW Ombudsman is responsible for reviewing the deaths of people with disability in care and the deaths of certain children. The death of a child aged less than 18 years is reviewable if the child's death *'is or may be due to abuse or neglect or that occurs in suspicious circumstances'*, or at the time of their death the child was in care or in detention.

CS-CRAMA requires the Ombudsman to:

- monitor and review reviewable deaths and maintain a register of these deaths
- formulate recommendations for preventing or reducing the reviewable deaths of children
- undertake research or other projects to help formulate strategies to reduce or remove risk factors associated with reviewable deaths that are preventable.

The Ombudsman is required to report to the NSW Parliament on a biennial basis about reviewable deaths.

Since 2015, the Ombudsman's office and FACS have monitored issues in child protection and out-of-home care through the *FACS/Ombudsman Integrated Governance Framework (IGF)*. The IGF is a joint process for tracking FACS's progress towards implementing broad systemic reforms as well as addressing discrete system/practice issues that we have identified through our work. This includes issues and recommendations arising from our child death reviews.

Where relevant, this report draws on FACS's latest advice in relation to the issues we are monitoring via the IGF.

1.3. About this report

1.3.1. A combined report

This report combines our statutory responsibilities for reporting to the NSW Parliament on the deaths of all children in NSW, and the reviewable deaths of children, that occurred in NSW in 2016 and 2017.

The report considers the deaths of 981 children. The deaths of 44 of these children (4%) have been determined as deaths reviewable by the Ombudsman because they were the result of abuse or neglect or occurred in suspicious circumstances (20 children), or the child died while they were in care (24 children).

In the past, the reports have been presented separately. Following legislative change, reporting requirements aligned in 2018. From that time, both the CDRT and reviewable child death reports must be provided to Parliament biennially – as soon as practicable after 30 June each second year.

We have taken this opportunity to present the two reports together. As noted by the Wood Inquiry[3] in regard to its recommendation to bring together reviewable deaths and the work of the CDRT:

> *It is evident to the Inquiry that in considering reviewable child deaths it is critical to examine and compare the contexts in which the deaths occur. This can be enhanced through an integrated function that examines all child deaths in NSW to enable the making of more systemic recommendations to prevent child deaths.*

Combined reporting also overcomes issues related to the sensitive and confidential reporting of a very small number of reviewable child deaths. In addition, most children in care die as a result of natural causes and these causes are well considered by the CDRT – as are suicide deaths of children in care.

There is also a significant crossover between the Ombudsman's reporting on both reviewable neglect-related deaths and the deaths of children in care, and the issues considered in CDRT reports. For example, drowning, Sudden Unexpected Death in Infancy (SUDI) and transport fatalities are causes of death which feature in both reviewable and CDRT work.

Bringing together our work and findings into one report will help strengthen a public health approach to reviews of child deaths in NSW by ensuring that the focus is on modifiable risk factors and whole of population measures for prevention.

1.3.2. Changes to defining fatal neglect and suspicious deaths

In addition to changing the reporting of child deaths, we have also revised our approach to classifying deaths that occur as a result of neglect, as well as those that occur in suspicious circumstances.

Deaths of children due to neglect

Part 6 of CS-CRAMA defines a child's death as reviewable if it *'is or may be due to abuse or neglect or that occurs in suspicious circumstances.'*

In the broader literature, there is no consistent definition of fatal neglect. What may constitute adequate care or supervision, or to what degree carers should anticipate harm, is highly contested. Approaches to fatal neglect range from broad theoretical frameworks to focused definitions, and few child death review mechanisms focus on fatal neglect.

3. Hon James Wood AO QC 2008. Report of the Special Commission of Inquiry into child protection services in NSW. NSW Government, Sydney.

Our previous reports of reviewable deaths have applied the following working definition of neglect-related death and death suspicious of neglect:

- The death of a child in neglect-related circumstances involves conduct by a parent or carer that results in the death of a child or young person, and that involves:
  - failure to provide for basic needs such as food, liquid, clothing or shelter
  - refusal or delay in providing medical care
  - intentional or significantly careless failure to adequately supervise,
  - a significantly careless act.

In 2017, the Australian Institute of Family Studies (AIFS) reviewed our approach to reporting fatal neglect.[4]

They noted the crossover in the CDRT reports and the Ombudsman's reports of reviewable child deaths. In particular, the majority of neglect-related deaths are attributed to drowning, motor vehicle fatalities and SUDI. These causes, and associated prevention strategies, are areas of particular focus for the CDRT.

The AIFS also noted the broad scope of our neglect definition and pointed out that:

> *'The prevention strategies for deaths where a child was deprived of basic requirements to thrive due to a knowing and wilful act (for example a child who dies from malnutrition or when a drunken or drug affected parent chooses to drive recklessly with their children unrestrained in the car) will be quite different to those where the deprivation is due to a lack of knowledge or access to services. Thus, it would make sense to identify and report deaths separately and include those due to knowing and wilful acts in the Reviewable Death Report rather than the CDRT'.*

In that context, AIFS recommended that the Ombudsman:

> *'…in the Reviewable Deaths report, due to the similarities between abuse and neglect at the severe end of the spectrum, consider all deaths where a wilful and knowing act has contributed to the death of a child as 'maltreatment related' to enable reporting rather than separating abuse from neglect'.*

Taking into account these issues and legislation governing the CDRT and reviewable deaths, the definition we have adopted and used in this report is:

The death of a child is due to neglect if a reasonable person would conclude that the actions or inactions of a carer exposed the child to a high risk of death or serious injury.

Deaths of children in suspicious circumstances

The working definition of 'suspicious' applied in our previous reports separates 'suspicious of neglect' and 'suspicious of abuse'. In the context of the above changes, we have adopted a more encompassing definition to reflect that a child's death may have been the result of abuse or neglect:

The death of a child where there is some evidence that the death may have been the result of abuse or neglect, but the evidence is insufficient for this to be reasonably determined.

4. NSW Child Death Review Team and Australian Institute of Family Studies 2017. Reporting of fatal neglect in NSW. NSW Ombudsman, Sydney.

1.4. Methods and report structure

1.4.1. Methods and definitions: key points to note

- The International Statistical Classification of Diseases and Related Health Problems (ICD) system is used to report cause of death in this report. The ICD is the international standard health classification published by the World Health Organisation (WHO).
- Analysis of cause of death in this report relates primarily to underlying cause of death. This is defined as 'disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury'.
- Since 2012, the CDRT has used a consistent approach to identifying Aboriginal and Torres Strait Islander status, which takes into account a range of records that may identify a child as Indigenous. As the approach was not consistent before 2012, any description of trends in the deaths of Aboriginal and Torres Strait Islander children is based on identification of Indigenous status in data from the Registry of Births, Deaths and Marriages (BDM) only.
- In relation to describing rates of death, the mortality rates used in this report are:
  - Crude Mortality Rates: This is the rate of deaths per 100,000 people under 18 years of age. Rates are not calculated for numbers less than four because of lack of reliability.
  - Infant Mortality Rates: Infancy is the period from birth to less than 12 months of age. The infant mortality rate is the rate of infant deaths per 1,000 live births. Where this measure is used, it is stated in the report.
- The term 'child' in this report means a person under the age of 18 years. Terms such as 'young person' or 'teenager' are used descriptively for older children. 'Young person' is used in chapter 11 (suicide) in recognition of the majority of these deaths occurring in the oldest age group.
- Remoteness was determined from the ABS Accessibility and Remoteness Index of Australia (ARIA+). Regional areas include outer and inner regional areas. Remote areas include remote and very remote areas.
- Socio-economic status was determined from the ABS Index of Socio-economic Disadvantage (IRSD). Quintile 1 refers to areas of most disadvantage and Quintile 5 refers to areas of least disadvantage.

For full details of our methodology, see Appendix 3.

1.4.2. Report structure

The report is presented in sections which address:

- trends in the deaths of children in NSW, the leading causes of death, and deaths from multiple causes – chapters 2, 3 and 4
- deaths from natural causes – chapter 5
- sudden Unexpected Death in Infancy – chapter 6
- deaths resulting from unintentional injury – chapters 7, 8, 9 and 10
- deaths from suicide – chapter 11
- deaths occurring in the context of abuse or neglect – chapter 12.

Each section includes information about the reviewable deaths of children.

Trends are described using information over five, 10 or 15 years – depending on the information being described. Data for the current two-year period of review (2016 and 2017) is presented by year.

Appendix 6 provides additional detailed data relating to child deaths in NSW for 2016 and 2017, as well as trends over time.

1.5. Deaths of resident children living outside NSW

Information about deaths registered interstate is generally not available for the current reporting year, 2017. The latest information relates to deaths registered in other states or territories in 2015 and 2016.

There were 20 children from NSW who died outside of the state in 2015, and 16 children in 2016. All 36 children died in states bordering NSW.

The CDRT's jurisdiction is limited to NSW, so we are unable to request agencies in other states or territories to provide information about the deaths of children outside NSW. Limited information is provided by child death review teams (or similar) in other states and territories. For this reason, the deaths of children outside of NSW are not included in the detailed analysis in this report.

As in previous years, the majority of the 36 children were infants (20) and almost all died (25) from natural causes:

- fifteen infants and one child died as a result of conditions originating in the perinatal period
- five infants and one child died from congenital and chromosomal conditions
- one child died from mitochondrial myopathy, another from sepsis, and another from bone cancer
- eight children died from external causes.

The cause of death was undetermined for one child, and the cause of death for two children is subject to ongoing coronial inquiry..

Chapter 2. Trends in deaths of children in NSW, 2003-17

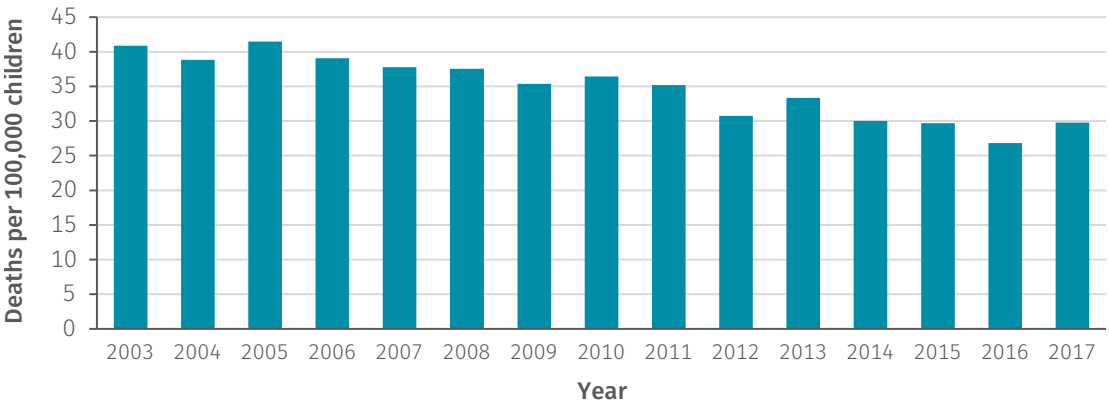
Over the past 15 years, the mortality rate declined by 27% in NSW. This mostly reflects a significant decline in infant deaths.

Trends in the mortality rate varied by gender, Indigenous background, remoteness and socio-economic status. For example, in the 2013-2017 period the rate was:

- 1.2 times as high for males as for females
- 2.0 times as high for Indigenous children as for non-Indigenous children
- 1.8 times as high for children in remote areas as for those in major cities
- 2.3 times as high for children in the most disadvantaged areas as for those in the least disadvantaged areas.

Over the 15 years to 2017, the deaths of 8,567 children occurred in NSW. As shown in Figure 1, the mortality rate for children significantly declined from 41 deaths per 100,000 children in 2003 to 30 deaths per 100,000 in 2017.[5]

Figure 1. Deaths of children aged 0-17 years in NSW, 2003-17



This chapter examines trends in the mortality rate across three periods between 2003 and 2017. We also examine how trends varied by age, gender, Indigenous status, remoteness, socio-economic status and child protection history. This chapter also summarises reviewable deaths examined by the Ombudsman between 2008-17.

2.1. Age and gender

Over the past 15 years, more than half (4,931; 58%) of children who died were male and 42% were female (3,636). As shown in Figure 2, the majority of children who died (5,265; 61%) were infants, aged under 1 year. Two thirds of the infants were neonates, aged under 29 days (3,572; 68%).

5. We examined changes in mortality rates between five year periods – 2003-07, 2008-12, 2013-17.

Figure 2. Deaths of children by age and gender, 2003-17

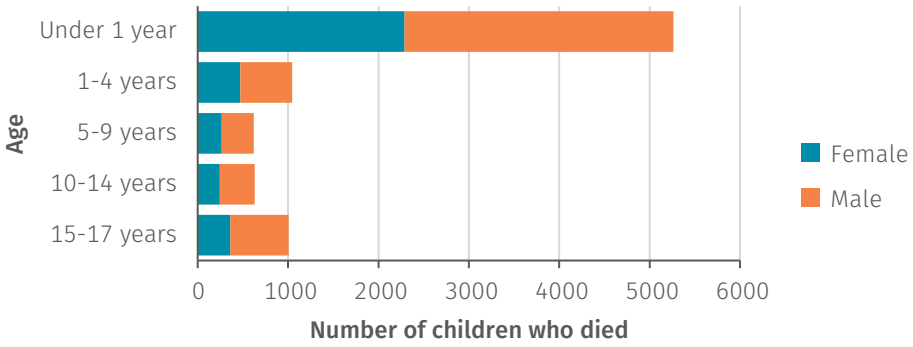
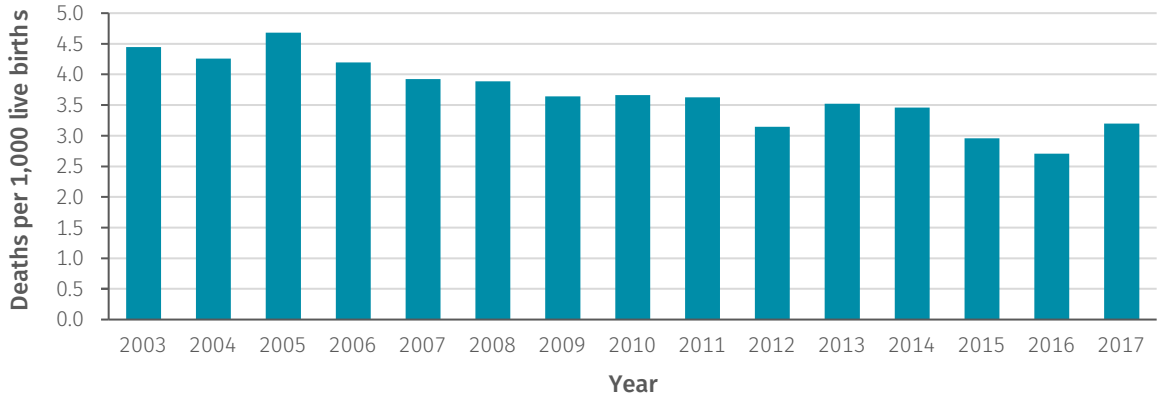


Figure 3 shows the infant mortality rate significantly declined by 39%, from 4.5 deaths per 1,000 live births in 2003 to 2.7 in 2016. While the rate in 2016 was the lowest observed during this period, it increased to 3.2 per 1,000 live births in 2017.

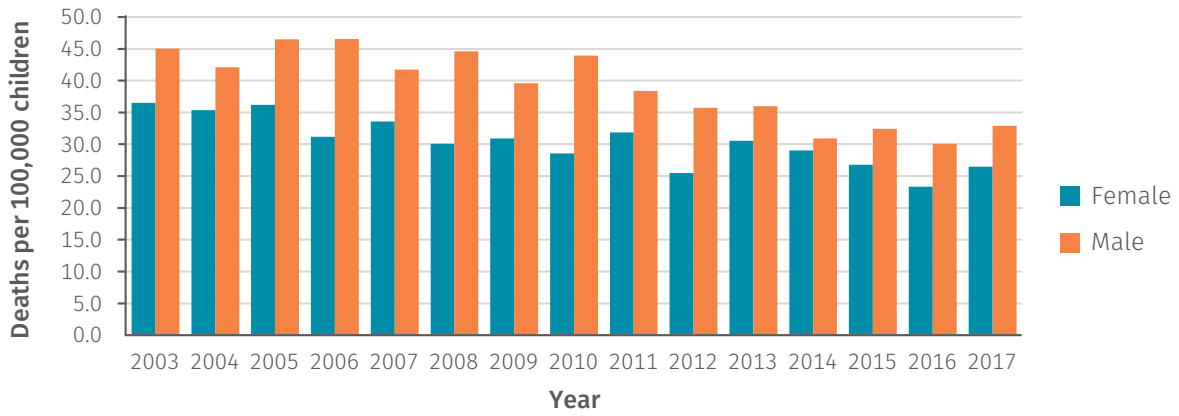
Figure 3. Deaths of infants aged under one year, 2003-17



For children aged 1-17 years – although the mortality rate declined – the decrease was significant only for children aged 1-4 years.

Over the past 15 years, a significant decline in the mortality rate occurred for both male and female children (Figure 4). However, the rate has remained significantly higher for males over this period.

Figure 4. Deaths of children aged 0-17 years by gender, 2003-17

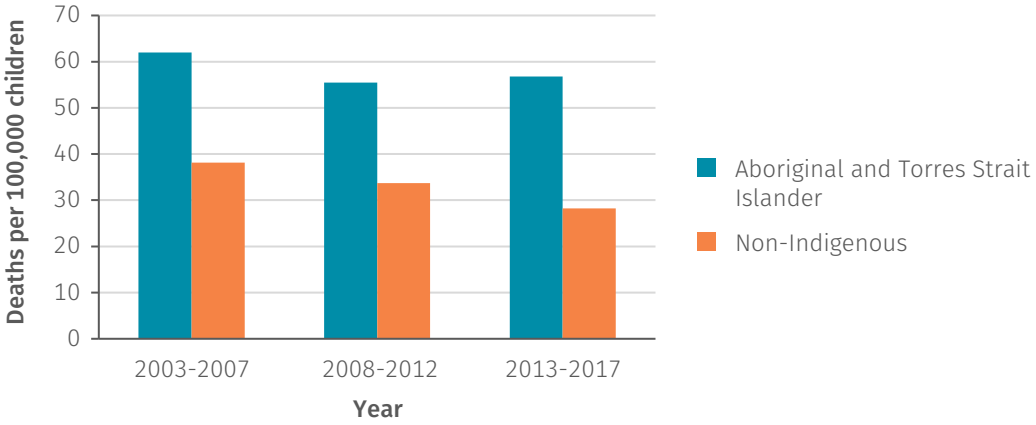


2.2. Aboriginal and Torres Strait Islander status

The Closing the Gap target is to halve the gap in national mortality rates between Indigenous and non-Indigenous children aged 0-4 years by 2018. Between 1998 and 2016, the national Indigenous mortality rate for this age group declined by 35% – from 217 to 146 deaths per 100,000 children. This contributed to a 32% reduction in the gap.[6]

By comparison, the mortality rate for Indigenous children[7] aged 0-4 years in NSW declined by 31%, from 212 to 145 deaths per 100,000. This contributed to a 20% reduction in the gap during this period.

Figure 5. Deaths of children aged 0-17 years by Aboriginal and Torres Strait Islander status, 2003-17



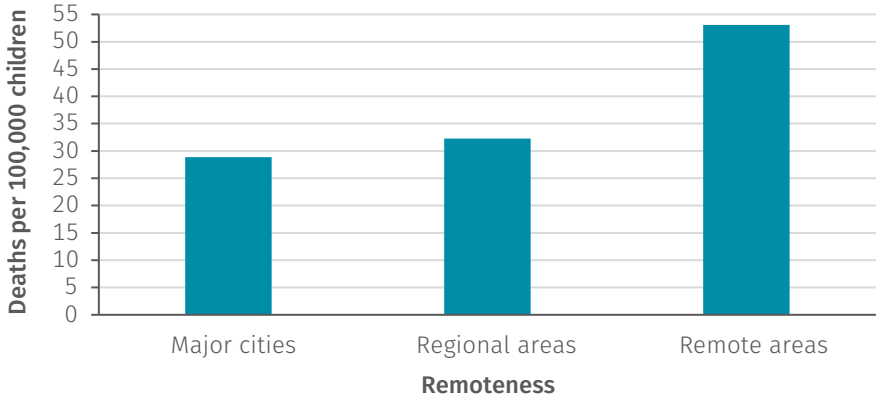
Over the past 15 years in NSW, the overall mortality rate for non-Indigenous children aged 0-17 years declined by 26% – and by 21% for Indigenous children. Despite these improvements, Figure 5 shows the mortality rate has remained higher for Indigenous children compared with non-Indigenous children aged 0-17 years.

The gap was more pronounced for certain age groups. For example, in the period 2013-17, the infant mortality rate was significantly higher for Indigenous infants (2 times as high). In the period 2013-17, the mortality rate for Indigenous young people aged 15-17 years (1.9 times as high) was also significantly higher compared with non-Indigenous children in these age groups.

2.3. Remoteness and socio-economic status

In the 2013-17 period,[8] 71% of the children who died lived in major cities, 28% lived in regional areas, and 1% lived in remote areas.[9] Despite this distribution, Figure 6 shows the mortality rate was 1.8 times as high for children in remote areas as for those in major cities. This difference was significant.

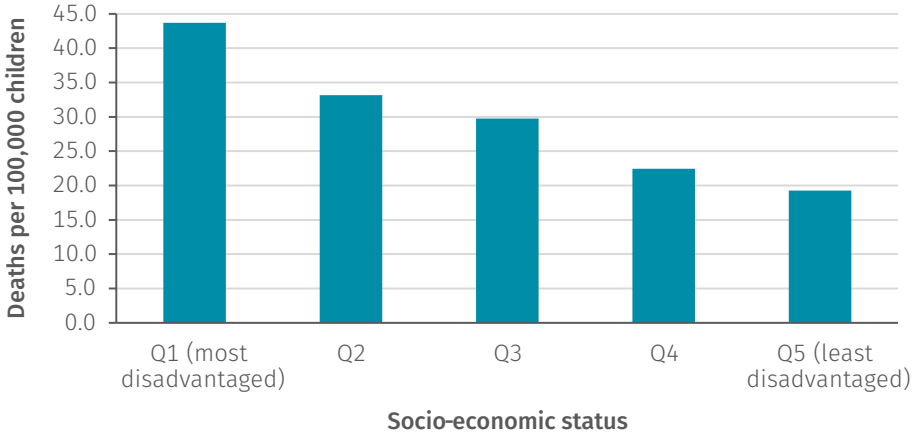
Figure 6. Deaths of children aged 0-17 years by remoteness, 2013-17



6. Department of the Prime Minister and Cabinet 2018. Closing the gap Prime Minister's report 2018. Commonwealth of Australia, Canberra.
7. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.
8. Remoteness and socio-economic status was limited to available ABS population data for the 2013-17 period.
9. As per the ABS accessibility and remoteness index of Australia (ARIA+). Regional areas included outer and inner regional areas. Remote areas included remote and very remote areas.

One third of children who died were from the most disadvantaged areas.[10] As shown in Figure 7, the mortality rate was 2.3 times as high for children in the most disadvantaged areas as for those in least disadvantaged areas.[11] This represented a significant difference of 24.5 deaths per 100,000 children between quintiles 1 and 5.

Figure 7. Deaths of children aged 0-17 years by socio-economic status, 2013-17



To provide a further measure of a family's socio-economic background, it is recommended to examine other indicators of disadvantage.[12] When we further examined socio-economic status for the level of education and occupational-related skills in an area, we found one in every five children who died in NSW were from areas of greatest disadvantage.[13]

2.4. Spatial analysis of child deaths in NSW

In 2016, we engaged the Australian Institute of Health and Welfare to undertake geospatial analyses of 8,657 children who died between 2001 and 2015, using data from the NSW Child Death Register.[14] This report is available at:

https://www.ombo.nsw.gov.au/__data/assets/pdf_file/0006/54258/Spatial-analysis-of-child-deaths-in-New-South-Wales.pdf

The report analysed nearly 90 geographical areas across NSW.[15] Over the 15-year period, the mortality rate declined as follows:

- No areas saw a significant increase in the mortality rate.
- 18 areas experienced a significant decline in the mortality rate.
- Differences in the mortality rate between areas narrowed over time.

However, the mortality rate varied by area-level characteristics. In the five-year period 2011-15, the likelihood of dying during childhood in NSW was:

- 1.7 times as high for children in high poverty areas as for those in low poverty areas.
- 1.8 times as high for children in areas with the lowest levels of school engagement as for those with the highest levels.[16]

10. Quintile 1 of the ABS index of socio-economic disadvantage.
11. Quintile 1 compared with Quintile 5
12. Saunders P 2012. Report for the NSW Child Death Review Team on measuring socio-economic status, prepared by the Social Policy Research Centre. University of New South Wales, Sydney
13. 20 per cent of children were in Quintile 1 for both the ABS index of socio-economic disadvantage, as well as the ABS index for education and occupation.
14. NSW Child Death Review Team 2018. Spatial analysis of child deaths in New South Wales, prepared by the Australian Institute of Health and Welfare. NSW Ombudsman, Sydney.
15. By ABS Australian Statistical Geography Standard, Statistical Area 3 level (SA3).
16. Proportion of 16 year olds currently in school.

- 1.5 times as high for children in areas with the highest levels of overcrowded housing as for those with the lowest levels.
- 2.0 times as high for children in areas where children had been assessed as developmentally vulnerable.[17]

The findings of the report demonstrated the risk of dying during childhood was greater for children living in more disadvantaged areas. It further identifies where children are at greater risk in NSW and what socio-economic factors were associated with an increased risk of death. This informs where interventions can be targeted to reduce this risk.

2.5. Child protection history

Previously, we have identified that children with a child protection history have a higher overall mortality rate than those without this history.[18] The CDRT considers a child has a child protection history if – within three years before their death – the child and/or their siblings were the subject of a report about safety, welfare or wellbeing made to FACS or a Child Wellbeing Unit.

Over the 15 years to 2017, one in every five children who died in NSW had a child protection history (1,754; 20%). This proportion has remained consistent over time.

Between 2011 and 2016, less than 5% of all children in NSW were the subject of a ROSH report.[19] By comparison, the proportion of children who died and were the subject of a ROSH report increased from 12% to 19% during this period.[20]

2.6. Reviewable deaths in NSW, 2008-17

In the 10-year period between 2008 and 2017, 5412 children died in NSW.[21] We identified 225 (4.2%) of these deaths as reviewable by the Ombudsman. This included:

- 118 children who died in circumstances of abuse (80) or neglect (20), or that were suspicious (18).
- 109 children who died in the care of the state or a service provider.

These categories are not exclusive as two children died in care and in circumstances of abuse during this period.

Chapter 12 of this report discusses in detail the deaths that occurred in circumstances of abuse, neglect and suspicious of neglect.

2.6.1. Children who died in out-of-home care

Over the 10-year period to 2017, almost two thirds (66) of the 109 children in care died due to natural causes and nearly a third (33) from external causes. The cause of death was not determined or yet to be determined for 10 children, of which seven were classified as SUDI.

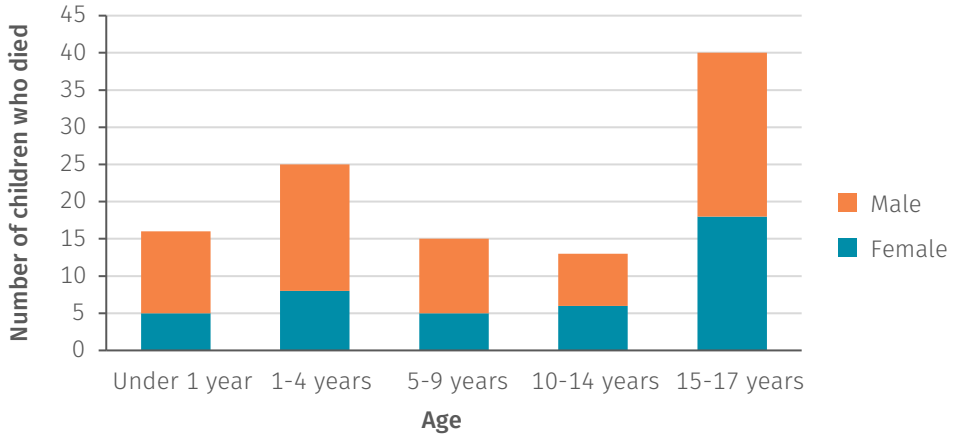
In 2016 and 2017, 17 of 24 children in care died from natural causes. These deaths are discussed in section 5.10.3. Six children in care died from external causes including three children who died from suicide (refer to chapter 11). The cause of death has yet to be determined for one child.

17. Areas where at least 15% of children were considered as developmentally vulnerable for two or more domains of the Australian Early Development Census (AEDC).
18. NSW Child Death Review Team 2014. Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.
19. Department of Family and Community Services 2018. Dashboard 3: ROSH reports, accessed from https://www.facs.nsw.gov.au/resources/statistics/statistical-report/children-young-people/dashboard on 27 August 2018; FACS report by financial year from 30 June 2011 to 30 June 2016.
20. NSW Register of Child Deaths from 1 January 2011 to 31 December 2016.
21. Data is presented from 2008-2017, in line with the NSW Ombudsman's responsibilities for reviewing the deaths of certain children during this period.

2.6.2. Age and gender

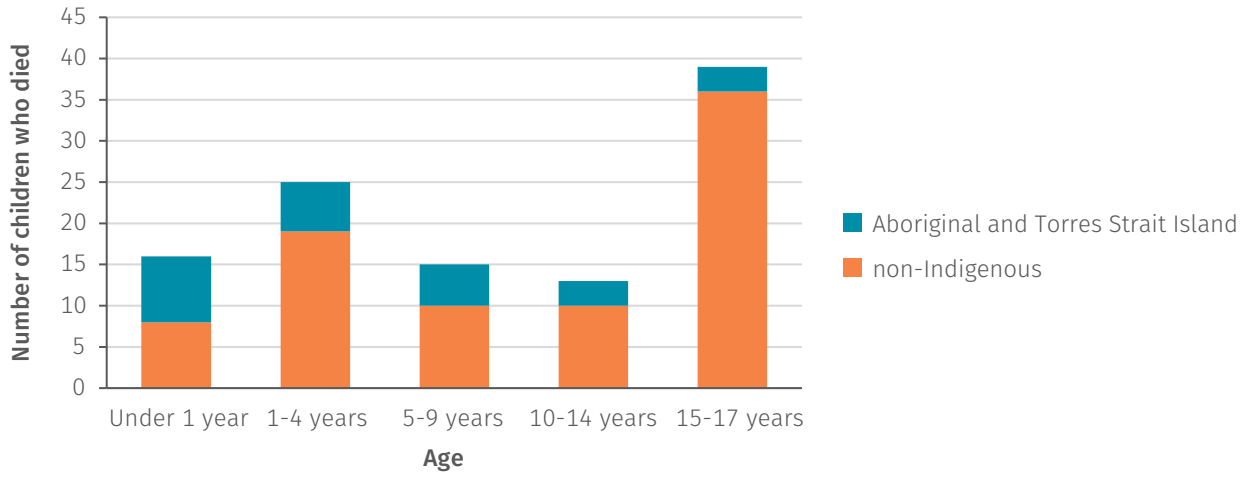
As shown in Figure 8, over the 10 years to 2017, almost two thirds of the children in care who died were male (67). By age group, most children were aged 15-17 years (40), followed by children aged 1-4 years (25).

Figure 8. Children in out-of-home care who died by age and gender, 2008-17



Almost a quarter (25) of children in care who died were Aboriginal and Torres Strait Islander (Figure 9).[22] The majority of Indigenous children in care who died were aged under five years.

Figure 9. Children in out-of-home care who died by age and Aboriginal and Torres Strait Islander status, 2008-17



22. Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages.

Chapter 3. Leading causes of death

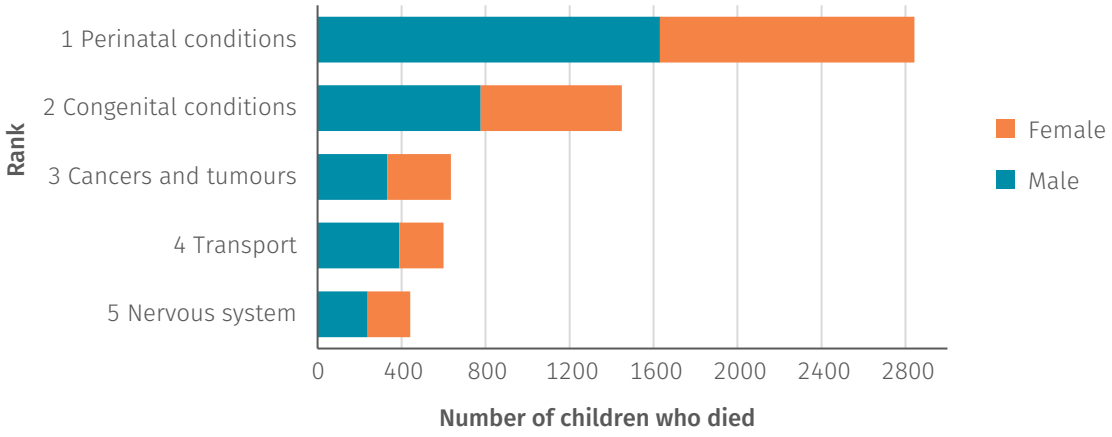
Over the past 15 years to 2017, the leading cause of death for all age groups was natural causes – except for 15-17 year olds.

- For infants – the leading cause of death was perinatal conditions, followed by congenital conditions.
- For children aged 1-4 years – the leading cause of death was cancers and tumours, followed by drowning.
- For children aged 5-9 years and 10-14 years – the leading cause of death was cancers and tumours, followed by transport.
- For children aged 15-17 years – the leading cause of death was transport, followed by suicide.

Of the 8,567 children who died in the 15 years to 2017, three quarters (6,376; 75%) died from natural causes. Injury-related causes resulted in the deaths of one in five children (1,532; 18%).[23]

This chapter examines the leading underlying causes of death from natural and injury-related causes in accordance with the International Classification of Diseases (ICD-10). This is the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accidents or violence which produced the fatal injury.[24] Analysis of the underlying cause of death is important as it reveals where interventions can be targeted.[25]

Figure 10. Top five leading causes of death for children aged 0-17 years by gender, 2003-17



Over the past 15 years, the leading cause of death for all children was perinatal conditions (Figure 10). The top five causes of death were similar for both genders, however transport-related injuries accounted for more deaths than cancers and tumours in male children. This chapter further examines how the leading causes of death vary by age group and Aboriginal and Torres Strait Islander status. (Appendix 6).

23. The cause of death was unknown for 635 (8%) of children.
24. World Health Organisation 2018. Mortality, accessed 2 October 2018 from www.who.int/topics/mortality/en
25. Australian Institute of Health and Welfare 2018. Deaths in Australia, Cat. No. PHD 229. AIHW, Canberra.

3.1. Age

Over the past 15 years, the leading cause of death for all age groups – except 15-17 year olds – was natural causes. As shown in Figure 11, the five leading causes of death markedly differed by age group.

Figure 11. Leading causes of death for children by age, 2003-17

	1st	2nd	3rd	4th	5th
Infants	Perinatal	Congenital	Nervous system	Respiratory	Accidental threats to breathing
1-4 years	Cancers and tumours	Drowning	Transport	Congenital	Nervous system
5-9 years	Cancers and tumours	Transport	Nervous system	Congenital	Circulatory and endocrine
10-14 years	Cancers and tumours	Transport	Nervous system	Suicide	Congenital
15-17 years	Transport	Suicide	Cancers and tumours	Nervous system	Circulatory

Blue corresponds to deaths from natural causes and orange corresponds to deaths from injury-related causes.

For infants, conditions originating in the perinatal period accounted for more than half of all deaths (2,819; 54%). Congenital and chromosomal conditions was the second leading cause, accounting for a quarter of infants that died (1,230; 23%).

For children aged 1-4 years, the leading cause of death was cancers and tumours (163; 16%) followed by drowning (126; 12%).

For children aged 5-9 years, the leading cause of death was cancers and tumours (165; 27%) followed by transport-related injuries (92; 15%).

For children aged 10-14 years, the leading cause of death was also cancers and tumours (128; 20%) followed by transport-related injuries (102; 16%).

For young people aged 15-17 years, the leading cause of death was transport-related injuries (284; 28%) followed by suicide (226; 23%).

Compared to the past 15 years, the leading causes of death were consistent in the 2016-17 period – except suicide became more common in older children and young people:

- For children aged 10-14 years, suicide was the second leading cause of death (12 children), following cancers and tumours (20 children).
- For young people aged 15-17 years, suicide accounted for the most deaths (42 children), followed by transport-related injuries (31 children).

3.2. Aboriginal and Torres Strait Islander status

Figure 12 shows the leading causes of death for Indigenous and non-Indigenous infants over the 15 years to 2017.

For both Indigenous and non-Indigenous infants, the leading causes of death were the same – perinatal conditions followed by congenital and chromosomal conditions. However, injury due to accidental threats to breathing featured among the leading causes of death for Indigenous infants (16; 3%).

Figure 12. Leading causes of death for children by Aboriginal and Torres Strait Islander status, 2003-17

	1st	2nd	3rd	4th	5th
	Infants aged under one year				
Non-Indigenous	**Perinatal**	**Congenital**	**Nervous system**	**Endocrine**	**Respiratory**
Aboriginal and Torres Strait Islander	**Perinatal**	**Congenital**	**Respiratory**	**Accidental threats to breathing**	**Nervous system**
	Children aged 1-17 years				
Non-Indigenous	**Cancers and tumours**	**Transport**	**Nervous system**	**Suicide**	**Congenital**
Aboriginal and Torres Strait Islander	**Transport**	**Suicide**	**Drowning**	**Cancers and tumours**	**Congenital** **Nervous system**

Blue corresponds to deaths from natural causes and orange corresponds to deaths from injury-related causes

Over the past 15 years, the mortality rate from injury-related causes was 2.2 times as high for Indigenous children as for non-Indigenous children aged 1-17 years.[26] However, there was no significant difference in the mortality rate from natural causes for this age group.

This was reflected by the top three leading causes of death for Indigenous children aged 1-17 years, which were all injury-related causes. Transport-related injuries were the leading cause of death (63; 25%), followed by suicide (31; 12%) and drowning (23; 9%).

By comparison, the leading cause of death for non-Indigenous children aged 1-17 years was cancers and tumours (573; 19%), followed by transport-related injuries (518; 17%) and diseases of the nervous system (284; 9%).

26. 12.4 deaths per 100,000 for Indigenous children and 5.6 deaths per 100,000 non-Indigenous children.

Chapter 4. Multiple causes of death

Over the 15 years to 2017, more than three quarters of deaths due to natural causes were reported with an associated cause of death.

Congenital and chromosomal abnormalities were commonly reported with deaths due to perinatal conditions. Diseases of the respiratory system were also commonly associated with deaths due to diseases of the nervous system, and some deaths due to congenital and chromosomal abnormalities.

While injury is reported as an associated cause for almost all deaths due to external causes, more than a tenth of deaths due to drowning had a disease of the nervous system such as epilepsy, as an associated cause.

From 2003-17, three quarters of children who died had more than one cause of death recorded on their death certificates and coronial determinations. For example:

- The direct cause of death is the disease or complication which led directly to death.
- The underlying cause of death is the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.
- The antecedent cause of death is the condition(s) that led to or precipitated the immediate cause of death.
- Other significant conditions contributing to the death, but not related to the disease or condition causing it.

This chapter examines patterns in multiple causes of death by analysing underlying causes of death with associated causes of the death (direct, antecedent and other significant conditions).[27] As discussed in chapter 3 (leading causes of death), identifying the underlying cause of death reveals where interventions can be targeted. However, analysis of multiple causes of death can show patterns that reflect changes in behaviours, exposures to disease or injury, social and environmental factors, the effects of medical and technological advances, as well as data coding practices.[28]

4.1. Common associated causes of death

Over the past 15 years, more than three quarters (76%) of deaths due to natural causes had an associated cause of death.

Almost three quarters (73%) of deaths due to perinatal conditions had at least one additional perinatal condition as an associated cause. Two in every five (41%) deaths due to perinatal conditions had congenital or chromosomal abnormalities as an associated cause.

More than a third (37%) of deaths due to congenital or chromosomal abnormalities had an additional abnormality as an associated cause. Twelve per cent of deaths due to congenital or chromosomal abnormalities had a disease of the respiratory system as an associated cause.

More than a fifth (23%) of deaths due to diseases of the respiratory system had a disease of the nervous system as an associated cause. Sixteen per cent of deaths due to diseases of the respiratory system had an infectious or parasitic disease reported as an associated cause.

27. Using ICD-10 coding.
28. Australian Institute of Health and Welfare 2018. Deaths in Australia, Cat. No. PHD 229. AIHW, Canberra

Almost half (45%) of deaths due to diseases of the nervous system had a disease of the respiratory system as an associated cause.

Almost all deaths (97%) where the underlying cause was external, had an injury as an associated cause of death. However, 6% of deaths due to external causes had a disease of the nervous system as an associated cause of death.

Table 1 shows examples of associated and underlying causes of death in children for 2003-17. This is further summarised in Appendix 6.

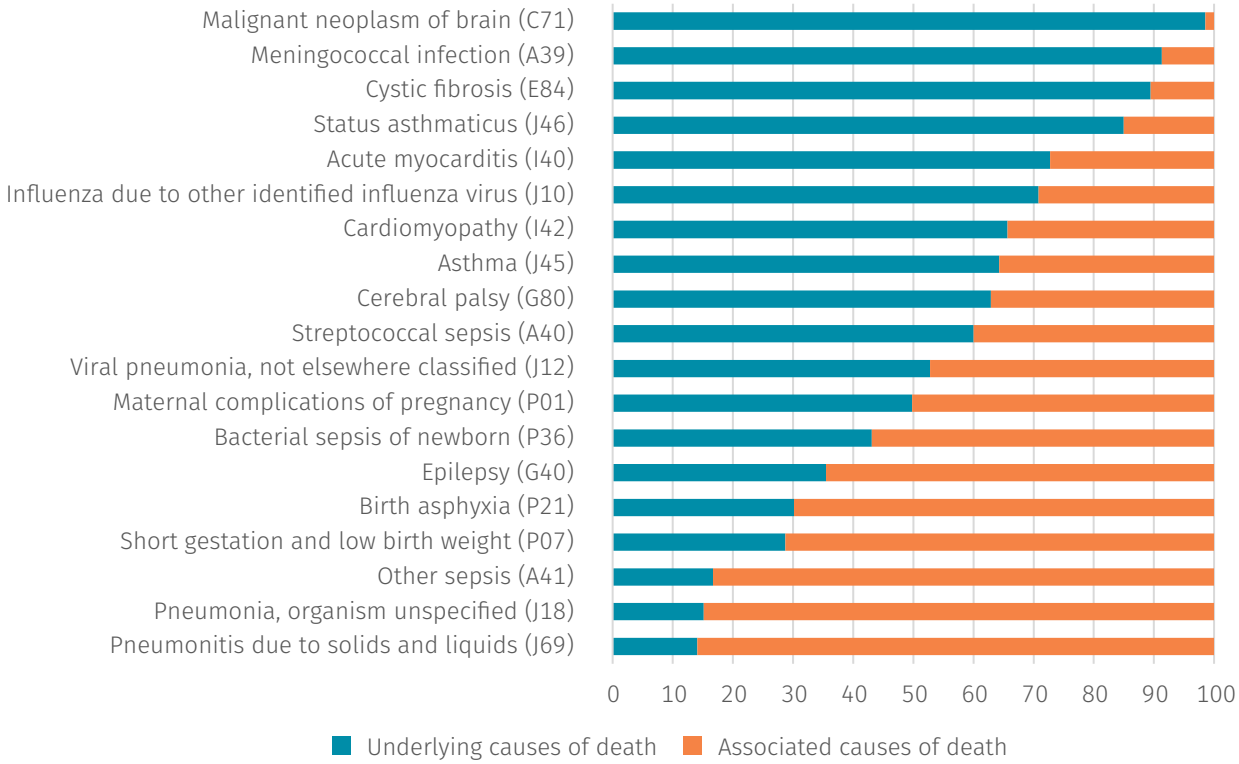
Table 1. Select associated and underlying causes of death for children aged 0-17 years, 2003-17

Associated causes	Underlying causes
Length of gestation and foetal growth was an associated cause of death for:	• 79% of deaths due to maternal factors and complications of pregnancy (720) • 56% of deaths due to perinatal respiratory and cardiovascular disorders (188) • 77% of deaths due to perinatal haemorrhagic and haematological disorders (158). • 29% of congenital malformations of the nervous system (81)
Injuries to the head was an associated cause of death for:	• 70% of deaths due to transport accidents (421) • 90% of deaths due to falls (27)
Influenza and pneumonia was an associated cause of death for:	• 30% of deaths due to cerebral palsy and other paralytic syndromes (30). • 14% of deaths due to metabolic disorders (27)
Other diseases of the respiratory system was an associated cause of death for:	• 26% of deaths due to cerebral palsy and other paralytic syndromes (26) • 14% of deaths due to other congenital malformations (24)
Other disorders of the nervous system was an associated cause of death for:	• 11% of deaths due to accidental drowning and submersion (21)

4.2. Underlying and associated causes of death

When deaths are reported by the underlying cause only, the involvement of certain diseases or other conditions can be underestimated.[29] Figure 13 shows how select diseases and conditions were recorded as an underlying and associated cause of death between 2003-17.

Figure 13. Select associated and underlying causes of death for children aged 0-17 years, 2003-17



Diseases and conditions that were more frequently reported as an underlying cause of death – rather than an associated cause of death – included cancers and tumours, metabolic disorders such as cystic fibrosis, heart conditions such as cardiomyopathy, and influenza.

Diseases and conditions that were more frequently reported as an associated cause of death included epilepsy, birth asphyxia, short gestation and low birth weight, sepsis other than streptococcus, pneumonia, and pneumonitis.

29. Australian Institute of Health and Welfare 2018, Deaths in Australia, Cat. No. PHD 229. AIHW, Canberra

Chapter 5. Deaths from natural causes in 2016 and 2017

Over the 15 years to 2017, the mortality rate from natural causes declined by 23% – mostly as a result of a significant reduction in the infant mortality rate. However, a significant difference in the rate persists between Indigenous and non-Indigenous infants.

For particular diseases during this time period, the mortality rate has:

- Declined for perinatal conditions, diseases of the nervous system, diseases of the circulatory system, and infectious diseases.
- Remained the same for congenital and chromosomal conditions, cancers and tumours, endocrine, nutritional and metabolic disorders, and diseases of the respiratory system.

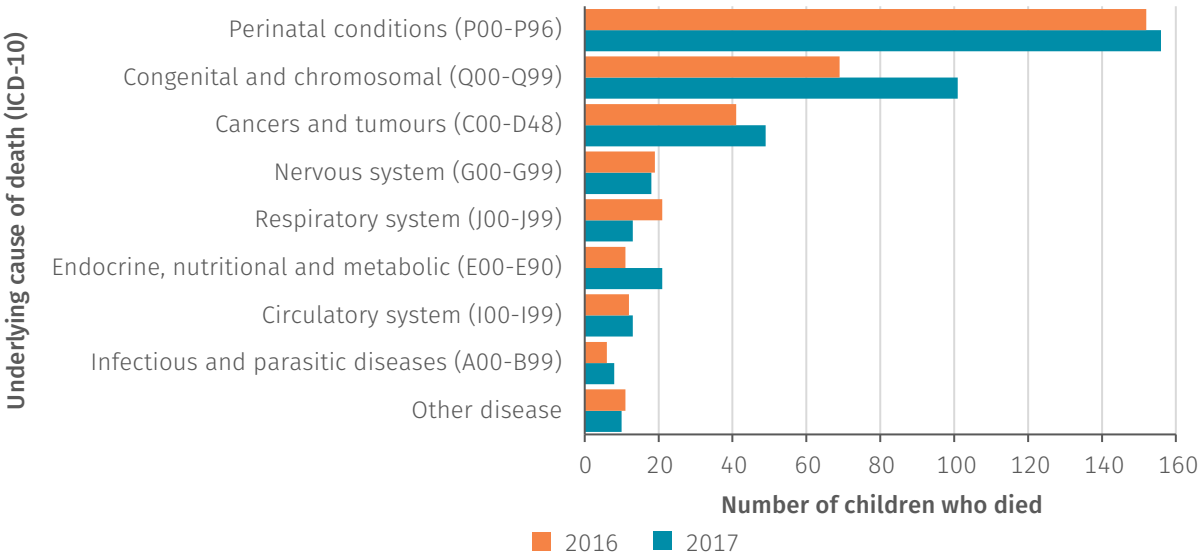
Over the two-year period 2016-17, 731 children aged 0-17 years died in NSW from natural causes. This represents 75% of all children who died in NSW over the same period, a rate of 21 deaths per 100,000 children.

This chapter examines trends in the mortality rate from natural causes across three time periods between 2003 and 2017.[30] We examine variations in trends based on age, gender and Aboriginal and Torres Strait Islander status (Appendix 6).

This chapter also examines underlying causes of death according to the International Classification of Disease 10th Revision (ICD-10).[31] For each ICD-10 classification, we summarise the most common causes of death over the past 15 years – and summarise the causes of death for 2016 and 2017.

Consistent with previous years, the majority of deaths from natural causes in 2016 and 2017 were from perinatal conditions (308; 42%), congenital and chromosomal conditions (170; 23%), followed by cancers and tumours (90; 12%) (Figure 14).

Figure 14. Deaths from natural causes of children aged 0-17 years, 2016 and 2017



In the period 2016-17, the deaths of 17 children who died from natural causes were reviewable by the Ombudsman because they were in the care of the state or a service provider.

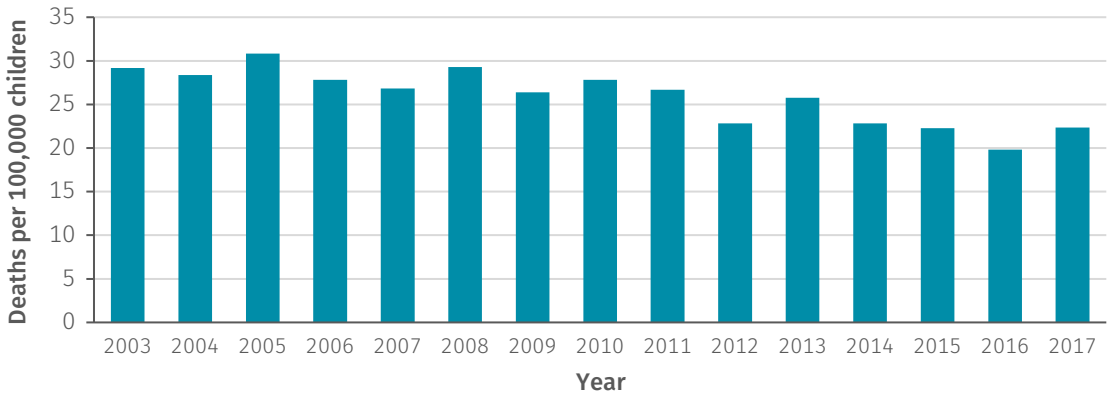
30. We examined changes in mortality rates between five year periods – 2003-07, 2008-12, 2013-17.
31. ICD diseases where less than 1 per cent of deaths occurred are not discussed.

5.1. Trends in deaths from natural causes in NSW, 2003-17

Over the 15 years to 2017, of the 8,567 children who died in NSW, almost three quarters were due to natural causes (6,376).

The mortality rate from natural causes significantly declined by 23% – from 29.2 deaths per 100,000 in 2003 to 22.4 in 2017 (Figure 15). The annual rate peaked at 30.8 in 2005 and reached its lowest at 19.8 in 2016.

Figure 15. Deaths from natural causes of children aged 0-17 years, 2003-17

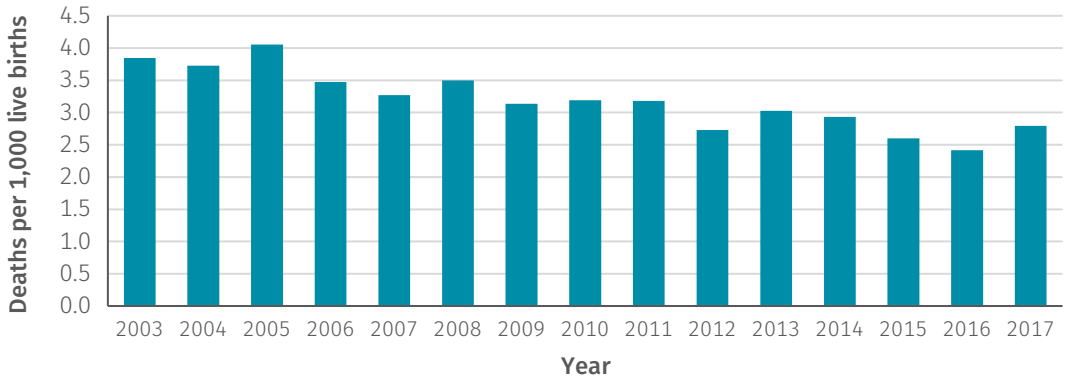


5.1.1. Age

Over the 15 years to 2017, almost three quarters of children who died from natural causes were infants aged under one year (4,556; 71%). These are discussed in further detail in Section 5.10.1.

From 2003-17, the infant mortality rate from natural causes significantly declined by 27% – from 3.85 to 2.80 deaths per 1,000 live births (Figure 16). This has been attributed to immunisation programs against vaccine preventable diseases (section 5.10.2), improved sanitation and hygiene, and improved neonatal health care.[32]

Figure 16. Deaths from natural causes of infants, 2003-17



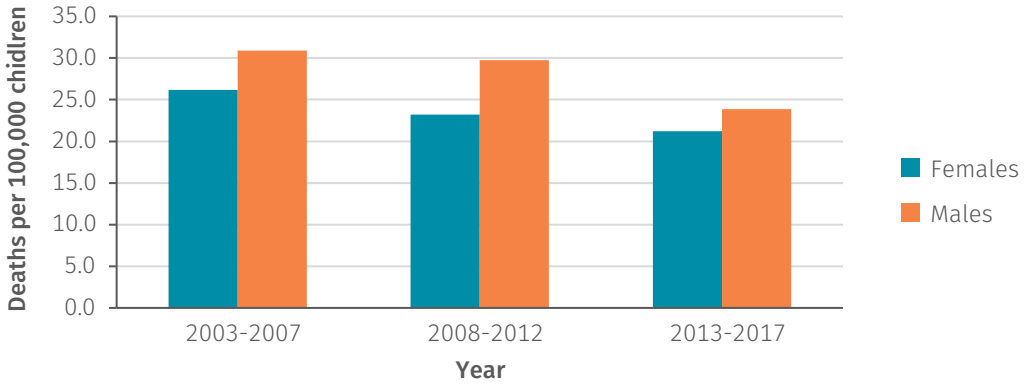
In the period 2003-07, a significant decline in the rate from natural causes only occurred for children aged 1-4 years. However, after 2007 the rates for all age groups have remained similar.

32. Australian Institute of Health and Welfare 2018, Deaths in Australia, Cat.no. PHE 229. AIHW, Canberra.

5.1.2. Gender

The mortality rate from natural causes significantly declined for both genders. The rate was significantly higher for males than females in the two periods before 2013. However, this gender difference was no longer significant in the most recent 2013-17 period (Figure 17).

Figure 17. Deaths from natural causes of children aged 0-17 years by gender, 2003-17

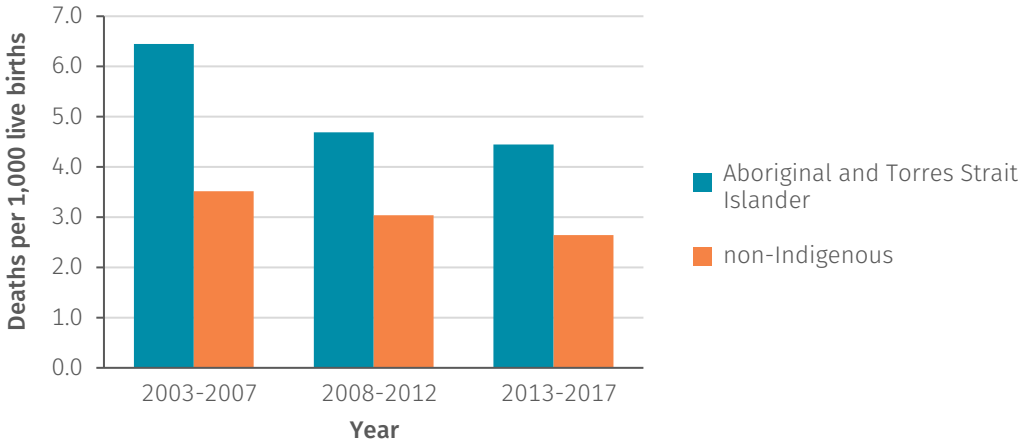


5.1.3. Aboriginal and Torres Strait Islander status

Over the 15 years to 2017, the infant mortality rate from natural causes has declined for both Indigenous[33] and non-Indigenous infants. However, the rate has remained significantly higher for Indigenous infants and was 1.7 times as high in the 2013-17 period (Figure 18).

For children aged 1-17 years, there has been no significant difference in the mortality rate from natural causes between Indigenous and non-Indigenous children.

Figure 18. Deaths from natural causes of infants by Aboriginal and Torres Strait Islander status, 2003-17



5.2. Deaths from conditions originating in the perinatal period

Perinatal conditions originate during pregnancy or up to 28 completed days after birth. It includes conditions such as prematurity, respiratory and cardiovascular disorders, haemorrhagic and haematological disorders, and complications of pregnancy. Although the conditions originate during the perinatal period, they can result in death later in life.

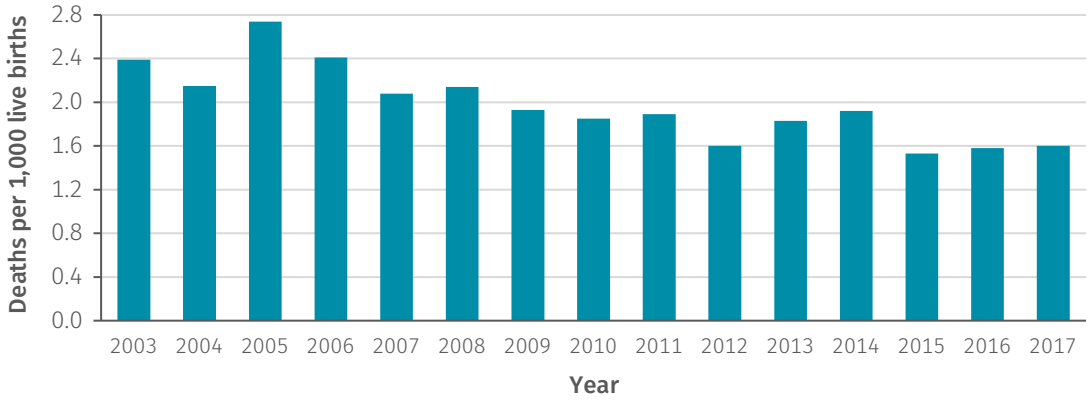
33. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.

5.2.1. Trends

Over the 15 years to 2017, perinatal conditions accounted for more than half (2,819; 53%)[34] of the 5,265 infants who died in NSW.

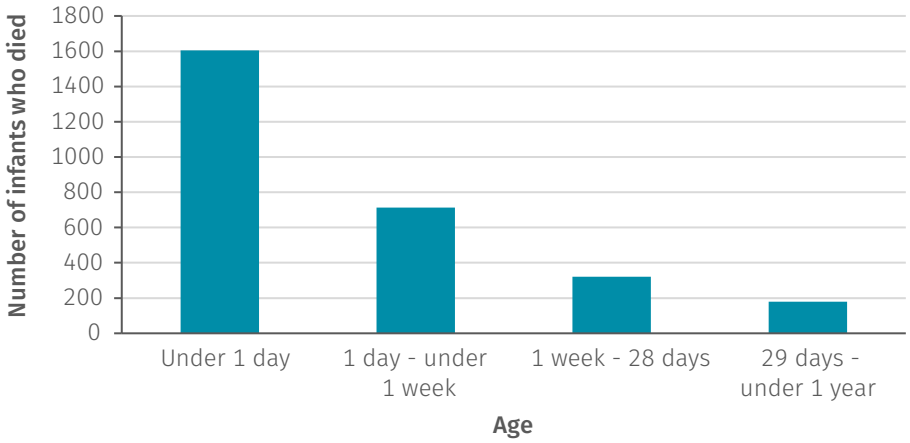
Between 2003-17, the infant mortality rate from perinatal conditions significantly declined by 33% – from 2.4 to 1.6 deaths per 1,000 live births (Figure 19).

Figure 19. Deaths from perinatal conditions of infants, 2003-17



As shown in Figure 20, nine out 10 infants who died from perinatal conditions (2,640), died in the neonatal period and more than half were under a day old (1,605).

Figure 20. Deaths from perinatal conditions in infants by age, 2003-17

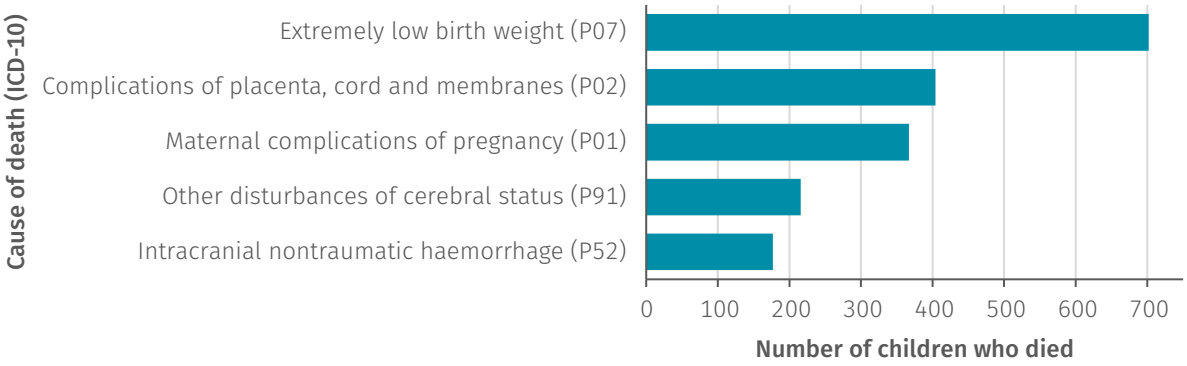


The infant mortality rate from perinatal conditions has remained significantly higher for male infants. In the 2013-17 period, it was 1.3 times as high for males as for females. The rate was also higher for Indigenous infants. In the period 2013-17, it was 1.8 times as high for Indigenous as for non-Indigenous infants.

Since 2003, 44 different perinatal conditions were recorded as an underlying cause of death for infants. As shown in Figure 21, the leading cause was extremely low birth weight of 999 grams or less – accounting for a quarter of deaths during this period (702; 25%).

34. An additional 23 children aged one year and above died from perinatal conditions.

Figure 21. Leading causes of death from perinatal conditions for infants, 2003-17



5.2.2. Children who died in 2016 and 2017

In NSW, 152 infants in 2016 and 155 infants in 2017 died from perinatal conditions. For these 307 infants, the main causes of death were:

- Maternal complications of pregnancy (135; 43%) – including premature rupture of membranes, incompetent cervix or infection of the membranes.
- Disorders relating to length of gestation and foetal growth (66; 21%) – the majority of these deaths were due to extreme prematurity of less than 24 completed weeks of gestation.
- Respiratory and cardiovascular disorders (32; 10%) – including chronic neonatal lung disease and pulmonary haemorrhage.
- Other disturbances of cerebral status (24; 8%) – this was mostly due to hypoxic ischaemic encephalopathy, a brain injury from oxygen deprivation.
- Haemorrhagic and haematological disorders (16; 5%).
- Infections in the perinatal period (10; 3%) – mostly due to bacterial sepsis of newborn.

5.3. Deaths from congenital malformations, deformations and chromosomal abnormalities

Congenital and chromosomal conditions are structural, functional or metabolic abnormalities that are present since birth.[35] These include anatomical defects such as congenital heart malformations and neural tube defects, or disorders with developmental consequences such as Down's syndrome and cerebral palsy.

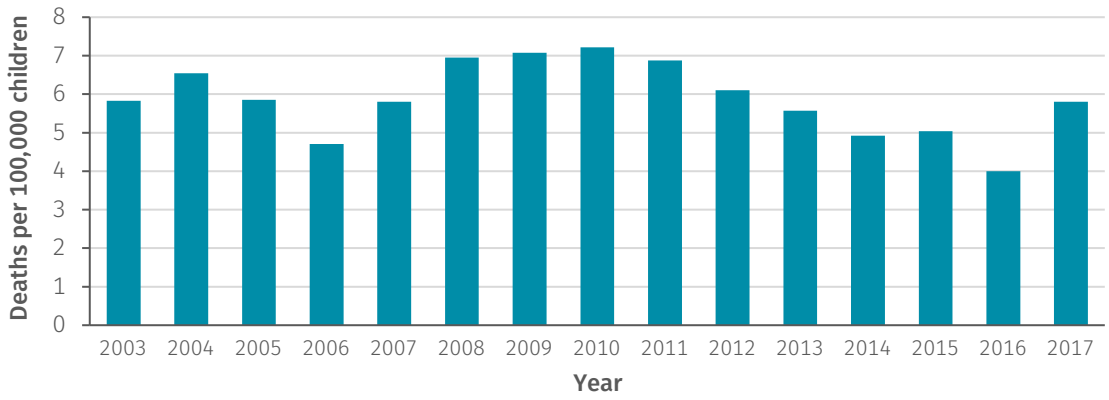
5.3.1. Trends

Over the 15 years to 2017, congenital and chromosomal conditions accounted for 1,449 children who died in NSW (Appendix 6). The majority of children who died were infants (1,230; 84%).

Between 2003 and 2017, the overall mortality rate from congenital and chromosomal conditions did not change (Figure 22). There were age specific differences, with the mortality rate for children aged 1-17 years decreasing by 53% – while the infant mortality rate increased by 9.2% during this period.

35. Australian Institute of Health and Welfare 2018. Australia's Health 2018. Cat no. 16. AUS 221. AIHW, Canberra.

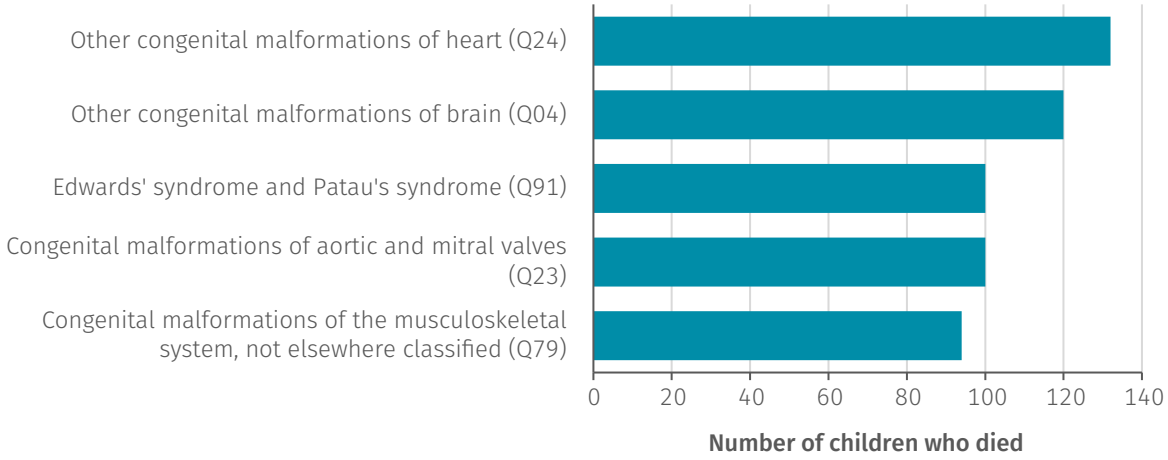
Figure 22. Deaths from congenital and chromosomal conditions of children aged 0-17 years, 2003-17



Over the 15 years to 2017, there has been no significant difference in the mortality rate from congenital and chromosomal conditions between genders or Indigenous and non-Indigenous children.

Since 2003, 55 different congenital and chromosomal conditions were recorded as an underlying cause of death for children. As shown in Figure 23, the leading cause was other congenital malformations of the heart (132; 9%).

Figure 23. Leading causes of death from congenital and chromosomal conditions of children aged 0-17 years, 2003-17



5.3.2. Children who died in 2016 and 2017

In NSW, 69 children in 2016 and 101 children in 2017 died from congenital and chromosomal conditions. For these 170 children, the main causes of death were:

- Congenital malformations of the circulatory system (61; 36%), mostly due to hypoplastic left heart syndrome.
- Congenital malformations of the nervous system (35; 21%), including spina bifida and other neural tube defects.
- Other congenital malformations (23; 14%) and congenital malformations of the musculoskeletal system (17; 10%).
- Chromosomal abnormalities (12; 7%), including Edward's syndrome, Patau's syndrome and Down's syndrome.

5.4. Deaths from cancers and tumours

Cancers and tumours are caused by the uncontrolled division of abnormal cells in a part of the body. These abnormal cells damage surrounding tissues or spread to other parts of the body.

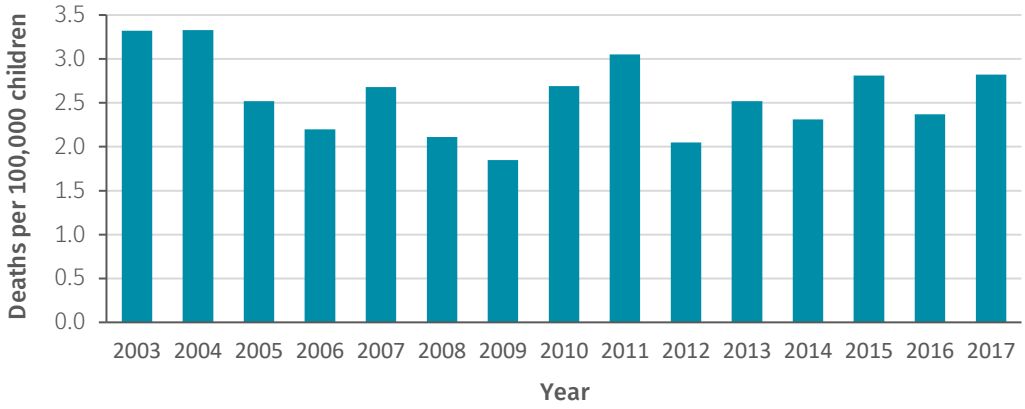
According to the Australian Childhood Cancer Registry (ACCR), over the 15 years to 2014, the mortality rate from cancer in children aged 0-14 years reduced by 48% – from 4.0 to 2.1 per 100,000 children.[36] However, the overall rate of newly diagnosed cancers increased during this period and was highest for children aged 0-4 years. The most common cancers diagnosed were leukaemia, followed by cancers of the central lymphomas – all of which had increased incidence rates during this period.

5.4.1. Trends

Over the 15 years to 2017, cancers and tumours accounted for 635 children who died in NSW (Appendix 6). The majority of children who died were under 5 years old (205; 32%).

There has been no significant change in the overall mortality rate from cancers and tumours. As shown in Figure 24, the annual rate continued to fluctuate between 3.3 and 1.9 over the 15-year period.

Figure 24. Deaths from cancers and tumours of children aged 0-17 years, 2003-17

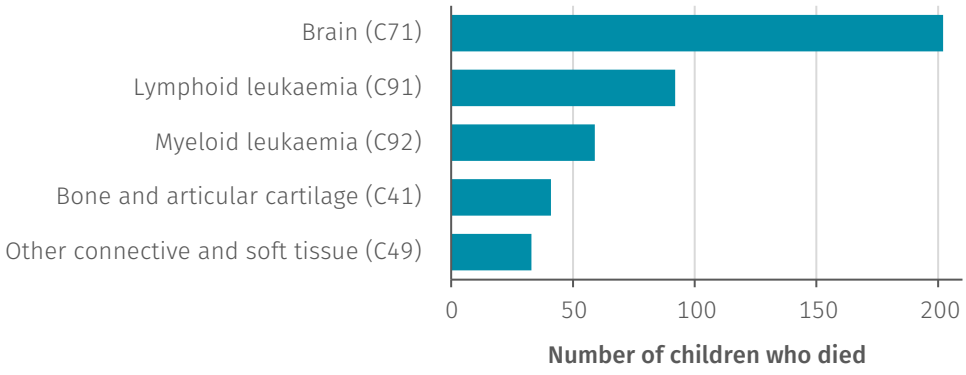


Over the 15-year period, the rate for cancers and tumours has remained highest for young people aged 15-17 years. There was no change in the rate for any age group over the period, except for infants, which significantly declined before 2008. However, from 2009 there has been no change in the infant mortality rate.

The mortality rate from cancers and tumours has remained similar for males and females, and lower for Indigenous children compared with non-Indigenous children.

Over the 15 years to 2017, 48 types of cancers and tumours were recorded as an underlying cause of death for children. As shown in Figure 25, a third of children died from cancers of the brain (202; 32%), followed by lymphoid leukaemia (92; 14%) and myeloid leukaemia (59; 9%).

Figure 25. Leading causes of death from cancers and tumours for children aged 0-17 years, 2003-17



36. Australian Childhood Cancer Registry 2018. Australian Childhood Cancer Statistics Online, accessed from https://cancerqld.org.au/research/queensland-cancer-statistics/accr/ on 11 September 2018.

5.4.2. Children who died in 2016 and 2017

In NSW, 41 children in 2016 and 49 children in 2017 died from cancers and tumours. For these 90 children, the main causes of death included:

- Cancer of the brain and central nervous system (40; 44%) – mostly of the brain and cerebellum.
- Leukaemia (21; 23%) – mostly due to acute lymphoblastic leukaemia. This is the most commonly diagnosed childhood cancer with a peak incidence in children aged 1-4 years old.[37]
- Neuroblastoma – cancers of the nerve tissue and commonly arising in the adrenal glands (8; 9%).
- Cancers of the bone and articular cartilage (7; 8%).

We reviewed additional information on a sample of 20 children who died from cancers of the brain. All children died receiving palliative care except one, who was receiving active treatment for their cancer. No issues with treatment toxicity or adverse incidents leading to and NSW Health Root Cause Analysis or incident reports were identified.

5.5. Deaths from nervous system diseases

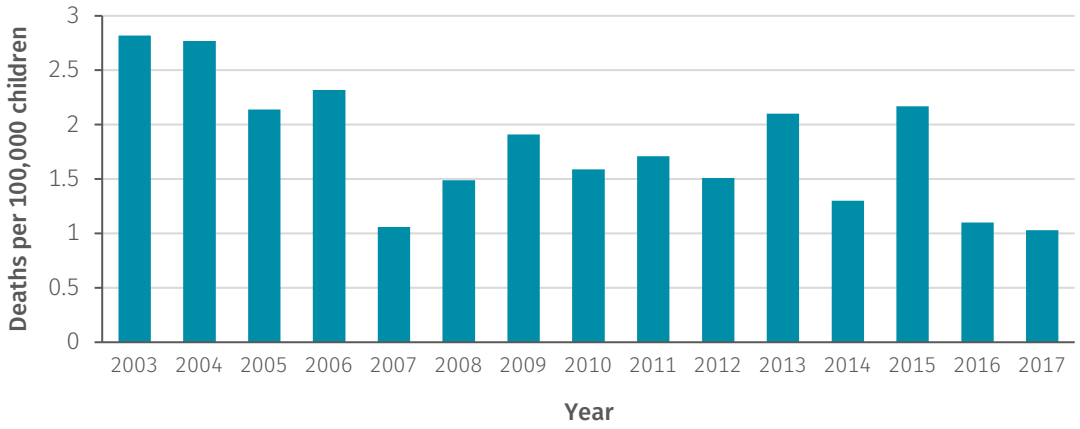
Diseases of the nervous system can affect the brain and spinal cord or the peripheral nervous system. They include diseases such as epilepsy, cerebral palsy, multiple sclerosis, muscular dystrophy and inflammatory diseases of the nervous system.

5.5.1. Trends

Over the 15 years to 2017, nervous system diseases accounted for 442 children who died in NSW (Appendix 6). The majority of children who died were infants (144; 33%).

The mortality rate from nervous system diseases significantly declined by 63%, from 2.8 to 1.0 deaths per 100,000 children (Figure 26). The rate for 2017 was the lowest observed during this period.

Figure 26. Deaths from nervous system diseases of children aged 0-17 years, 2003-17



Over the past 15 years, the mortality rate from nervous system diseases declined for all age groups examined. The rate has remained highest among infants. A gender difference in the rate has decreased over time and in the 2013-17 period it was the same for both genders.

As shown in Figure 27, the mortality rate for nervous system diseases increased for Aboriginal and Torres Strait Islander children but decreased for non-Indigenous children. In the period 2013-17, the rate was 1.7 times as high for Indigenous as for non-Indigenous children.

37. Australian Childhood Cancer Registry 2018. Australian Childhood Cancer Statistics Online, accessed from https://cancerqld.org.au/research/queensland-cancer-statistics/accr/ on 11 September 2018.

Figure 27. Deaths from nervous system diseases of children aged 0-17 years by Aboriginal and Torres Strait Islander status, 2003-17

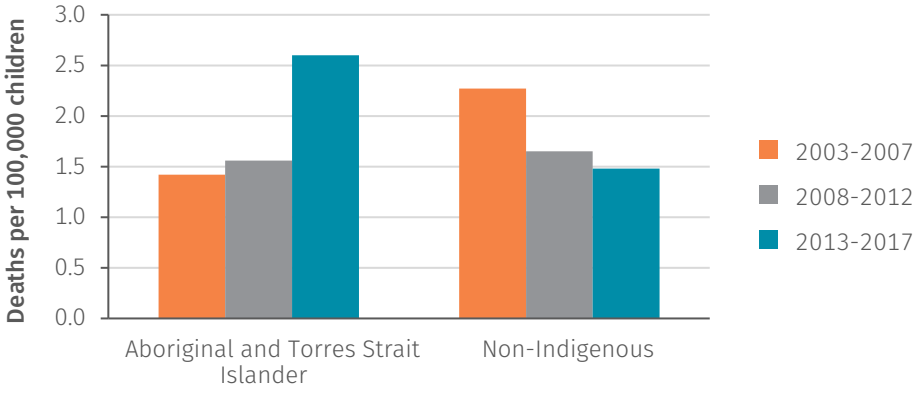
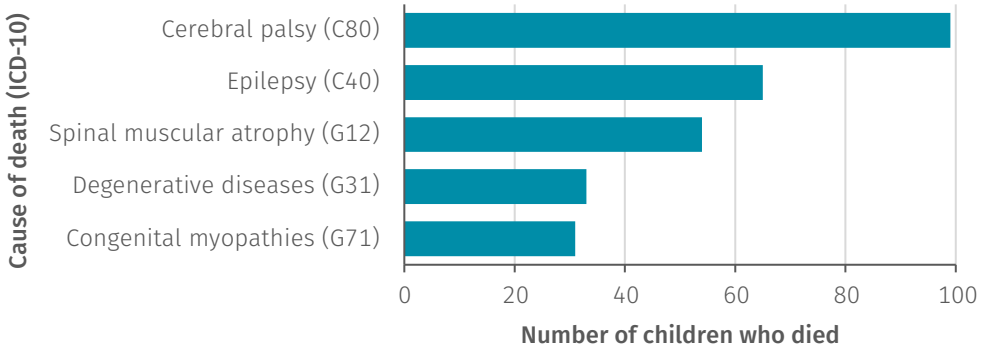


Figure 28 shows the most common causes of death from nervous system diseases over the past 15 years. Almost a quarter of these deaths were due to cerebral palsy (99; 22%), followed by epilepsy (65; 15%) and spinal muscular atrophy (54; 12%).

Figure 28. Leading causes of death from nervous system diseases of children aged 0-17 years, 2003-17



5.5.2. Children who died in 2016 and 2017

In NSW, 19 children in 2016 and 18 children in 2017 aged between 0-17 died from nervous system diseases. Of these 37 children:

- Nine children died as a result of epilepsy.
- Eight children died as a result of cerebral palsy.
- Six children died as a result of spinal muscular atrophy.
- Five children died from inflammatory diseases of the central nervous system, mostly due to bacterial meningitis.
- Five children died from diseases of the myoneural junction or muscle.
- Two children died from degenerative diseases, and another two children died as a result of other disorders.

5.6. Deaths from respiratory system diseases

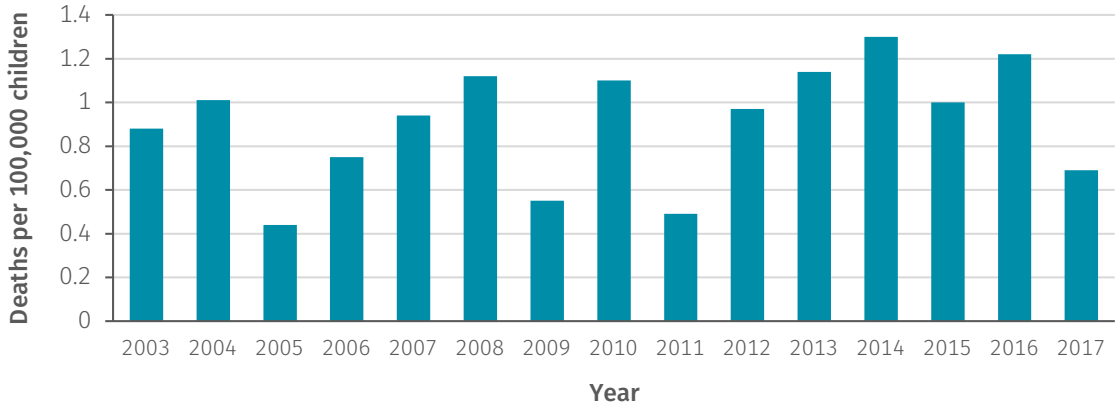
Diseases of the respiratory system can be acute or chronic. They include upper and lower respiratory infections, pneumonia, asthma and bronchitis. While influenza is common infectious disease, it is classified as a respiratory disease according to the ICD-10 and reported in this section. Influenza is also considered vaccine preventable and is further discussed in section 5.10.2.

5.6.1. Trends

Over the 15 years to 2017, respiratory diseases accounted for 225 children who died in NSW (Appendix 6). The majority of deaths occurred in children aged 0-4 years (140; 62%).

Over the 15-year period, there has been no significant change in the mortality rate from respiratory diseases as the annual rates continued to fluctuate (Figure 29). However, the rate for 2017 of 0.8 deaths per 100,000 children was the lowest observed since 2011. Over the 15 years, the mortality rate from respiratory disease has remained highest for infants despite a decline in the overall infant mortality rate. However, the rate has increased for all other age groups except for children aged 5-9 years.

Figure 29. Deaths from respiratory diseases of children aged 0-17 years, 2003-17



The mortality rate from respiratory disease has remained significantly higher for males than females. In the 2013-17 period, it was 1.4 times as high for male children as for female children. It has also remained higher for Indigenous children as for non-Indigenous children, and was 1.9 times as high in the 2013-17 period.

Since 2003, 49 different respiratory diseases were recorded as an underlying cause of death for children. As shown in Figure 30, the most common causes of death included:

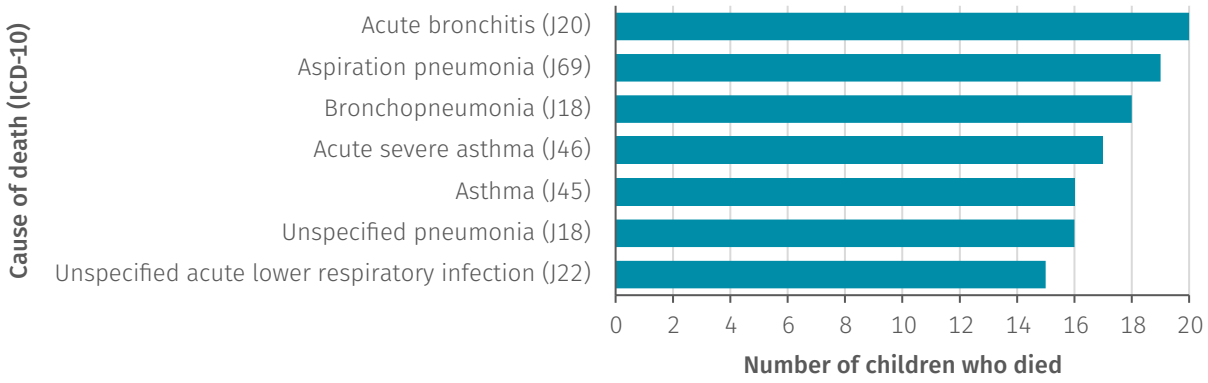
- Acute lower respiratory infections such as acute bronchitis (20 children).
- Aspiration pneumonia due to inhalation of food or vomit (19 children). These children often have a background of developmental conditions associated with recurrent aspiration.
- Unspecified pneumonia such as bronchopneumonia (18 children).
- Asthma (16 children) and acute severe asthma (17 children).

The children who died from asthma and acute severe asthma were aged five years and above and predominantly male. Previously, we conducted a review of 20 children who died from asthma in the 10-year period between 2004 and 2013.[38] The majority of children had factors that may have increased their risk, including:

- sub-optimal levels of asthma control
- insufficient follow-up after a hospital presentation or admission for asthma
- poor adherence to medication
- lack of a written asthma action plan
- exposure to tobacco smoke.

38. NSW Child Death Review Team 2013, Annual Report 2013. NSW Ombudsman, Sydney.

Figure 30. Leading causes of death from respiratory diseases for children aged 0-17 years, 2003-17



5.6.2. Children who died in 2016 and 2017

In NSW, 21 children in 2016 and 13 children in 2017 died from respiratory diseases. Of these 34 children:

- 13 children died from pneumonia due to viral, bacterial and unspecified infections. Most were aged under five years old (12).
- Seven children died from influenza due to an identified seasonal virus. Most were aged five years and above (5). Influenza is the most common vaccine preventable disease in Australia,[39] and is further discussed in section 5.10.2
- Seven children died from asthma. These were chronic (2) and acute severe asthma (5). All children were five years of age and above.
- Two children died from acute upper respiratory infections and two children from acute lower respiratory infections. All were under five years of age.
- Two children died from aspiration pneumonia due to inhalation of food or vomit.
- One child died from tracheostomy malfunction.

5.7. Deaths from circulatory system diseases

Diseases of the circulatory system include cardiovascular disease, cerebrovascular disease and diseases of the blood vessels. Many of these diseases start early in childhood and progress with age.

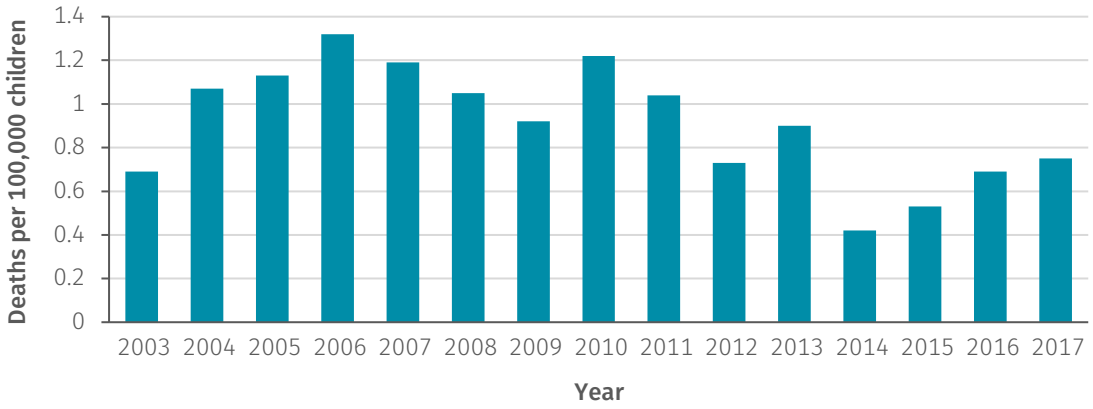
5.7.1. Trends

Over the 15 years to 2017, circulatory system diseases accounted for 223 children who died in NSW. Almost half of these children were under five years of age (103; 46%).

Since 2012, the mortality rate from circulatory system diseases has remained lower than 1 death per 100,000 children (Figure 31). The decline mostly reflects a significant decline in the mortality rate for females.

39. Australian Technical Advisory Group on Immunisation. Australian immunisation handbook. Australian Government Department of Health, Canberra, 2018.

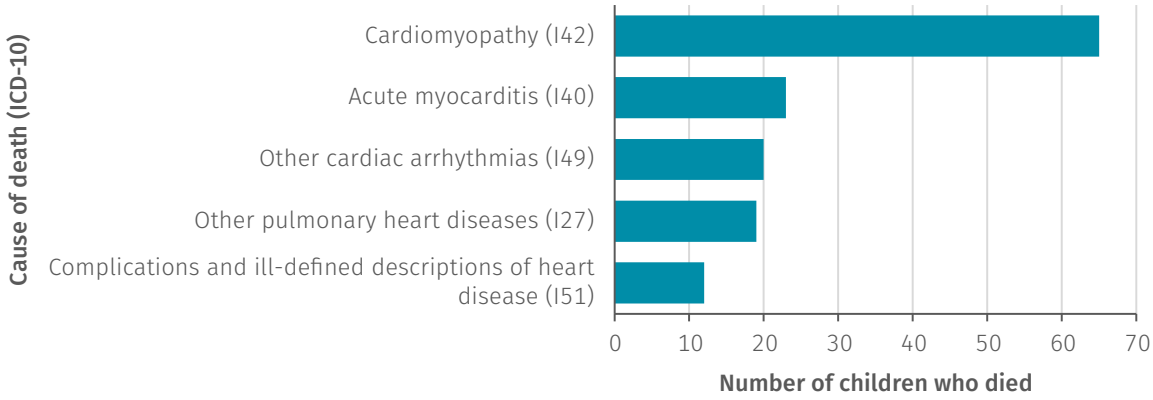
Figure 31. Deaths from circulatory diseases of children aged 0-17, 2003-17



Over the 15 years, the rate has remained highest for infants. However, there has been a significant decline in the mortality rate from circulatory diseases for children aged 15-17 years.

Over the last 15 years, 32 different circulatory diseases were recorded as the underlying cause of death for children. As shown in Figure 32, the leading cause of death from circulatory diseases was cardiomyopathy (65; 29%) – a disease in which the heart becomes enlarged, thickened or dilated. This was followed by acute myocarditis (23; 10%), which is inflammation of the heart muscle. The remaining major causes were cardiac arrhythmia (20; 9%), pulmonary heart disease (19; 8%) and complications of heart disease (12; 5%).

Figure 32. Leading causes of death from circulatory diseases of children aged 0-17 years, 2003-17



5.7.2. Children who died in 2016 and 2017

In NSW, 12 children in 2016 and 13 children in 2017 died from circulatory diseases.
Of these 25 children:

- Seven children died from cardiomyopathy.
- Four children died from infective myocarditis.
- Three children died from pulmonary hypertension.
- Two children died from cardiac arrhythmia.

The remaining nine children each died from a separate circulatory disease such as non-rheumatic mitral valve disorder and congestive heart failure.

The two deaths from cardiac arrhythmia were considered to be sudden cardiac deaths. These are unexplained or presumed arrhythmic sudden death in a child or young person with previously unknown cardiac disease.

5.8. Deaths from endocrine, nutritional and metabolic diseases

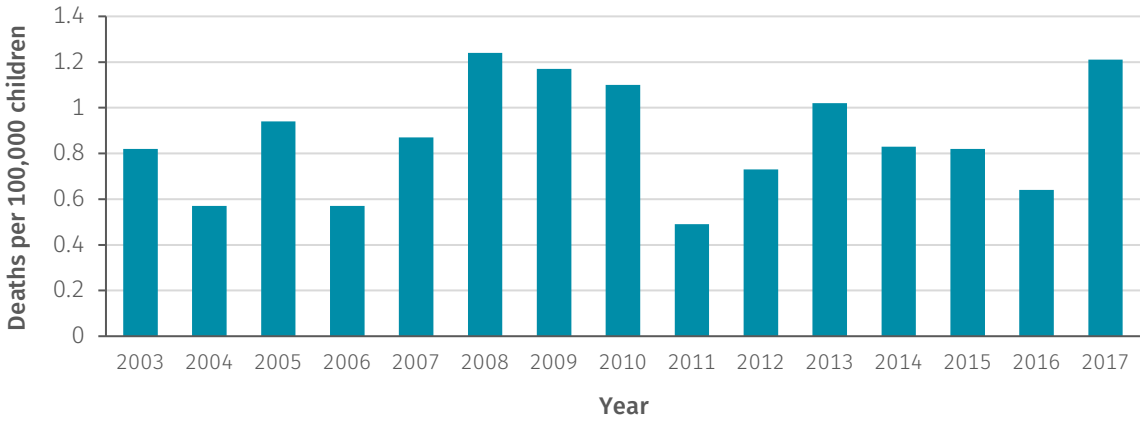
Endocrine, nutritional and metabolic diseases (ICD Codes E00-E90) include a wide range of conditions such as diabetes, cystic fibrosis and other rare metabolic disorders. Although some conditions can be treated, many affect the function of multiple organs and often have life-threatening consequences.

5.8.1. Trends

Over the 15 years to 2017, endocrine, nutritional and metabolic diseases accounted for 214 children who died in NSW (Appendix 6). More than half of these children were aged 0-4 years old (122; 57%).

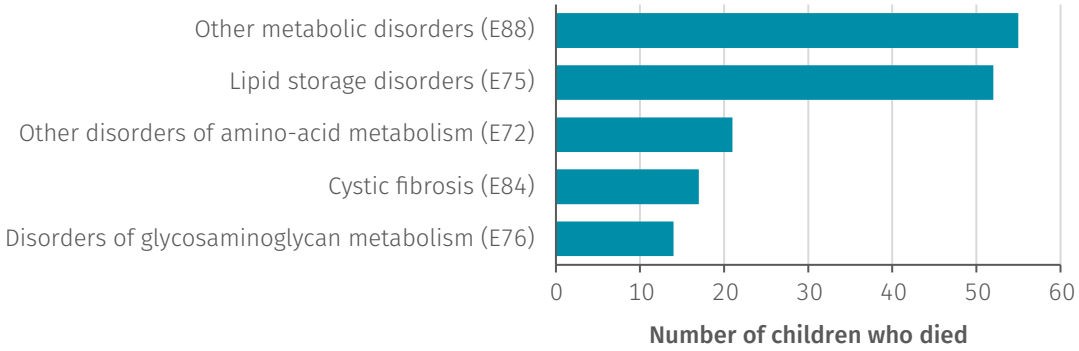
There has been no significant change in the mortality rate from endocrine, nutritional and metabolic diseases. The annual rate for 2017 was the highest since 2008 at 1.2 deaths per 100,000 children (Figure 33). The rate has also remained highest among infants.

Figure 33. Deaths from endocrine, nutritional and metabolic diseases of children aged 0-17 years, 2003-17



Over the last 15 years, 20 different endocrine, nutritional and metabolic disorders were recorded as an underlying cause of death for children. As shown in Figure 34, the majority of deaths were due to other metabolic disorders (55; 26%), as well as lipid storage disorders (52; 24%). This was followed by other disorders of amino-acid metabolism (21; 10%), cystic fibrosis (17; 8%) and disorders of glycosaminoglycan metabolism (14; 7%).

Figure 34. Leading causes of death from endocrine, nutritional and metabolic disorders for children aged 0-17 years, 2003-17



5.8.2. Children who died in 2016 and 2017

In NSW, 11 children died in 2016 and 21 died in 2017 and they were all due to metabolic disorders. Of the 32 children, the majority died from lipid storage disorders (15), followed by cystic fibrosis (4).

Many of the children had related complications with other systems such as the circulatory, respiratory and digestive system as a result of their condition.

5.9. Deaths from infectious diseases

Infectious diseases are caused by pathogenic organisms including bacteria, viruses and parasites.[40] They are also referred to as communicable diseases as they are transmitted from person to person through direct or indirect contact. Children are at increased risk of some infectious diseases because they may not have developed an adequate immunity to them. In addition, children are exposed to large crowds through educational and recreational activities such as sports. Some may also have difficulty with some aspects of hygiene.

Immunisation has successfully reduced the number of child deaths from infectious diseases. The current National Immunisation Program (NIP) provides funded vaccination to protect against 17 infectious diseases for eligible people.[41] Vaccine preventable diseases are further discussed in section 5.10.2.

The *Public Health Act 2010* requires certain infectious diseases to be notified to public health authorities in NSW for surveillance as they may pose a significant risk to public health. For example, schools and child care centres are required to notify their local public health unit if they are aware that a child has a vaccine preventable disease – including diphtheria, mumps, poliomyelitis, haemophilus influenza type b (Hib), meningococcal disease, rubella, measles, pertussis (whooping cough) or tetanus.[42]

5.9.1. Trends

Over the 15 years to 2017, infectious diseases accounted for 148 children who died in NSW (Appendix 6). Almost three quarters of children were aged 0-4 years (109; 74%). More than a tenth (16; 11%) were Aboriginal and Torres Strait Islander children.

Over the 15-year period, there has been a significant decline in the mortality rate from infectious diseases – despite a peak of 1.3 deaths per 100,000 children in 2006 (Figure 35). The rate was also highest among infants.

The rate has also significantly declined for male children, and in the period 2013-17 there was no significant difference between genders.

The rate for both Indigenous and non-Indigenous children has also significantly declined. In the period 2013-17, there was no longer a significant difference between Indigenous and non-Indigenous children.

Figure 35. Deaths from infectious diseases of children aged 0-17 years, 2003-17

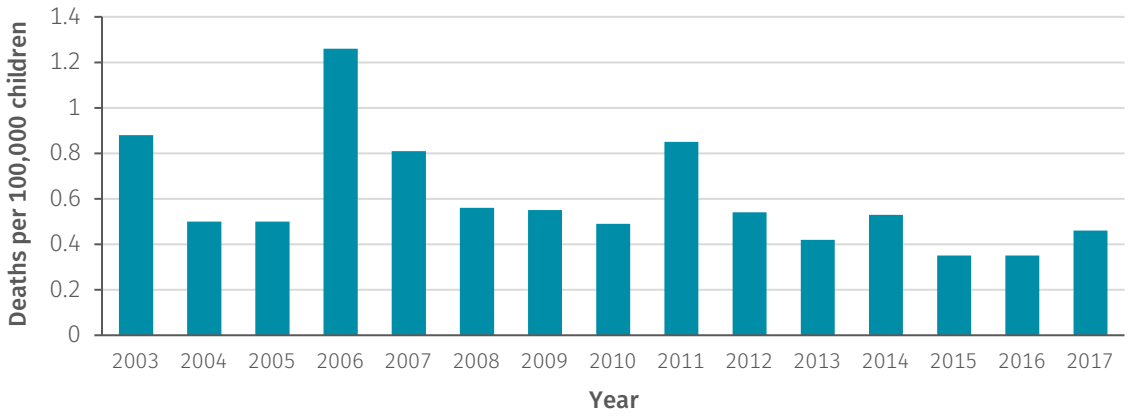
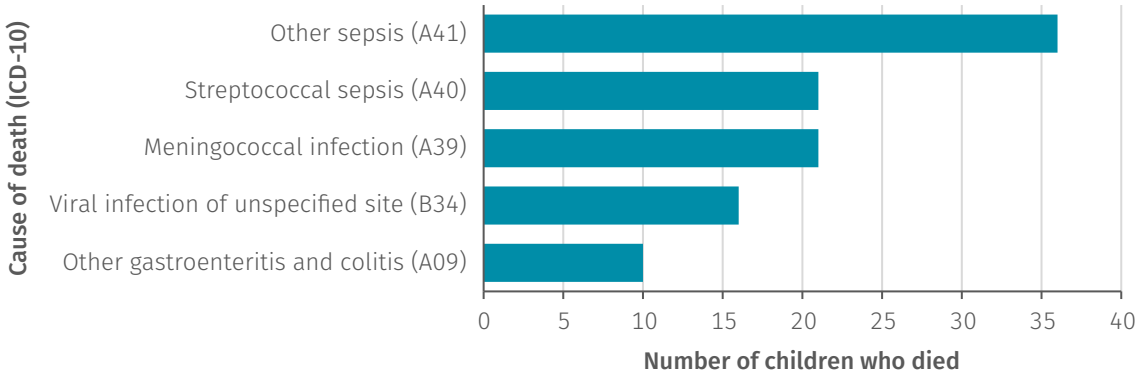


Figure 36 shows the leading causes of death from infectious diseases for the past 15 years. The leading cause of death was sepsis (57; 39%), including 36 children who died from streptococcus infection and 21 from other infections. This was followed by meningococcal infection (21; 14%).

40. Influenza, while an infectious disease has been included in Section 5.6 for respiratory diseases as per ICD-10 classification.
41. Australian Technical Advisory Group on Immunisation. Australian immunisation handbook. Australian Government Department of Health, Canberra, 2018.
42. NSW Ministry of Health 2018, Disease notification, accessed from https://www.health.nsw.gov.au/infectious/pages/notification.aspx on 26 September 2018.

Previously, we made recommendations for the vaccination of specific groups in a review of vaccine preventable diseases in NSW between 2005 and 2014.[43] This included vaccines against meningococcal B disease for all Australian children.

Figure 36. Leading causes of death from infectious disease for children aged 0-17 years, 2003-17



5.9.2. Children who died in 2016 and 2017

In NSW, six children died in 2016 and eight children died in 2017 from infectious diseases.

Of these 14 children:

- Six children died from sepsis due to Group A streptococcus. Two of these occurred in infants.
- Three children died from other sepsis due to Escherichia coli, haemophilus influenzae and an unspecified pathogen. All were children under five years old.
- One child died from meningococcal disease, and another from a salmonella infection.
- One child died from viral myocarditis and another from enterovirus infection.
- One child died from a parasitic infection.

5.10. Reviews of certain groups in 2016 and 2017

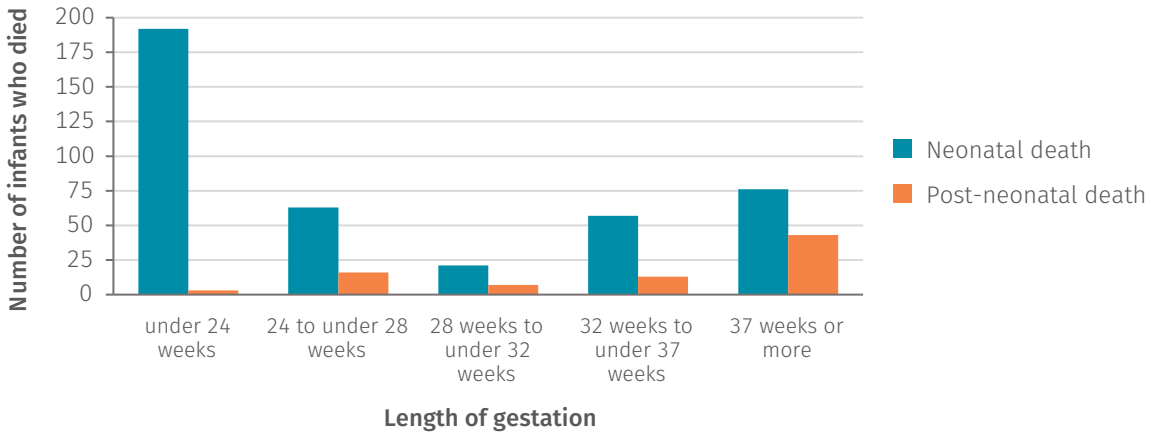
5.10.1. Infants who died from natural causes

We reviewed additional information for 502 infants who died from natural causes in 2016 and 2017. Four in every five infants died in the neonatal period, under 29 days of age (411).[44]

As shown in Figure 37, four in five infants (333) who died during the neonatal period were born prematurely, at less than 37 weeks of gestation.[45] Almost half (192) were extremely premature, at under 24 weeks of gestation. In contrast, almost half (43) of the 91 infants who died in the post-neonatal period were born term, at 37 weeks of gestation or more.

43. NSW Child Death Review Team 2016, Child deaths from vaccine preventable infectious diseases, NSW 2005-2014, prepared by the National Centre for Immunisation Research and Surveillance. NSW Ombudsman, Sydney.
44. 253 infants were under one-day old, 93 were one day to one week old and 65 were more than one week to under 29 days old.
45. Length of gestation was not available for 11 infants.

Figure 37. Length of gestation of infants who died from natural causes, 2016 and 2017

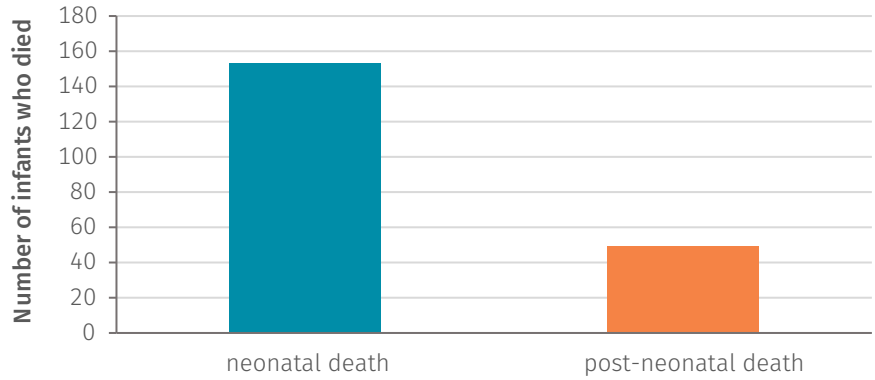


Congenital and chromosomal abnormalities

Two in every five of the infants (202) had a congenital or chromosomal condition that contributed to their death. As shown in Figure 38, three quarters of these infants died in the perinatal period (153).

The majority had congenital malformations of the circulatory system (51), congenital malformations of the nervous system (39), and chromosomal abnormalities (31). Almost a third of infants (60) with congenital or chromosomal conditions were not diagnosed during the antenatal period.[46]

Figure 38. Congenital and chromosomal abnormalities of infants who died from natural causes, 2016 and 2017



Infection

A previous infection that contributed to death was identified in almost one fifth (90) of infants who died from natural causes.

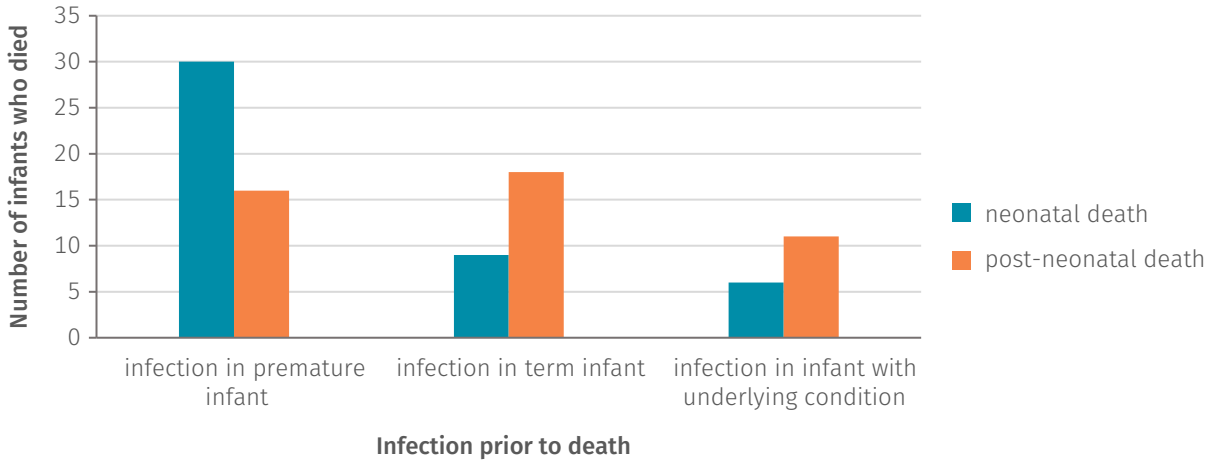
As shown in Figure 39, almost half (46) of these deaths occurred in infants who were born prematurely, where multiple risk factors are present – including low birth weight and an immature immune system. Most of these deaths occurred in the neonatal period.

More than a quarter of deaths related to infection occurred in infants who were born at term – at least 37 weeks of gestation (27) – and the majority of these deaths occurred in the post-neonatal period (18). Of these 18 infants, 16 were classified as SUDI. The cause of their deaths were later explained as deaths due to infection. This is discussed in further detail in chapter 6.

A further 17 infants had an underlying congenital or chromosomal condition that increased their vulnerability to infection.

46. Information on diagnosis was not available for an additional six infants.

Figure 39. Infants with an infection that contributed to death, 2016 and 2017



5.10.2. Children who died from vaccine preventable diseases

Vaccinations available for certain diseases have been a key preventive measure for reducing deaths.[47] In October 2016, we tabled a report in *Parliament on Child Deaths from Vaccine Preventable Infectious Diseases, NSW 2005 – 2014*. The report was the outcome of research we commissioned from the National Centre for Immunisation Research and Surveillance (NCIRS). The NCIRS identified 54 deaths associated with a disease for which a vaccine was provided by the National Immunisation Program (NIP). The report concluded that 23 deaths over the 10 years were preventable or potentially preventable by vaccination. The most common deaths were from influenza, followed by meningococcal disease.

Trends

We identified deaths in the NSW Register of Child Deaths associated with a disease of interest based on ICD-10 coding for underlying causes of death. A disease of interest was defined as a disease for which a vaccine is currently available on the National Immunisation Program (Table 2). Human papillomavirus was not included because this causes disease in adulthood.

Table 2. Diseases of interest

Diphteria	Meningococcal disease	Rotavirus
Haemophilus influenzae	Mumps	Rubella
Hepatitits A and B	Pertussis	Tetanus
Influenza	Pneumococcal disease	Varicella
Measles	Poliomyelitis	

A death was considered vaccine-preventable according to the framework below (Table 3). Vaccines protect against specific subtypes of a disease. For example, funded vaccines against meningococcal disease in Australia on the NIP from 2003 to June 2018 were available for subtype C, and administered to children at 12 months of age. However, from July 2018, children became eligible to receive a meningococcal vaccine that protects against subtypes A, C, W and Y.

47. Australian Institute of Health and Welfare 2018, Australia's Health 2018. Cat no. 16. AUS 221. AIHW, Canberra.

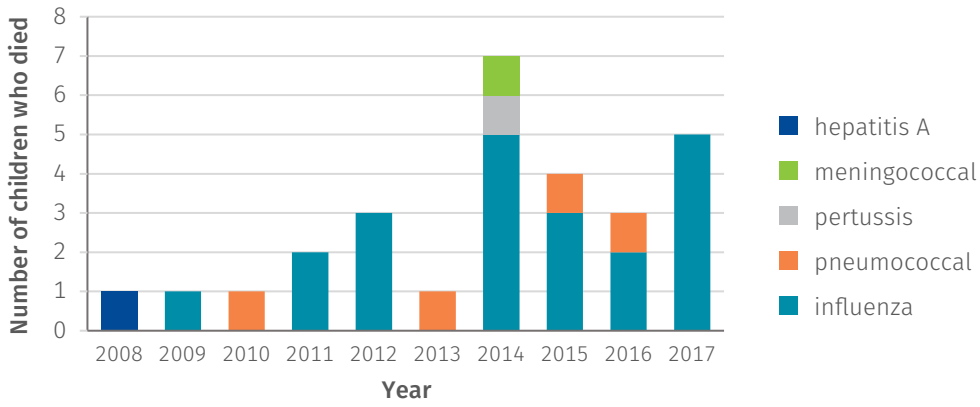
Table 3. Classification for vaccine-preventable death

Preventable	• Vaccine available and child eligible under the National Immunisation Program (NIP)
Potentially preventable	• Vaccine available, however child was not eligible under NIP • Insufficient information about subtype*
Not preventable	• Vaccine not available • Too young to be immunised • Medical contraindication to immunisation • Fully immunised but ineffective immune response

*Insufficient information about subtype to determine if it was in an available vaccine

Over the 10 years to 2017, 29 deaths were considered preventable or potentially preventable by vaccination (Figure 40). The majority of deaths (21) were due to influenza.

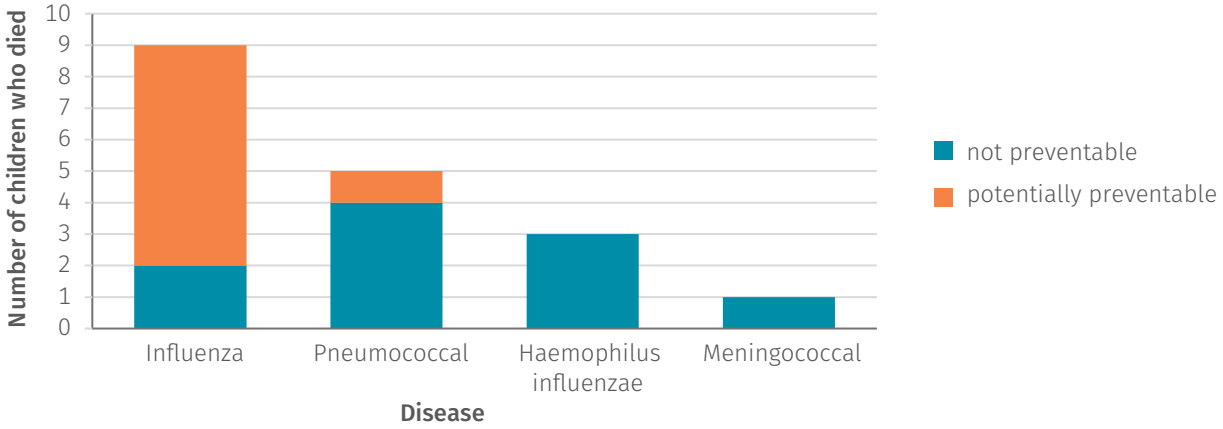
Figure 40. Deaths from preventable and potentially preventable diseases of children aged 0-17 years in NSW, 2008-17



Deaths in 2016 and 2017

In the two-year period 2016-17, 18 deaths were associated with a disease of interest (Figure 41). Eight were considered potentially preventable by vaccination according to the framework.

Figure 41. Children aged 0-17 years who died from potentially preventable diseases in NSW, 2016-17



Potentially preventable deaths

The majority of potentially preventable deaths were due to influenza (7) – predominantly influenza B (5) – and two cases were due to influenza A. There was no additional information on the subtypes of Influenza B and Influenza A to confirm whether the subtypes were available in the influenza vaccine.

One child was documented as having a high risk medical condition and may have been eligible for the influenza vaccine under the National Immunisation Program, but the child's immunisation status was unknown. An additional three children were aged under five years but were not eligible under the NIP at the time, as they did not have a documented high risk medical condition. From April 2018, NSW Health commenced its program for influenza vaccines to all children in NSW aged six months to under five years who are not currently eligible for influenza under the NIP.[48]

One child died from untyped pneumococcal disease – we could not confirm whether the subtype was available in the pneumococcal vaccine.

The remaining 10 deaths were considered non-preventable as a vaccine may not have been available at the time, the child was too young to be immunised according to the NIP, or the child was fully immunised but did not develop an effective immune response.

In the context of the recommendations of the *Child Deaths from Vaccine Preventable Infectious Diseases, NSW 2005 – 2014*, we asked NSW Health to consider the observations and recommendations of the review. In June 2018, NSW Health advised us of a number of strategies targeted at vaccine preventable disease in children.

Some of the key strategies include:

- Having electronic medical record alerts at two children's hospitals to identify high risk children requiring vaccination, and establishing influenza drop-in vaccination clinics.
- Providing free influenza vaccination to all children aged six months to less than five years.
- Promoting pertussis and influenza vaccination during pregnancy, including developing an online education module for maternity staff and midwives as well as other promotional materials.
- Conducting a webinar to inform GPs about the extended National Immunisation Program catch-up vaccine program for 10-19 year olds.

We welcome the actions undertaken by NSW Health to increase vaccination rates among children. We will continue to monitor strategies for vaccine preventable disease in our ongoing work.

5.10.3. Children in out-of-home care who died from natural causes

The 17 children in care who died in 2016 and 2017 as a result of natural causes had a wide range of conditions. Their deaths were most commonly from congenital and chromosomal conditions (8), followed by cancers and tumours (3). The majority (13) were children with disability who had significant health concerns and complex support needs.

Consistent with the age profile of all children in care who died of natural causes over the last 10 years, most of the children were either very young or were adolescents. Seven children were four years of age or younger (including two infants) and seven were aged 15-17 years.

In 2017, more than a third of children living in out-of-home care were Aboriginal (38.1%).[49] Seven of the children in statutory or supported out-of-home care who died from natural causes were Aboriginal and Torres Strait Islander.[50] This proportion of Indigenous children who died in care over the last 10 years has shown little change and reflects the over-representation of Indigenous children in out-of-home care.

48. NSW Health, Immunisation programs, accessed https://www.health.nsw.gov.au/immunisation/Pages/kids-flu-shot.aspx on 14 March 2019.
49. Department of Family and Community Services 2018. Dashboard 3: ROSH reports, accessed from https://www.facs.nsw.gov.au/resources/statistics/statistical-report/children-young-people/dashboard on 12 November 2018
50. Seven children were identified as Indigenous using all sources available including NSW Health, Police and the Registry of Births and Marriages (BDM). Four children were identified as Indigenous using BDM records only.

The 17 children had varied placement and care arrangements.

- Four children were in the voluntary care of a residential disability service when they died.
- Thirteen children were in statutory out-of-home care by way of final orders of the Children's Court, and one child was in supported out-of-home care. FACS had case management responsibility for the majority (9) of these children.
  - Seven of these children lived with grandparents.
  - Five children lived with foster carers.
  - One child was never discharged from hospital.

Our reviews of children in care who died from natural causes in 2016 and 2017 have identified the importance of the following:

- Casework that is responsive to the changing support needs of children with disability and/or serious medical conditions, and to the needs of their caregivers.
- Good communication between out-of-home care service providers, NSW Health and general and specialist medical practitioners when a child has high medical needs.
- Collaboration, information sharing and comprehensive planning between FACS and non-government agencies that case manage children for whom the Minister has parental responsibility and for whom medical treatment decisions are required.
- Facilitating and supporting appropriate contact and involvement of parents and siblings throughout the course of a child's illness and during palliative care.

Chapter 6. Sudden Unexpected Deaths of Infants 2016 and 2017

In 2016 and 2017, the deaths of 83 infants were classified as Sudden Unexpected Death in Infancy.

Although SUDI has declined over the past 15 years, this decline has plateaued and the rate has not changed significantly over the past decade.

Most infants who die suddenly and unexpectedly are very young infants. Over two-thirds of the infants whose death was classified as SUDI over the past 15 years were aged less than three months.

Most infants who died suddenly and unexpectedly were exposed to at least one avoidable risk, including smoking and objects that pose a risk of suffocation.

Over the last 15 years, almost half of the infants whose deaths were classified as SUDI were from families with a child protection history.

Agencies need to continue to focus on targeting interventions to infants in disadvantaged and vulnerable families.

Comparing the number of explained deaths over the period 2006-15 with 2016-17, the number of sudden and unexpected infant deaths where a cause was able to be identified through post-death investigation has improved, increasing from 27% to 45%.

In NSW, the deaths of 83 infants were classified as Sudden Unexpected Death in Infancy (SUDI) – 35 infants in 2016 and 48 infants in 2017. This represents an infant mortality rate of 0.4 and 0.5 deaths per 1,000 live births respectively.

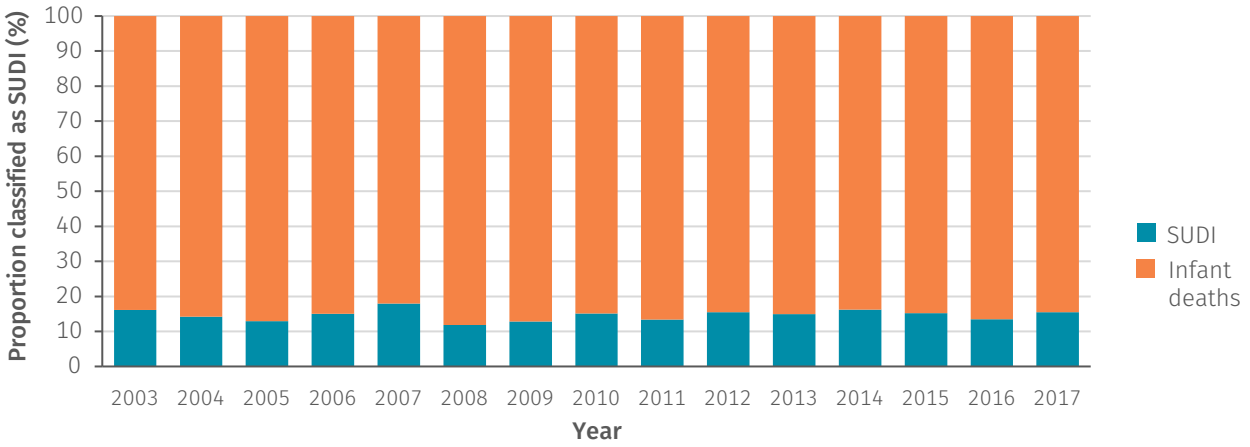
The term SUDI applies to the death of an infant aged less than 12 months that is sudden and unexpected, where the cause was not immediately apparent at the time of death. Excluded from this definition are infants who died unexpectedly as a result of injury – for example, transport fatalities – and deaths that occurred in the course of a known acute illness in a previously healthy infant.

Of the 83 infants who died suddenly and unexpectedly, a cause of death was identified following investigation for 37 infants ('explained' SUDI). For 24 infants, a cause was unable to be determined ('unexplained' SUDI). Investigation of the remaining deaths has not been finalised at the time of writing.

The 83 SUDI represent nearly 15% of all infant deaths in NSW over the two-year period.[51] Although there has been some fluctuation in actual numbers, the proportion of infant deaths classified as SUDI has been consistent over the past 15 years (Figure 42).

51. 570 infants aged under one year died in NSW over the two-years 2016 and 2017.

Figure 42. Proportion of infant deaths classified as SUDI, 2003-17



The deaths of four infants were reviewable by the Ombudsman because the deaths occurred in suspicious circumstances.

6.1. Preventing SUDI in NSW

To help prevent future SUDI deaths, it is important to identify the underlying cause of death. Identifying why an infant died is also important:

- for parents and carers to understand their loss
- to provide information about possible medical or genetic implications for the family
- to learn from untimely deaths and help prevent future deaths
- to identify any possible suspicious deaths.

In our report of child deaths in 2015, we noted that a cause of death is only able to be determined in one quarter of SUDI in NSW.[52] From 2006-15, 73% of SUDI cases remained unexplained after autopsy.

In response to this observation, and in consultation with the State Coroner's office and experts in paediatrics and neonatology, we conducted a retrospective review of cases[53] where a cause of death was unable to be determined to consider opportunities to identify a cause of death. We found the Coroner's inability to determine a cause of death was understandable – given the incomplete information about the death scene investigation, infant medical history and pathology.

Identifying a cause of death after the sudden and unexpected death of an infant requires a timely, expert-led and comprehensive investigation involving police, NSW Health (emergency departments and forensic services) and the Coroner's office.

The CDRT has consistently identified gaps in investigations of SUDI.

In 2016, we recommended that the NSW Government consider a centralised model for SUDI response, and a multi-disciplinary case review approach to investigating SUDI. We recommended the government devise a joint agency policy and procedure to govern the individual and coordinated roles and responsibilities of relevant agencies in a SUDI investigation, and that the State Coroner should consider including a specialist review of key information to help determine the manner and cause of death for SUDI.

In 2017, the NSW Government advised that it supported improving the interagency approach to SUDI investigation. The Department of Premier and Cabinet (DPC) was tasked with leading work to achieve this goal. A cross-agency working group was established involving representatives from DPC, the NSW Coroner's Office, NSW Police and NSW Health (including NSW Ambulance and the Department of Forensic Medicine). The role of the working group was to agree on some immediate, practical actions that NSW agencies could take to improve responses to SUDI.

52. NSW Child Death Review Team 2016. Child death review report 2015. NSW Ombudsman, Sydney.
53. Fifteen cases in summary and five cases in detail.

Some of the positive changes already implemented include:

- Updated and aligned policy directives across NSW Police, NSW Ambulance and NSW Health to clarify interagency roles and responsibilities.
- Improved guidance for frontline NSW Police and NSW Ambulance staff – for example, the guidance now reinforces the need to transfer all infants who die suddenly and unexpectedly to their nearest emergency department. This is a vital step to enable a medical history to be taken and for parents/carers to receive support.
- Improved quality and timeliness of information to support the Coroner to identify cause of death.

In the short period of time since these changes have been put in place, our work has identified an early change indicating an increase in the number of SUDI where a cause of death is able to be determined.

A range of other actions and initiatives have been developed or are underway to ensure expert, on-call advice is available to investigators in responding to SUDI, appropriate forensic examination occurs, and essential relevant information is captured. For example, the NSW Coroner's Court and the Department of Forensic Medicine (DOFM) now convene a multidisciplinary paediatric review team meeting – a group of specialists who review all SUDI cases. A paediatric pathologist also either performs, or is consulted about, autopsies for all SUDI cases.

The work and achievements of the DPC's working group are very positive steps towards an improved response to SUDI in NSW. The Ministry of Health will now work with agencies to monitor and review progress – focusing on ensuring all families who experience SUDI are offered support and referral, and on increasing the proportion of SUDI cases with an established cause of death. We will continue to actively monitor and report on progress to implement the CDRT's recommendations in this area.

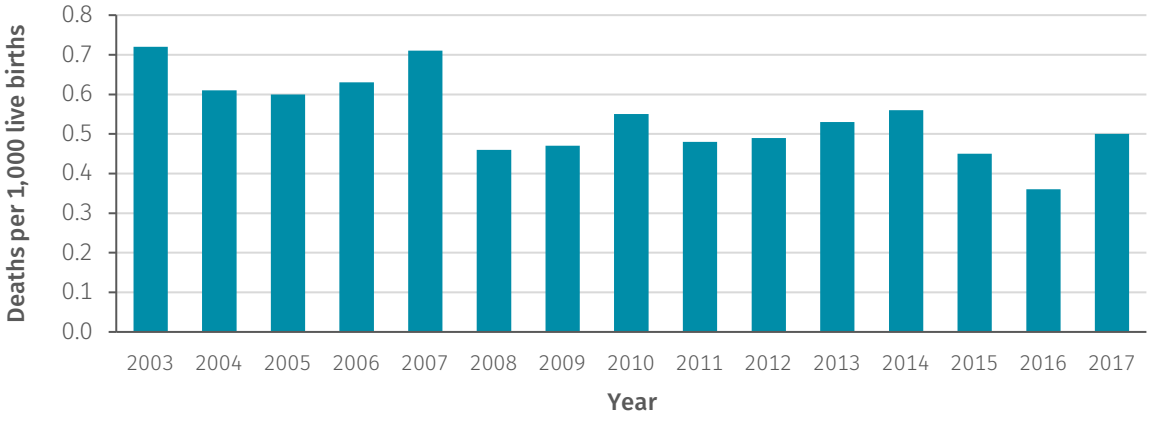
The CDRT have also been working to ensure that important information about factors that may contribute to SUDI is captured through consistent classification of these deaths. A consistent approach to classifying SUDI is an important step in preventing future deaths.

In 2017, we developed an alternative classification – drawing on an earlier framework developed by Krous et al in 2004[54] – that emphasises the identification of risk factors present in the child's environment and background (Appendix 4). We are working with the Coroner's Office and NSW forensic pathologists to trial this classification with the intention of developing a simple and consistent classification of SUDI.

6.2. Trends in SUDI in NSW, 2003-17

Over the 15-year period to 2017, the NSW child death register classified 771 infant deaths as sudden and unexpected.

Figure 43. Deaths of infants classified as SUDI, 2003-17



Overall, the infant mortality rate for SUDI has declined since 2003. Despite some yearly fluctuations, the rate has not changed significantly since 2008 (Figure 43).

54. Krous HF et al. 2004. Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach. American Academy of Pediatrics, 114, pp.234-238.

6.2.1. Age and gender

The majority of SUDI deaths occur in infants aged three months or less – accounting for 68% of all SUDI over the 15 years 2003 to 2017. By comparison, only a small number of deaths involving infants aged seven to 11 months are classified as SUDI. This pattern is consistent with both national and international data, which shows that 'approximately 95% of SIDS deaths occur in the first six months of life with a peak incidence in infants aged between 2 and 4 months'.[55]

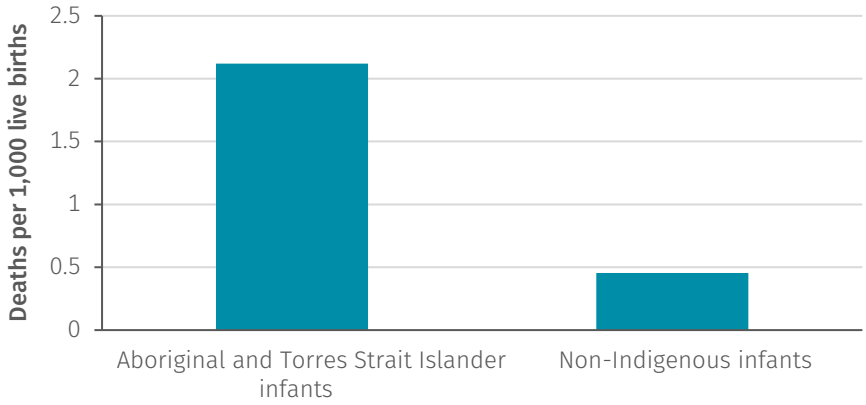
Male infants have consistently accounted for a higher proportion of SUDI deaths over time. However, the difference in male and female mortality rates for SUDI has been closing across the past 15 years. In the period 2016 and 2017, the rate for males was only marginally higher than for females,[56] and the difference between male and female infants is no longer significant. This is consistent with the trend observed for infant deaths due to all causes.

6.2.2. Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander children represent around 6% of all children less than one year of age.[57] However, on average, Indigenous children have accounted for almost 20% of the deaths classified as SUDI in NSW over the past 15 years.[58]

Overall, the infant mortality rate for SUDI has remained significantly higher among Indigenous infants compared with non-Indigenous infants (Figure 44).

Figure 44. Deaths of infants classified as SUDI by Aboriginal and Torres Strait Islander status, 2003-17



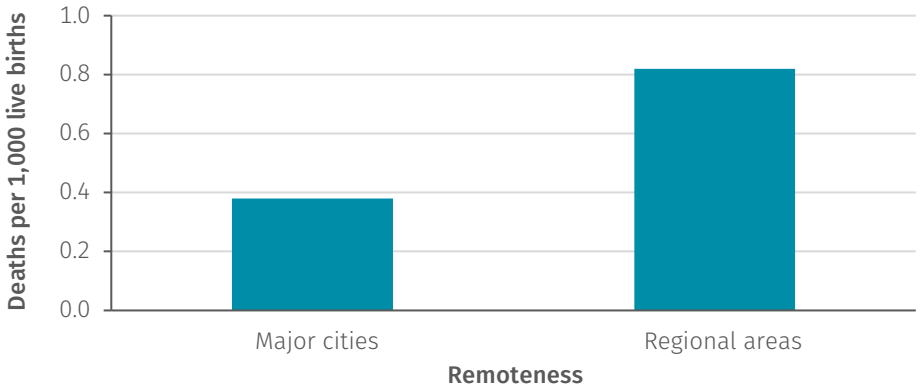
6.2.3. Remoteness and socio-economic status

Previous work by the CDRT and the Australian Institute of Health and Welfare (AIHW) has shown that SUDI disproportionately affects vulnerable families and infants living in disadvantaged areas, and that mortality rates are lower in cities compared to regional and remote areas.[59]

Although nearly two thirds of infants lived in major cities, the infant mortality rate for infants living in regional areas was more than twice that of infants living in major cities and this difference was significant (Figure 45).[60]

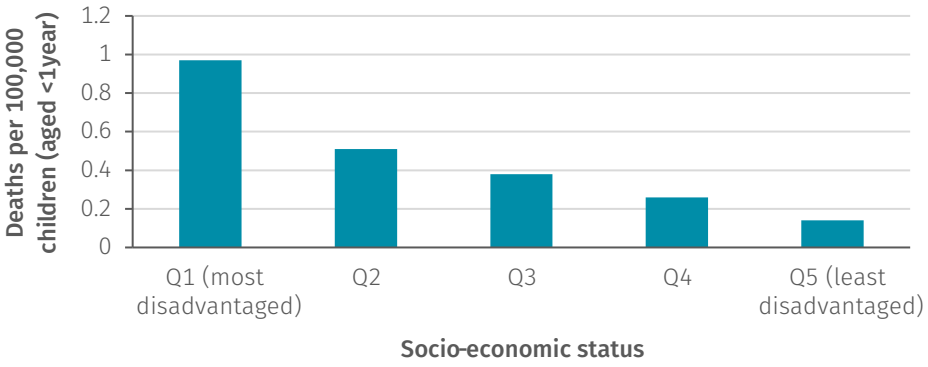
55. Duncan JR, Byard RW 2018. Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.15-50.
56. 0.45 and 0.42 deaths per 1000 live births respectively.
57. Australian Bureau of Statistics 2014. Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001-2026, Cat no. 3238.0.55.001. ABS, Canberra.
58. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.
59. NSW Child Death Review Team 2014. Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.
60. As per the ABS accessibility and remoteness index of Australia (ARIA+).

Figure 45. Deaths in infants classified as SUDI by remoteness, 2013-17



In addition, SUDI disproportionately affects families living in areas of greatest socio-economic disadvantage (Figure 46). During the 2013-17 period, nearly 70% of infants whose deaths were classified as SUDI were living in areas with the highest levels of socio-economic disadvantage (Quintiles 1 and 2).[61] The mortality rate was 6.9 times higher for infants living in areas of greatest socio-economic disadvantage (Quintile 1) than for those living in the least disadvantaged areas (Quintile 5).[62]

Figure 46. Deaths in infants classified as SUDI by socio-economic status, 2013-17



6.2.4. Child protection history

Families known to child protection services are highly over-represented in SUDI.

Over the last 15 years, 44.5% of infants whose deaths were classified as SUDI were from families with a child protection history. This proportion has not changed significantly since 2003.[63] By comparison, only a small proportion of all children in NSW are reported for child protection concerns or risk of significant harm (ROSH). For example, during the period 2011-16, less than 5% of children in NSW (aged 0-17) were the subject of a ROSH report.[64]

In 2016 and 2017, nearly half the families (37) of the 83 infants had a child protection history, where the child and/or their siblings had been the subject of a report made to FACS (35) or to a Child Wellbeing Unit (2).

All but one of the families reported to FACS had been the subject of at least one report that was assessed as meeting the ROSH threshold, and for over half the families (20) the reported risks included concerns about the infants who died. Parental alcohol and/or drug misuse, domestic violence, neglect, physical harm or risk of physical harm, and parental mental health were the most frequently reported risks – with multiple risk issues reported in the majority of cases.

61. As per the ABS index of socio-economic disadvantage.
62. Data was not available to determine infant mortality rates by socio-economic status. We calculated deaths per 100,000 for children aged under one year. The difference between quintile 1 and 5 was significant.
63. 43.4% for 2003-2007, 45.5% for 2008-2012 and 44.8% for 2013-2017.
64. Department of Family and Community Services 2018, Dashboard 3: ROSH reports, accessed from https://www.facs.nsw.gov.au/resources/statistics/statistical-report/children-young-people/dashboard on 27 August 2018; FACS report by financial year from 30 June 2011 to 30 June 2016.

The majority of infants with a child protection history (81%) were in unsafe sleep environments when they died – including infants who were sharing a sleep surface, and infants who had been put to sleep on a couch or sofa or in unsafe cots. The majority of infants with a child protection history (84%) had also been exposed to tobacco smoke – in most cases, maternal smoking during pregnancy.

Prenatal reports

Seventeen infants who died suddenly and unexpectedly in 2016 and 2017 had been the subject of a prenatal report to FACS – and often more than one prenatal report (11 infants). For three families, concerns about the unborn child were reported on many occasions (4 to 8 prenatal reports).

Almost all prenatal reports involved concerns about maternal drug or alcohol misuse, and/or risks associated with parental drug abuse. In five cases, reports triggered a 'high risk birth alert' to ensure FACS was informed of the birth.[65]

Most of the families (12 of 17) did not receive a face-to-face response from FACS. In some cases (5), FACS made referrals to, or liaised with, Brighter Futures early intervention services and then closed the report. In other cases (3), FACS obtained further information from other services (such as NSW Health) and then closed the case. The other four matters were closed without a response, generally after a single prenatal report.

Five of the 17 families subject to prenatal reports were prioritised for a casework response. Each of these families were characterised by significant parental drug abuse, domestic violence, neglect, physical harm and/or maternal mental health issues. FACS conducted risk assessments in each case:

- Two cases were open matters allocated to a caseworker at the time of the infant's unexpected death. One infant was subsequently found to have died from an infectious viral illness, and a cause of death for the other infant has not yet been finalised. Casework to address evident risks was ongoing in both these matters.
- Three cases were closed before the infant's death after an assessment. Each of these infants died in the context of co-sleeping – two infants were found to have accidentally suffocated and the cause of the other infant's death remains unexplained. In each case, our reviews identified issues in relation to the adequacy of FACS assessments – including a lack of safety planning, premature case closure despite evidence of ongoing risk, or closure after a superficial assessment without a thorough understanding of likely risk to the newborn.

The disproportionate number of infants who die suddenly and unexpectedly in disadvantaged and vulnerable families is discussed further in section 6.6.

6.3. Cause of death

Following investigation, deaths classified as SUDI are either explained or unexplained. Explained SUDI include:

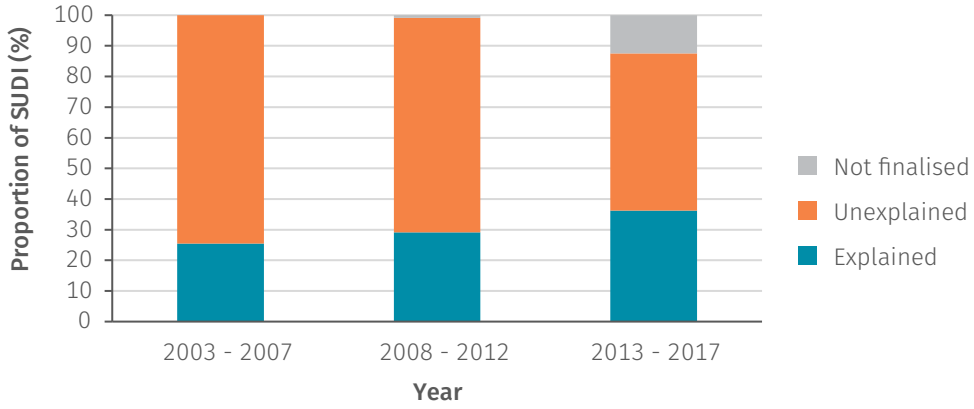
- Deaths due to disease or morbid conditions that were not identified as life threatening before death.
- Accidental threats to breathing.
- Other external causes, including deaths that occur in suspicious circumstances.

Unexplained SUDI involve cases where a cause of death was unable to be determined, including deaths classified as Sudden Infant Death Syndrome (SIDS).[66]

65. High Risk Birth Alerts (HRBA) are issued by Community Services in situations where it is determined that there may be a risk of significant harm to the unborn child, after the child's birth. HRBAs are issued to relevant health providers to ensure that FACS is advised of a birth where further protective intervention may be required.
66. SIDS is defined as the sudden unexpected death of an infant less than one year of age, with onset of the fatal episode apparently occurring during sleep, which remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history. See Appendix 3 for a further information including sub-categories.

Over the 10-year period 2003-12, the proportion of explained and unexplained SUDI remained similar. However – as shown in Figure 47 – during the last five years the proportion of explained SUDI has risen from the previous average of 29% to 39% in 2013-16 (noting some deaths in 2017 have not been finalised). In particular, there has been a marked increase in the proportion of explained SUDI from 2015 (51% explained in 2015 and 57% explained in 2016). This change appears likely to continue in 2017. At the time of writing, 63% of cases have been finalised – and of these more than half (57%) are explained.

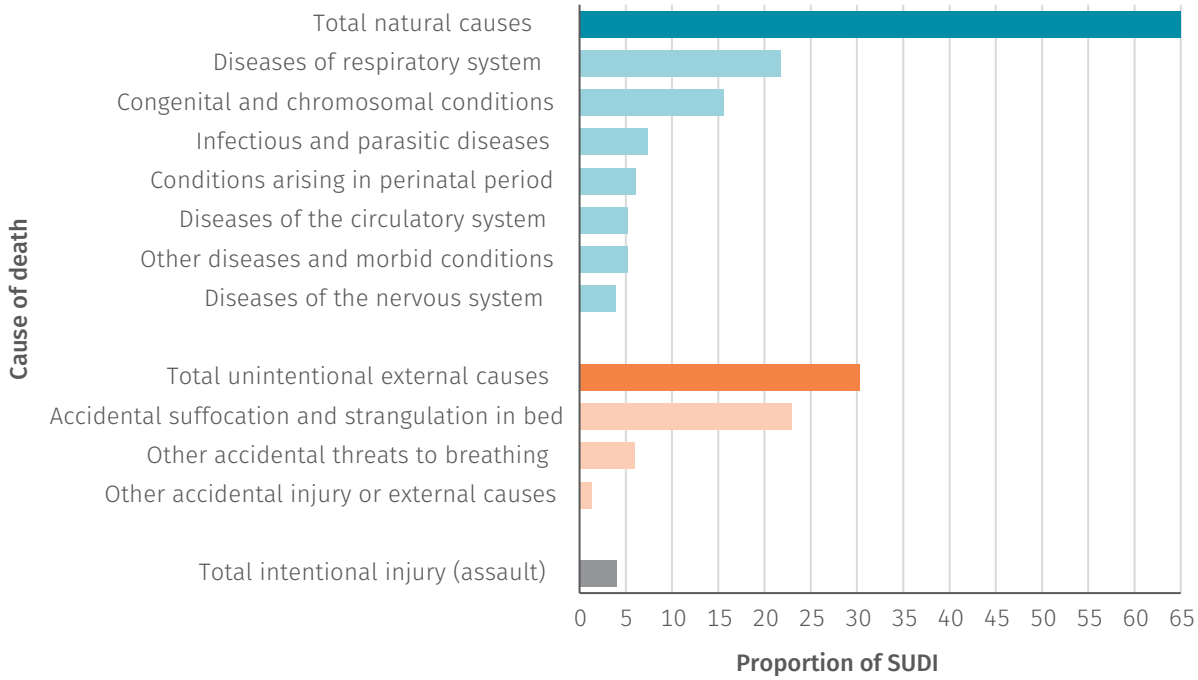
Figure 47. Proportion of explained and unexplained deaths classified as SUDI, 2003-17



6.3.1. Explained SUDI

The majority of SUDI where a cause of death is subsequently determined are due to natural causes or accidental asphyxiation (Figure 48). In 2016 and 2017, 37 deaths are explained SUDI.

Figure 48. Cause of death for explained SUDI, 2003-17



Natural cause deaths

As shown in Figure 48, nearly two thirds of the explained SUDI in NSW over the past 15 years have been due to an underlying illness or condition that was not identified or recognised as life threatening before death.

In 2016 and 2017, 23 infants died from natural causes:

- Nine infants died from lower respiratory tract infection (pneumonia, bronchiolitis, bronchopneumonia).

- Eight infants died from sepsis-related infection (eg meningococcal sepsis, peritonitis).
- Five infants died from cardiac conditions (congenital cardiac anomaly, infective myocarditis, cardiomyopathy).
- One infant died from aspiration pneumonia.

Three of these deaths were from vaccine preventable diseases.[67] In one case the infant died before the vaccine became available. One infant was considered vulnerable and had yet to develop an effective immune response. The third infant died from a disease subtype considered unlikely to be vaccine preventable. Therefore, none of these deaths were considered vaccine preventable (Section 5.10.2).

In 2016, the CDRT published the results of a review of child deaths from vaccine preventable infectious diseases.[68] The report notes that while child deaths due to vaccine preventable diseases are now rare in Australia, deaths can occur due to disease sub-types not included in current vaccines, among infants too young to be vaccinated, or in unvaccinated older children.

Nine of the infants who died from natural causes had been seen by a medical professional in the two weeks before death, but none were identified as having a life-threatening illness.

Over half (13) of the infants who died as a result of natural causes were recorded as displaying a range of minor symptoms such as a cough or sniffles, intermittent fever and excessive crying. Such symptoms can also be experienced by infants who do not develop a serious illness. Ten infants reportedly showed no signs of illness during the fortnight leading up to their death.

Accidental threats to breathing

Just over one third of SUDI are found to result from external injury-related causes – primarily accidental threats to breathing associated with an unsafe sleeping environment (Figure 48).

In 2016 and 2017, 14 infants died from unintentional asphyxiation as a result of loose/soft bedding or in the context of bed-sharing. Only one infant who accidentally suffocated was placed for sleep in infant-specific bedding, and in this case there were risks associated with items placed in the cot. Most of the infants (9) who accidentally suffocated were very young (less than 3 months).

6.3.2. Unexplained SUDI

Of the 60 matters closed by the Coroner in 2016 and 2017, a cause of death was unable to be determined for 24 infants. These deaths remain unexplained SUDI.

6.4. Risk factors associated with SUDI deaths

Research has consistently identified certain risk factors associated with SUDI. These risk factors include both intrinsic and extrinsic factors.

Intrinsic risk factors involve individual characteristics that affect an infant's susceptibility,[69] including:

- Low birth weight (less than 2500g).
- Preterm birth (less than 37 weeks gestation).
- Small for gestational age (less than 10th percentile at birth) or small for age.
- Preceding infection (within two weeks of death).
- Prenatal exposure to drugs, particularly nicotine (from cigarettes) and alcohol.

67. The *Public Health Act 2010* requires that certain medical conditions be notified to public health authorities in NSW. NSW Ministry of Health 2018, Disease notification, accessed from https://www.health.nsw.gov.au/infectious/pages/notification.aspx on 26 September 2018.
68. NSW Child Death Review Team 2016. Child deaths from vaccine preventable infectious diseases, NSW 2005-2014, prepared by the National Centre for Immunisation Research and Surveillance. NSW Ombudsman, Sydney.
69. Duncan JR, Byard RW (editors) 2018. Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide.

Intrinsic factors are generally not modifiable, with the exception of exposure to maternal cigarette smoking (or other drug and alcohol consumption) during pregnancy. Duncan and Byard[70] note that in the wake of reductions in prone sleeping, exposure to maternal smoking during pregnancy is now considered the dominant modifiable risk factor for SIDS – although the exact mechanism of how this increases risk is still to be fully explained.

There are also well evidenced extrinsic (environmental) risk factors for SUDI, including:

- Sleep position – especially prone position (placing an infant to sleep on their front) and side sleeping.
- Sharing a sleep surface – particularly for very young infants.
- Bedding that is not designed for infants and/or for sleeping – such as a sofa.
- Post-birth exposure to smoking.
- Over-bundling/over-heating – excess bedding and clothing.
- Loose soft items in an infant's sleep environment that pose a suffocation risk.

Extrinsic risks are modifiable factors. Internationally, researchers have noted at least one risk factor (and sometimes more) is present in approximately 90% of all SIDS cases, with very few SIDS cases reported where no extrinsic risk factors are present.[71]

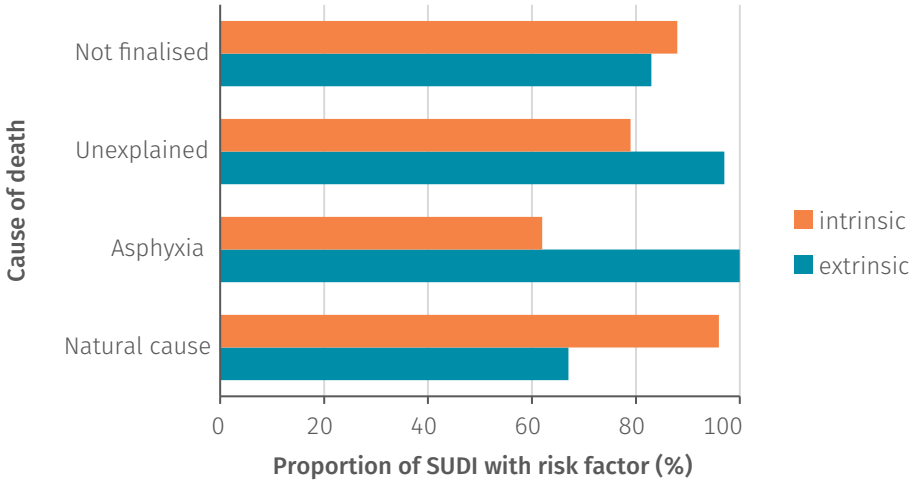
6.5. Risks identified for children who died in 2016 and 2017

In 2016 and 2017, and consistent with previous years, our reviews found at least one risk factor was evident in the vast majority of SUDI. We considered the presence of the 11 risk factors identified above, and found that only three of the 83 infants who died suddenly and unexpectedly had no documented evidence of risk.

The majority of the infants (71 of 83) were exposed to at least one avoidable (extrinsic) risk, and for most of these children (53) a cause of death could not be determined – or was associated with accidental suffocation.[72]

Infants who died from natural causes had a significantly lower proportion of extrinsic factors compared with asphyxia deaths (Figure 49). Intrinsic risks were more commonly identified for infants who died from natural causes and unexplained deaths, though not significantly so.

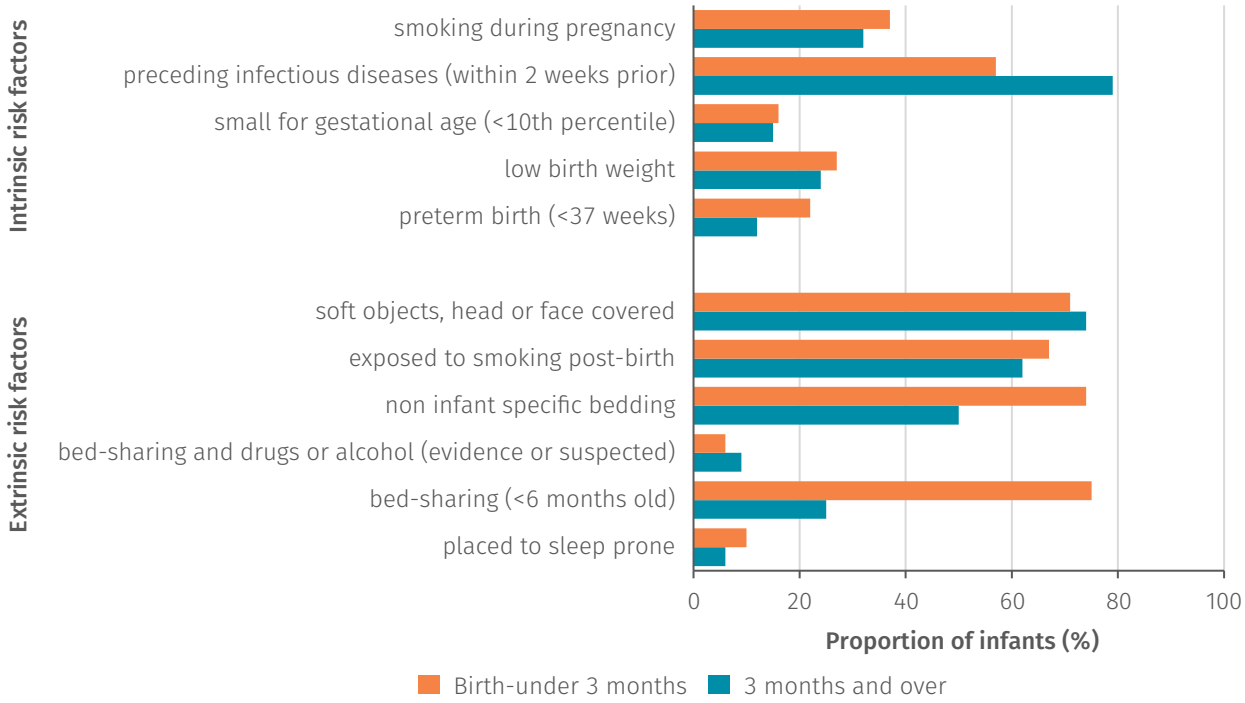
Figure 49. Proportion of SUDI by cause of death, SUDI 2016-17



70. Duncan JR, Byard RW (editors) 2018. Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide.
71. As above
72. Including 14 matters which had not yet been finalised.

The age of an infant – less than 3 months compared with those aged 3 months and over – was significant for preceding infection. Older infants were significantly more likely to have experienced a preceding infectious disease than very young infants (Figure 50).[73] This difference may be due to a number of reasons, such as increased opportunities for older infants to be exposed to illness or difficulties in identifying illness in younger infants.

Figure 50. Key reported risk factors identified for SUDI by age group, 2016-17



6.5.1. Intrinsic risk factors

In 2016 and 2017, there was evidence of at least one intrinsic risk factor for almost two thirds (64%) of infants who died suddenly and unexpectedly. As expected, there is a significant association between certain risk factors – for example, smoking during pregnancy and low birth weight and/or small for gestational age.

Two of the key intrinsic risk factors are discussed in more detail below.

Smoking during pregnancy

In 2016 and 2017, 39% of mothers of infants who died suddenly and unexpectedly smoked tobacco during pregnancy. By comparison, national data shows that only 8% of women who gave birth in NSW smoked during pregnancy in 2016.[74] Although prenatal smoking can be modified, it is not modifiable once the child is born and becomes an intrinsic vulnerability.

There is a significant association between socio-economic status and smoking during pregnancy (Figure 51). In NSW, health data shows that 12% of mothers from the most disadvantaged areas (Quintiles 1 and 2) reported smoking during pregnancy, compared with 5% of mothers from the least disadvantaged areas (Quintiles 3-5).[75]

73. Infants aged 6 months and over were excluded for bed-sharing. We report significance at a 5% level. Non-infant specific bedding was significant however, at a 10% level. Refer to methodology for further detail.
74. Australian Institute of Health 2016. Australia's mothers and babies 2016, Perinatal statistics series no. 34. Cat no. PER 97. AIHW, Canberra.
75. NSW Health 2018. Smoking in pregnancy, accessed from http://www.healthstats.nsw.gov.au/ on 28 August 2018.

For mothers of infants who died suddenly and unexpectedly, this pattern is emphasised further. In 2016 and 2017, nearly half (43%) the mothers living in the most disadvantaged areas (Quintiles 1 and 2) reported smoking during pregnancy, compared with 15% of SUDI mothers from the least disadvantaged areas (Quintiles 3-5).

Figure 51. Smoking during pregnancy, SUDI vs NSW

Preceding infectious disease

Researchers have noted that stressors – such as infection, fever, and minor respiratory and gastro-intestinal illnesses – commonly occur in the days to weeks preceding the sudden unexpected death of an infant, and that minor infections have been associated with an increased likelihood of SIDS when combined with head covering or prone sleeping.[76]

In 2016 and 2017, more than half (55) the 83 infants whose deaths have been classified as SUDI were identified as having been exposed to, or experienced, preceding infectious disease at some point in the two weeks prior to their death. Evidence of preceding infection ranged from post-death detection of a virus in autopsy swabs without evidence of infection, through to severe undiagnosed infections. Of the 55 infants:

- 21 died of natural causes. In most (17) of these cases, the preceding infection was directly related to the infant's cause of death. The 21 infants died from:
  - pneumonia / lower respiratory tract infections (9)
  - sepsis due to streptococcus Group A, haemophilus influenzae, meningococcal, acute peritonitis, or other unspecified causes (7)
  - infective myocarditis (3)
  - Congenital cardiac anomaly (1)
  - Peritonitis (1)
- Seven infants died as a result of accidental asphyxia in the context of sharing a sleep surface with parents and, in some cases, a parent and other children. Three of these infants were reportedly showing signs of respiratory illness, or were in the process of recovering from a respiratory illness confirmed at autopsy.
- A cause of death was not able to be determined for 14 infants.
- At the time of writing, investigations were still underway into the cause of death for 13 infants.

76. Duncan JR, Byard RW (editors) 2018. Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.15-50.

For half (11) of the 21 infants who died of natural causes and who had a recent history of preceding infection, there was some documented evidence that the infants had shown signs of illness in the two weeks before their death.[77] In the main, these symptoms included sniffles, cough, difficulty feeding, difficulty breathing, diarrhoea and fever – either singly or in combination.

Of the 11 infants who exhibited some signs of illness, six were seen by a health professional in the two-week period – including general practitioners, early childhood health nurses, paediatricians and a hospital emergency department. Most of these infants were presented to health practitioners for non-specific symptoms of illness (eg cough, fever). None of the infants were identified as having a serious illness at the time of presentation.

Two of the infants died within a short period of contact with a hospital. In one case, the infant was presented to emergency with symptoms of croup with cough. The second infant died days after having stayed in a hospital with their unwell carer. The relevant NSW Health Districts completed a Root Cause Analysis (RCA) review in both cases. While systems improvement opportunities were noted and relevant recommendations made, no system-related root cause was identified in relation to the death of either child.

Five infants who exhibited some sign of illness were not presented to a health professional in the two weeks before their death. In the context of post-death investigation, parents/carers reported that the infants had displayed a range of symptoms, including persistent cough, excessive crying/fussiness, runny nose, and fever. All but one of these infants were found to have had severe undiagnosed infections that would be considered life threatening in the absence of treatment or intervention.

6.5.2. Extrinsic risk factors

In 2016 and 2017, the majority of infants (76) were exposed to at least one modifiable risk factor and generally to multiple risks – regardless of cause of death. The most frequently identified extrinsic risk factors were:

- Suffocation risk – loose soft pillows, bedding and other objects in sleep environment.
- Exposure to smoking post-birth.
- Non-infant specific bedding.

Suffocation risk

Of the SUDI matters in 2016 and 2017 currently finalised by the Coroner, nearly one in every four deaths (14) were found to result from accidental asphyxia. In all but one of these cases, infants were placed in a sleep environment with loose bedding or other soft objects which posed a suffocation risk. The other asphyxia death occurred in the context of unsafe sleeping on a couch.

For the other infants – and excluding the 23 infants who died from natural causes – the majority were in sleep environments with loose bedding or other soft objects. In many cases, the infants were sharing a sleep surface and were exposed to loose adult bedding such as blankets, doonas and pillows. However, soft objects and loose bedding were also frequently present where infants were sleeping alone. Fourteen infants were found with their heads covered by loose bedding.

Exposure to tobacco smoke

Two thirds (55) of all the infants were exposed to tobacco smoke after birth. In just over half these families (29), the mother smoked during pregnancy. In comparison, NSW Health data shows that between 2016 and 2017, only 15% of adults (18% of males and 12% of females) in NSW were current tobacco smokers.[78]

The high proportion of SUDI exposed to tobacco smoke has been consistent over time. Over the five years 2013-17, where information was available about smoking, more than two thirds (71%) of all SUDI were infants who had been exposed to tobacco smoke.

77. Reviewed by a CDRT member with medical qualifications.
78. NSW Health 2018. Current smoking in adults, accessed from http://www.healthstats.nsw.gov.au/ on 28 August 2018.

Bedding not designed for infants

Nearly all the infants (73 of 83) were in a sleep environment at the time they were located – either placed for sleep (60) or not placed for sleep but in a sleep environment (13). Almost two thirds of these infants (44) were sharing a sleep surface (adult bedding or mattresses, sofas/couches and other surfaces). All except three of the infants sharing a sleep surface were less than 6 months old, and most (33) were less than 3 months. Our reviews noted six infants were sharing a bed with an adult affected by alcohol or other drugs. All but one of these cases involved an infant under 6 months – with 3 infants less than 3 months.

Of the 29 infants who were alone in a sleep environment, seven were placed alone on bedding not designed for infants (adult beds, sofas/couches). A further two infants were placed in unsafe infant-specific bedding – for example, travel cots without mattresses where a doona/quilt had been used in its place. Four of the nine infants located in unsafe or non-infant specific bedding were less than 6 months – the presence of loose or soft bedding was noted in all but one of these cases.

6.6. Agency responses to SUDI

There are five primary aims for SUDI investigations.[79] They are to:

- Establish, as far as possible, the cause or causes of the infant's death.
- Identify any potential contributory or modifiable factors.
- Provide ongoing support to the family.
- Ensure that all statutory obligations are met.
- Learn lessons to reduce the risks of future infant deaths.

Effective investigation requires close work between health, police, coronial and forensic professionals.

At the time of writing, the most comprehensive resource providing guidance about the management of SUDI is NSW Health's policy directive, Death – Management of Sudden Unexpected Death in Infancy (2008).[80] This policy governs the actions of all health staff and also describes the role of associated agencies – such as the NSW Police Force, NSW Coroner and forensic services, and government contractors. NSW Health's policy directive is currently under review (due 31 December 2018) and is being considered as part of the cross agency working group process.

Key aspects of the policy are:

- All babies dying suddenly and unexpectedly are to be taken with their families to a hospital emergency department.
- The senior on-call paediatrician must be notified and should take a full history from the family in the presence of a social worker, using a standard SUDI medical history form. The completed form is to be given to the forensic pathologist before the post mortem.
- Ongoing care of the family is coordinated by the paediatrician and social worker, including grief counselling, medical care and other services.
- A forensic pathologist is to complete a post mortem examination according to the protocol outlined in the directive.

Each of these key steps are crucial – attendance at the emergency department should initiate NSW Health's SUDI response, a comprehensively completed medical history ensures the investigation is not compromised by a lack of information about the infant's health and circumstances, and a post mortem examination must include all relevant testing and expert input to help determine the cause of death.

79. Sidebotham P, Marshall D and Garstang J 2017. Responding to unexpected child deaths in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.85-116.
80. NSW Health Policy Directive 2008. Death – Management of Sudden Unexpected Death in Infancy, Doc no. PD2008_070. NSW Health, North Sydney.

The CDRT has identified significant gaps in the investigation of SUDI over a number of years. These gaps include a lack of detailed information about the death scene, missing or incomplete SUDI medical history forms, and issues with post death forensic processes.

6.6.1. Investigations of SUDI in 2016 and 2017

Our reviews of deaths classified as SUDI in 2016 and 2017 continued to highlight problems with the investigation of SUDI during the two-year period. These problems include:

- Triage to appointed hospital – although the majority of infants (67 of 83) were transported to a hospital emergency department as prescribed by the protocol, nearly one fifth (16) were taken directly to a morgue.
- Infant medical history – in nearly two thirds (54) of SUDI, there was no record that a paediatric interview to document a medical history took place. A record of the interview was located for only 29 of the 83 infants. In five of these cases, the infant's medical history was incomplete and/or inadequate.[81] There is some evidence of improvement over the two years – only eight medical history interviews were located for deaths in 2016, compared with 21 interviews for deaths in 2017.
- Post mortem examination – a full internal post mortem was conducted in the majority of cases (76 of 83). However, our reviews identified seven cases where a comprehensive post mortem did not occur. Three infants were not examined by a forensic pathologist (ie no post mortem was conducted), and four infants underwent an external (2) or external radiology only (2) examination. Many post mortem examinations were also completed without having access to potentially important information in a paediatric history.
- Family support and follow up – we found no evidence in records we reviewed that support was provided by NSW Health to 35 of the 83 families, including a number of the infants who were presented to a hospital emergency department. Ongoing consideration of the psychological and emotional needs of the family, including referral for bereavement support, is a key aspect of the SUDI response.[82] Engagement with families is also an important way of obtaining information about possible medical or genetic issues that may have implications for the family.

6.7. Observations and recommendations

SUDI mortality has plateaued in NSW. There has been no significant decline in mortality over the past decade.

Agencies need to continue to focus on targeting interventions to infants in disadvantaged and vulnerable families.

Most infants who died suddenly and unexpectedly were exposed to at least one avoidable risk, including smoking and objects that pose a risk of suffocation.

A strategy to assist families to recognise signs and symptoms of illness may help prevent some sudden infant deaths.

Cross-agency work is underway to establish a clearer and more coordinated approach to responding to SUDI in NSW.

81. Only 24 of the 83 (just over one quarter) had an adequate paediatric history
82. Sidebotham P, Marshall D and Garstang J 2017. Responding to unexpected child deaths in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.85-116.

6.7.1. The rate of SUDI is not declining

Although the overall number and rate of child deaths in NSW are reducing, this trend is not apparent for SUDI. Our data shows there has been no significant decline in SUDI mortality since 2008. This plateauing is apparent in other countries as well, and 'simply continuing with the same approaches will now only have marginal effects, particularly among those families most at risk of SIDS'.[83]

Our reviews highlight the importance of work now underway in NSW to establish a clearer and more coordinated approach to responding to SUDI. We look forward to seeing practical outcomes achieved by the government's cross agency working group, and to reviewing and implementing changes to NSW Health's SUDI policy directive once it is released. Revision of this policy represents a significant opportunity for NSW Health to incorporate key aspects of a coordinated joint agency response.

6.7.2. SUDI prevention initiatives should target high-risk populations

Our work has identified the disproportionate number of infants who die suddenly and unexpectedly in disadvantaged families – including Aboriginal families, families with a child protection background, families from areas of greater socio-economic disadvantage, and families living in more remote locations.

NSW Health and FACS have clear roles in responding to vulnerable families.

We have previously recommended these agencies should jointly consider initiatives in other jurisdictions that specifically target high risk populations, including the findings emerging from safe sleep pod programs in New Zealand and Cape York.[84]

In 2017, NSW Health and FACS provided us with advice on progress towards meeting this recommendation – with both agencies indicating they would continue to monitor findings from safe sleep pod programs, and that this work is ongoing.

In 2017, FACS published its most recent child deaths annual report.[85] In relation to SUDI, the report notes that its casework practice intranet site has a range of information and resources – including a training package for practitioners about providing safe sleeping advice to families that incorporates culturally tailored advice. The report also notes one of the ongoing challenges for practitioners working with families with a range of vulnerabilities is that messages about safe sleeping are not always received, understood or adopted and parents need to be supported to maintain practices that promote safety for their baby.

NSW Health have noted that it is essential all families receive consistent safe sleeping information. A revised NSW Health safe sleep policy (currently in draft) targets high risk groups with additional need for support and information.

Although there is continuing evidence to support the benefits of safe sleep pods,[86] we noted in our 2017-18 Annual Report[87] that we would focus our recommendations and broad monitoring on:

> *specific actions being taken by both agencies, together or separately, to prevent SUDI in Aboriginal families, in families where there is a child protection history, and in families living in disadvantaged areas.*

83. Sidebotham P, Marshall D and Garstang J 2017. Responding to unexpected child deaths in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.217-256.
84. NSW Child Death Review Team 2015. Annual report 2014. NSW Ombudsman, Sydney.
85. NSW Department of Family and Community Services 2017. Child deaths 2016 Annual Report. FACS, Sydney. At the time of writing, FACS Child deaths 2017 Annual Report was not available.
86. Baddock SA, Tipene-Leach D, Williams SM et al 2018. Physiological stability in an indigenous sleep device: a randomised controlled trial. Archives of disease in childhood, 103 pp.377-382.
Mitchell EA, Cowan S, Tipene-Leach D 2016. The recent fall in postperinatal mortality in New Zealand and the Safe Sleep programme. Acta paediatrica, 105 pp.1312-1320.
Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.77, 187-216.
87. NSW Child Death Review Team 2018, CDRT annual report. NSW Ombudsman, Sydney.

We recommend that:

1. **NSW Health should develop and implement strategies to promote safe infant sleep practices to vulnerable families. In particular, NSW Health should target:**
   - **In consultation with the Department of Family and Community Services, families known to child protection services**
   - **Families living in remote areas of the state, and**
   - **Families living in areas of greatest socio-economic disadvantage.**

6.7.3. Many of the risks to which infants were exposed are avoidable

Our reviews found modifiable risk factors – and generally multiple factors – are present in the overwhelming majority of cases where infants die suddenly and unexpectedly. Research conducted by Garstang[88] with parents after the SIDS death of an infant found that in many cases parents seem to understand the relevance of hazardous sleep environments or their smoking habits. However, this understanding does not appear to be translating into behavioural changes.

The CDRT have previously made recommendations to NSW Health and Red Nose about unintentional bed sharing and strategies targeting young mothers and grandmothers. We note that both agencies are taking steps to explore new ways of delivering messages to at-risk populations.

NSW Health staff are required to model safe sleeping practice and strongly encourage parents and caregivers to use safe sleeping practices at home and in any environment where a baby is placed to sleep. These interventions should be repeated at each opportunity until the baby is 12 months of age.

Research suggests there are complex and interrelating factors that contribute to the lack of change in relation to modifiable risks. For example:

- Mixed messaging – there are opposing views about the potential benefits and risks associated with sharing a sleep surface with an infant, and evidence that it is the circumstances in which shared sleeping occurs that is the most important factor. For example, the presence of other known risk factors such as parental use of alcohol, drugs, or other sedating medication, maternal smoking, a very young infant aged less than 3 months who was premature or of low birth weight, and the type of surface being shared such as a sofa or couch.[89]
- The need for multi-faceted preventive approaches – it is unlikely that any single preventive approach will achieve universal success.
- Interventions need to be 'relatable' to the target group – interventions that are not perceived as relevant or do not meet the needs of the individual, or fail to identify other priorities, are unlikely to be successful.[90]

In relation to shared sleeping, a 'risk minimisation' approach (rather than risk elimination) may be more likely to be effective in reducing preventable infant deaths as it acknowledges that infants will be placed to sleep – intentionally or unintentionally – in their parent's bed at some stage, particularly if they are breastfed.[91] A risk minimisation approach does not prevent providing information about the known dangers of some shared sleeping practices, nor the circumstances in which it should be avoided altogether. Risk minimisation strategies include the use of side-car cots and safe sleep pods – as well as providing nuanced information to parents that addresses the unique needs and influences of the families being targeted. This approach is consistent with and supported by recommendations from health professionals such as the World Health Organisation and the Australian College of Midwives.[92]

88. Garstang J 2018. Parental perspectives, in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.123-142.
89. Young J and Shipstone R 2018. Shared sleeping surfaces and dangerous sleeping environments, in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.187-216.
90. Sidebotham P et al 2018. Preventative strategies for sudden infant death syndrome, in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.217-259.
91. Young J and Shipstone R 2018. Shared sleeping surfaces and dangerous sleeping environments, in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.187-216.
92. Unicef UK 2017. Guide to the UK baby friendly initiative standards, accessed from https://www.unicef.org.uk/babyfriendly/ on 14 September 2019
National Institutes for Health and Care Excellence 2014, Clinical guideline CG37 – Postnatal care up to 8 weeks after birth. NICE, UK.
Australian College of Midwives 2014. Position statement on bed-sharing and co-sleeping. ACM, Canberra.

6.7.4. Early recognition of illness in infants is an important prevention strategy

In 2016 and 2017, we identified that a preceding infectious illness was present for more than half the infants who died suddenly and unexpectedly. Although the infection was minor or appeared not to be a factor in the death in many cases, for some infants undiagnosed illness was fatal. Signs of serious illness in infants can be subtle and difficult to recognise, and hard to differentiate from those of a relatively minor illness. Infants can also develop an acute illness very quickly and can deteriorate very rapidly.

To assist parents recognise serious illness in children, the Sydney Children's Hospitals Network have produced an educational Fact Sheet[93] which alerts carers to features of illness such as alertness and irritability, breathing, skin colour and appearance, and fluids in and out (how much a child is drinking and passing urine). NSW Health also highlights the Australian parenting website, Raising Children, as a resource in the NSW My Personal Health Record 'Blue Book'.[94]

Internationally, researchers working in the United Kingdom have proposed a simple scoring system that grades the severity of 19 signs and symptoms of illness to assess seriousness of illness in infants.[95] The tool, known as *Baby Check,*[96] is designed to be used at home to help parents understand whether they need to seek medical attention. The tool is not intended to diagnose specific conditions or diseases. Questions in the tool score signs and symptoms such as fluid intake, circulation, level of alertness and temperature – all described in everyday language for ease of use. The higher the score, the more serious the illness.

Sample questions from the Baby Check tool

Symptom	Score
In the last 24 hours:	
If your baby has taken a little less fluid than usual	**3**
If your baby has taken about half as much fluid as usual	**4**
If your baby has taken very little fluid	**9**
If your baby has vomited at least half the feed after every one of the last 3 feeds	**4**
If your baby has had green vomit	**13**
If your baby has been drowsy and less alert than usual when awake score as follows:	
Occasionally drowsy; or	**3**
Drowsy most of the time	**5**
If your baby seems more floppy than usual	**4**
If your baby has breathing difficulty, the lower chest and upper tummy will dip in with each breath. This is called 'in drawing'.	
If there is in drawing just visible with each breath; or	**4**
If there is obvious or deep in drawing with each breath	**15**
If your baby is wheezing when breathing out	**3**
If your baby's nails are blue	**3**

93. Sydney Children's Hospital Network 2017. Recognition of serious illness in children, accessed from https://www.schn.health.nsw.gov.au/fact-sheets on 7 March 2019.
94. Raising Children Network Australia 2017, Serious childhood illnesses: 0-3 years, accessed from https://raisingchildren.net.au/babies/health-daily-care/health-concerns/serious-child-illnesses on 7 March 2019.
95. Sidebotham P et al 2018. Preventative strategies for sudden infant death syndrome, in Duncan JR and Byard RW (editors), Sudden infant and early childhood death: The past, the present and the future. University of Adelaide Press, Adelaide, pp.217-259.
96. The Lullaby Trust 2018. Baby Check, accessed from https://www.lullabytrust.org.uk/safer-sleep-advice/baby-check-app/ on 16 September 2018.

The tool has been validated and trialled in homes, hospitals and general practices and in population-based data.[97] It was found to be accurate, easy to use, and improved the identification of signs of serious illness. A full list of questions included in the tool is provided in Appendix 4. The tool has been translated into a smartphone application that can be accessed by anyone at any time.[98]

Noting that a number of infants who died suddenly and unexpectedly were found to have had undiagnosed and untreated infectious illness prior to their death,

We recommend that:

2. **NSW Health should undertake a campaign to promote resources (including fact sheets, websites, apps and phone lines) that aim to assist parents and carers to identify illness in infants. The campaign should focus on resources that are evidence-based and have been subject to evaluation.**

The presence of infection among infants who died suddenly and unexpectedly also highlights the importance of early recognition of serious illness by health professionals.

Quality health care requires an understanding of each stage of infancy and childhood, diagnosis and management of common presentations as well as uncommon serious presentations, and having the communication skills to engage with children and their families in order to elicit the best outcomes.

NSW Health's clinical practice guidelines – Recognition of a Sick Baby or Child in the Emergency Department – state that, *'as a rule of thumb, a neonate presenting to the Emergency Department should be considered sick, until proven otherwise'*.[99] The guidelines recommend a structured approach to recognising illness involving obtaining a good history and precipitating factors to the infant, repeated observations over time, and ongoing vigilance by parents to the possible emergence of new or worsening signs and symptoms. Each Local Health District is responsible for ensuring that local protocols based on these guidelines are developed.

The CDRT will continue to monitor this issue through its reviews, noting that families consult with a range of health professionals, including general practitioners and community nurses, in both the public and private health care systems.

97. Morley CJ et al 1991. Baby Check: a scoring system to grade the severity of acute systemic illness in babies under 6 months. Arch Dis Child, 66 pp.100–6.
Morley CJ et al 1991. Symptoms and signs in infants younger than 6 months of age correlated with the severity of their illness. 88(6) pp.1119-24.
Thornton AJ et al 1991. Field trials of the Baby Check score card: Mothers scoring their babies at home. Arch Dis Child. 66(1), pp.106-1.
Morley CJ et al 2000. Field trials of the Baby Check score card in general practice. Arch Dis Child. 1991;66(1), pp.111-14.
Ward Platt M et al 2000. A clinical comparison of SIDS and explained sudden infant deaths: How healthy and how normal? CESDI SUDI Research Group. Confidential Inquiry into Stillbirths and Deaths in Infancy study. Arch Dis Child. 82(2), pp.98-106
98. The Lullaby Trust 2018. Baby Check, accessed from https://www.lullabytrust.org.uk/safer-sleep-advice/baby-check-app/ on 16 September 2018.
99. NSW Health 2011. Recognition of a Sick Baby or Child in the Emergency Department, Doc no. PD2011_038. NSW Health, North Sydney.

Chapter 7. Injury-related deaths in 2016 and 2017

In 2016 and 2017, 185 children died as a result of injury.

Injury-related causes account for the death of around one in every five children who die in NSW.

There has been a decline in the rate of unintentional injury-related fatalities over the past 15 years; however, there has not been a decline in the rate of intentional injury causes.

Young people aged 15-17 years have the highest injury-related mortality rate of any age group.

Aboriginal children and young people, families with a child protection history, and children living in the most disadvantaged areas of NSW are over-represented in injury-related deaths.

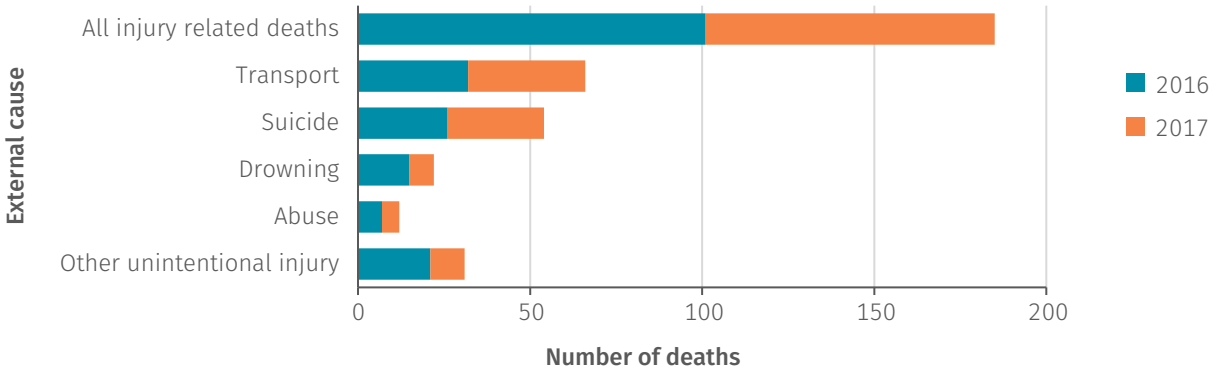
Over the two-year period 2016-2017, 185 children aged 0-17 years died from injury-related causes in NSW – 101 children in 2016 and 84 children in 2017 (Figure 52). These 185 deaths represent 19% of all child deaths during the period – a rate of 5.3 deaths per 100,000 children.

Almost two thirds (119) of the deaths were due to unintentional injury. The following chapters examine the major causes of unintentional injury in detail:

- Transport deaths (66) – see chapter 8.
- Drowning (22) – see chapter 9.
- Accidental suffocation of infants (14) – examined as SUDI in chapter 6.
- Deaths from other injuries sustained unintentionally (17) – see chapter 10.

The deaths of 66 children were intentional, either due to suicide (54) or related to abuse (12). These deaths are examined in chapters 11 and 12.

Figure 52. Deaths from injuries of children aged 0-17 years, 2016 and 2017



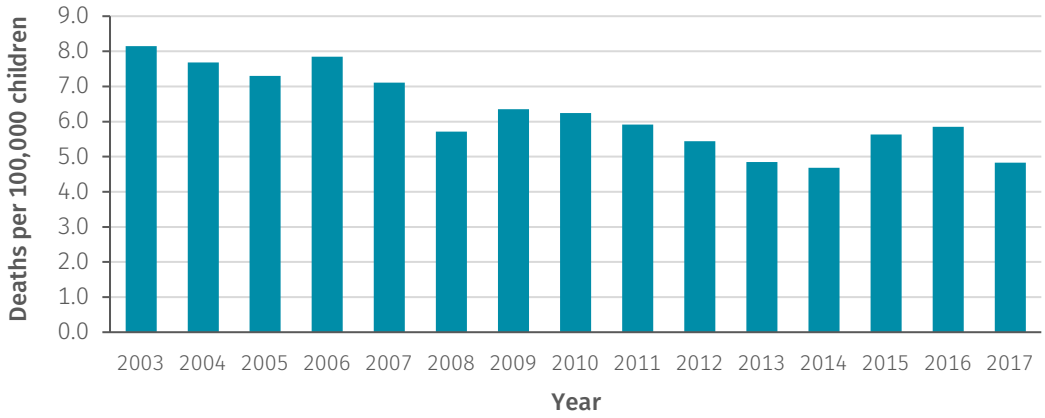
Twenty injury-related deaths were reviewable by the Ombudsman because the deaths occurred in circumstances of abuse (11) or neglect (2), were suspicious (1), or the children were in care (6).

7.1. Trends in deaths from injuries in NSW, 2003-17

In Australia, injury is the leading cause of death of children aged 1 to 16 years.[100] In NSW, injury-related causes account for the death of around one in every five children.

As shown in Figure 53, there has been a decline in the overall injury-related mortality rate over the 15 years to 2017 – from 8.2 deaths per 100,000 children in 2003 to 4.8 in 2017. This decline was significant from 2003 to 2013, after which there has been no significant change.

Figure 53. Deaths from injuries of children aged 0-17 years, 2003-17

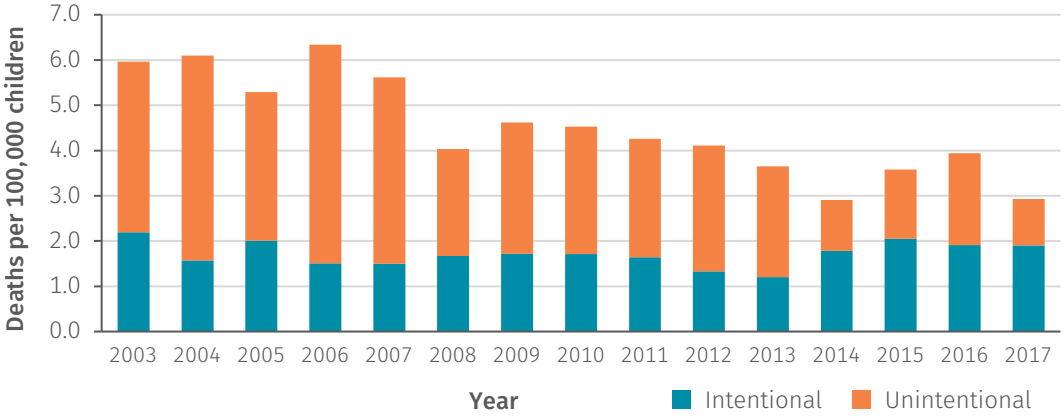


Mitchell et al[101] note that *'medical advances, pre-hospital intervention and trauma management, legislative change and the introduction of safety initiatives (such as swimming pool fencing, helmet use, child-proof medicine containers, non-flammable clothing, hot water tempering) and mechanical safety advances (including motor vehicle safety assisted technologies, such as rear-view cameras) have all contributed to the increased survival of children following traumatic injury'.*

7.2. Unintentional and intentional injuries

There has been a significant decrease in the injury-related mortality rate over the 15 years to 2017. This decrease is due to a significant decline in the mortality rate for unintentional injuries (Figure 54). There has not been a significant change in the mortality rate for intentional injuries over the same period.

Figure 54. Deaths from intentional and unintentional injuries in children aged 0-17 years, 2003-17



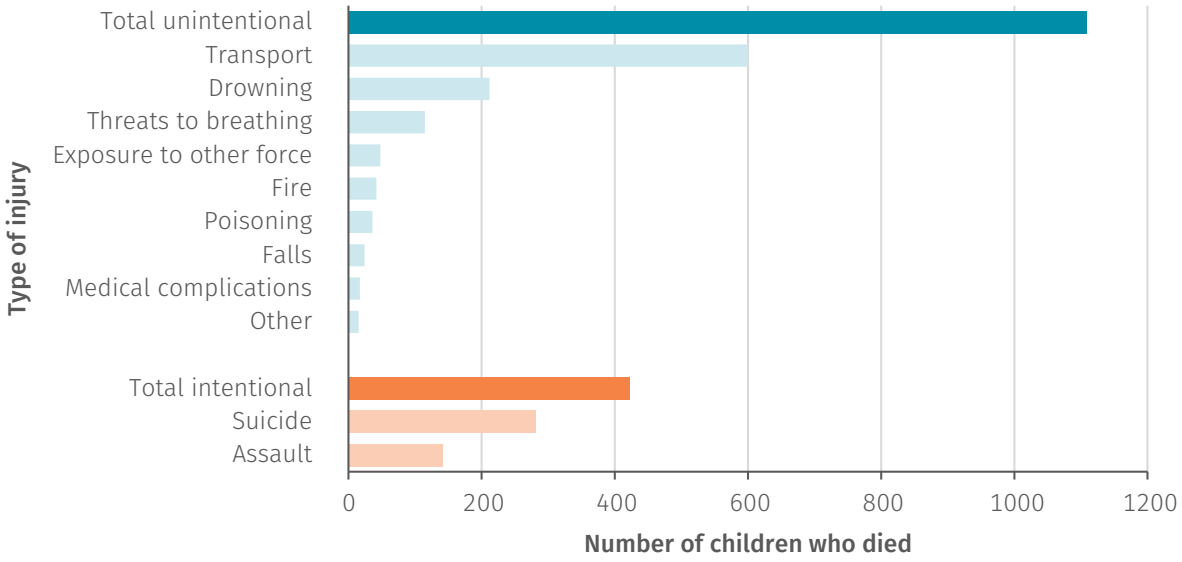
The reduction in unintentional injury-related deaths can be attributed to significant declines in the mortality rate from transport injuries and drowning. These trends are discussed in more detail in Chapters 8 and 9.

100. Mitchell R, Curtis K, Foster K, 2017. A 10-year review of the characteristics and health outcomes of injury-related hospitalisations of children in Australia. Macquarie University, University of Sydney and Australian Catholic University, Sydney.
101. As above.

7.3. Leading causes of injury

The main causes of injury-related death for children in NSW over the past 15 years (2003-17) are shown in Figure 55. Transport fatalities account for the majority (54%) of unintentional injury deaths – more than the combined total of all other unintentional injury-related causes. Suicide represents the majority (66%) of intentional injury deaths.

Figure 55. Leading causes of death from injury in children aged 0-17 years, 2003-17



Child injury mortality represents the 'tip of the iceberg' in terms of the burden of childhood injury in Australia, with many more children suffering non-fatal injuries.[102] Each year in NSW, around 20,000 children aged 0-17 years are hospitalised as a result of an unintentional injury.[103]

The main causes of hospitalised injury are different to the leading causes of injury-related death. For example, drowning causes a high proportion of unintentional deaths – but a low proportion of hospitalised injury cases. Falls are a leading cause of hospitalised injury,[104] but account for relatively few deaths.[105]

7.3.1. Age and gender

The way in which children sustain fatal injuries varies significantly by developmental age. Figure 56 shows the leading causes of injury-related death by age:

- For infants, the leading injury-related cause of death was accidental threats to breathing (49%) followed by fatal abuse (21%).
- Drowning and transport fatalities were the leading injury-related causes of death for children aged 1-4 and 5-9 years.
- Transport fatalities and suicide were the leading injury-related causes of death for children and young people aged 10-14 and 15-17 years.

102. Mitchell R 2018. NSW Child Death Register Review: key advice. Australian Institute of Health Innovation and Macquarie University, Sydney
103. Adams S et al 2016. Child Safety Good Practice Guide: Good investments in unintentional child injury prevention and safety promotion. Sydney Children's Hospitals Network, Sydney.
104. According to the Child Safety Good Practice Guide (see previous reference), falls account for 45% of all unintentional injury-related hospital admissions.
105. Australian Institute of Health and Welfare 2018. Trends in hospitalised injury, Australia 1999-00 to 2014-15, Cat no. INJCAT 190. AIHW, Canberra.

Figure 56. Leading causes of death from injury in children by age group, 2003-17

	1st	2nd	3rd	4th	5th
Infants	Threats to breathing	Assault	Transport	Drowning	Medical complications
1-4 years	Drowning	Transport	Assault	Threats to breathing	Fire
5-9 years	Transport	Drowning	Assault	Exposure to force	Fire
10-14 years	Transport	Suicide	Assault	Drowning	Threats to breathing
15-17 years	Transport	Suicide	Assault	Poisoning	Drowning

Blue corresponds to intentional injuries and orange corresponds to unintentional injuries

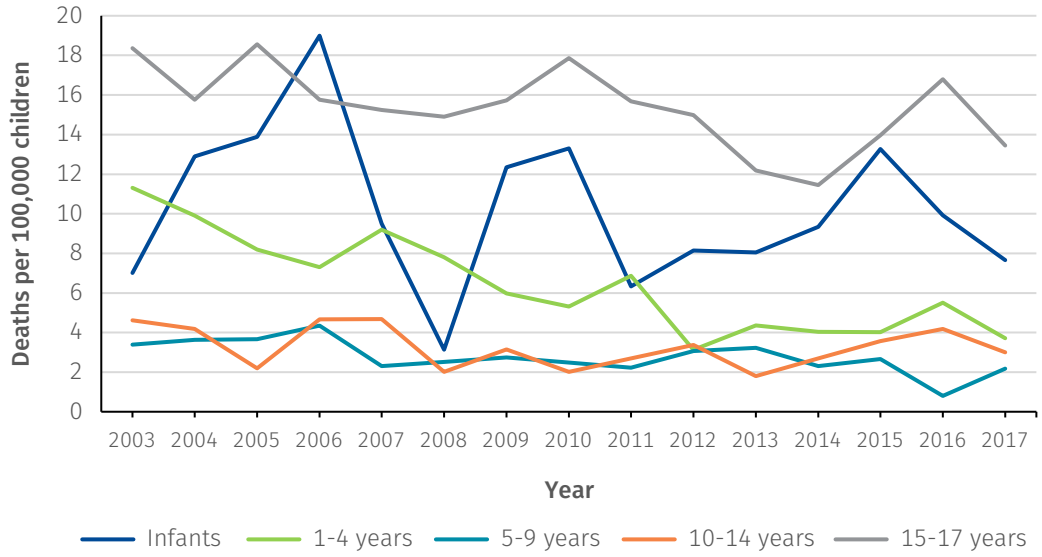
The differences in leading cause, depending on the age of a child, emphasises the need for injury prevention strategies to target childhood developmental stages.[106] For example, although transport fatalities are the leading cause of injury-related death for children aged 5-9, 10-14 and 15-17 years, the risks associated with possible injury change. For younger children, strategies targeting the appropriate use of safety restraints in vehicles, increasing a child's road safety knowledge as a pedestrian or pedal cyclist, traffic calming methods such as speed bumps, and mechanisms to separate cyclists from vehicles (such as cycle pathways) are vital. Injury prevention strategies aimed at reducing transport fatalities among young people include skills-based and risk awareness training for novice drivers, vehicle maintenance, and legislation about mobile phone use, drug and alcohol use, driving curfews and passenger numbers.

More detailed information about fatality numbers according to the type of injury and age is provided in Appendix 6.

Overall, young people aged 15-17 have the highest injury-related mortality rate – followed by infants and then 1-4 year olds (Figure 57).[107]

The injury-related mortality rate has declined in all age groups. This decline was significant for all ages except children 10-14 years old before 2008. Since 2008, the decline has only been significant for children aged 1-4 years.

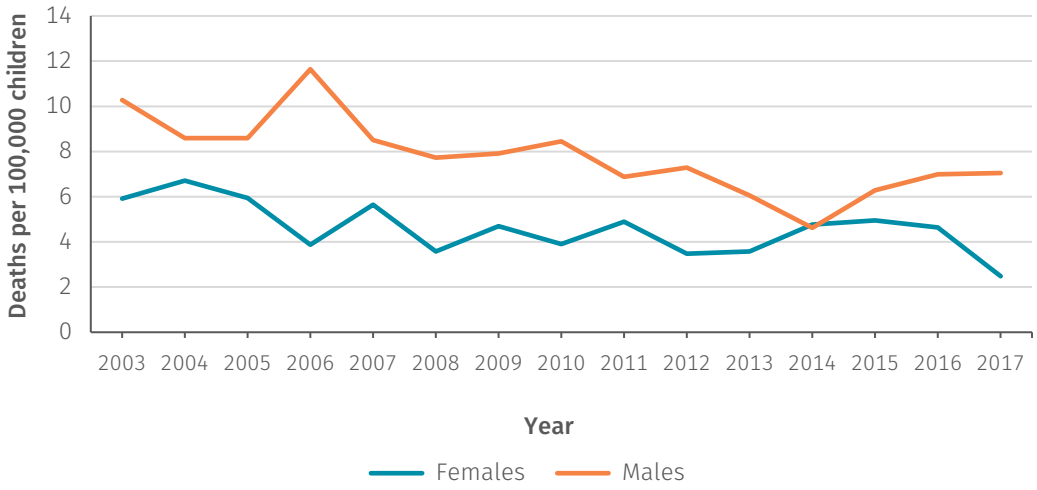
Figure 57. Deaths from injuries of children and young people aged 1-17 years, 2003-17



106. Mitchell R, Curtis K, Foster K, 2017. A 10-year review of the characteristics and health outcomes of injury-related hospitalisations of children in Australia. Sydney, Macquarie University, University of Sydney and Australian Catholic University.
107. Rates were 13.6 deaths per 100,000 for young people aged 15-17 years old, 9.7 for infants, and 4.3 for children aged 1-4 years old.

In relation to gender, the mortality rate for males who died from injury-related causes is significantly higher than for females (Figure 58). In 2014 – and for the only time during the 15-year period – the annual injury-related mortality rate for females was marginally higher than for males. Since then, the gap in the rates between genders has again increased.

Figure 58. Deaths from injuries of children aged 0-17 years by gender, 2003-17

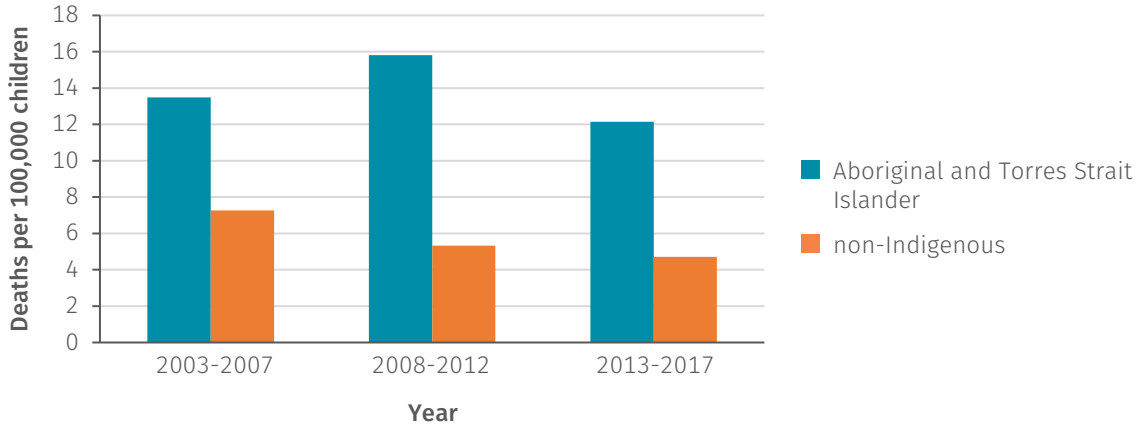


7.3.2. Aboriginal and Torres Strait Islander status

Across Australia, Aboriginal children have higher infant and child mortality rates compared to non-Aboriginal children.[108] NSW data is consistent with national data – the injury-related mortality rate for Indigenous children is consistently and significantly higher than that for non-Indigenous children.

Figure 59 shows that – over the 15 years to 2017 – the mortality rate from injury-related causes has remained significantly higher for Indigenous children[109] than for non-Indigenous children. In the most recent five-year period (2013-17), it was 2.6 times as high.

Figure 59. Deaths from injuries in children aged 0-17 years by Aboriginal and Torres Strait Islander status, 2003-17



There is no difference, however, between Aboriginal and non-Aboriginal children in terms of the main types of fatal injuries sustained. The top five causes of injury-related death – transport, suicide, drowning, assault, and accidental threats to breathing – are the same for all children, regardless of Indigenous status.

108. Australian Institute of Health and Welfare 2012. A Picture of Australia's Children 2012. AIHW, Canberra.
109. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.

However, there are inequalities in rates of non-fatal unintentional injury-related hospitalisations between Aboriginal and non-Aboriginal children. Moller et al[110] found that Aboriginal children are more likely to be hospitalised for an unintentional injury than non-Aboriginal children – with the largest differences being in relation to poisoning and injuries stemming from exposure to fire, flames, heat and hot substances. The research indicated that injury prevention measures that specifically address injury risks in Aboriginal children have the potential to improve Aboriginal child health and reduce health inequalities; but that, with the exception of the 'Buckle Up' safely program,[111] there are few current prevention activities that specifically target Aboriginal children.

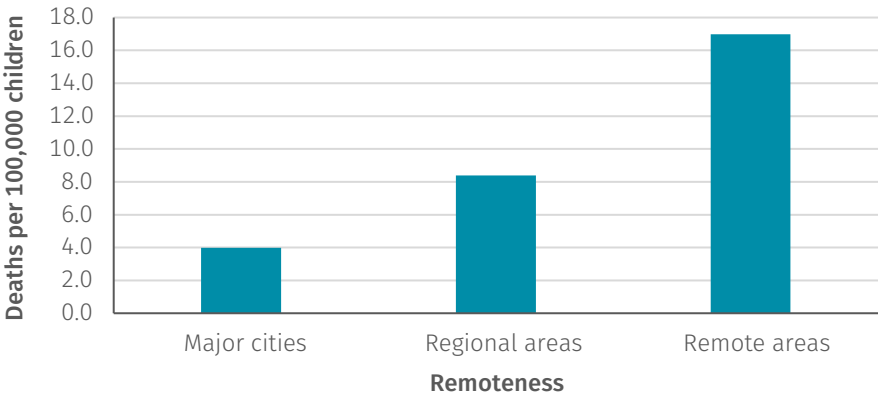
The issue of the need to develop injury prevention strategies that reach the most vulnerable children is also discussed in the Sydney Children's Hospitals Network *Child Safety Good Practice Guide.*[112] The guide highlights the need to acknowledge and understand the unique and complex factors at play in vulnerable communities, and to consult individuals within these groups as part of the planning and delivery of programs, products or policies.

7.3.3. Remoteness and socio-economic status

Socio-economic data was available for the five-year period 2013–17.

Although more than half (56%) the children who died from injury-related causes lived in major cities and only a small number of children (2%) lived in remote areas,[113] the mortality rates reflect the opposite pattern – the rate was 4.3 times higher for children in remote areas than for children in major cities (Figure 60). Children in remote areas were significantly more likely to die as a result of injury than children in major cities.

Figure 60. Deaths from injuries of children aged 0-17 years by remoteness, 2013-17

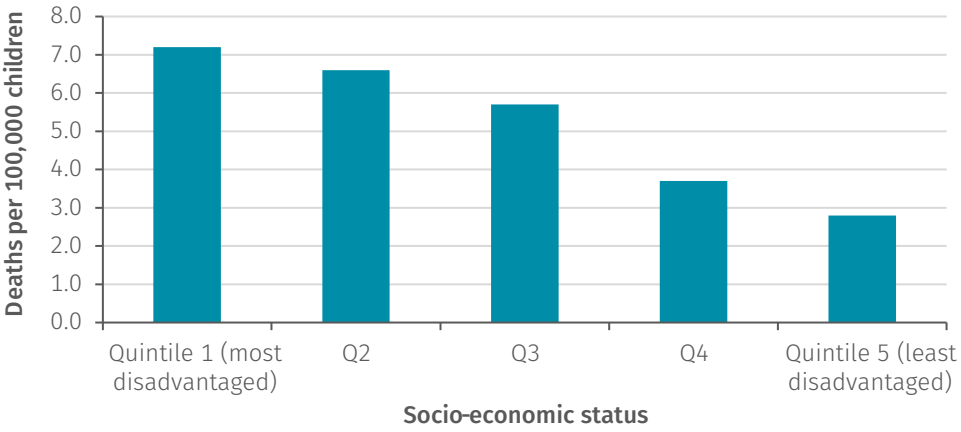


In relation to socio-economic status, the mortality rate for injury-related deaths was highest for children in the most disadvantaged socio-economic areas and lowest for those in the least disadvantaged areas (Figure 61).

Almost a third (134; 30%) of children who died from injury-related causes lived in the most disadvantaged socio-economic areas.[114] When we further examined socio-economic status for the level of education and occupational-related skills in an area, we found that one in every five children was from an area of greatest disadvantage.[115]

110. Moller H et al 2016. Inequalities in hospitalised unintentional injury between Aboriginal and Non-Aboriginal Children in New South Wales, Australia. AJPH Research, 106(5).
111. Hunter K et al 2014. Buckle up safely (Shoalhaven): a process and impact evaluation of a pragmatic, multifaceted preschool-based pilot program to increase correct use of age-appropriate child restraints. Traffic Injury Prevention. 15(5), pp.483-490.
112. Adams S et al 2016. Child Safety Good Practice Guide: Good investments in unintentional child injury prevention and safety promotion. Sydney Children's Hospitals Network, Sydney.
113. An additional 41 per cent resided in regional areas as per the ABS accessibility and remoteness index of Australia (ARIA+).
114. Quintile 1 of the ABS index of socio-economic disadvantage.
115. 20 per cent of children were in Quintile 1 for both the ABS index of socio-economic disadvantage, as well as the ABS index for education and occupation.

Figure 61. Deaths from injuries of children aged 0-17 years by socio-economic status, 2013-17



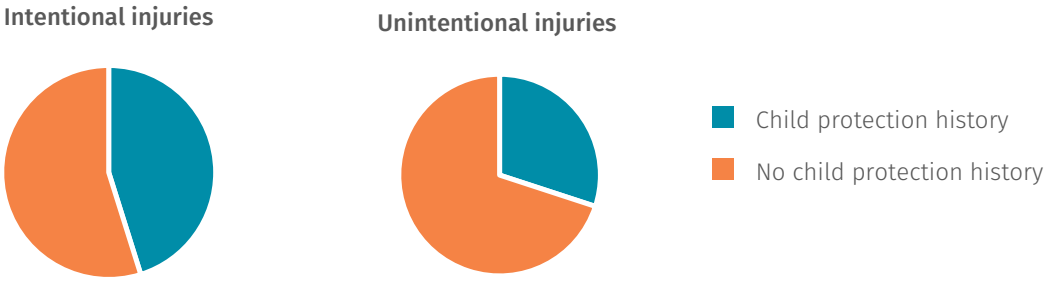
7.3.4. Child protection history

It is well established that mortality rates are higher for children from families with a child protection history. Research has also shown that children with a child protection history have a much higher mortality rate for particular causes of death – including SUDI, injury-related causes (fire, assault, accidental poisoning, suicide and drowning), and certain natural causes.[116]

In 2016-17, one third (61) of the 185 children who died from injury-related causes were from families with a children protection history. Of the 66 children who died from intentional injuries, 30 (45%) were from families with a child protection history – and of the 119 children who died from unintentional injuries, 31 (26%) were from families with a child protection history.

This pattern has been consistent over time (Figure 62). For the 15-year period 2003-17, nearly half the children (45%) who died from intentional injury-related causes had a child protection history, compared with less than one third (30%) of children who died from unintentional causes.

Figure 62. Child protection history for intentional vs unintentional injuries, 2003-17



116. NSW Child Death Review Team 2018. Spatial analysis of child deaths in New South Wales, prepared by the Australian Institute of Health and Welfare. NSW Ombudsman, Sydney.
NSW Child Death Review Team 2014. Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.

Chapter 8. Transport-related deaths in 2016 and 2017

In 2016 and 2017, 66 children died in vehicle crashes. A transport-related injury was the second leading cause of death for young people aged 15-17 years in the two-year period.

Although the rate of death from transport injuries has declined by almost half over the past 15 years, the rate has not changed significantly since 2008. The decline has mostly been in relation to passengers and pedestrians, not drivers.

The rate for 15-17 year olds has also remained significantly higher than any other age group.[117]

Remoteness is a key factor in transport deaths – the mortality rate for children from remote areas was more than double that of children from regional areas, and almost seven times as high as that of children from major cities.

Children from socio-economically disadvantaged areas were more likely to die in transport incidents than children from the least disadvantaged areas.

In NSW, transport incidents resulted in the deaths of 32 children in 2016 and 34 children in 2017 – a rate of 1.85 and 1.95 deaths per 100,000 children respectively. In the two-year period, transport fatalities were the second leading cause of death for young people aged 15-17 years.

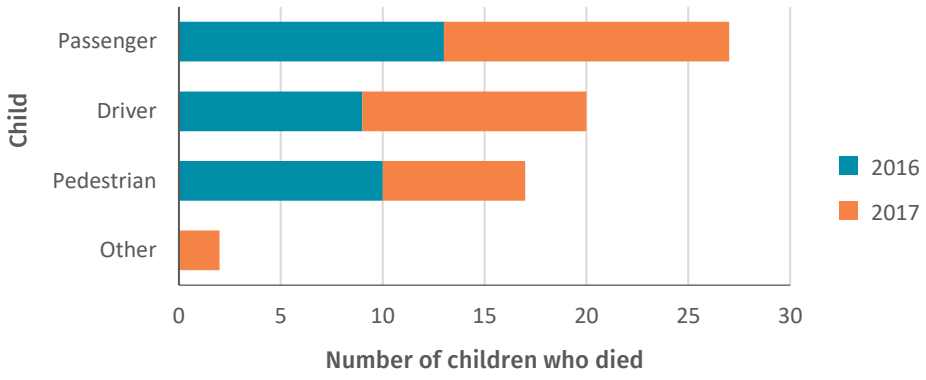
Sixty-one collisions resulted in the 66 deaths. Most of the children were travelling in a vehicle (Figure 63):

- 27 children were passengers in vehicles – primarily sedan cars, 4WDs or similar. Other deaths occurred in a seaplane incident (1), a quad bike crash (1) and after falling from a commercial vehicle (1).
- 20 children, mostly older teenagers, were in control of the vehicle. Most of the vehicles being driven were on-road. Four were off-road – either dirt bikes (3) or a quad bike (1).
- Nineteen children, mainly pedestrians (17), were struck by a vehicle. Two children died as a result of a vehicle crashing into a building. Five children between one and three years old died in low-speed vehicle run-over incidents, where the child moved into the pathway of a slow moving or reversing vehicle.

Three-quarters (46) of the collisions involved a single vehicle. Of the fifteen collisions involving more than one vehicle, eight children died when the car or motorcycle they were occupying was struck by a heavier vehicle – such as a heavy truck or a utility.

The deaths of three children were reviewable by the Ombudsman as a result of carer neglect (2) or because the child was living in out-of-home care (1).

Figure 63. Deaths from transport of children aged 0-17 years, 2016-17



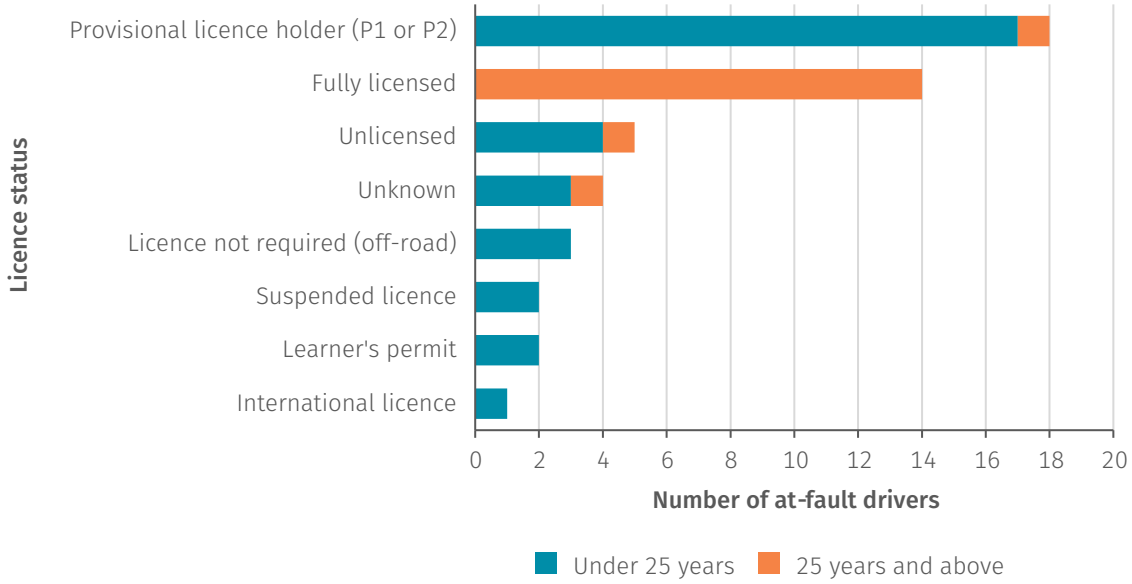
117. Of children aged under 18 years.

Police deemed over three-quarters (49) of the drivers or riders to be 'at-fault' for the collision.[118] Most (32) of the drivers / riders were under 25 years of age, and just under half (23) were under the age of 18.

The licence status for at-fault drivers is shown in Figure 64. Provisional licence holders were disproportionately represented.

Half (25) of the at-fault drivers died in the incident. Of the surviving drivers, 22 were charged with negligent and/or dangerous driving offences and one driver was charged with manslaughter. Thirteen of the drivers were convicted for one or more of the charges laid. In eight cases, the matter is still before the courts.

Figure 64. Licence status of at-fault drivers, 2016-17



8.1. Preventing transport-related deaths and injury of young people in NSW

8.1.1. Drink and drug driving prevention

NSW has three blood alcohol concentration limits – zero, under 0.02 and under 0.05. The limits depend on licence category and vehicle type. Learners, P1 and P2 drivers and riders have a zero alcohol limit and must remain alcohol free while driving or riding.

Random breath testing was introduced in NSW in 1982. NSW Police have the power to stop drivers at random to test for alcohol. The 'Plan B' campaign aims to educate drivers on the need for a plan to get home safely after a night out drinking.[119]

Mobile drug testing operates alongside random breath testing. NSW Police have the power to test drivers they believe might be under the influence of illegal or prescription drugs. The Mobile Drug Testing campaign is aimed at educating drivers that mobile drug testing can occur at anytime, anywhere.[120] Mobile drug testing is increasing – police plan to conduct up to 200,000 roadside drug tests in NSW by 2020.[121]

118. For the purpose of this chapter, 'at fault' includes drivers or riders charged in relation to the collision.
119. NSW Centre for Road Safety 2017. Plan B, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/planb.html on 18 October 2018.
120. NSW Centre for Road Safety 2019, Mobile drug testing, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/mobile-drug-testing/index.html on 3 October 2018.
121. NSW Centre for Road Safety 2019, Drugs and Driving, accessed from https://roadsafety.transport.nsw.gov.au/stayingsafe/alcoholdrugs/drugdriving/index.html on 3 October 2018.

8.1.2. Provisional licensing scheme

NSW has a graduated licensing scheme. The number of young drivers killed on NSW roads has halved since the introduction of this scheme in 2000, but young drivers are still over-represented in collisions. Young drivers under the age of 25 years are three times more likely to be in a crash than drivers aged 25 years or older. National road trauma data shows that – over the past 10 years – deaths among the 15 to 24-year age group have decreased by 29%. This reduction is largely due to the introduction of graduated licensing scheme models in all states and territories.[122]

NSW recently introduced changes to the graduated licensing scheme. The Centre for Road Safety reports that the scheme prepares new drivers to be safe and low risk drivers.[123] Changes from November 2017 include:

- Learners have to take a hazard perception test before taking a driving test that will progress them to unsupervised driving. The hazard perception test focuses on the five most common crash types for NSW provisional drivers.[124]
- The time a driver must stay on their P2 licence will be extended by six months each time they receive a suspension for unsafe driving behaviour.

Special licence conditions also apply for young drivers in NSW – including speed restrictions, passenger numbers, vehicle types and mobile phone use.[125]

Transport for NSW also allows learners to earn a bonus of 20 hours log book credit for completing the Safer Drivers Course.[126] This course, which is not mandatory for obtaining a licence, develops safe driving behaviour by teaching learners how to reduce road risks and cope with peers in the vehicle. To complete the course, drivers must be learners, aged under 25 years, and have already completed 50 log book hours of driving.

In a response to the Staysafe Inquiry into driver education training and road safety in NSW, Transport for NSW indicated that findings from an outcome evaluation of the Safer Drivers Course would be published after an analysis of five years of crash data (2013-18).[127] It is anticipated that this evaluation will start no earlier than August 2019 once 2018 crash data is finalised.[128] The outcome of this evaluation will inform whether NSW considers making the Safer Drivers Course compulsory for all learner drivers.[129]

8.1.3. Driver education and safety campaigns

The NSW Government has a range of programs and campaigns aimed at educating road users, enforcing road rules and motivating drivers and road users to behave safely. Some of the relevant campaigns include:

- The 'Don't Rush' campaign, aimed at males aged 17 to 49 – reinforces the importance of speed compliance among drivers, and encourages vigilance among peer groups to speak out against road rule breakers.[130]
- The 'Don't trust your tired self' campaign – aims to provide drivers with tools to evaluate how tired they might be and provide them with a plan if they are fatigued, and provide education around how fatigue is one of the big three killers on NSW roads.[131]

122. NSW Centre for Road Safety 2015 , Younger drivers, accessed from http://roadsafety.transport.nsw.gov.au/research/gls/index.html on 3 October 2018.
123. NSW Centre for Road Safety 2019, Licence conditions, accessed from http://roadsafety.transport.nsw.gov.au/stayingsafe/drivers/youngdrivers/licenceconditions.html on 3 October 2018.
124. Roads and Maritime Services 2019, Hazard Perception Test, accessed from http://www.rms.nsw.gov.au/roads/licence/driver/tests/hazard-perception-test.html on 3 October 2018.
125. NSW Centre for Road Safety 2019, Licence conditions, accessed from http://roadsafety.transport.nsw.gov.au/stayingsafe/drivers/youngdrivers/licenceconditions.html on 3 October 2018.
126. NSW Centre for Road Safety 2018, Safe Drivers Crouse, accessed from http://roadsafety.transport.nsw.gov.au/stayingsafe/drivers/youngdrivers/youngerdriverscourse.html on 4 October 2018.
127. Transport for NSW 2018, Government response – Stay safe Inquiry into driver education, training and road safety. TfNSW, Sydney.
128. Advice provided to NSW Ombudsman by Transport for NSW on 23 November 2018.
129. Transport for NSW 2018, Government response – Stay safe Inquiry into driver education, training and road safety. TfNSW, Sydney.
130. NSW Centre for Road Safety 2016, Don't Rush, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/dont_rush/index.html on 3 October 2018.
131. NSW Centre for Road Safety 2019, Fatigue, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/donttrustyourtiredself.html on 3 October 2018.

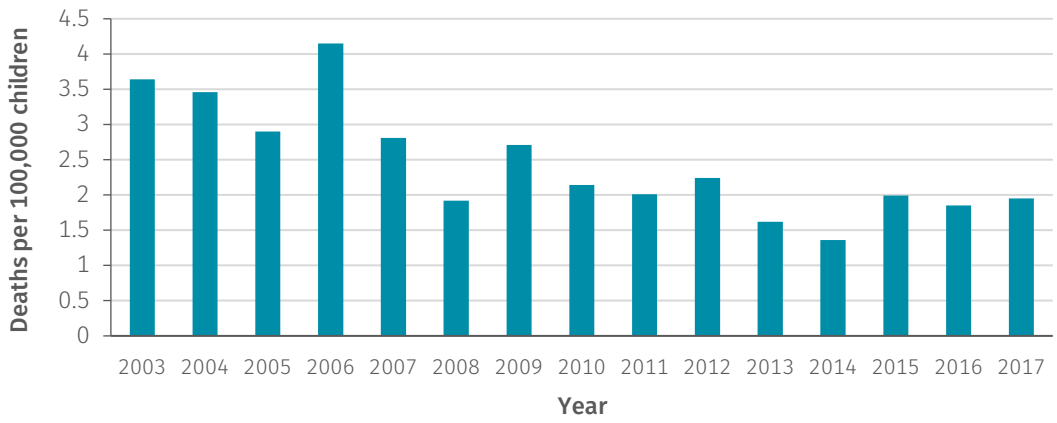
- Towards Zero – a Safe System Approach is a campaign by the NSW Centre for Road Safety to achieve the ultimate goal of zero deaths and serious injuries on NSW roads. The campaign supports the Road Safety Plan 2021, which aims to reduce fatalities by at least 30% from 2008-10 levels by 2021.[132]
- The 'Get your hand off it' campaign, aimed at 17 to 49 year olds – aims to educate drivers that taking your eyes off the road for just two seconds results in driving 33 metres blind, and that driving while using a mobile phone is not worth it.[133]
- In November 2017, the NSW Government launched 'Your last text: Is it worth dying for?' This campaign aims to highlight that inconsequential text messages are not worth dying for, and highlights the increased risks of a collision when texting while driving.[134]
- Transport for NSW, together with the NSW Police Force, launched the 'Stop it … or cop it' campaign to reduce risky behaviour and improve road safety. This campaign combines high visibility police enforcement with perceived certainty of enforcement and immediacy of penalties. Behaviours such as speeding, drink driving, not using seatbelts, and illegal mobile phone use are some of the risky behaviours targeted by this campaign.[135]

8.2. Trends in transport-related deaths of children in NSW, 2003-17

Over the 15-year period to 2017, the NSW Register of Child Deaths recorded 600 deaths of children in transport-related incidents in NSW.

As shown in Figure 65, the mortality rate from transport injuries declined by almost half between 2003 and 2017 – from 3.6 to 2.0 deaths per 100,000 children. However, the rate has not changed significantly from 2008 to 2017.

Figure 65. Transport-related deaths of children aged 0-17 years, 2003-17



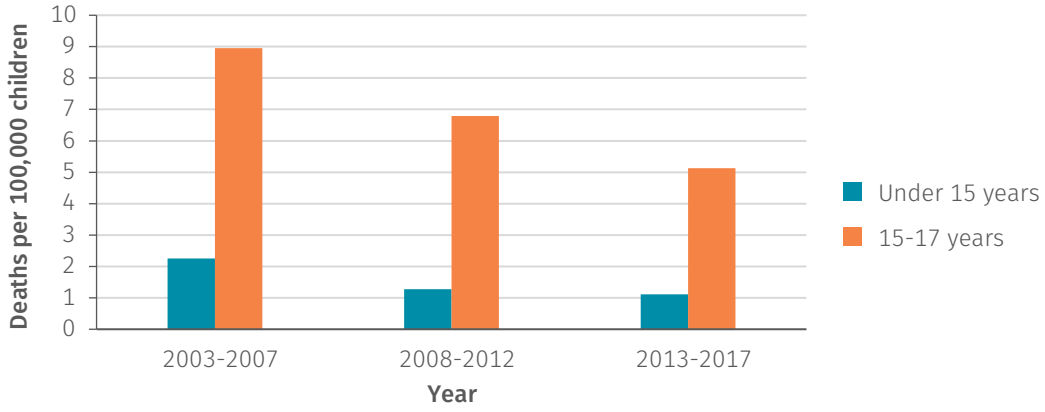
Crash data from the NSW Centre for Road Safety shows that 39,744 children under the age of 18 were injured in road traffic crashes between 2001 and 2015.[136]

132. Transport for NSW 2019, Towards Zero, accessed from https://towardszero.nsw.gov.au/thecampaign on 3 October 2018.
133. NSW Centre for Road Safety 2018, Get your hand off it, accessed from http://roadsafety.transport.nsw.gov.au/campaigns/get-your-hand-off-it/index.html on 3 October 2018.
134. Transport for NSW 2017, Your last text: Is it worth dying for? accessed from https://www.transport.nsw.gov.au/news-and-events/media-releases/your-last-text-it-worth-dying-for on 3 October 2018.
135. NSW Centre for Road Safety 2018, Stop it…Or cop it, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/enhancedpolice.html on 3 October 2018.
136. NSW Centre for Road Safety data reflects road traffic crashes only, and does not include off-road incidents.

8.2.1. Age and gender

Over the past 15 years, young people aged 15-17 years accounted for almost half (47%) of the transport-related deaths of children under 18. Although the mortality rate has continued to decline for this age group, the mortality rate for the 15-17 age group has remained significantly higher than any other age group (Figure 66).

Figure 66. ransport-related deaths of children aged 0-17 years, 2003-17



While males are more likely to die in transport incidents, the mortality rate has declined significantly for both males and females (Figure 67). Although the difference between males and females has reduced over time, the rate was 1.6 times higher for males than females. Young males have a propensity for taking risks, which is coupled with an over-estimation of driving ability. Young male drivers are more likely than young females to be involved in more serious and loss of control crashes, as well as more likely to be unrestrained and in older vehicles.[137]

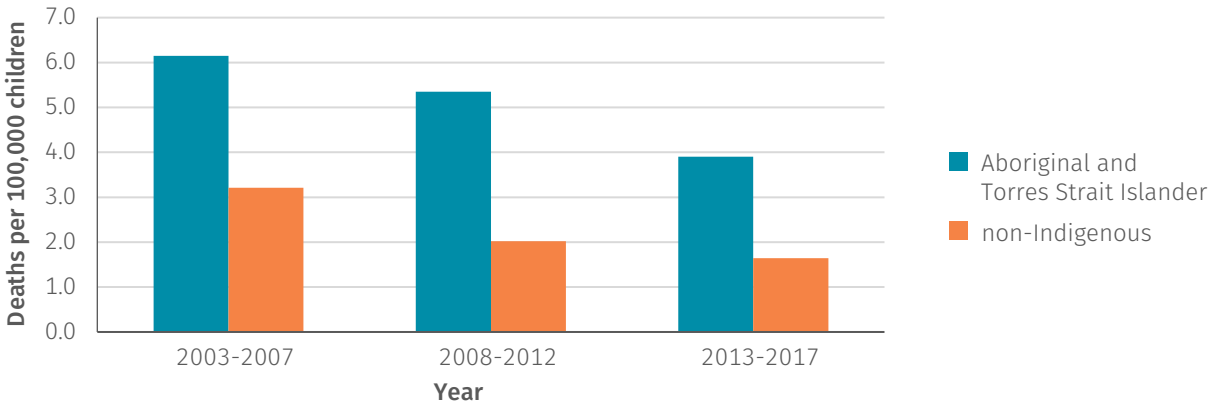
Figure 67. Transport-related deaths of children aged 0-17 years by gender, 2003-17

8.2.2. Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander young people have been consistently over-represented in transport-related deaths. The mortality rate has remained significantly higher for Indigenous[138] children compared with non-Indigenous children. In the period 2013-17, the rate was 2.3 times higher for Indigenous children (Figure 68).

137. Brown J, Senserrick T, Bilston L 2014. Gender differences in crash characteristics among young drivers admitted to hospital in NSW, Proceedings of the 2014 Australasian Road Safety Research, Policing and Education Conference.
138. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.

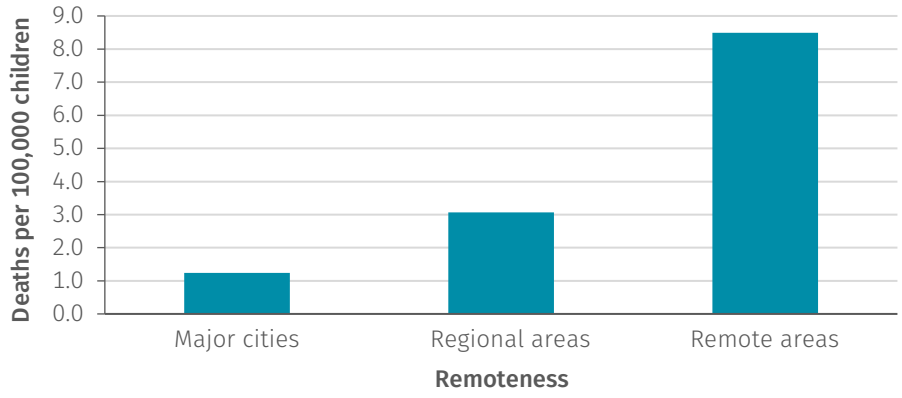
Figure 68. Transport-related deaths of children aged 0-17 years by Aboriginal and Torres Strait Islander status, 2003-17



8.2.3. Remoteness and socio-economic status

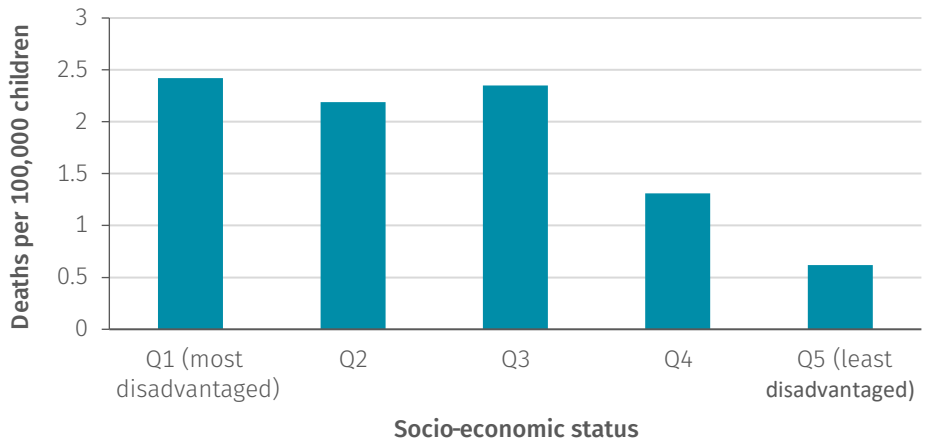
In the period 2013-17, half (51%) of the children who died from crash injuries lived in major cities. Just under half (45%) lived in regional areas. Although a very small proportion of the children resided in remote areas (3%), the mortality rate for children from remote areas was 2.5 times higher than those from regional areas and 6.8 times higher than those from major cities (Figure 69).[139]

Figure 69. Transport-related deaths of children aged 0-17 years by remoteness, 2003-17



More children who died from transport injuries lived in the most disadvantaged areas, and the mortality rate was significantly lower in the least disadvantaged areas (Figure 70). The rate was 3.9 times as high for those in the most disadvantaged areas as for those in the least disadvantaged areas.

Figure 70. Transport-related deaths of children aged 0-17 years by socio-economic status, 2013-17

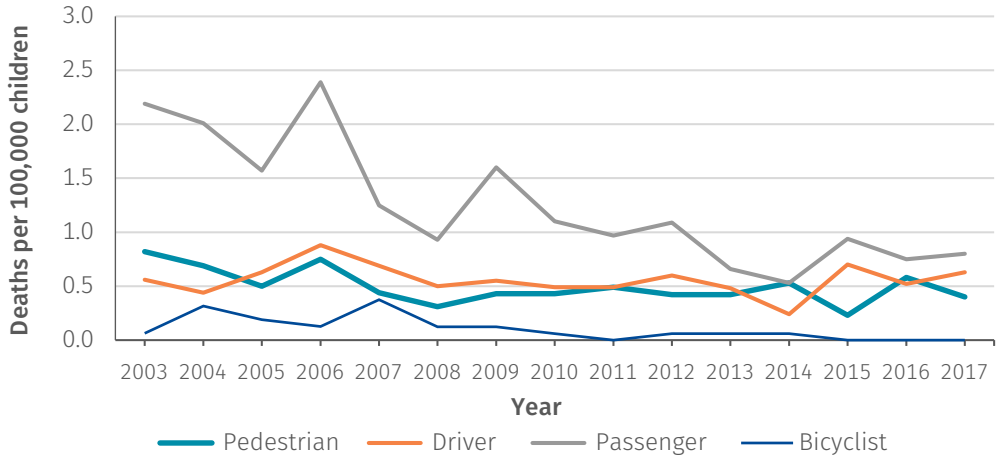


139. These differences were significant.

8.3. Nature of transport incidents

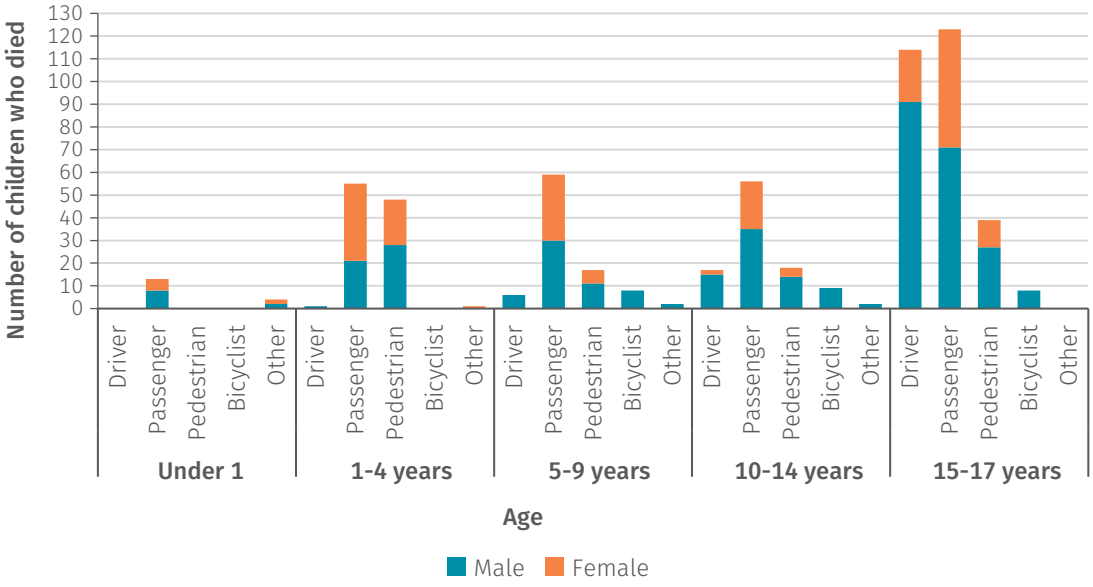
Between 2003 and 2017, the mortality rate declined by half (51%) for pedestrians (Figure 71). A significant and steeper decline (63%) in the rate also occurred for passengers of all motor vehicles.[140] The rate has also declined for pedal cyclists. There were no deaths of children riding a bicycle in NSW in the three years to 2017. There has been no change in the rate of death for drivers of all motor vehicles.

Figure 71. Transport-related deaths of children aged 0-17 years, 2003-17



As shown in Figure 72, there was a higher mortality rate for 15-17 year olds – and male drivers accounted for most deaths in this age group.

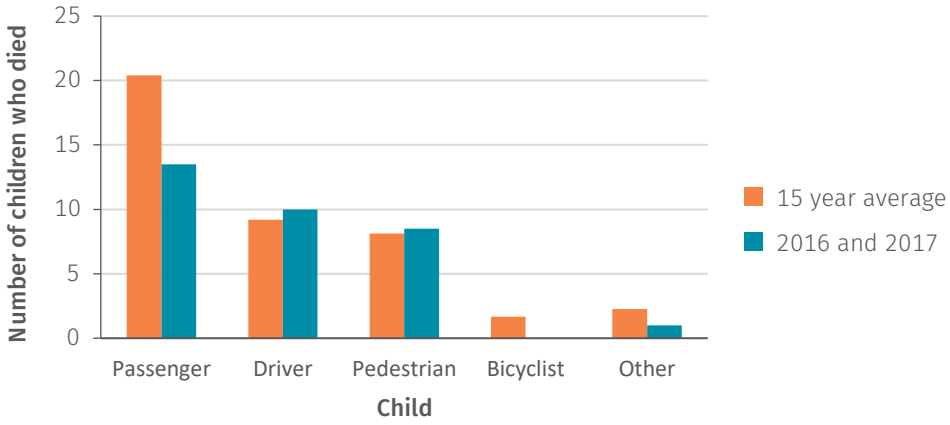
Figure 72. Transport-related deaths by age and gender, 2003-17



In 2016 and 2017, fewer passenger deaths occurred compared to the 15-year average. However, driver and pedestrian deaths were above the 15-year average (Figure 73).

140. All motor vehicles include motorcycles and quadbikes.

Figure 73. Transport-related deaths of children aged 0-17 years, 2016-17 vs 15-year average



8.4. Risk factors associated with transport-related deaths

In NSW in 2017, there were 389 fatalities on NSW roads and over 12,000 hospitalisations due to road traffic crashes – with a cost of around $7.5 billion.[141] Factors that may contribute to motor vehicle crashes and road trauma relate to driver behaviour, vehicle factors and environmental conditions. These factors are not mutually exclusive and are often identified together as contributing to fatal incidents.

The National Road Safety Strategy[142] notes that the main behavioural factors associated with deaths and serious injuries are, in proportionate order:

- speeding
- drink and drug driving
- driver fatigue
- driver distraction
- age and experience
- environmental conditions.

Additional factors that contribute to transport-related death and injury reflect a lack of, or inappropriate use of, available protections. This includes:

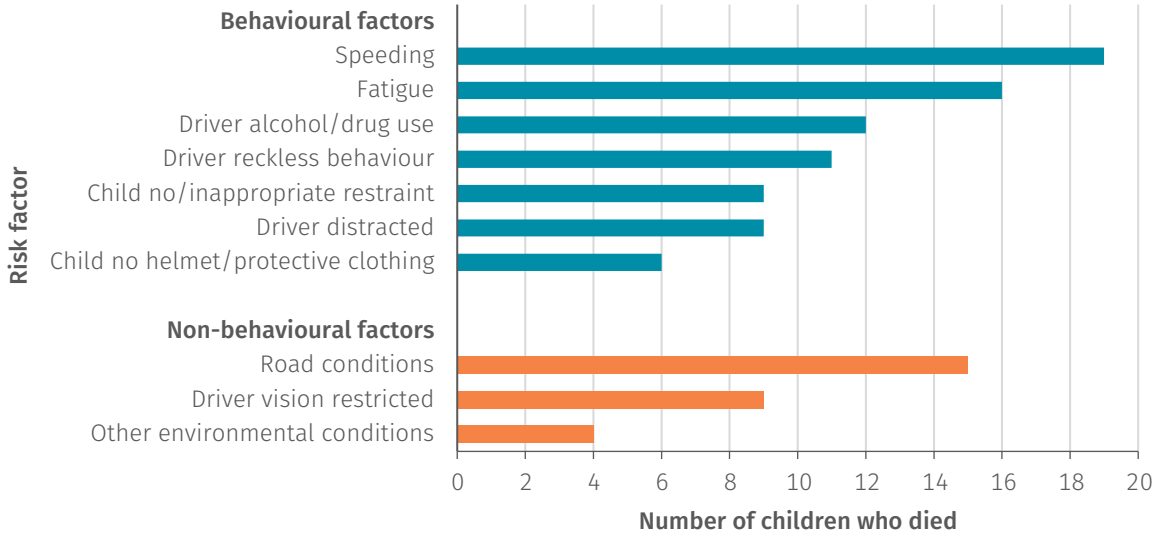
- a lack of, or inappropriate use of, seatbelts and child restraints in motor vehicles
- a lack of, or inappropriate use of, helmets and protective clothing
- inadequate supervision
- a lack of separation of children from vehicles and/or driveways
- a lack of vehicle safety features.

141. Transport for NSW 2018. Road Traffic Casualty Crashes in New South Wales - Statistical Statement for the year ending 31 December 2017. TfNSW, Sydney.
142. Department of Infrastructure, Regional Development and Cities, National road safety strategy 2011-2020. Australian Government, Canberra.

8.5. Risks identified for children who died in 2016 and 2017

As shown in Figure 74,[143] police crash investigations often identify more than one risk factor as contributing to a collision or incident resulting in the death of a child. The majority of these factors are behavioural.

Figure 74. Risk factors identified in transport-related deaths of children aged 0-17 years, 2016 and 2017



8.5.1. Speeding

Speeding remains the greatest risk factor leading to death and injury on NSW roads, contributing to 43% of road fatalities.[144] In addition to the direct causal role, speed contributes significantly to the severity of most crashes. As well as driving above the posted speed limit, speeding includes driving too fast for the prevailing weather, light, traffic and road conditions – or beyond the capabilities of the driver's skill and experience or the condition of the vehicle.[145]

In 2016 and 2017, speeding was identified through crash investigation as a contributing factor in less than one-third (18) of the collisions. However, police were unable to determine the exact speed at the time of the collision for many of the vehicles. Two vehicles were travelling in excess of 100km/hour over the sign-posted speed limit at the time of the collision, and another was travelling 85km/hour over the sign-posted speed limit.

Speeding was generally coupled with other risk factors, such as inexperience (15) and drug or alcohol use (4).

8.5.2. Driving under the influence of drugs/alcohol

Drink and drug driving are significant risks in death and serious injury on NSW roads. Drink driving was a factor in at least 14% of all fatalities and 7% of serious injuries in NSW in 2017.[146] In 2015, about 10% of mobile drug tests came back positive – compared with less than 1% of random breath tests for alcohol.[147]

143. Figure 74 is informed by police and coronial records, including crash scene investigation. Other risks may have been present but not recorded; Road conditions include bad street lighting, unsealed roadways, no lane markings, tar lifting off roadway, a build-up of silt/mud, potholes, wet roadways and loose gravel; Environmental conditions include heavy rain and an animal running on the road.
144. Transport for NSW 2018. Road Traffic Casualty Crashes in New South Wales - Statistical Statement for the year ending 31 December 2017. TfNSW, Sydney.
145. Department of Infrastructure, Regional Development and Cities, National road safety strategy 2011-2020. Australian Government, Canberra.
146. Transport for NSW 2018. Road Traffic Casualty Crashes in New South Wales - Statistical Statement for the year ending 31 December 2017. TfNSW, Sydney.
147. NSW Centre for Road Safety 2019. Drugs and driving, accessed from http://roadsafety.transport.nsw.gov.au/stayingsafe/alcoholdrugs/drugdriving/index.html on 3 October 2018.

Drug and/or alcohol use was a factor in 10 collisions in which 12 children died in 2016 and 2017. In more than half of the collisions (6), driver illicit drug use was detected after the crash. Three drivers were using more than one illicit substance and alcohol was detected in four drivers.

In all cases, drug and/or alcohol use was present with at least one other risk factor.

8.5.3. Fatigue/distraction

Fatigue is one of the top three contributing factors to the NSW road toll, particularly crashes that involve long trips and continuous driving – but also short trips when the driver has previously been deprived of sleep. Evidence indicates that sleep deprivation can have similar hazardous effects to alcohol consumption.[148]

The vast majority of fatigued drivers in fatal crashes (89%) and serious injury crashes (74%) are males.[149]

In 2016 and 2017, fatigue was a factor in 16 transport-related deaths of children (14 incidents). In six of these deaths, the driver was also under the influence of alcohol and/or drugs.

From 2008 to 2016, driver distraction by something inside or outside the vehicle has been linked with 10% of all fatal and serious crashes on NSW roads.[150] The use of mobile phones while driving is associated with a four-fold increased risk of serious injury in a crash, particularly those involving a young driver.[151]

There is some evidence that female drivers are more likely to be at-fault in a fatal motor vehicle crash if they have a passenger under five years of age in the vehicle than females driving alone. The potential for young children to distract a female driver has been raised by these findings.[152]

In 2016 and 2017, driver inattention and/or distraction was a factor in the deaths of nine children. Distractions included other passengers in the vehicle (including young children), the driver carrying out other tasks within the vehicle (including mobile phone use) and distractions outside the vehicle.

8.5.4. Age and inexperience

Young novice drivers have a high rate of involvement in road crashes. For example, crash data from the NSW Centre for Road Safety shows that in 2014-16, 17% of all male and 10% of all female motorcycle riders involved in fatal crashes were aged 17-25.[153]

Particular risk factors relating to driver age and inexperience include:

- undeveloped visual perception, psychomotor and hazard perception skills associated with riding or driving
- a tendency to over-estimate driving skills and abilities and to underestimate environmental and driving hazards
- a tendency in adolescence toward risk taking behaviour
- a greater likelihood of driving an older, less safe vehicle.[154]

In 2016 and 2017, two thirds of the identified at-fault drivers or riders involved in collisions where children died were either under the age of 25 and/or held a provisional or learners licence or were unlicensed. Inexperience was often coupled with more than one other risk factor including speed, drug or alcohol use and fatigue.

148. Department of Infrastructure, Regional Development and Cities, National road safety strategy 2011-2020. Australian Government, Canberra.
149. Transport for NSW 2017. Road Traffic Casualty Crashes in New South Wales - Statistical Statement for the year ending 31 December 2016. TfNSW, Sydney.
150. Data provided to NSW Ombudsman by Transport for NSW.
151. Llerena LE et al 2015. An evidence-based review: Distracted drivers. Journal of trauma and acute care surgery, 78(1), pp.147-52.
152. Maasalo I et al 2016. Child passengers and driver culpability in fatal crashes by driver gender. Traffic Injury Prevention, 17(5), pp.447-53.
153. NSW Centre for Road Safety 2017. Young Driver Trauma Trends Report. 2017. TfNSW, Sydney.
154. Centre for Accident Research and Road Safety 2015. Novice drivers fact sheet, accessed from www.carrsq.qut.edu.au on 3 October 2018.

8.5.5. Vehicle safety

Vehicle safety systems

Advancements in vehicle safety technology are a key component of improving road safety. More recently manufactured vehicles have more crash avoidance and crash protection features such as air bags, electronic stability control, anti-lock braking systems and speed limiters. The risk of death and serious injury in a crash is lower for later model cars – for example, risk involving a 2007 vehicle is described as about half that of a vehicle produced in 1987.[155] The Australasian New Car Assessment Program (ANCAP) adopted the EuroNCAP protocols from January 2018 and these include an assessment for child occupant protection that contributes to the vehicle's safety rating.[156]

Vehicle safety ratings (between one and five stars) are based on how well the vehicle protects occupants, and can make a difference in surviving or being seriously injured or killed in a crash. ANCAP reports that *'you have twice the chance of being killed or seriously injured in a 3 star ANCAP safety rated car compared to a 5 star ANCAP safety rated car'*.[157]

For 2016 and 2017 – of the 38 cars in which a child passenger died – 23 had an ANCAP safety rating:

- five cars had a rating of 3-stars or below
- 17 had a 4-star rating
- one vehicle had a 5-star rating.

Used Car Safety Ratings (UCSR) help identify safer second hand cars. Ratings are based on statistics from car crashes collected from Australia and New Zealand between 1990 and 2016.[158]

Seven vehicles only had a UCSR – three had one star, two had 3-star and two had a 4-star rating. All of these vehicles were older – five were over 16 years old.

The eight vehicles that did not have a safety rating were also older, between seven and 20 years.

The NSW Road Safety Strategy identifies that younger drivers are more likely to drive older, less safe vehicles. Of the 14 teenagers that died in 2016 and 2017 driving on-road vehicles, 10 were driving vehicles over 10 years old.

Quad bike safety

It is broadly accepted that children under the age of 16 years should not ride adult-size quad bikes or side-by-side vehicles. However, there is no legislative prohibition in NSW that applies to the use of quad bikes on private properties, such as farms, by children under 16 years of age.

In 2016 and 2017, two children died in quad bike crashes – the children were both under ten years of age. One child was riding an adult quad bike, and the other was a passenger on an adult quad bike. The rider in the second case was under 15 years of age.

In our report of child deaths in 2015, we recommended that the NSW Attorney General refer to the NSW Law Reform Commission to review the introduction of legislation to prohibit any child under 16 years of age from using an adult sized bike or side-by-side vehicle on private property or in recreational vehicle areas. This recommendation was not accepted.

155. Transport for NSW 2012. NSW Road Safety Strategy 2012-2021. TfNSW, Sydney.
156. ANCAP 2018. Technical Protocols & Policies, accessed from https://www.ancap.com.au/technical-protocols-and-policies on 3 October 2018.
157. ANCAP 2018. ANCAP Safety ratings explained, accessed from https://www.ancap.com.au/safety-ratings-explained on 3 October 2018.
158. Used Care Safety Ratings, accessed from http://howsafeisyourcar.com.au/Rating-Process/What-is-UCSR/ on 3 October 2018.

Driveway run-overs

Although evidence of their effectiveness is still lacking, availability of in-vehicle technology to increase rearward visibility or automatic braking is expected to be associated with a reduction in serious injuries due to driveway run-overs. This is particularly the case with large vehicles which are over-represented in driveway run-overs.[159]

In 2016 and 2017, five children died in low-speed vehicle run-overs – four were run over by a larger vehicle moving forward.

8.5.6. Restraints and protective equipment

NSW legislation[160] requires all drivers and passengers of moving or stationary vehicles which are not parked to be appropriately restrained. National and NSW child restraint laws require suitable restraints to be used for all children under seven years of age. The child must be properly fitted in an age-appropriate child restraint and the restraint must be properly fitted to the vehicle.[161]

When used properly, child car seats reduce the risk of injury in a crash by 71% to 82%, and the risk of death by approximately 28% – compared to children of the same age being restrained in an adult seat belt.[162]

Inappropriate use, or the lack of a restraint, was a factor in the deaths of nine children in 2016 and 2017. Four of the children were unrestrained. In four other cases, the restraint was not properly installed in the vehicle, and/or the restraint was improperly used – for example, a child's arms being released from a five-point harness.

Existing restraint requirements are based on age. Although not required by law to be in a particular restraint, one child was below the recommended minimum height to use the vehicle seatbelt.[163]

Motorcycle riders are more exposed and are at a greater risk of serious injuries if they are in a collision.[164] On-road motorcycle riders are required to wear an approved motorcycle helmet that is securely fitted and fastened. Riders who wear the right protective clothing are less likely to have permanent physical injuries after a crash. In NSW there is currently no legislated minimum age for child riders and no requirement to use a helmet on motorcycles, quad bikes or side-by-side vehicles on private property.

In NSW in 2016 and 2017, both of the on-road motorcycle riders who died were wearing helmets. However, one was not wearing protective clothing. Five of the children who died in off-road crashes were not protected with either an appropriate helmet, protective clothing or restraint.

159. Fildes B, Keall M, Newstead S. Backover Collisions and the Effectiveness of Reversing Cameras. 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV); Detroit, Michigan2017.
160. NSW legislation *Road Rules 2008 and the Road Amendment (Isabelle Broadhead Child Restraint Measures) Rules 2010.*
161. NSW Centre for Road Safety 2017. Child car seats, accessed from https://roadsafety.transport.nsw.gov.au/stayingsafe/children/childcarseats/index.html on 3 October 2018.
162. Arbogast KB et al 2004. An evaluation of the effectiveness of forward facing child restraint systems. Accident; analysis and prevention, 36(4), pp.585-9.
Zaloshnja E, Miller TR, Hendrie D 2007. Effectiveness of child safety seats vs safety belts for children aged 2 to 3 years. Archives of pediatrics & adolescent medicine, 161(1), pp.65-8.
Elliott M et al. 2006. Effectiveness of child safety seats vs seat belts in reducing risk for death in children in passenger vehicle crashes. Archives of Pediatrics & Adolescent Medicine. 160(6), pp.617-21.
163. Neuroscience Research Australia (NeuRA) recommends that once a child has outgrown their forward facing child restraint they should use a booster seat until they are too tall for it or can achieve good seatbelt fit, approximately 145-150cm or up to approximately 12 years of age.
Neuroscience Research Australia 2013. Best practice guidelines for the safe restraint of children travelling in motor mehicles (recommendation 1.9), accessed from https://www.neura.edu.au/wp-content/uploads/2016/05/Best-Practice-Child-Restraint-Guidelines_0.pdf on 29 July 2016.
164. NSW Centre for Road Safety 2018. Motorcyclists, accessed from http://roadsafety.transport.nsw.gov.au/stayingsafe/motorcyclists/index.html on 3 October 2018.

8.5.7. Role of seatbelts and child restraints in transport fatalities 2007-16

In 2017, we commissioned Dr Julie Brown from Neuroscience Australia to undertake a 10-year review of passenger fatalities of children aged less than 13 years in NSW.

The research had three parts:

- A review of current legislative requirements governing the use of child restraints and seatbelts for children.
- A review of literature relating to the use of child restraints and seatbelts to reduce injuries and deaths associated with motor vehicle crashes.
- An analysis of CDRT data of 66 child motor vehicle passengers (aged 0-12 years) who died in NSW between 2007-16.

The full report is available at: www.ombo.nsw.gov.au

The report found that just over half (35) of the 66 children who died in crashes over the 10-year period 2007-16 were not properly restrained in the vehicle – that is, they were not restrained, not using an age appropriate restraint, or were using an incorrectly fitted restraint. The report concludes that the lack of, or inappropriate use of, seatbelts or restraints played a primary role in the death of almost one-third (20) of the children, and that many of the deaths could likely have been prevented if the children had been properly buckled up.

The review is discussed in more detail in section 8.6.4 below.

8.5.8. Environmental factors and visibility

Environmental factors such as heavy rain, poor visibility on the road and poor road conditions can also contribute to crashes – particularly if drivers are not driving to account for those conditions.

Police identified that road and environmental conditions possibly contributed to 16 deaths of children in NSW in 2016 and 2017. Factors included an unsealed road surface, unmarked roadway, a wet roadway, uneven road surface, roadworks, poor street lighting – and, in one incident, an animal running out in front of a vehicle. Two deaths occurred when vehicles crashed on roads affected by flooding.

Restricted driver vision was a factor in 11 deaths, including seven pedestrian deaths. Vision was restricted by other vehicles, lighting, and trees on the side of the roadway. For three children that were run over at low speeds, the driver's vision was restricted by the height and size of the vehicle, blind spots – and, in one case, the slope of a driveway.

8.5.9. Supervision

Kidsafe NSW advises that children under the age of 10 are not physically or developmentally equipped to make the crucial decisions needed to keep them safe in the traffic environment. Children aged under 10 years therefore need to be accompanied and closely supervised by a parent or adult carer.[165]

Effective community-based education/advocacy programs to prevent child pedestrian injuries that offer a range of strategies – including educational, social and environmental strategies – have shown injury reductions ranging from 12% to 54%.[166]

In 2016 and 2017, supervision was a factor in six pedestrian deaths of children under the age of 10 in NSW. Three children were understood to be safe with another caregiver at the time of the incident, one child was left unsupervised and thought to be in a safe place, and the supervisor of one child was momentarily distracted at the time of the incident. Another child under the age of 10 crossed a roadway under the supervision of a sibling, also under the age of 10.

165. Kidsafe NSW 2012. Pedestrian Safety, accessed from: http://www.kidsafensw.org/road-safety/pedestrian-safety/ on 3 October 2018.
166. Turner C et al 2004. Community-based programmes to prevent pedestrian injuries in children 0-14 years: a systematic review. Injury control and safety promotion, 11(4), pp.231-7.

Separation of children from vehicles

Five of the pedestrian deaths occurred at low speed. All were on a driveway and involved children aged between one and three years of age. Children under four years of age are particularly vulnerable to low speed vehicle run-overs, and children aged between one and two years appear the least likely to survive this type of incident.[167]

Small children can be difficult to see from a vehicle, they may not understand danger, and may wander or run into the path of a vehicle. Driveways with a separate pedestrian path to the house have been found to be associated with a 60% reduction in the risk of a run-over resulting in a hospital admission for children under the age of seven. Driveways separated from the dwelling and play areas have been found to also significantly reduce the risk of run-over events with young children.[168]

8.6. Observations and recommendations

Speeding, alcohol and drug use, fatigue and driver distraction remain key contributing risk factors in transport related deaths. Other contributing factors in transport crashes included novice at-fault drivers and driving older vehicles with fewer safety features.

Inappropriate use or the lack of a restraint was a factor in the deaths of nine children in 2016 and 2017.

In the 10 years 2007 to 2016, 66 children aged under 13 years died in transport incidents. Non-use of seatbelts or restraints, the use of restraints not appropriate for age, or misuse of a restraint was a significant contributing factor in the deaths of almost half (29) of the 66 children.

There has been no real change in the number of child deaths in low speed vehicle run-overs in 2016 and 2017 compared to the last 15 years. Young children are particularly vulnerable to low speed vehicle run-overs.

Quadbikes are inherently dangerous for children, and children continue to die as controllers and as passengers on off-road vehicles.

8.6.1. Unsafe driver behaviours remain the key contributing factors in transport crashes

In 2016 and 2017 – consistent with previous years – speed, driver drug and alcohol use, driver fatigue and driver distraction were significant contributing factors in transport-related deaths of children. Unsafe driver behaviours were rarely seen in isolation. In most incidents, more than one risk factor was present.

8.6.2. Over half of at-fault drivers were novice drivers

In 2016 and 2017, young and/or novice drivers made up the majority of at-fault drivers responsible for collisions. Despite making up only 15% of all licence holders, crashes involving younger drivers (aged under 26 years) account for almost a quarter of annual road fatalities in NSW.[169]

167. Department of Infrastructure and Transport 2012. Child Pedestrian safety: driveway deaths and low speed vehicle runovers Australia 2001 – 2010 2012. Australian Government, Canberra.
168. Madley B and Campbell MM 2014. The built environment, Hamilton City Council policies and child driveway safety: a balancing act. Department of Societies and Cultures, University of Waikato; 2014.
169. NSW Centre for Road Safety 2018. Younger drivers, accessed from https://roadsafety.transport.nsw.gov.au/stayingsafe/drivers/youngdrivers/index.html on 4 October 2018.

The graduated licence scheme, restrictions for learner and provisional licence holders, vehicle restrictions and the promotion of safer drivers courses are all measures put in place to prepare young people to be safe and low risk drivers. Although the number of young drivers killed on NSW roads has halved since the introduction of the graduated licence scheme in 2000, age and inexperience are still major risk factors for transport fatalities.

We note the potential of the Safer Drivers Course – or a similar type of course – to assist learner drivers to develop safe driving behaviour, and the possibility for this to become compulsory for all learners.

8.6.3. The majority of deaths involved older, less safe vehicles

Many of the children who died in transport-related incidents were travelling in older vehicles that did not incorporate modern safety technologies. This is consistent with our findings over previous years. Features/advancements available in newer and safer vehicles include:

- Car structure improvements - newer vehicles have better crumple zones, occupant compartments to maintain the vehicle shape and protect the occupants from intrusion, and better side protection than older vehicles.
- Vehicle safety features - recent developments include seatbelt technology, reversing cameras, crash avoidance technology and driver warning systems (such as lane departure warning, blind spot warning and driver fatigue warning).
- Seat belt technology - improvements include pre-tensioners and load limiters that manage the forces applied to the body, as well as changes to the Australian standards which require all vehicles manufactured from July 2013 to have lap-sash seat belts in all seating positions.
- Airbags - designed to supplement the protection provided by seat belts, passenger side and side/curtain airbags are becoming more common.

Younger drivers tend to drive older, less expensive cars and vehicle safety features are often not their first priority when buying a vehicle.[170]

Almost half of the young drivers who died in transport incidents in 2016 and 2017 lived in the most disadvantaged areas. For disadvantaged families, buying a vehicle with advanced safety features may not be an affordable option.

The *NSW Road Safety Strategy 2012-2021* aims to promote consumer awareness and uptake of road safety technologies. Stated initiatives include:

- working with industry to improve vehicle safety and draw on available technology
- promoting consumer awareness and uptake of road safety technologies
- working with the Federal Government and other jurisdictions to continue improving vehicle standards
- promoting road safety through effective schemes relating to the roadworthiness of in-service vehicles and ensuring modified vehicles comply with safety standards.[171]

Providing education on safety for young drivers and their families when buying a new or used vehicle is crucial. The NSW Government, in partnership with ANCAP and the NRMA, launched the *Safer Vehicle Choices Save Lives* campaign in November 2018. The campaign encourages a focus on safety ratings and the difference in safety between older and newer vehicles. The Transport Accident Commission Victoria also has a website to help young drivers compare the safety features of vehicles they are thinking of buying, with the aim of helping young people buy the safest vehicle they can afford. The website includes safest choices for vehicles priced $10,000 and less and $5,000 and less.[172]

170. Anderson RWG et al 2013. Access to safer vehicle technologies by young drivers: factors affecting motor vehicle choice and effects on crashes (CARS118), Centre for Automotive Safety Research, Adelaide.
171. NSW Centre for Road Safety 2018, Road safety strategies, accessed from https://roadsafety.transport.nsw.gov.au/downloads/road_safety_strategies.html on 4 October 2018.
172. Transport Accident Commission Victoria, how safe is your first car?, accessed from http://www.howsafeisyourfirstcar.com.au/ on 25 October 2018.

Promoting the purchase of a safe vehicle is an important initiative. We encourage the NSW Government to consider promoting safer choices by price, given the link between fatal car crashes, age and socio-economic status.

We recommend that:

3. **Transport for NSW (Centre for Road Safety) should include, as part of the Safer Vehicle Choices Save Lives campaign website, a page targeted at young drivers purchasing a new vehicle. This should detail the features and vehicles to consider when purchasing the safest car in a range of price brackets – similar to the '*how safe is your first car?*' website (Victorian Transport Accident Commission).**

8.6.4. Better use of seatbelts and child restraints will prevent the deaths of children in vehicle crashes

The lack of a seatbelt or child restraint, use of an age inappropriate restraint, or use of an incorrectly fitted restraint was a factor in the deaths of nine children in NSW in 2016 and 2017.

As noted above, in 2017, we commissioned a review of the role of seatbelts and child restraints in the deaths of child passengers in vehicle crashes. The review examined the deaths of 66 children (aged 0-12 years) who died as passengers in NSW during the 10-year period, 2007-16.

Restraint factors

The review found that 35 of the 66 child passengers were not properly restrained in the vehicle – they were either unrestrained, in a restraint that was not appropriate for their age, or in a restraint that was not fitted correct. In many (15) cases, the crash severity was such that an appropriate and well-fitted seatbelt or restraint would likely not have prevented the fatality. However, for almost one in three of the children (20, 30%), the improper use or failure to use a child restraint or seatbelt, played a primary contributing role in their death.

In relation to the 66 children, the review found:

- Almost half (29) the children were properly restrained (age appropriate and correctly fitted).
- Almost one-third (20) of the children were not properly restrained:
  - 14 children were using an appropriate form of restraint for their age, but the restraints were incorrectly fitted. Issues identified included seat belts placed under the arm, children laying across the seat with the seat belt on, poor routing of sash belts through booster seats, tethers not anchored correctly, not used, twisted or loose in booster seats and forward facing child restraint systems, poor adjustment of harnesses in forward facing child restraints – that is, harnesses positioned too high for the child, positioned unevenly across the child, or only partially used.
  - Six children were in restraints that were inappropriate for their age. All of the inappropriate use occurred in children aged between two and six years, and almost all involved the use of seat belts by children who should have been using a dedicated child restraint system.
- Approximately one in five (15) of the children were unrestrained in the vehicle.
- Correct use of a restraint may have prevented the deaths of 20 children.

Socio-economic status

Two thirds (41) of the children who died lived in the lowest socio-economic areas of NSW (Quintile 1 and 2 of the Index of Socio-economic Disadvantage). The mortality rate was five times as high for children from the most disadvantaged areas compared to those from areas of least disadvantage (Quintile 1 compared with Quintile 5).

Road safety strategies may require an increased focus on people from lower socio-economic areas.

Remoteness

Most – four of every five – of the children died in crashes that occurred outside of major cities in NSW. Most children (56) also died in crashes that occurred on high-speed roads with speed limits of 80km/hr or more.

Aboriginal and Torres Strait Islander children

Of the 66 children, 13 (20%) were identified as Aboriginal and Torres Strait Islander. Indigenous children were over-represented in child passenger fatalities, given that of all children in NSW, approximately 5% are Indigenous.

In the 10-year period, the rate for child passenger deaths of Aboriginal and Torres Strait Islander children was 4.2 times as high compared with non-Indigenous children (2 versus 0.5 deaths per 100,000 children).

Driver factors

One fifth (13) of the drivers of vehicles in which the child was travelling were found to have drugs in their system at the time of the crash. In some cases (4), the driver of the other vehicle involved in the crash, had drugs in their system. Much fewer cases involved alcohol – two drivers of the child's vehicle and three drivers of other vehicles.

Other known risk factors for crash involvement – such as driver fatigue and driver distraction – were also commonly identified among the drivers of both the vehicle the child was travelling in and other vehicles. Broad measures to combat these features across the population are therefore important for reducing deaths among child passengers.

Conclusions

Taking all factors into account, the review proposed that:

- Regular monitoring of child restraint practices across NSW should be introduced, particularly in areas of socio-economic disadvantage and outside major cities. There has been no population estimate of restraint use among NSW children since 2008, yet significant legislative reform has been introduced since that time. There is a need to understand if the practices observed among fatally injured children reflect population trends or are a marker of other risk factors associated with involvement in high severity and fatal crashes.
- Measures to increase restraint use should be developed and implemented.
- Programs and policies ensuring the high quality and performance of child restraints sold in Australia should continue.
- Greater attention should be given to identifying and implementing measures to reduce misuse through restraint design and product standard requirements – and to removing barriers to vulnerable population groups accessing restraint fitting programs and services. Access to programs like the NSW Restraint Fitting Stations Network, and Restraint Fitting Checks should be expanded in areas of most need. It is also imperative that families at highest risk of serious crash involvement and misuse of restraint be identified.
- Current legislative controls over minimum restraint use should be maintained, alongside wider dissemination of information on best practice for restraining children – particularly children over the age of seven. Dissemination strategies must ensure these messages reach and are understood by those sectors of the community most in need.
- Road safety initiatives should account for the higher involvement of people from the lowest areas of socio-economic disadvantage in transport-related deaths.

In the context of the findings of the review of seatbelts and child restraints, **we recommend that:**

4. **Transport for NSW should undertake a study of child restraint practices in NSW. The study should have a particular focus on areas of socio-economic disadvantage and those outside major cities.**

5. **NSW Health and Transport for NSW should use their data linkage system for regular surveillance and monitoring of crash injuries and fatalities of children under the age of 13.**

6. **Transport for NSW (Centre for Road Safety) should actively promote information on best practice for restraining children over the age of seven years. Promotion activities should particularly target culturally and linguistically diverse (CALD) communities, Aboriginal and Torres Strait Islander communities, and areas of low socio-economic status.**

7. **Transport for NSW should fund a comprehensive and ongoing program to increase the correct and age-appropriate use of motor vehicle child restraints in NSW. The program should draw on the learnings of the Buckle-Up Safely program and incorporate a range of settings. It should provide education about safe travel for children, access to appropriate restraints (including subsidies for low income families), and expert fitting of child restraints.**

8.6.5. At least two children die each year in low speed vehicle run-over incidents

In 2016 and 2017, five children died in low speed vehicle run-overs. There has been no real change in the number of deaths at low speed over the past 15 years.

Young children are particularly vulnerable to low speed vehicle run-overs, and younger children aged between one and two years of age appear the least likely to survive this type of incident.[173] Our reviews have consistently shown that the driver often does not know a child is nearby, or assumes the child is being looked after elsewhere. Recent safety developments in contemporary vehicles, such as reversing cameras and sensors, provide assistance in eliminating blind spots. However, continued vigilance and attention to children's whereabouts by drivers is required, and a reliance on in-vehicle safety technologies is not sufficient.[174] In 2016 and 2017, four of the five children who died in low speed vehicle run-overs were run over by a vehicle travelling forward.

In 2012, we conducted a 10-year review of low-speed vehicle run-over fatalities and made a number of recommendations to the Centre for Road Safety. These recommendations included developing strategies to reduce the risk of death and injury from these incidents.

The Centre for Road Safety partnered with the Georgina Josephine Foundation and established a campaign to educate drivers on driveway safety, *'They're counting on you'*.[175] The campaign informs drivers to take simple steps to supervise children near vehicles, separate play areas from driveways and stresses the importance of drivers seeing where children are at all times.[176]

We recommend that:

8. **Transport for NSW (Centre for Road Safety) should, in the context of the evaluation of 'They're counting on you', consider further action to prevent low speed vehicle run-over incidents through promoting good practice and carer education.**

173. Department of Infrastructure and Transport 2012. Child Pedestrian safety: driveway deaths and low speed vehicle runovers Australia 2001 – 2010 2012. Australian Government, Canberra.
174. NSW Centre for Road Safety 2019. Driveway safety, accessed from https://roadsafety.transport.nsw.gov.au/campaigns/theyre-counting-on-you/driveway-safety.html on 3 October 2018
175. As above
176. Correspondence from NSW Premier to NSW Ombudsman on 29 May 2015.

8.6.6. Quad bikes are inherently dangerous for children

Adult quad bikes and side-by side vehicles are inherently dangerous for children and it is recommended they not be ridden by a child under 16 years, however this is not legislated.

We have previously recommended that the NSW Government consider legislation to prohibit children under the age of 16 years from riding an adult quad bike or side-by-side vehicle. The government did not accept this recommendation, but advised that they were providing incentives and education to encourage farmers to improve the safety of their quad bikes. In 2016, the NSW Government introduced the $2 million *Quad Bike Safety Improvement Program. This program aims to:*

> *decrease the unacceptably high rates of fatality and injury associated with quad bike use with the aim of bringing to an end the financial and social costs of fatalities in our rural communities.*[177]

The program includes rebates for safety equipment, research and data collection and education, and a communications strategy to 'deliver quad bike and child safety messages across NSW'.

In 2017, SafeWork NSW published a mid-point assessment on the impact of the program on the farming community since its introduction.[178] The findings in relation to children are limited, but concerning. Based on a survey of 413 farmers, the assessment report identified:

- In regard to a question posed as to whether any restrictions are put in place on the use of quad bikes by children under 16 years, there were no significant changes in rules between 2016 and 2017. Less than half (45%) of respondents indicated any restrictions were in place to manage the use of quad bikes by children.
- Only a third (38%) of respondents indicated children are never allowed to ride adult quad bikes.
- A quarter of respondents agreed or strongly agreed with the statement that children would always need to use quad bikes – it's a part of farm life. Under half of the respondents disagreed or strongly disagreed with that statement.

In the context of these outcomes and the NSW Government's decision not to accept our recommendation to consider legislation changes, **we recommend that:**

9. **Safe Work NSW should establish a specific focus on children within the *Quad Bike Safety Improvement Program*. The program should strongly promote the message that children under 16 years of age should not operate, or be a passenger on, an adult quad bike under any circumstances or for any reason.**

177. SafeWork NSW 2019. Quad bike safety improvement program snapshot 2016 – 21, Cat no. SW08210. SafeWork NSW, Gosford.
178. SafeWork NSW 2017. NSW quad bike safety improvement program survey results for mid-point evaluation, accessed from https://www.safework.nsw.gov.au/__data/assets/pdf_file/0014/330017/2568_Quad_bike_mid_point_report.pdf on 28 October 2018.

Chapter 9. Drowning deaths in 2016 and 2017

In 2016 and 2017, 22 children in NSW – most of whom were under five years of age – died as a result of drowning.

The mortality rate from drowning has gradually declined over the past 15 years. However, drowning remains the leading cause of unintentional injury-related death for children aged 1-4 years in NSW. Male children also have more than twice the mortality rate of females.[179]

Trends in drowning deaths also vary by age and location. For children aged under five years, most incidents occurred in private swimming pools. For children aged five years and above, the majority of incidents occurred in natural bodies of water such as beaches, rivers and lakes.

Over the two-year period 2016 and 2017, 22 children aged 0-17 years died in NSW from drowning. These 22 deaths represent 2.2% of all children who died in NSW over the same period – a rate of 0.6 deaths per 100,000 children. The majority (16) of the 22 children were aged under five years.

Consistent with previous years, the most common location of drowning deaths in 2016 and 2017 was private swimming pools (8).[180] Drowning deaths also occurred in public swimming pools (2), natural bodies of water (5), and bathtubs (2). An additional five drowning deaths occurred in other water hazards located near a home, such as a dam and a canal – or in the home, including a pond and household container.

Research has shown that for every drowning death in Australia there are three non-fatal drowning incidents. For children under five years old, almost eight non-fatal drownings occurred for every drowning death.[181] Unlike many childhood injuries, drowning is associated with a higher risk of mortality, and hospitalisation rates for non-fatal drowning of children under five years are low compared to other causes of injury in this age group.[182]

In the two-year period 2016 and 2017, the drowning death of one child was reviewable by the Ombudsman because the child was in out-of-home care at the time of their death.

9.1. Preventing drowning deaths of children in NSW

9.1.1. Swimming pool legislation and regulation

In January 2018, the NSW Government transferred responsibility for the swimming pools regulatory scheme from the Office of Local Government to the NSW Department of Finance, Services and Innovation (DFSI).

179. In the period 2013-17.
180. Seven deaths occurred in an in-ground swimming pool and one death occurred in a portable wading pool.
181. Mahony A et al 2017. A thirteen year national study of non-fatal drowning in Australia: Data challenges, hidden impacts and social costs, Royal Life Saving Society, Sydney.
182. Mitchell R, Curtis K, Foster K, 2017. A 10-year review of child injury hospitalisations, health outcomes and treatment costs in Australia, Injury prevention, 24(5), pp.344-50.

In September 2018, the Swimming Pools Regulation 2018 came into effect.[183] Key changes to the regulation included:

- introducing greater flexibility for the way that spa pools can be secured[184]
- a new obligation to display a warning notice while a swimming pool is being constructed
- updating the content of required warning signs
- improving public access to applicable Australian Standards
- requiring inspection details for certificates of non-compliance to be entered on the Swimming Pools Register.

The *Swimming Pools Act 1992* requires compliance with one of three standards by Standards Australia, depending on the age of the pool. These standards are licensed, only available for purchase and cannot be published.

Under the new regulation, there has been some improvement in access to the standards for pool owners, tenants and the general public. Each local authority must now ensure an electronic version, and if requested a paper copy, of the relevant extract of the applicable Australian Standards, the Building Code of Australia and the Cardiopulmonary Resuscitation Guideline are available at no cost for public inspection.

9.1.2. Summer water safety

The largest proportion of drowning deaths occur in summer.[185] The NSW Government delivered the 'Be water safe. Not sorry' education campaign in summer 2017-18 through print, radio, social media and Spotify. Further resources were made available online to pool owners, councils and certifiers – including self-assessment checklists through the swimming pool register.

In Australia, more than a third of drowning deaths of males aged 15 years and over involved alcohol and/or drugs.[186] The Royal Life Saving Society, Australia launched the campaign 'Don't let your mates drink and drown' in summer 2017. This campaign aimed to reduce risk-taking behaviours that contribute to accidents and drowning. Accompanying this, Royal Life Saving NSW – in partnership with the NSW Government – also released the 'Sinkers' social media campaign aimed at reducing alcohol-related drowning in people aged 15-29 years.

9.1.3. Children aged under five years

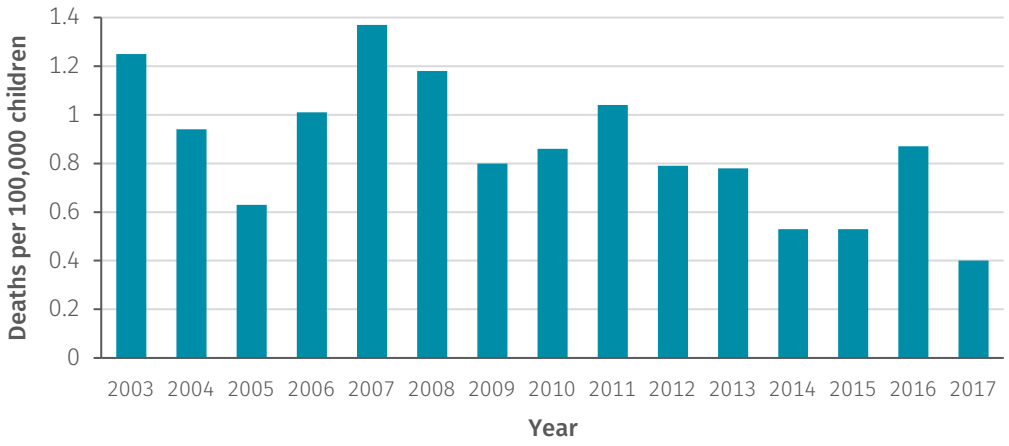
An accidental fall into water is the leading activity that results in drowning for children aged under five years in Australia.[187] In 2018, Royal Life Saving launched the 'Keep Watch' campaign aimed at preventing drowning deaths of children under five years of age in all aquatic locations. The campaign promotes awareness of drownings in bathtubs, public pools and water hazards around farms.

9.2. Trends in deaths from drowning in NSW, 2003-17

Over the 15 years to 2017, 212 children died from drowning in NSW. As shown in Figure 75, the drowning mortality rate has gradually and significantly declined. The rate steadily declined from 2011. However, it increased to 0.9 deaths per 100,000 children in 2016 before reaching 0.4 in 2017 – the lowest rate in 15 years.

183. NSW Government, Swimming Pool Register, accessed from http://www.swimmingpoolregister.nsw.gov.au/information on 24 October 2018
184. To be exempt from requirements to surround a spa pool, the spa pool must be covered and secured by a lockable child-resistant structure that meets specific requirements.
185. Royal Life Saving Australia 2018, National Drowning Report 2018, RLSA, Sydney.
186. Royal Life Saving Australia 2018, Don't let your males drink and drown, accessed via https://www.royallifesaving.com.au/programs/dont-let-your-mates-drink-and-drown/Media-Room on 14 November 2018.
187. Royal Life Saving Australia 2018, Trends in child drowning over the last 25 years, RLSA, Sydney.

Figure 75. Deaths from drowning of children aged 0-17 years, 2003-17



9.2.1. Age and gender

Over the 15 years to 2017, children aged under five years accounted for the most deaths (141; 67%). Male children also accounted for more than two thirds of all drowning deaths (146; 69%).

As shown in Figure 76, the drowning mortality rate has remained significantly higher for children aged under five years. However, the rate for this age group has significantly decreased over time.

Figure 76. Deaths from drowning of children by age, 2003-17

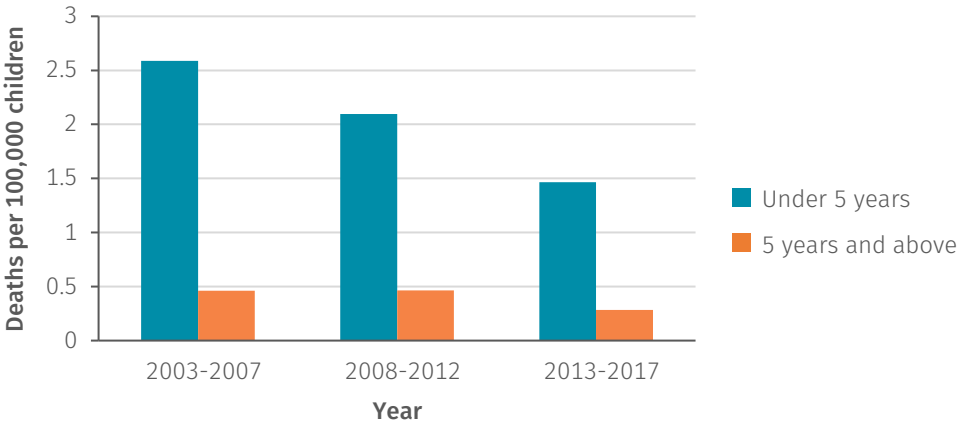
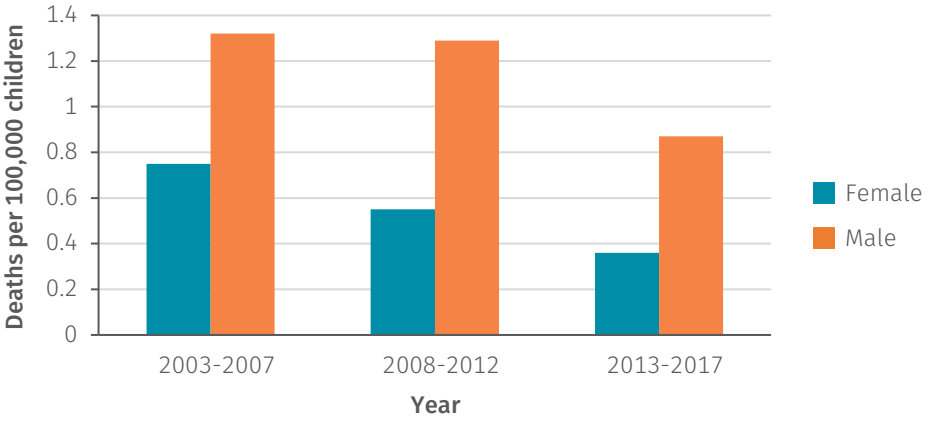


Figure 77 shows the rate of drowning has also remained significantly higher for male children. In the period 2013-17, it was 2.4 times as high for males as for females in that period.

Figure 77. Deaths from drowning of children aged 0-17 years by gender, 2003-17



9.2.2. Aboriginal and Torres Strait Islander status

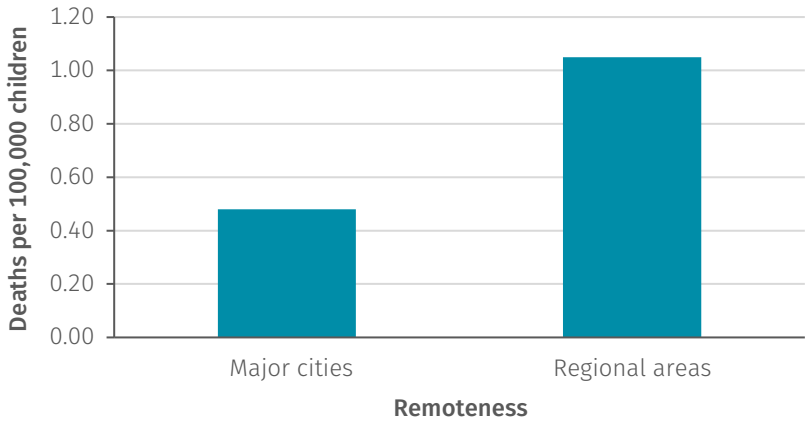
Over the 15 years to 2017, Aboriginal and Torres Strait Islander children represented 11% of all children who died from drowning in NSW.[188] For Indigenous children aged 1-4 years, it was the leading cause of death.

The drowning mortality rate for Indigenous children aged 0-17 years decreased from 2.9 deaths per 100,000 children in 2008-12 to 0.9 in 2013-17. In the latter period, there was no longer a significant difference in the Indigenous rate compared with non-Indigenous children. No drowning deaths of Indigenous children were recorded for 2017.

9.2.3. Remoteness

In the period 2013-17, more than half (57%) of the children who died from drowning lived in major cities and 43% in regional areas.[189] However, as shown in Figure 78, the mortality rate from drowning for children from regional areas was 2.2 times as high as for those from major cities.

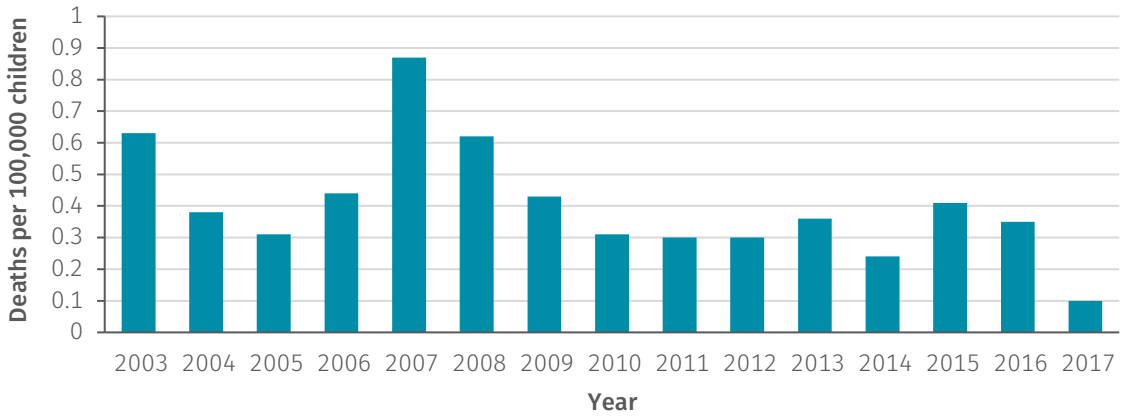
Figure 78. Deaths from drowning of children aged 0-17 years by remoteness, 2013-17



9.2.4. Location of drowning

Over the past 15 years, the majority of drowning deaths occurred in private swimming pools (100; 47%). As shown in Figure 79, after a peak in 2007, the drowning rate in private swimming pools began to decline. However, there have been fluctuations in the annual rate since 2013 before it reached its lowest in 2017.

Figure 79. Deaths from drowning in private swimming pools of children aged 0-17 years, 2003-17



As shown in Figure 80, the location of drowning also varied with age. For children aged under five years, the majority of deaths occurred in private swimming pools. For children aged five years and above, most deaths occurred in natural bodies of water.

188. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.
189. As per the ABS accessibility and remoteness index of Australia (ARIA+).

Figure 80. Deaths from drowning of children by age, 2003-17

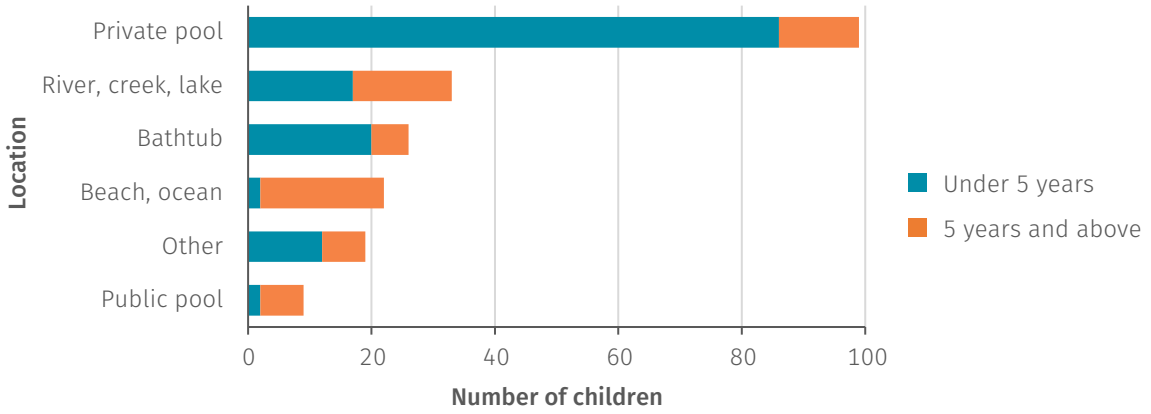
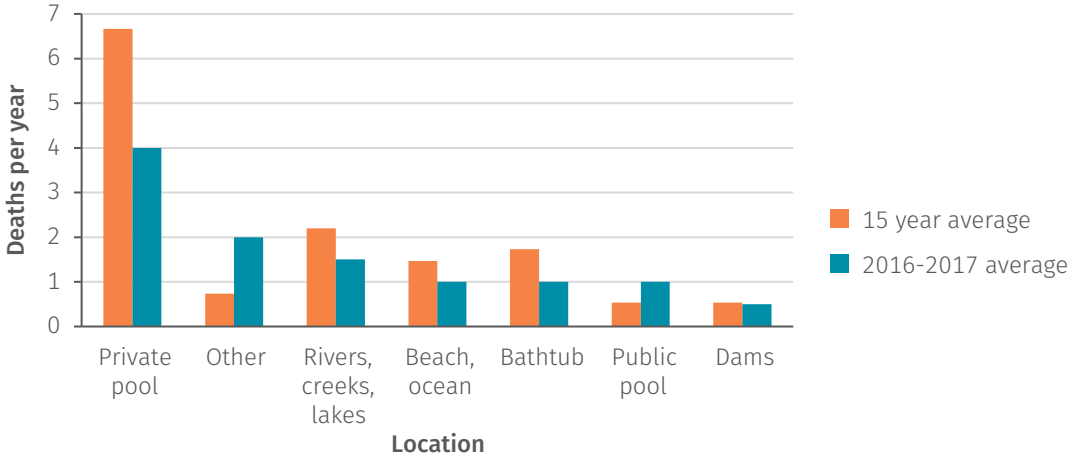


Figure 81 shows the average number of drowning deaths in different locations. Compared with the 15-year average, in the period 2016 and 2017, a higher number of children died in other bodies of water and public pools.

Figure 81. Drowning deaths of children aged 0-17 years, 2016 and 2017 vs 15-year average



9.3. Risk factors associated with drowning deaths

Surf Life Saving Australia has identified a 'drowning chain' – four key factors that alone, or in combination, could lead to death by drowning.[190] They are:

- Lack of knowledge, disregard or misjudgement of a hazard
- Uninformed, unprotected or unrestricted access to a hazard
- Lack of supervision or surveillance
- Inability to cope once in difficulty.

Royal Lifesaving's Keep Watch program is similarly based on four key drowning prevention actions relating to children under five years in all aquatic locations.[191] These actions are:

- Supervise – close, constant and focused supervision
- Restrict access – maintain pool barriers and gates, provide a child safe play area
- Water awareness – familiarise, develop and educate children about water
- Resuscitate – learn, update and act to resuscitate.

190. Surf Life Saving NSW 2017, Coastal safety report 2017. SLSNSW, Sydney.
191. Royal Lifesaving Australia 2018, Keep Watch, accessed from http://www.royallifesaving.com.au/programs/keep-watch-toddler-drowning-prevention-program/keep-watch-actions on 22 October 2018.

Our reviews show that a drowning death often follows a chain of events – a faulty pool gate left unsecured, carer distraction with household chores or attending to other children, unclear delegation for supervision, and the child able to leave the house unseen.

Reviews particularly underscored the critical link between lack of direct supervision of young children, even for very short periods of time, and inadequate (faulty or absent) child resistant barriers.

For older children or teenagers, other factors often come into play. These include:

- Risk taking behaviours – for example, mixing alcohol and ocean swimming or swimming in floodwater.
- Lack of experience in assessing danger – including ocean rips or the likelihood of submerged objects in rivers and waterways.

The absence of adult supervision can also be a risk for some young people – for example, if a young person with a disability is physically unable to manage alone in water.

We acknowledge and support the work of a range of organisations that deliver education and awareness programs targeting water safety, as well as the distribution of resources such as fact sheets, checklists and electronic apps.[192]

9.4. Risks identified for children who died in 2016 and 2017

Consistent with previous years, the majority (16) of the 22 children who died in 2016 and 2017 were aged under five years and gaps in supervision and unprotected access to water were critical factors. The majority of deaths occurred in bodies of water within or near homes.

All children aged over five years (6) were male. Five of these deaths occurred while visiting a public location for swimming and recreation. Contributing factors identified included lack of experience and misjudgement of hazards, poor swimming ability, and pre-existing medical conditions.

9.4.1. Access to water

In 2016 and 2017, unrestricted or unprotected access to water was identified across several locations of drowning deaths. Issues with unrestricted access to water for children included:

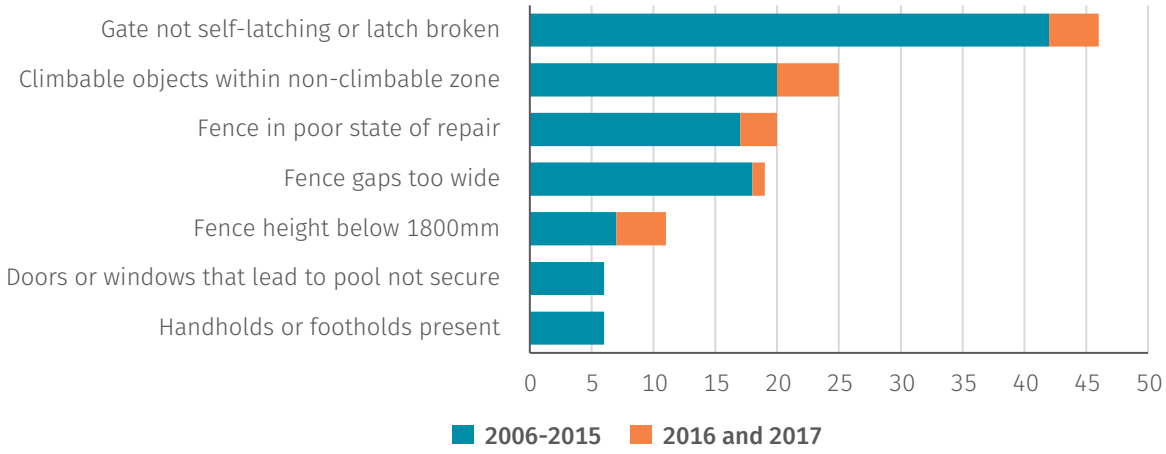
- Faults in child safety barriers for private swimming pools and spas.
- Water not emptied from portable wading pools immediately after use.
- Absence of supervision around uncovered bodies of water or within a child's reach, such as ponds.

Private swimming pools

Figure 82 summarises the findings of a barrier safety review of private pools where drowning deaths occurred between 2006 and 2015.[193] Almost all pools had reported faults with gate or latch mechanisms that meant the gate did not self-close. Other issues included climbable objects within a 900mm non-climbable zone and gaps in the fence that were too wide. Fences were also found to have defects, such as broken rails, or did not meet 1800mm height requirements. Handholds or footholds were also identified in some pool barriers. Some pools were identified as not child safe because they were directly accessible from windows or doors.

192. As part of the Keep Watch Program, Royal Life Saving has developed a Home Pool Safety Checklist that allows pool owners to complete a self-assessment of the pool and its surrounds, and launched a Pool Safety App for pool owners to use as a checklist. See http://www.royallifesaving.com.au/families/at-home/home-pool-safety accessed on 22 October 2018.
193. NSW Child Death Review Team 2016. Child death review report 2015. NSW Ombudsman, Sydney.

Figure 82. Issues identified in private swimming pool barriers, 2006-17 vs 2016 and 2017



Issues with barrier safety were identified in all but one of the private pools where drowning deaths occurred in 2016 and 2017. Of the pools where issues were identified, all had climbable objects around the barrier. Most had gates that were not self-closing. Barriers also did not meet height or gap requirements and were in a poor state of repair.

Previously, we noted that one in five drowning deaths occurred in portable pools. In 2016 and 2017, one child drowned in an unfenced portable wading pool under 300mm in height. Fencing is not required for pools of this capacity.[194]

Dams and other inland waterways

According to the Australian Centre for Agricultural Health and Safety (ACAHS),[195] drowning is the leading cause of death for children on farms and the most common location was dams.

In the past 15 years, eight drowning deaths have occurred in dams and half (4) were children under five years of age. An additional 33 drowning deaths – including 17 children aged under five years – occurred in natural inland bodies of water such as creeks, rivers and lakes.

In 2016 and 2017, one child drowned in a dam on a nearby property and another child drowned in a creek near a playground in a public park. In both cases, the children were aged under five years and there were no safety barriers present to prevent them from reaching the water.

A coronial inquest was held in one case. The inquest found that the child drowned in a creek after accidentally falling. The Coroner made recommendations to the Minister for Local Government to address the safety of the waterway by reshaping the creek banks and removing obstructive vegetation to reduce drop off and increase visibility. A further recommendation included appropriate signage alerting users of the park of the potential drowning hazard.

Other artificial bodies and sources of water

Although pools are the most common drowning locations, 11 children died over the past 15 years in NSW from drowning in artificial bodies or sources of water. This included structures such as canals, irrigation channels, drains and household items such as eskies, buckets and other water containers. Household water containers pose a particular drowning hazard for very young children.[196]

Such drowning hazards may not be immediately obvious, particularly when families of children are visiting another residence. In 2016 and 2017, three infants drowned in a canal, a pond and a large household container. Two of these drownings occurred during a visit to another household.

194. NSW Fair Trading 2018. Pool fencing requirements, accessed via https://www.fairtrading.nsw.gov.au/housing-and-property/building-and-renovating/pools-and-pool-safety/pool-fencing-requirements on 22 October 2018
195. Australian Centre for Agricultural Health and Safety 2018. Child safety on farms, accessed via http://sydney.edu.au/medicine/aghealth/projects/populationsatrisk/childsafety/index.php on 22 October 2018
196. Royal Life Saving Australia 2018. Fact sheet 7 - home water safety, accessed https://www.royallifesaving.com.au/__data/assets/pdf_file/0003/3963/7.-Home-Water-Safety.pdf on 23 October 2018

9.4.2. Active adult supervision

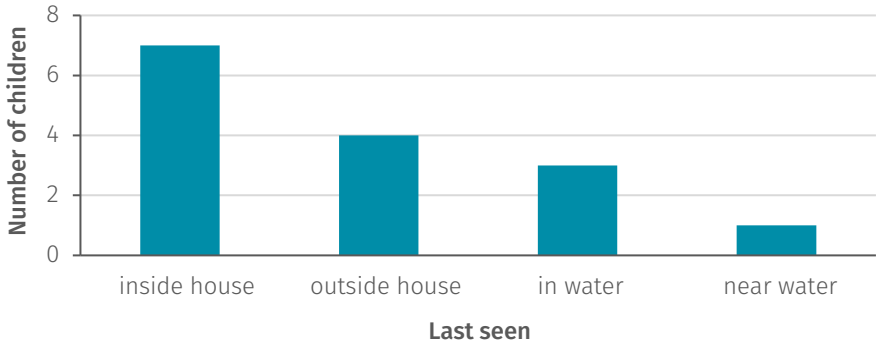
A lack of or lapse in supervision has been identified as a contributing factor in almost three quarters of child drowning deaths in Australia.[197] In 2016 and 2017 – as in previous years – the absence of active adult supervision was a predominant risk factor for children under five years.

In 2016 and 2017 – with the exception of one child who was a passenger in a vehicle that was submerged in water – all children aged under five years (15) died in the absence of active adult supervision.

For two deaths, police reports noted that the use of medication by supervising adults had caused drowsiness – which resulted in a lack of active supervision for two children. The children were assumed to be in a safe place inside the home, asleep or under the supervision of an older sibling.

The importance of supervision is shown in Figure 83. Of the 15 children aged under five years reportedly unsupervised, the majority were last seen inside the house (7), or outside the house (4) and had wandered away unnoticed.

Figure 83. Location child last seen before death from drowning, 2016 and 2017



Time unsupervised

Ten of the 15 unsupervised children aged under five years were reportedly unsupervised for 10 minutes or less. Carers were otherwise engaged in daily activities such as household chores, and the child was believed to be in a safe place or under the supervision of other adults or older siblings.

The remaining five children were reportedly not seen for more than 15 minutes and up to a number of hours. These cases often occurred in circumstances where the child had woken from sleep and left the house unseen.

Two of the children who drowned while unsupervised were in the bath. Over the 15 years to 2017, 26 children drowned in a bathtub. Most often, the children were infants under 12 months of age and the time they were left unsupervised was often very short. Common scenarios included carers leaving the bathroom to collect towels or clothing, or to tend to another child. Drowning of very young children can be quick and silent.[198]

Shared supervision

As seen in previous years, supervision responsibility was not always clear. This was either in the context of social gatherings of family or friends where responsibility for supervision was shared among a group, or the child was assumed to be with another person. Other circumstances included supervision for the child being unclearly designated or shared between adults and/or siblings, with assumptions being made about who was caring for the child. This often occurred when adults were doing activities in different areas of the home.

197. Petrass L, Blitvich J, Finch C 2011. Lack of caregiver supervision: a contributing factor in Australian unintentional child drowning deaths, 2000-2009, The Medical Journal of Australia, 195(5), pp.228-23.
198. Royal Life Saving 2018. Keep Watch 2018, accessed from https://www.royallifesaving.com.au/programs/keep-watch-toddler-drowning-prevention-program/Keep-Watch-2018.-Water.-Its-only-safe-while-youre-watching on 14 November 2018.

Pre-existing medical conditions

Seizure disorders and other medical conditions can reduce the ability to self-manage in water and increase the risk of drowning. In Australia, between 2005-15, an estimated 61 people with a history of epilepsy drowned. The most common place these drownings occurred was in the bathroom.

In 2016 and 2017, pre-existing medical conditions were identified as possible contributing factors in two drowning deaths. One child had a history of seizure disorders, and in another case recent asthma may have contributed to difficulty in the water.[199]

9.4.3. Misjudgement of hazard

Lack of awareness of hazards associated with different aquatic environments was identified in the deaths of four of the five older children, all aged over 10 years. Drowning deaths in this age group are more likely to be associated with risk-taking behaviours.[200]

We have previously discussed the risks of drowning in floodwaters and how floodwater can create strong water flows in drains and culverts.[201] One older child drowned in a stormwater drain while playing in floodwater. The drain was reportedly not visible in the floodwater.

Two children drowned while swimming in hazardous conditions at beaches that were also unpatrolled at the time. Another child drowned after jumping into a natural body of water that was shallow.

The influence of drugs and alcohol also increases the risk of drowning in young people as these can impair judgment, slow reaction times, and result in greater risk-taking behaviour. Cannabinoids were detected in one older child who drowned while swimming.

9.5. Observations

The most common location of child drowning deaths is private swimming pools with non-compliant safety barriers. NSW councils are showing improvements in publishing information on private swimming pool inspections and compliance certificates, but aggregated data on the results of the council inspection program is not publically available in relation to defects identified and the time taken to rectify non-compliance.

The Department of Finance, Services and Innovation should analyse and publish data on the overall effectiveness of the inspection regime.

Drowning deaths of children younger than five often occurred in the context of carer distraction for very short periods of time. Active supervision is particularly critical for this age group. Carer supervision of all children at public swimming pools is also a critical protective factor.

Some drowning deaths of very young children occurred in bodies of water around and near the home that are not immediately obvious as drowning hazards, such as ponds and household items that hold water. Campaigns such as Keep Watch are key strategies to improving awareness of drowning hazards that are not often recognised.

199. Royal Life Saving 2018, Fact sheet 29 - drowning and epilepsy, accessed from https://www.royallifesaving.com.au/__data/assets/pdf_file/0007/19348/RLS_FactSheet_29_Drowning-and-Epilepsy.pdf on 31st October 2018
200. Royal Life Saving 201., Keep Watch 11-16 years, accessed from https://www.royallifesaving.com.au/programs/keep-watch-toddler-drowning-prevention-program/keep-watch-lifestages/keep-watch-11-16-years on 14 November 2018.
201. Royal Life Saving Australia 2018, Don't let your mates drink and drown, accessed from https://www.royallifesaving.com.au/programs/dont-let-your-mates-drink-and-drown/Media-Room on 14 November 2018

9.5.1. Only one private swimming pool in which a child drowned was compliant with child safety barrier fencing requirements

Of the private swimming pools in which children drowned in 2016 and 2017, only one pool was compliant with regulations required by the *Swimming Pools Act*. The most common issue that contributed to the children accessing the pools was faulty gate latches.

In addition to faulty latches, all pools that were not compliant had climbable objects within the 900mm non-climbable zone around the barrier. Most barriers also did not meet the 1800mm height requirements for property boundary fences that double as the pool barrier.

None of the private swimming pools with safety barrier faults were known to be non-compliant by local councils before the drowning deaths. In NSW, a swimming pool certificate of compliance is valid for three years from its date of issue. Two swimming pools had current certificates of compliance issued within a year to two years before the deaths occurred. This illustrates the importance of pool owners doing regular checks to maintain the compliance of safety barriers.

9.5.2. It is not clear how effective the inspection regime is in NSW

In NSW, local councils are currently required to:

- develop and implement a swimming pool barrier inspection program in consultation with their communities
- inspect pools associated with moveable dwellings, tourist and visitor accommodation at three-year intervals
- at the request of a pool owner, inspect a swimming pool or spa pool before the sale or lease of the property
- issue either a certificate of compliance or non-compliance after an inspection
- investigate complaints about breaches of the *Swimming Pools Act*
- where necessary, direct pool owners to take action to ensure that legislated pool barrier requirements are complied with
- make publicly available a relevant extract of the Building Code of Australia, Cardio Pulmonary Resuscitation Guideline and applicable Australian Standards
- report annually on the number of pool inspections completed and the level of compliance with the requirements.[202]

However, the effectiveness of the compliance regime and swimming pool inspections remains unclear. As previously reported in our CDRT Annual Report 2017-18,[203] our review of local council annual reports for 2016-17 identified a low level of compliance with this requirement.

In May 2018, DFSI advised us that the agency was '*reviewing the IT infrastructure supporting the Swimming Pool Register*' and was considering enhancements in the ability to report defects and consolidated data reporting across councils. The swimming pool register also now requires inspection details of non-compliance certificates to be entered.[204]

The 2017-18 Building Professionals Board Annual Report includes information on the number of pools inspected in 2017-18 and the number of those pools found to be non-compliant.[205] In February 2019, DFSI advised us that the Swimming Pool Register cannot currently provide an amalgamated report on defects identified and the time taken for rectification of non-compliance. DFSI is considering further enhancements to the Register including the ability to provide amalgamated reports.

202. NSW Fair Trading 2018, Swimming pools and spas, accessed via https://www.fairtrading.nsw.gov.au/housing-and-property/building-and-renovating/pools-and-pool-safety/swimming-pools-and-spas on 6 November 2018.
203. NSW Child Death Review Team 2018, CDRT annual report. NSW Ombudsman, Sydney.
204. NSW Legislation 2018, *Swimming pools regulation 2018 accessed from* https://www.legislation.nsw.gov.au/regulations/2018-503.pdf on 23 October 2018.
205. Building Professionals Board NSW 2018, Annual Report 2017-18, accessed from https://www.finance.nsw.gov.au/sites/default/files/bpb_annual_report2017-18.pdf 12 March 2019.

Under the *Swimming Pools Act*, a local council must include in their annual report the number of inspections it carried out that:

- were of tourist and visitor accommodation
- were of premises on which there were more than 2 dwellings
- resulted in the council issuing a certificate of compliance or a certificate of non-compliance.

As of 30 December 2018, local council annual reports for 2017-18 were available for 106 of the 128 councils in NSW. Of these, 59 councils reported all the above information. However, there was also variation in the type of information provided. An additional 10 councils only reported information on certificates of compliance and/or non-compliance issued. There were 37 councils that did not meet these requirements by only reporting the overall number of inspections (5) or providing no information (32).

The level of compliance by councils with reporting requirements has remained low.

To examine the overall effectiveness of the inspection regime, we will continue to monitor our previous recommendation[206] that:

- The Department of Finance, Services and Innovation should publish an analysis of annual data from the swimming pool register, including but not limited to:
  a. The number of pools registered
  b. The number of pools that have been inspected
  c. The proportion of inspected swimming pools that were deemed non-compliant with the Act at the time of inspection
  d. The main defects identified at the time of inspection, and
  e. Whether or not owners have rectified defects within a reasonable period of time.

9.5.3. Carer supervision is a critical protective factor at public swimming pools

In 2016 and 2017, two children drowned in public swimming pools – which was double the 15-year average. At the time of writing, both cases remained open with the NSW Coroner.

A 10-year review of drowning in aquatic facilities by Royal Life Saving Australia found there was an absence of carer supervision in three out of every four drowning deaths that occurred.[207] As observed in our review of deaths in 2016 and 2017, the Royal Life Saving review identified that pre-existing medical conditions were also a risk factor at facilities as they may reduce the ability to self-manage in water.

Royal Life Saving Australia has an existing public awareness program, 'Keep Watch at Public Pools' that includes resources available to swimming pools and aquatic facilities that sign up as partners.[208] The program further promotes guidelines for safe pool operation for participating facilities.

9.5.4. Drowning hazards were not readily identified for children under five years

Our review indicates some water hazards were not immediately obvious to carers and that drowning deaths occurred in the absence of active adult supervision. Five children under five years died in water hazards located at homes or near to homes that may not have been readily identified as potential hazards. Fishponds, dams, canals and even household water containers can pose a risk – particularly to very young children.

206. NSW Child Death Review Team 2018, CDRT annual report, NSW Ombudsman, Sydney.
207. Mahony A et al 2018. A 10-year analysis of drowning in Aquatic Facilities: Exploring risk at Communal, Public and Commercial Swimming Pools. Royal Life Saving Society Australia, Sydney.
208. Royal Life Saving Australia 2018, Keep watch at public pools, accessed https://www.royallifesaving.com.au/aquatic-centres/managers/programs/keep-watch-at-public-pools on 2 November 2018.

In the past 15 years, there has been no change in the number of deaths in dams. NSW legislation does not require fencing of dams on private properties. However, securely fenced child safe play areas can help prevent such drownings by restricting access.[209]

Royal Life Saving Australia has an existing public awareness program, 'Keep Watch at The Farm' – promoting supervision, child safe play areas, water awareness in farm environments and resuscitation.[210] The program also promotes guidelines for safe pool operation for participating facilities.

Our reviews indicate the need for improved awareness and education on home water safety, as well as designated supervision in social settings to prevent drowning deaths.

209. Royal Life Saving 2018, Child Safe Play Areas, accessed from https://www.royallifesaving.com.au/__data/assets/pdf_file/0020/3962/6.-Child-Safe-Play-Areas.pdf on 2 November 2018.
210. Royal Life Saving Australia 2018, Keep watch at farms, accessed from https://www.royallifesaving.com.au/programs/keep-watch-toddler-drowning-prevention-program/keep-watch-@-the-farm on 2 November 2018.

Chapter 10. Other unintentional injury deaths in 2016 and 2017

In 2016 and 2017, 17 children died from a range of external (injury-related) causes – other than road crashes, drowning or accidental suffocation of an infant. These injuries included poisoning, falls and fire.

Lack of supervision and access to hazards are particular risks for children under five years of age. Older children and teenagers are more involved in the physical environment, and alcohol and other drug use and risk-taking behaviours can also contribute to serious injury.

This chapter concerns the 17 children who died in 2016 and 2017 from injuries that were sustained unintentionally – other than transport, drowning, or the accidental suffocation of an infant.[211] The 17 children died in a diverse range of circumstances:

- Five children died from force-related injuries – including horse riding accidents (2), being struck or knocked by a person (2), or crushed by a falling object (1).
- Four children died from poisoning – including illicit drug toxicity (2), anaphylaxis (1) and snake bite (1).
- Three children died from falls.
- Two children died as a result of exposure to smoke, fire or flames.
- Two children (over one year of age) died from accidental asphyxiation.
- One child died from surgical and/or medical complications.

One of these deaths was reviewable by the Ombudsman because the child was in care.

10.1. Risk factors associated with deaths from unintentional injuries

Risk factors associated with unintentional injury vary according to the child's age and developmental status – as well as the specific environment, circumstances, and/or type of hazard. In some cases, injury may not be foreseeable and there may be limited opportunities to prevent these deaths.

Common risks associated with unintentional injury include:

- lack of knowledge, disregard or misjudgement of a hazard
- unrestricted access to a hazard
- product faults
- lack of supervision.

For children under five years, particular risks include lack of supervision and access to hazards – and for infants, a safe sleeping environment.

For older children and teenagers, other factors come into play. These include risk-taking behaviour such as drug and alcohol use, increasing engagement in the physical environment, and lack of experience in assessing danger.

211. Transport deaths are examined in chapter 8, drowning deaths in chapter 9, and threats to breathing in infants (classified as SUDI) in chapter 6.

10.2. Unrestricted access to a hazard

In 2016-17, two children died as a result of exposure to smoke, fire or flames. Both deaths occurred after children in the family accessed matches or cigarette lighters while one or more carers slept.

In 2014, the CDRT reviewed the deaths of 35 children who died in 27 house fires in NSW over a 10-year period (2004-13). The review found that nearly half the fires were caused by children playing with matches or cigarette lighters. In all the cases, children gained access to matches and lighters that had been left out or were easily accessible – such as in a kitchen drawer or a handbag. The review also found that in most cases, the children who started the fire had a history of playing with matches/lighters or starting fires and this was known by their carers.

The review highlighted the risks associated with:

- Children having access to, and playing with, matches and lighters.
- Smoke alarms not being installed or not working.
- Heaters and candles being placed too close to flammable materials and/or being left unattended while in use.
- Young children being unsupervised or left in the supervision of young teenagers.
- Household members not having adequate means of escaping the premises.

In July 2018, the NSW Coroner's Court released the findings of an inquest into one of the 2016-17 deaths. The inquest found the death occurred in a rental property that did not have a functioning smoke alarm, despite laws making smoke alarms mandatory in NSW since 2006.[212] The inquest specifically considered how the law related to rental properties in NSW, and identified a number of issues in relation to the checking and testing of smoke alarms in rental properties, the need for real estate agents to understand and prioritise safety requirements, the lack of monitoring and investigation of compliance, and the need to harness the significant knowledge and research in this area to help steer and strengthen further legislative reform.

The Coroner found that the child's death could have been prevented if there had been adequate smoke alarms fitted in the property, and made recommendations to government and non-government authorities. These recommendations included:

- mandating the placement of more smoke alarms, the interconnection of devices and the compulsory use of hard wiring or long term batteries
- considering a certificate of compliance as part of the residential tenancy agreement
- reviewing and improving training for real estate agents
- education strategies for public awareness.[213]

10.2.1. Risk-taking

For our reviews, a death is considered to occur in the context of risk-taking if the young person was involved in an activity or behaviour in the period immediately preceding their death that posed a significant foreseeable risk to their safety.

In 2016-17, our reviews identified that five young people aged 15-17 died in circumstances of risk-taking:

- Two of the young people died from drug toxicity. In both cases, the Coroner found the deaths were unintentional. One death was the result of the combined effect of multiple substances. The other death was linked to the teenager's use of synthetic cannabis. The death prompted NSW Police to

212. In May 2006 changes to the *Environmental Planning and Assessment Act 1979* and Regulations (2000) came into effect requiring all residential dwellings to have functional smoke alarms in compliance with the Australian Standard 3786. The legislation requires all NSW residences to have at least one working smoke alarm installed on each level of the home – including owner occupied, rental properties, relocatable homes, caravans and campervans or any other residential building where people sleep. The legislation requires the smoke alarms to be operational, and that persons do not remove or interfere with their operation.
213. See http://www.coroners.justice.nsw.gov.au/Documents/Miata%20Jibba_.pdf for full details.

issue a warning in relation to the drug, and the NSW Government to add one of the substances – AB-CHMINACA – to the list of prohibited substances.[214] Another substance (MDMB-FUBINACA) identified in toxicology tests is yet to be added.[215]

- Two young people died from falls. In one case, the young person fell from a balcony while intoxicated. In the other case, the young person fell onto rocks after disregarding the advice of friends who identified the situation as dangerous.
- One young person died from hanging which was determined to be the result of misadventure by the Coroner, rather than the consequence of a deliberate, intentional act of self-harm.
- Young people are more likely to engage in risk-taking behaviours that make them vulnerable to harm. Taking risks is a part of the adolescent developmental stage and can provide young people with a way to learn more about themselves and their environment. A moderate amount of risk-taking has been shown to assist with the development of social competence and the transition to adulthood. However, some risk-taking can place the young person at risk of serious harm, and this lack of experience in assessing and judging the potential consequences of risk is apparent in these deaths.

214. In April 2016, AB-CHMINACA was added to Schedule 1 of the *Drug Misuse and Trafficking Act 1985*.
215. NSW legislation lists AB-FUBINACA as a prohibited substance, not MDMB-FUBINACA.

Chapter 11. Suicide deaths in 2016 and 2017

In 2016 and 2017, 54 school-aged young people died by suicide.

Unlike other causes and circumstances of death, the suicide rate for school-aged young people aged 10-17 has increased.

Aboriginal and Torres Strait Islander young people have a much higher rate of suicide than non-Indigenous young people.

More young men than young women die by suicide – but the gender gap is narrowing due to an increased rate of suicide in females.

In 2016 and 2017, 54 young people under the age of 18 died by suicide in NSW. This was 26 young people in 2016 and 28 young people in 2017 – a rate of 3.6 and 3.8 deaths per 100,000 young people aged 10-17 respectively.[216]

This chapter considers deaths that occurred as a result of suicide or probable suicide. It includes deaths where:

- the Coroner has made a finding that the cause and manner of death was self-harm with fatal intent
- police have identified the death as suicide and the case remains open with the Coroner
- the Coroner has dispensed with an inquest and has not made a finding about the manner of death, but police have identified the death as suicide and records examined provide evidence of suicidal intent.

The Coroner has determined that 40 of the deaths were the result of suicide or intentional self-harm, and has dispensed with an inquest without recording findings about the manner of death in seven cases. At the time of writing, six cases were still open with the Coroner and one death occurred outside NSW.

Consistent with previous years, the majority (40) of the 54 young people who died were male, and 14 were female. Most (42) were aged between 15 and 17 years.

Aboriginal and Torres Strait Islander young people have been consistently over-represented in suicide deaths of young people.[217] Across 2016 and 2017, almost one in four (13) of the young people who died were Indigenous.

The deaths of three of the young people were reviewable by the Ombudsman because they were in out-of-home care at the time of their death.

11.1. Preventing suicide deaths of young people in NSW

In NSW, there are multiple services and initiatives across health, community and education sectors to promote wellbeing, identify emerging mental health problems, and provide early intervention and support services. Most strategies include, and some target, school-aged children and young people. Interventions span state and commonwealth governments and private and community based providers. This section outlines the most recent and major initiatives.

216. This section uses an age-adjusted rate (young people 10 – 17 years). There has been no recorded suicide death of a child under the age of 10 in NSW.
217. Since 2007, the Aboriginal and Torres Strait Islander rate has been higher than for non-Indigenous young people.

11.1.1. A strategic framework for suicide prevention

In October 2018, in conjunction with the release of the *Strategic framework for suicide prevention in NSW 2018 – 2023*, the NSW Government announced additional funding of $90 million over three years for suicide prevention.[218]

The framework was developed by the NSW Mental Health Commission. New and expanded initiatives marked to start from 2019 include:

- Aftercare services – ensuring all people who have been admitted to hospital after a suicide attempt have access to follow up care and support.
- Emergency department alternatives – providing a more suitable alternative for people in crisis, such as designated 'cafes' with trained mental health workers at hand.
- Zero suicides in care – strengthening practices within the mental health system to eliminate suicide attempts by people in care.
- Expanded community mental health outreach teams – increasing the capacity to respond to calls to the NSW Mental Health hotline.
- New support services for people bereaved by suicide – to prevent 'clusters' of further suicides, especially among young people.
- Resilience building within local communities – engaging communities to participate in suicide prevention, with a particular focus on Aboriginal communities.
- Enhancing the Rural Adversity Mental Health Program – providing additional counsellors for people in regional and rural areas.
- Improved collection and distribution of suicide data in NSW.[219]

11.1.2. LifeSpan

NSW Health, the NSW Mental Health Commission and the Department of Education are currently working in partnership with the Black Dog Institute in a trial of LifeSpan, an *'evidence-based approach to integrated suicide prevention'*.[220] LifeSpan is being delivered and will be evaluated in four NSW sites – Newcastle, Illawarra Shoalhaven, Gosford/Wyong and the Murrumbidgee.

LifeSpan uses a systems approach to suicide prevention. The aim is for medical, health and community agencies to work together at a local level to implement nine evidence-based suicide prevention strategies:

- aftercare and crisis care
- psychological and pharmacotherapy treatments
- GP capacity building and support
- frontline staff training
- gatekeeper training
- school programs
- community campaigns
- media guidelines
- means restriction.

218. NSW Mental Health Commission 2018. Strategic framework for suicide prevention in NSW 2018 – 2023, accessed from https://nswmentalhealthcommission.com.au/resources/strategic-framework-for-suicide-prevention-in-nsw-2018-2023 on 23 October 2018.
219. NSW Health 2018, Suicide prevention in NSW, accessed from https://www.health.nsw.gov.au/mentalhealth/resources/Factsheets/strat-fmk-suicide-prev-nsw-factsheet.pdf on 23 October 2018.
220. Blackdog institute 2017, Integrated Suicide Prevention, accessed from https://blackdoginstitute.org.au/research/lifespan on 23 October 2018.

The Black Dog Institute states that '*based on scientific modelling, LifeSpan is predicted to prevent 21% of suicide deaths and 30% of suicide attempts*'.[221]

11.1.3. School-based initiatives

LifeSpan strategies targeted to young people include:

- Youth Aware of Mental Health (YAM) – a universal mental health and suicide prevention program for young people aged 14 – 16 years. YAM is delivered in NSW public schools by the Black Dog Institute with the NSW Department of Education and Headspace. The program aims to promote discussion and awareness of mental health issues and develop problem solving skills.
- Question, persuade, refer – an online gatekeeper training program for high school teachers.

Public school programs targeted to student mental health and wellbeing include School-link, a joint health and education early intervention program for students at higher risk – and Project air for schools, which provides mental health training for high school teachers. The Department of Education has also developed postvention guidance for schools 'Responding to student suicide support guidelines for schools'.

The non-government schools sector is diverse. The NSW Education Standards Authority requires schools to have in place policies and procedures for pastoral care and student welfare, including early intervention programs for students at risk.

11.1.4. Parliamentary inquiry into the prevention of youth suicide in NSW

In June 2017, the NSW Parliamentary Committee on Children and Young People began an inquiry into current approaches aimed at preventing youth suicide in NSW. The age range considered by the committee was 12 to 25 years. We provided a submission to the inquiry and appeared before the committee.[222] The final report of the inquiry was tabled in the NSW Parliament in October 2018.[223]

The inquiry acknowledged significant work underway in NSW to assist young people with mental health problems and to prevent youth suicide. However, it also identified areas requiring change and improvement – including the need for improved governance and coordination of services available to young people, monitoring and evaluation of major prevention initiatives, better access to services, improved data on and understanding of youth suicide and self-harm, and the development of specific strategies to address the needs of vulnerable young people.

The inquiry's 27 recommendations address each of these areas – in addition to overarching recommendations for a youth-specific suicide prevention plan for NSW, a specific suicide prevention plan for Aboriginal and Torres Strait Islander children and young people, the establishment of a NSW suicide register, and consideration of the establishment of a suicide mortality review team.

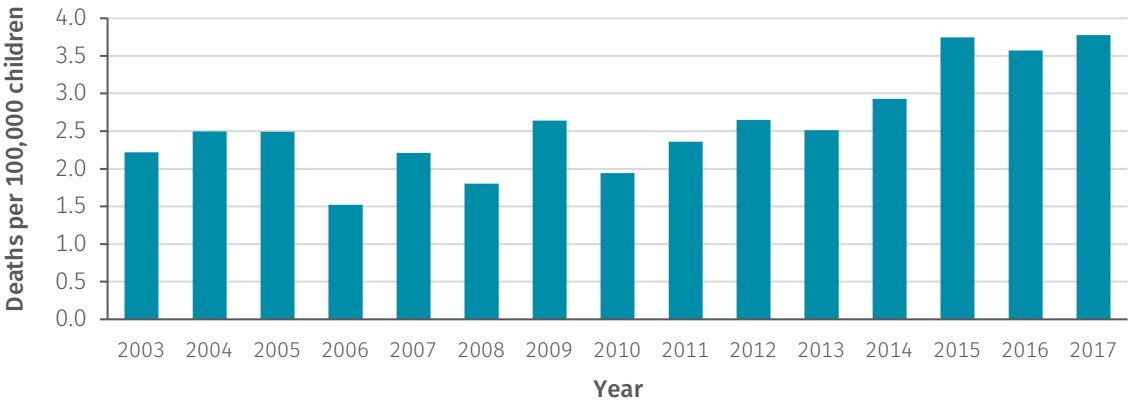
Overall, the inquiry's conclusions reflect many of the findings of our reviews. In this section, we have taken into account the inquiry report.

11.2. Trends in suicide deaths of young people in NSW, 2003-17

Over the 15-year period to 2017, the NSW Register of Child Deaths has recorded the deaths by suicide of 281 young people under the age of 18.[224] As shown in Figure 84, since 2003 there has been a significant increase in the suicide rate of young people. The rate in 2017 (3.8 deaths per 100,000 young people) was the highest observed in this period.

221. Blackdog institute 2017, Integrated Suicide Prevention, accessed from https://blackdoginstitute.org.au/research/lifespan on 23 October 2018.
222. The Convenor and Ombudsman, Mr Michael Barnes and CDRT expert member, Professor Philip Hazell, appeared before the Inquiry.
223. Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
224. No death of a child aged less than 10 years has been recorded as suicide.

Figure 84. Deaths due to suicide of young people aged 10-17, 2003-17

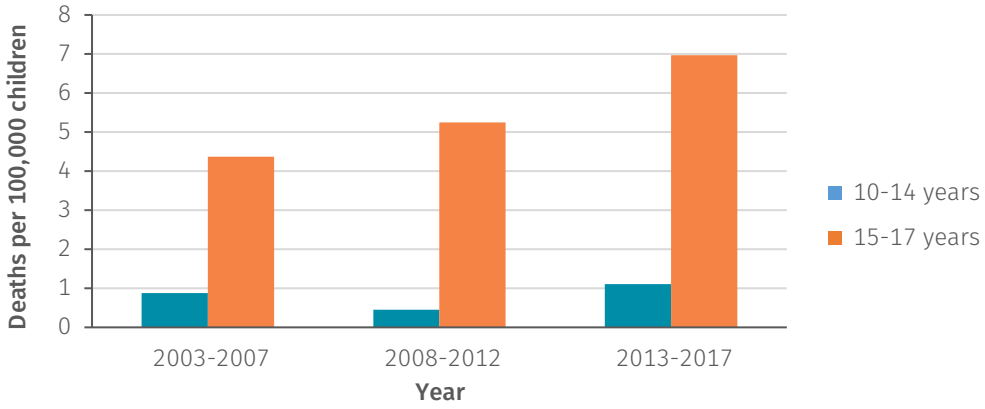


In the 15-year period 2003-17, suicide was the second leading cause of death for children aged 10-17 years. In 2016-17, it was the leading cause of death for this age group.

11.2.1. Age and gender

As shown in Figure 85, the majority of deaths by suicide occurred in the 15-17 year age group, and deaths in this age group have driven the increased rate of youth suicide in NSW. Over the 15 years from 2003 to 2017, 15-17 year olds represented 80% of all suicide deaths in the 10-17 age group.

Figure 85. Deaths due to suicide by age, 2003-17



The proportion of suicide deaths of 15 year olds increased over that time, rising from 6% to 14% of all deaths by suicide of young people under 18.

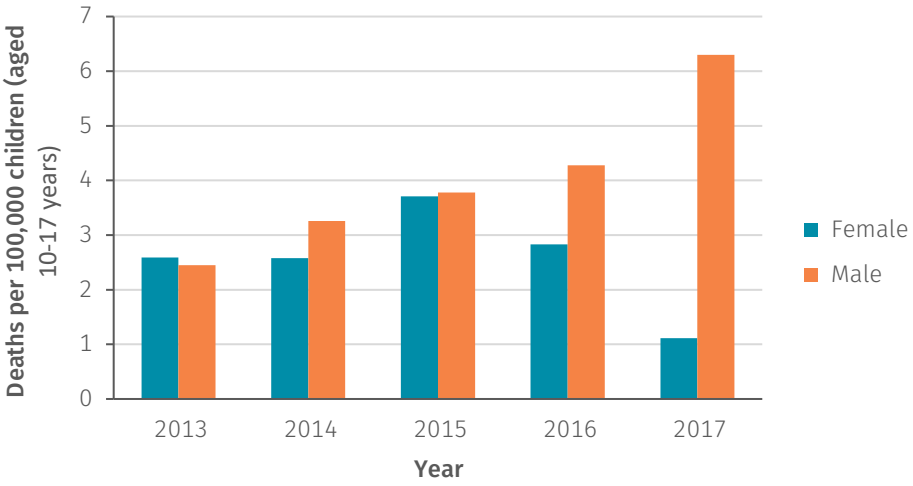
The number of suicide deaths of young people between the ages of 10 and 14 years is comparatively small, but is notable in terms of the proportion of all deaths within this age group. Between 2003 and 2017, 9% of all deaths of children aged 10-14 in NSW were deaths by suicide. Comparing five-year periods, the rate of suicide for this age group increased significantly in the 2013-17 period (1.1 per 100,000 children) compared to the previous five-year period 2008-12 (0.45). This increase can be attributed to an increase in suicide deaths of 14 year olds in 2017.

Recent NSW data indicates that mental health-related presentations to emergency departments between 2010 and 2014 had grown most rapidly for young people aged 10 to 14.

Males have consistently been over represented in suicide deaths of young people in NSW, and this is also reflected nationally. In our report of child deaths in 2015, we noted that the difference between the male and female suicide rate had reduced over the previous three years, due largely to an increase in female suicide deaths. However, as shown in Figure 86, this trend was not sustained.

In 2016 and 2017, the male suicide rate continued to increase while the female suicide rate decreased. The difference in the suicide rate in 2017 was the largest observed in the 15 years – it was 5.7 times as high for males as for females.

Figure 86. Deaths due to suicide of young people aged 10-17 years by gender, 2013-17



National data indicates that females have higher hospitalisation rates for intentional self-harm than males, with rates being highest for females aged 15-19 years.

11.2.2. Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander children and young people accounted for 11% of suicide deaths among young people in the 15-year period 2003 to 2017,[225] but they made up only 5% of the age-adjusted population.[226]

The suicide rate for Aboriginal and Torres Strait Islander young people aged 10-17 years increased from 5.6 deaths per 100,000 young people in 2008-12 to 9.1 in 2013-17. In 2017, the suicide rate was 3.8 times as high for Indigenous young people as for non-Indigenous young people.

In the period 2016-17, suicide was the leading cause of death for Indigenous children aged 15-17 years. Over the previous 15 years, the leading cause was transport.

11.2.3. School and work

The majority of young people under 18 years who have died by suicide were enrolled in school. For the five-year period 2013-17, school students accounted for 87% of the young people who died. Table 4 shows that suicide deaths across different school sectors broadly reflect the level of enrolment in those schools.

The 13% of young people who were not enrolled in school were either attending TAFE, were not in school, were employed or unemployed.

Table 4. Proportion of enrolments by school sector, students who died from suicide (2013-17) versus overall students in NSW (2017)

School sector	Students who died from suicide, 2013-17	Overall students enrolled in NSW, 2017
Government	68 (65%)	791,763 (65%)
Independent	19 (18%)	255,906 (21%)
Catholic	17 (16%)	161,638 (13%)
Total	**104 (100%)**	**1,209,307 (100%)**

225. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.
226. Australian Bureau of Statistics 2014. Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026, Cat. no. 3238.0, ABS, Canberra.
Australian Bureau of Statistics 2018, Estimated resident population by single year of age, New South Wales, Cat no. 3101.0, ABS, Canberra.

11.3. Risk factors associated with suicide deaths

Suicide in adolescence is associated with a complex interplay between genetic, biological, psychiatric, psychological, social and cultural factors.[227] No one risk or combination of risks predicts suicide. Risk factors for young people under 18 years relate to four key domains. Box 1 describes the risk factors associated with child and adolescent suicide against these domains.[228]

Box 1: Risk factors associated with adolescent suicide

Individual factors

- Psychiatric disorders – including affective disorders, disruptive disorders/conduct disorders, alcohol and drug abuse/misuse
- Adverse events – eg witnessing or experiencing violence, physical or sexual abuse, loss through death or separation, disciplinary crisis
- Preoccupation with death
- Previous self-harm or suicidal behaviour

Familial factors

- Parental divorce, poor family cohesion
- Poor parent-child communication
- Parent-child conflicts
- Family history of mental health problems
- Family history of suicidal behaviour
- Presence of a step-parent
- Frequent changes in living and educational arrangements

School and peer-related factors

- Peer problems – bullying, negative peer pressure, conflicts
- Suicidal behaviour among peers
- Perceived or actual poor academic performance
- Dropping out from school

Community and societal factors

- Access to means
- Exposure to media / internet and social media
- Availability of health care
- High level of deprivation in the community
- Remoteness

Chronic problems within a family – such as poor relationships, family conflicts, parental separation/ divorce, maltreatment and familial psychopathology and suicidal behaviour – have all been linked to suicide in children.

227. Hawton K, Saunders R and O'Connor R 2012. Self-harm and suicide in adolescents. The Lancet, 379, pp.2373-2380.
228. NSW Child Death Review Team 2019. Review of suicide clusters and evidence-based prevention strategies for school-aged children, prepared by the Australian Institute for Suicide Research and Prevention. NSW Ombudsman, Sydney.

In pre-adolescent children, familial factors are thought to play a central role in suicide.[229] In addition, diagnosed disorders such as Attention Deficit Hyperactivity Disorder (ADHD) are more common among younger children who die by suicide, compared with older adolescents.

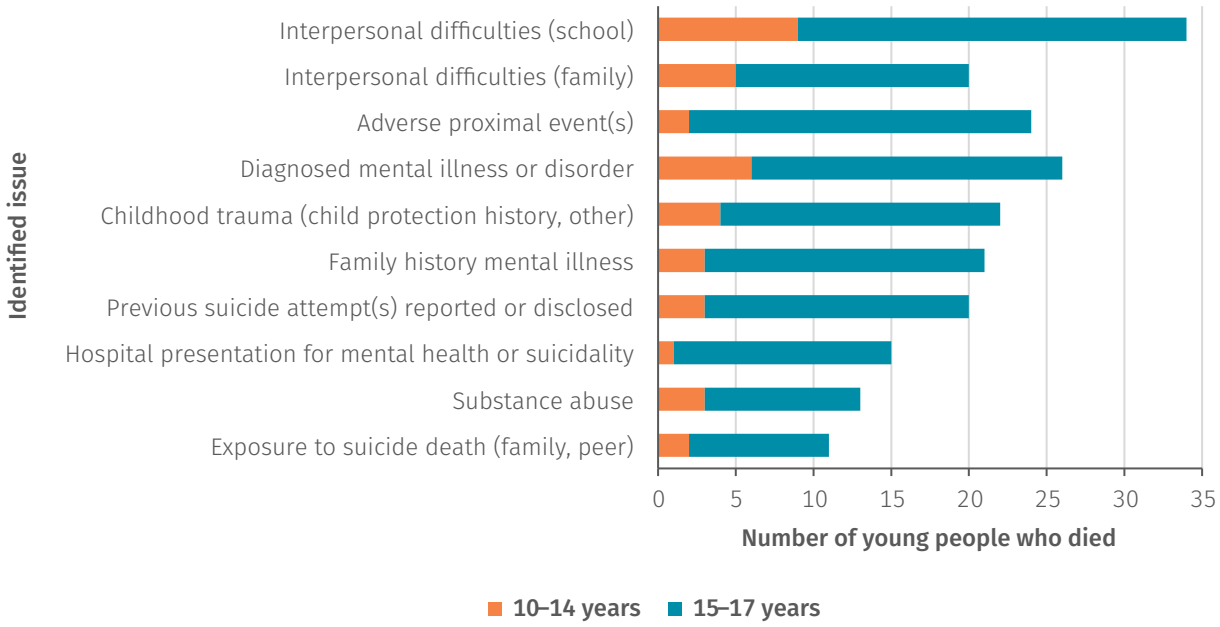
Older adolescents show a greater prevalence of diagnosed mood disorders and substance abuse problems, as well as a higher dominance of romantic or peer relationship problems.[230]

11.4. Risks identified for young people who died in 2016 and 2017

It is important to note that risk factors associated with suicide are not specific to suicide. Some – for example family discord, school and peer related problems, and substance misuse – are experienced by many young people. Exposure to risk factors does not necessarily mean a young person will consider, or attempt, suicide.[231] Protective factors such as strong family relationships, access to interventions and support, personal resilience and skills in problem solving can buffer individuals from suicidal thoughts and behaviour.[232]

While the following sections consider specific risks, most of the 54 young people who died were facing numerous difficulties across different areas of their lives. Figure 87 describes some of the most common issues and adverse events identified for the young people, and illustrates that multiple risks were often present.

Figure 87. Select risk factors identified for young people who died from suicide aged 10-17 years, 2016-17



11.4.1. Individual risk factors

Individual risk factors associated with suicide include psychiatric disorders, substance misuse, adverse events and previous self-harm or suicidal behaviour.

229. Pfeffer CR 2000. Suicidal behaviour in children: An emphasis on developmental influences. In: Hawton K, Van Heeringen K (editors). The International Handbook of suicide and attempted suicide. John Wiley & Sons, pp. 237-48.
230. NSW Child Death Review Team 2019. Review of suicide clusters and evidence-based prevention strategies for school-aged children, prepared by the Australian Institute for Suicide Research and Prevention. NSW Ombudsman, Sydney.
Soole R, Kolves K, De Leo D 2014. Factors related to childhood suicides: Analysis of the Queensland Child Death Register. Crisis, 35(5), 292-300.
231. Beyond Blue 2019. Risk factors for suicide, accessed from https://healthyfamilies.beyondblue.org.au/age-13/mental-health-conditions-in-young-people/suicide/risk-factors-for-suicide on 11 April 2019.
232. Centres for Disease Control and Prevention 2018. Suicide: risk and protective factors accessed from https://www.cdc.gov/violenceprevention/suicide/riskprotectivefactors.html on 11 April 2019.

Mental illness

The Federal Government's second *Australian Child and Adolescent Survey of Mental Health and Wellbeing* undertaken in 2013-14 identified that almost one in seven (13.9%) of 4-17 year-olds were assessed as having a mental disorder in the previous 12 months.[233] According to the NSW Mental Health Commission, teens to early 20s is the most common time for the onset of severe mental illness.[234]

Nearly half (26) of the young people who died by suicide in NSW in 2016 and 2017 had been diagnosed with a mental illness and/or disorder.[235] For another eight young people, post death investigations identified concerns held by family, teachers or support people about emerging signs of depression.

Previous suicide attempt

A previous suicide attempt is considered a strong predictor of a future suicide attempt or suicide.[236]

Over one third (20) of the young people had previously attempted suicide. For 11 young people, this was known because of emergency presentations for treatment after the attempt. In other cases, young people disclosed an attempt to their family, a professional or a friend either at the time or later.

Adverse event proximal to suicide

Stressful and traumatic events may occur close to the suicide and serve as 'tipping points' from suicide ideation to suicide attempt.[237]

Over half of the young people who died (28) had experienced an adverse event either recently or immediately before their suicide. The most common adverse events were an altercation with family or a girlfriend or boyfriend and/or a relationship break-up. Other events included sexual or physical assault, being the victim or perpetrator of bullying, adverse involvement with police and suspension from school.

Alcohol and other drug misuse

Research supports the existence of a strong relationship between suicide and substance abuse.[238] Once co-occurring mental health and alcohol and other drug problems have been established, the relationship between them is generally one of mutual influence – with each condition serving to perpetuate and exacerbate the other.[239]

Some alcohol or other drug use was identified for half (27) of the young people who died from suicide. This ranged from infrequent cannabis or alcohol use to regular heavy drinking and/or frequent and significant illicit drug use. For 16 young people, records indicate that the alcohol or other drug use was problematic due to its frequency, the amount and/or the nature of the substance(s) used.

11.4.2. Family factors

Family factors that have been associated with youth suicide include parental divorce or poor family cohesion, parent-child conflicts, family history of mental illness or suicidal behaviour, and unstable living arrangements. Adverse and traumatic events in childhood can be precipitating factors in suicide attempts or suicides. In particular, physical abuse, sexual abuse and family violence have been correlated with suicidal behaviour.[240]

233. Lawrence D et al 2015. The mental health of children and adolescents. Report on the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. Department of Health, Canberra.
234. Mental Health Commission of NSW 2014. Youth and young adults, accessed from https://nswmentalhealthcommission.com.au/mental-health-and/youth-and-young-adults on 11 April 2019.
235. For this report, we have identified a mental illness or disorder as diagnosed if a diagnosis or preliminary diagnosis was recorded by a psychiatrist, psychologist, counsellor or general practitioner.
236. Suicide Prevention Australia 2010. Position Statement: Youth suicide prevention, SPA, Sydney.
237. As above.
238. Pompili M et al 2012. Substance abuse and suicide risk among adolescents, European Archives of Psychiatry and Clinical Neuroscience, 262.
239. NSW Health 2015. Effective models of care for comorbid mental illness and illicit substance use: Evidence check review. NSW Health, Sydney.
240. Suicide Prevention Australia 2010. Position Statement: Youth suicide prevention, SPA, Sydney.

Childhood trauma

Many (22) of the young people who died had a recorded experience of childhood trauma associated with their family circumstances. For some the trauma remained active. Thirteen young people had a child protection history[241] that included reports about domestic violence in the family. In some cases, there were also concerns about neglect, physical abuse, carer mental health issues and homelessness. The families of another five young people had been the subject of reports to child protection in their early childhood.

For three young people, abuse and neglect within the family resulted in their placement in care.

Four young people with no child protection history had experienced other early trauma related to their family situation, including being placed by their parents into the care of relatives.

Family mental illness

A family history of mental illness was identified for 21 of the 54 young people, primarily for immediate family members (16). Records indicated that six young people had family members, either nuclear or extended family, who died by suicide.[242]

Other issues

Other issues identified relating to family circumstances included housing instability – either due to family financial circumstances or parental separation – ongoing general conflict with one or more family members, and a lack of contact and/or engagement with a parent.

11.4.3. School and peer-related factors

School and peer-related factors include suicidal behaviour among peers, romantic relationship problems, negative peer pressure and conflict, bullying, and perceived or actual poor academic performance.

Most (49) of the 54 young people were enrolled in school at the time they died. More than two thirds of those students were known to have problems at school, and/or with their peers. Problems included high levels of school absenteeism and suspensions for behavioural issues, bully victimisation, social isolation and difficulty making friends.

Fifteen young people were noted to have had recent problems in romantic relationships. This included a relationship break-up, ongoing conflict in a relationship, or parents acting to limit contact with the young person's partner.

11.4.4. Community and societal factors

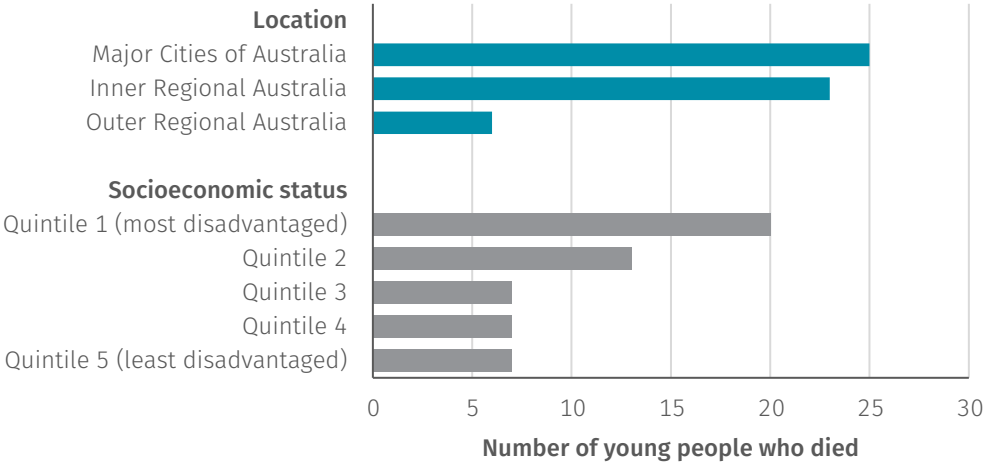
Community and societal risk factors include economic disadvantage and locational factors, access to support services and exposure to suicide.

Economic and locational disadvantage

Over half (33) of the young people who died by suicide lived in areas of greatest socio-economic disadvantage (Figure 88). Over half lived in non-metropolitan areas.[243]

241. Within three years before their death – the child and/or their siblings were the subject of a report about safety, welfare or wellbeing made to FACS or a Child Wellbeing Unit.
242. Other suicide deaths in the family may not be consistently recorded in the documents reviewed.
243. As per the ABS accessibility and remoteness index of Australia (ARIA+). No young people were in remote or very remote areas.

Figure 88. Proportion of young people who died from suicide aged 10-17 years, by remoteness and socio-economic status, 2016-17



In some cases, regional location was identified as a factor limiting the young person's access to services. Difficulties included lack of transport to access counselling services in a regional area, limited access to psychiatric services, and lack of beds for voluntary emergency admission for mental health assessment and treatment.

11.4.5. Exposure to suicide deaths

Exposure to the suicide death of peers was of note in relation to some deaths in 2016 and 2017, particularly a cluster of suicide deaths in northern NSW. A suicide cluster refers to:

> *'a group of suicides or suicide attempts, or both, that occur closer together in time and space than would normally be expected on the basis of statistical prediction or community expectation'.*[244]

Young people are noted to be at higher risk of suicide clusters than adults. To understand the phenomenon of cluster suicide, we commissioned a literature and policy review from the Australian Institute for Suicide Research and Prevention (AISRAP). The full report is available at: www.ombo.nsw.gov.au.

Cluster-specific factors identified by the review included recent direct or indirect exposure to a suicide – for example, a direct link to someone who died or social dissemination including through different types of media. Studies have also suggested that individuals in cluster suicides have a high prevalence of common suicide risk factors – such as psychiatric disorders, a personal and family history of suicidal behaviour and social isolation – and may therefore be more vulnerable.[245]

244. Centers for Disease Control 1988. CDC recommendations for a community plan for the prevention and containment of suicide clusters. Morbidity & Mortality Weekly Report, 37(6), 1–12.
245. NSW Child Death Review Team 2019. Review of suicide clusters and evidence-based prevention strategies for school-aged children, prepared by the Australian Institute for Suicide Research and Prevention. NSW Ombudsman, Sydney.

It has been suggested that the internet and social media may contribute to the ease of development of – and increase the incidence of suicide clusters – as the geographical area becomes less relevant. Robinson et al[246] highlights five reasons for the role of the internet in the potential increase of suicide clusters in young people:

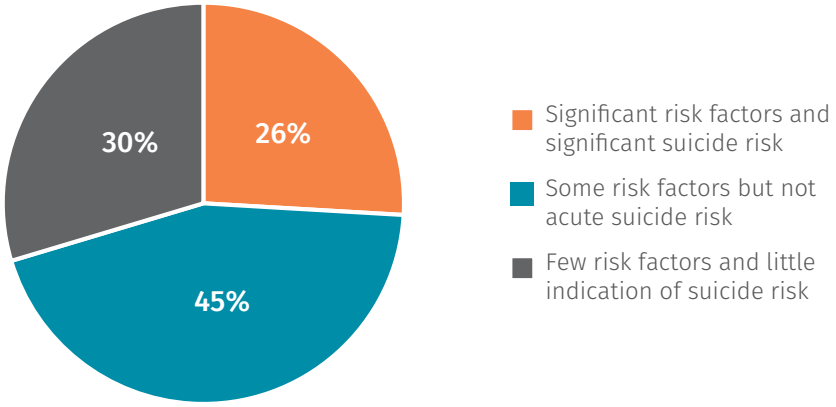
- Wider social networks make exposure to a larger number of suicides more likely.
- There is less control over the accuracy and delivery of the information about suicide cases.
- There are web pages to memorialise people who died by suicide, which tend to be excessively glorifying – shown to increase imitative behaviour in mainstream media.
- Vulnerable young people may congregate on the websites.
- Information can be shared about suicide methods, particularly about unusual methods.

11.5. Were the young people identified as being at risk?

Identifying risk factors associated with suicide is an important step in providing timely and appropriate support to individuals. An understanding of risk can also help to develop well targeted policies and programs. However, many of the risk factors associated with suicide are not uncommon among adolescents. The following section examines whether, and to what degree, the young people who died by suicide in 2016 and 2017 were recognised as being at risk of suicide or were experiencing mental health problems that required intervention.

In some cases, professionals and/or family identified that a young person was at possible risk of suicide. Some young people were, or had been, engaged with mental health or other support services – but were not considered to be at particular risk. In a small number of cases, there was little indication that the young person was experiencing difficulties (Figure 89).

Figure 89. Degree of risk identified in young people who died from suicide aged 10-17 years, 2016-17



11.5.1. Young people with serious mental health concerns and other risk factors, and for whom suicide was a significant risk

One in four (14) of the young people who died by suicide were identified as having complex needs and chronic difficulties. These young people were experiencing multiple risks most often associated with suicide. Two of the young people were living in out-of-home care at the time they died.

All 14 had been diagnosed with a mental illness[247] – primarily depression and/or anxiety, or a disorder. Four young people had been diagnosed with Attention Deficit Hyperactivity Disorder in association with depression and/or anxiety.

246. Robinson et al 2016. Spatial suicide clusters in Australia between 2010 and 2012: a comparison of cluster and non-cluster among young people and adults. BMC psychiatry, 16, p.417.
247. For this report, we have identified a mental illness or disorder as diagnosed if a diagnosis or preliminary diagnosis was recorded by a psychiatrist, psychologist, counsellor or general practitioner.

Thirteen of the young people had previously attempted suicide – 11 of whom had been presented to emergency after an attempt and/or for suicidal ideation or acute mental illness. Records identified that five of the young people had also been exposed to the suicide death of a family member or peer.

Ten of the 14 young people had a history of trauma in childhood, due to circumstances such as sexual abuse, family violence, death in the family or acrimonious family breakdown.

Alcohol and/or other drug abuse was an identified concern for four of the young people, which complicated approaches to managing their mental health problems.

Interpersonal issues were evident for all 14 young people – including bullying, learning issues and disengagement with school, involvement with Juvenile Justice and significant discord within the family.

How was risk responded to?

Seven of the 14 young people identified as being at significant risk were, or had recently been in receipt of, mental health support – mainly through Community and Adolescent Mental Health Services (CAMHS). Some young people were also receiving support from private practitioners and school counsellors. Eight were prescribed medication at the time they died, mainly for depression and anxiety. Another three young people had previously been prescribed medication for depression or anxiety, but had stopped using the medication at some time before their death.

The deaths of eight young people who were identified as having serious difficulties were subject to a Root Cause Analysis (RCA) by relevant Local Health Districts.[248] Underlying causes or systems improvement opportunities were identified in most cases. Common themes included:

- Problems with access to services – such as referral processes and triage – and in two cases, high service demand and low capacity and limited access to consultant clinicians.
- Lack of coordination between services – including difficulties in building relationships with other agencies involved with the young person, ineffective referral and handover between mental health services and community clinicians, and a lack of information exchange or escalation of issues between involved services.

11.5.2. Young people with some mental health and/or other risk factors, but for whom suicide was not identified as an acute risk

Just under half (24) of the young people who died by suicide were identified as having some mental health or related support needs and/or interpersonal issues. These young people had not been identified as being at acute risk of suicide.

Half (12) of these young people had at some point been given a diagnosis or preliminary diagnosis of a psychiatric disorder – primarily depression and/or anxiety – and six young people had a history of attempted suicide or suicidal ideation.

Problematic use of alcohol and/or other drugs was identified for a third (8) of the young people and, for a number of the young people, was the primary concern identified before their death.

Adverse events proximal to suicide were identified for half of this group – including relationship breakdowns, major arguments with family or peers, school suspensions and significant anniversaries.

The majority (18) of the young people were noted to be experiencing interpersonal issues – for example, family discord, poor relationships or bullying at school, difficulties managing at school, sexuality concerns, self-esteem issues.

248. An RCA is conducted following the suspected suicide of a person who has received care or treatment for a mental illness from a Health Service or other public health organisation where the death occurs within seven days of the person's last contact with the organisation, or where there are reasonable grounds to suspect a connection between the death and the care or treatment provided by the organisation: NSW Health Incident Management Policy 2014, accessed from https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2014_004.pdf on 11 April 2019.

How was risk responded to?

Seven of the young people with diagnosed conditions were receiving some professional support in the period immediately before their death – including CAMHS, psychologists, general practitioners and paediatricians. In some cases, the support had only recently begun or had changed. Most of these young people had been prescribed medications, in some cases relatively recently. At least one young person was recorded as having stopped taking the prescribed medication, and in two other cases it was unclear as to whether the young person was taking their medication.

11.5.3. Young people who evidenced few risk factors, and for whom there was little indication they were at risk or required assistance

Sixteen young people gave little indication to family, teachers or other professionals that they were experiencing significant problems.

Only one of the young people had a diagnosed disorder (ADHD) and had been prescribed medication. However, for another five young people, police inquiries after their death identified emerging concerns including depressive symptoms.

Over half (10) of the 16 young people were noted to have had some relationship or other interpersonal problems – including school absenteeism and concerns about school performance, family discord and romantic relationship breakdown. Adverse events proximal to suicide were also evident for this group of young people.

11.5.4. Young people in care

Our reviews have consistently identified that young people in out-of-home care are particularly vulnerable and frequently present with high and complex needs.

Three young people who died by suicide in 2016 and 2017 were under the parental responsibility of the Minister. In addition to the trauma that resulted in care applications, two of the young people had a history of mental health problems, diagnosed mental illness and suicidal behaviours. Both young people had been the subject of risk of significant harm reports relating to suicidal behaviour or suicide attempts while in care. The third young person engaged in risk taking behaviour and threats of self-harm, and had been exposed to suicide.

Internal reviews by the Department of Family and Community Services (FACS) after the suicide deaths found that, for two of the young people, mental health issues were either not fully understood or addressed by either FACS caseworkers or the broader service system – or were not taken seriously.

11.6. Observations and recommendations

The majority of school-aged young people who died by suicide were identified as being at some risk and many were known to mental health or other support services.

A focused suicide prevention plan for young people in NSW is needed and would provide for well targeted interventions to prevent suicide.

NSW has, and is continuing to develop, good systems for identifying young people who are at risk of suicide or who are dealing with mental health problems – but there is a need to improve risk containment and risk management strategies for school-aged children with mental illness and/or suicide risk. This includes addressing gaps in the delivery of appropriate specialist mental health services for children and young people in NSW.

The role of schools – both government and non-government – is critical in developing strategies to prevent suicide. Strategies should be evidence-based and subject to ongoing monitoring and evaluation. Major prevention strategies – such as LifeSpan in NSW – should be evaluated for their appropriateness and effectiveness for young people.

Key agencies – including schools – should review their involvement with young people who die by suicide. Learning from missed opportunities and using that understanding to frame future practices should be a key strategy in improving the capacity of agencies to develop effective prevention strategies.

11.6.1. There is no focused suicide prevention plan for young people in NSW

Unlike other causes and circumstances of death, the suicide rate for young people aged 10 – 17 has increased over the past 10 years. While this trend is not confined to NSW or to this age group, school-aged young people have particular vulnerabilities and needs that should be taken into account in suicide prevention strategies.

Orygen notes that responding to suicide risk among young people requires a different approach than for other age groups. Mental illness often emerges in adolescence – and developmental changes in adolescence can result in impulsivity and poor decision-making which in turn affects how young people respond to and communicate distress. Rapid social, technological and economic changes can also increase pressure on young people.[249]

The inquiry into youth suicide in NSW found that the specific needs of children and young people provide valid reasons for a youth specific response. The committee has therefore recommended that:

> *The NSW Government develop a youth specific suicide prevention plan developed in consultation with children and young people.*[250]

In recognition of the sustained over-representation of Aboriginal and Torres Strait Islander children in suicide deaths, the committee also recommended that:

> *The NSW Government develop an Aboriginal and Torres Strait Islander specific youth suicide prevention plan for NSW consistent with the findings of the ATSISPEP [Aboriginal and Torres Strait Islander Suicide Prevention Evaluation Project] study.*[251]

We support these recommendations.

Taking into account the extent to which individual circumstances vary – and noting that the presence of risk factors is not in and of itself predictive of suicidal behaviour – our reviews over a number of years have highlighted several key issues and related opportunities for prevention and targeted interventions for school-aged children and young people. These include:

- The importance of providing multiple avenues and opportunities for young people to obtain help.
- The importance of early identification, and response to, mental health concerns including:
  - the need for appropriate referral, assessment and therapeutic support for young people identified to be at risk of suicide

249. Robinson J et al 2016. Raising the bar for youth suicide prevention. Orygen, the National Centre of Excellence in Youth Mental Health, Melbourne.
250. Recommendation 3 from Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
251. Recommendation 7 from Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.

- the need for proactive follow-up of young people who present to health services for assistance
- strategies for assertive follow up if there is a lack of follow-through by families or the young person expresses reluctance to engage with therapeutic supports.

- The key role of schools in supporting students at risk, including:
  - working with families to facilitate referrals to specialist mental health services, and supporting young people to manage risks in the school environment
  - providing postvention supports and strategies targeted to young people who have experienced the suicide death of another student, family member or friend
  - de-stigmatising mental health problems through whole-of-school programs designed to promote mental health and wellbeing.
- The need to ensure the coordination of care and support provided to young people at risk.
- The recognition that young people in out-of-home care are particularly vulnerable and often experience significant risk factors and unmet need.
- The need for an overarching whole-of-government suicide prevention framework that includes a specific focus on measures targeted towards the particular needs of children and young people.
- The importance of measuring and evaluating the impact of suicide prevention strategies and initiatives.
- The need for effective data collection and reporting on youth suicide.

In the context of these observations, **we recommend that:**

10. **The NSW Government should include in any suicide prevention plan specific measures targeted to school-aged children and young people across the spectrum of need. In particular, this should include:**
    a. **universal strategies that promote wellbeing in children and young people**
    b. **early intervention designed to arrest emerging problems and difficulties**
    c. **the provision of targeted, sustained and intensive therapeutic support to young people at high risk – including strategies for reaching those who are hard to engage.**

11.6.2. Identification of suicide risk in young people must be supported by effective strategies to manage and contain risk

Our reviews have identified that around three quarters of school-aged young people who died by suicide were known to mental health or related support services. Some – around one in four – were known to be at high risk. Other young people had identified risk factors such as depression and self-harming behaviour in addition to other stressors.

We have noted that NSW has good systems for identifying young people who are at risk of suicide or who are dealing with mental health problems,[252] through for example 'gatekeeper' training and school-based initiatives. The AISRAP literature and policy review of suicide clusters indicated there are comprehensive activities and guidelines for postvention and prevention developed for school-aged children by the NSW Government in collaboration with research and community organisations.[253] In this context, we note that the Inquiry into prevention of youth suicide in NSW has called for better and expanded provision of gatekeeper training and evaluation of programs.

However, we have also identified the need to improve risk containment and risk management if school-aged children are identified as experiencing mental health problems or being at risk of suicide.

252. Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
253. NSW Child Death Review Team 2019. Review of suicide clusters and evidence-based prevention strategies for school-aged children, prepared by the Australian Institute for Suicide Research and Prevention. NSW Ombudsman, Sydney.

Similar to previous years, our reviews of suicide deaths in 2016 and 2017 identified that intervention for young people was often episodic and fragmented. We have consistently found that:

- Where young people received treatment or support from one or more services simultaneously, it was not always the case that services were aware of each other's involvement or communicated effectively if involvement was known. Communication breakdowns have been noted especially between health services, and between schools and health services.[254]
- If young people had contact with emergency and acute care services, active and sustained follow-up and continuity of care was not always provided.
- Some young people with mental health-related problems can be resistant to accepting support, and lack of engagement or disengagement may present further challenges to mental health services that are already struggling with demand.

The NSW government has noted that:

> *'The demand for access to developmentally appropriate specialist mental health services for children and adolescents in NSW regularly outstrips the capacity to supply timely services'.*[255]

In regard to service provision and access, the inquiry into prevention of youth suicide in NSW has recommended, among other strategies:

- An online directory of programs and services specifically targeted for children and young people to access.
- A minimum standard for the provision of access to mental health services in regional, rural and remote NSW and funding for this.
- (NSW Health) prioritise strategies to improve post-discharge care for children and young people, especially children and young people who show reluctance to receive care.
- Investigation of opportunities to use technology to provide support to children in regional, rural and remote areas.
- Funding to services such as Kids Helpline, ReachOut and eHeadspace.

We support these proposals. In addition, and noting the difficulty in supplying timely and developmentally appropriate specialist mental health services for children and young people, **we recommend that:**

11. The NSW Government should direct funds associated with the Strategic Framework for Suicide Prevention in NSW 2018–2023 to address gaps in the delivery of appropriate specialist mental health services for children and young people in NSW.

11.6.3. Suicide prevention and intervention strategies should be subject to ongoing monitoring and evaluation

As noted above, in 2017 we commissioned AISRAP to examine cluster suicides among school-aged children and young people. Based on a literature review, the study considered evidence-based prevention and postvention strategies and existing youth suicide prevention strategies.

The literature review identified that the majority of studies note that young people are at higher risk of suicide clusters than adults.

254. NSW Government 2017, Submission to the NSW Parliament Committee on children and young people, Inquiry into prevention of youth suicide in NSW. Submission no 46, accessed from https://www.parliament.nsw.gov.au/ladocs/submissions/58741/Submission%2046%20-%20NSW%20Government.pdf on 11 April 2019.
255. NSW Government 2017, Submission to the NSW Parliament Committee on children and young people, Inquiry into prevention of youth suicide in NSW. Submission no 46, accessed from https://www.parliament.nsw.gov.au/ladocs/submissions/58741/Submission%2046%20-%20NSW%20Government.pdf on 11 April 2019.

Postvention and prevention strategies in schools

The AISRAP review identified comprehensive activities and guidelines for postvention and prevention developed for school-aged children by the NSW Government in collaboration with research and community organisations.[256] The key policy guiding NSW government schools is 'Responding to Student Suicide – Support Guidelines for schools', developed in collaboration with the NSW Ministry of Health, NSW Department of Education and Headspace.[257] These guidelines supplement existing initiatives to support the mental health and wellbeing of school students in NSW. They aim to enable a comprehensive and timely response and facilitate holistic support for the entire school when a student dies by suicide.

The review also noted, however, that very limited literature and research has addressed the topic of prevention of suicide clusters and specific postvention activities. No study has evaluated the overall effectiveness of these strategies in preventing future clusters.

Similarly, the inquiry into prevention of youth suicide in NSW[258] noted the need for improvements to data on youth suicide and self-harm to provide a clearer picture of youth suicide and identify areas of emerging risk. The committee found that although schools treat student wellbeing seriously, evidence suggested that suicide prevention activities in schools 'lacked coordination and consistency'. Relevant to school-aged children, the committee recommended that:

> *The NSW government should review the adequacy and efficiency of the suicide prevention, postvention and mental health and wellbeing programs currently provided to primary school students in NSW.*

We support this recommendation.

We also recommend that:

12. **The NSW Department of Education should evaluate postvention initiatives in NSW government high schools, particularly the effectiveness of such initiatives in preventing suicide clusters.**

For independent schools, the inquiry noted that 'overall, the committee received limited evidence on the suicide prevention programs and activities available in non-government schools.'

As described above, approximately one in three suicide deaths of school aged children occur in non-government schools. **We therefore recommend that:**

13. **Catholic Schools NSW should work with and assist member schools to examine the adequacy of suicide prevention, postvention and mental health and wellbeing programs currently provided to students in NSW Catholic Schools.**

14. **The Association of Independent Schools of NSW should work with and assist member schools to examine the adequacy of suicide prevention, postvention and mental health and wellbeing programs currently provided to students in NSW Independent Schools.**

LifeSpan

LifeSpan is acknowledged as an innovative initiative in suicide prevention in NSW designed for implementation within a localised region. The nine key strategies for suicide prevention are evidence-based. LifeSpan is predicted to prevent 21% of suicide deaths and 30% of suicide attempts.[259]

LifeSpan is also a 'high fidelity research trial' – part of which incorporates investigating the aspects of the trial that work best. LifeSpan information acknowledges that although the nine key strategies are suitable for any group, the strategies need to be tailored to the needs of local communities and high risk populations.[260]

256. NSW Child Death Review Team 2019. Review of suicide clusters and evidence-based prevention strategies for school-aged children, prepared by the Australian Institute for Suicide Research and Prevention. NSW Ombudsman, Sydney.
257. NSW Education 2015. Responding to student suicide – support guidelines for schools. NSW Education, Sydney.
258. Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
259. Blackdog institute 2017, Integrated Suicide Prevention, accessed from https://blackdoginstitute.org.au/research/lifespan on 23 October 2018.
260. LifeSpan 2018. Frequently asked questions, accessed from https://lifespanmurrumbidgee.org.au/faqs/ on 11 April 2019.

The inquiry into prevention of youth suicide in NSW[261] has noted that the LifeSpan model has been supported by numerous stakeholders and presents an opportunity for NSW to monitor the trials and evaluate what works and what does not. The committee has also recommended that:

> *The NSW Government monitor and evaluate the progress of the LifeSpan trial sites in New South Wales and share outcomes with other governments in relation to the model's effectiveness and appropriateness for children and young people in regional, rural and remote areas and metropolitan areas.*[262]

We support this recommendation.

11.6.4. Agency review of involvement with and response to young people who die by suicide should inform better responses

Our reviews have consistently identified service gaps and missed opportunities resulting from poor coordination and information exchange between services or services and schools, and episodic support to young people with identified mental health problems and suicidal risk. These issues have also been consistently identified in RCAs by health services.[263]

Where agencies such as NSW Health and FACS reviewed their involvement with young people who died – nine and three deaths respectively in 2016 and 2017 – in most cases they identified missed opportunities or ways to do things better in the future.

NSW Health RCA findings and recommendations are directed to the specific Local Health District. The NSW Clinical Excellence Commission coordinates the RCA Review Committee, which reviews RCA findings and escalates issues of concern.[264] FACS reviews also make local recommendations, with provision for systems recommendations to be made to the FACS Serious Case Review Panel.[265]

For young people under 18 years of age, schools are a critical part of the service system for identifying and intervening early to prevent suicide. Schools have a key role in supporting students at risk, working with families to facilitate referrals to specialist mental health services, and supporting young people to manage risks in the school environment. The NSW Department of Education does not currently have a process to undertake a systems review of suicide deaths of students.

Learning from missed opportunities and using that understanding to frame future practices and policy is critical to inform work with vulnerable young people, and should be a key strategy in improving the capacity of agencies to develop effective prevention strategies.

We recommend that:

15. **The NSW Department of Education should establish a process of review after the suicide death of a child or young person in a public school. The process should involve considering, with the local school and district, the involvement of the school with the young person and their family – particularly in terms of identifying and responding to mental health or suicidal risk behaviours. Outcomes of the reviews should inform future practice and policy.**

261. Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
262. Recommendation 4 from Joint Committee on Children and Young People 2018, Prevention of youth suicide in New South Wales, NSW Parliament, Sydney.
263. NSW Child Death Review Team 2016. Child death review report 2015. NSW Ombudsman, Sydney.
264. NSW Clinical Excellence Commission. RCA review and analysis accessed from http://www.cec.health.nsw.gov.au/incident-management/root-cause-analysis on 11 April 2019.
265. Serious case review panel comprising of FACS Senior Executive meets quarterly to discuss complex reviews and to make recommendations. See Family and Community Services 2017. Child deaths 2016 annual report. FACS, Sydney.

11.6.5. Children and young people with a child protection history are at higher risk, and young people in care are particularly vulnerable

Our work, and the inquiry into prevention of youth suicide in NSW, have identified the over-representation of young people with a child protection history in suicide deaths.[266] In addition, based on the past 15 years, young people in care were 2.9 times more likely to die from suicide than those not in care.

Our 2017 Report of Reviewable Deaths in 2014 and 2015 included a focused review over the period 2004 and 2015 of the circumstances of a group of 15 young people (aged 13-17 years) who were in out-of-home care and died by suicide (9) or in a risk-taking context (6). Our review highlighted the critical importance of intensive case management, a consistently supportive and therapeutic care environment, and close monitoring and support of placements. We recommended that FACS should consider the issues raised and provide details of current or proposed strategies to address these issues. We said that:

FACS should have particular regard to:

- *Responses to risk of significant harm reports, particularly those that raise concerns about self-harm and risk-taking behaviours (including suicide attempts or threats of suicide, and substance abuse)*
- *Identification of, and response to, escalating self-harm/risk-taking behaviours, and*
- *Lack of placement stability and homelessness.*

We asked that FACS provide details of current or proposed strategies to address these issues.

Our reviews of deaths in 2016 and 2017 identified that for two young people who were living in care at the time they died, mental health issues were either not fully understood or addressed by either FACS caseworkers or the broader service system – or were not taken seriously.

In June 2017, FACS advised us that they accepted the recommendation. FACS provided information at that time, as well as in September 2018, about a range of strategies directly and indirectly addressing the recommendation. FACS noted, for example, the establishment of the Intensive Therapeutic Care (ITC) service system, and initiatives such as the LINKS Trauma Healing Services, a dedicated trauma treatment service to improve psychological wellbeing and long term outcomes for children and young people in care.

In regard to how the agency responds to risk of significant harm reports for children and young people in care, particularly those relating to self-harm and risk-taking behaviours, FACS told us in January 2019 that it uses an 'Alternate Assessment Tool' to assess ROSH reports in certain cases, including where a child or young person is in care. This tool is currently under review.[267]

In this context, **we recommend that:**

16. **FACS provide a copy of the finalised Alternate Assessment Tool, including advice as to how changes will assist FACS's staff to understand and respond to reports of risk of significant harm for children and young people in care, where those reports raise concerns about mental health, self-harm and/or suicidal behaviours.**

266. NSW Child Death Review Team 2014, Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.
267. FACS Secretary, correspondence to the Ombudsman on 21 January 2019.

Chapter 12. Abuse and neglect-related deaths in 2016 and 2017

In 2016 and 2017, 20 children died in circumstances of abuse or neglect or in suspicious circumstances.

Over the past 10 years, from 2008–17:

- Very young children were most vulnerable to fatal abuse and neglect, with children under five years accounting for more than half of all abuse and neglect-related deaths.
- Over half the families of children who died in circumstance of abuse or neglect had a child protection history.
- One in five of the children who died in circumstances of abuse or neglect were Indigenous.

All deaths of children under the age of 18 years that are the result of abuse or neglect or that occur in suspicious circumstances are reviewable by the NSW Ombudsman.[268]

In 2016 and 2017, 20 children aged 0-17 years died in NSW in circumstances of abuse or neglect or circumstances that were identified as suspicious – 10 children each year, which represents a rate of 0.58 per 100,000 children.[269]

Eleven of the children died in circumstances of abuse, two children died as a result of carer neglect, and seven children died in suspicious circumstances.

The term abuse refers to an act of violence by any person directly against a child or young person that causes injury or harm leading to death.[270]

The death of a child is considered to be due to neglect if a reasonable person would conclude that the actions or inactions of a carer exposed the child to a high risk of death or serious injury.[271] Examples of carer neglect in this context include deprivation of sufficient food or liquid to sustain life, abject failure to seek medical assistance or comply with medical advice, and exposing children to life threatening injury as a result of alcohol and/or drug intoxication.

A death is classified as suspicious where there is some evidence that the child's death may have been the result of abuse or neglect, but the evidence is insufficient for this to be reasonably determined.

This chapter refers to abuse, neglect and suspicious deaths together as 'abuse and neglect-related deaths'.

The 20 children who died in 2016 and 2017 belonged to 19 families. Two children died in a single incident. The children died from various causes – including blunt or sharp force injuries, poisoning, gunshot wounds, drowning and transport fatalities. In some cases, a final cause of death has not been determined or is currently unavailable. Most fatal incidents occurred at the child's home.

Seventeen of the 20 children died in the context of familial abuse or neglect. Three children, all teenagers, were killed by unrelated individuals.

268. As outlined in Part 6, *Community Services (Complaints, Reviews and Monitoring) Act 1993.*
269. During the two years a total of 981 children died in NSW from all causes.
270. Excluded from this definition are lawful acts which result in the death of a child, for example police discharge of a firearm to bring a dangerous individual under control.
271. As described in Chapter 1, the definitions of 'neglect' and 'suspicious' were amended in 2017. This chapter reflects the amended definitions.

12.1. Coronial and criminal status

Most of the abuse or neglect-related deaths that occurred in 2016 and 2017 are still open investigations or are subject to current criminal proceedings. We have therefore been careful not to provide information that may be identifying.

At the time of writing, investigations have identified 12 females and 9 males as responsible for, or suspected of being responsible for, the deaths of the 20 children. In three cases, more than one person is implicated in the death. A person of interest has not been identified in one case.[272]

Charges against four individuals have been finalised in the criminal court. Three offenders received custodial sentences after being convicted of the murder of an unrelated teenager, the manslaughter of a young child, and dangerous driving occasioning the death of a child. Another person charged with the murder of a young child was found not guilty by reason of mental illness, and was detained in a correctional facility for the purpose of receiving ongoing treatment.[273]

Criminal processes are still underway for nine persons of interest charged in relation to the deaths of six children. No charges are possible in relation to the deaths of five children because the people identified by police as responsible for the deaths of the children also died in the incidents.

The remaining cases are either open police investigations (4), have been closed without charge on the basis that the carer's actions did not reach the threshold of criminal negligence (1), or have been transferred to another state jurisdiction (1).

A coronial inquest is scheduled to be held, or is likely to be held, in relation to three cases where four children died in the context of murder-suicide.[274]

12.2. Preventing child abuse and neglect

Most government agencies – and many non-government agencies and services – have a role in responding to children who may be at risk of abuse or neglect. Child protection is considered to be 'everybody's business'.[275]

In the context of the very young age of most children who die in circumstances of abuse or neglect, key frontline government agencies are the Department of Family and Community Services (FACS) and NSW Health.

12.2.1. Family and Community Services

Their Futures Matter

Their Futures Matter, launched in late 2016, is the NSW Government's long-term strategy for improving outcomes for vulnerable children and families.

The *Their Futures Matter* strategy was informed by a review of the out-of-home care system – which found the current system was not addressing the complex needs of vulnerable children and families, improving outcomes, or having an impact on cycles of intergenerational abuse and neglect. The review found this was especially true for Aboriginal children and their families.

272. We have used the term 'person of interest' to refer to a person who has been convicted or charged in relation to the death of a child, or who is suspected of involvement in the death of a child.
273. An accused person found not guilty by reason of mental illness can be detained at a place and in a manner as determined by the Mental Health Review Tribunal, pursuant to s39(1) of the *Mental Health (Forensic Provisions) Act 1990*, until released by due process of law.
274. Murder-suicide refers to a circumstance where the person who killed the child subsequently died by suicide.
275. Department of Premier and Cabinet 2009, Keep them safe accessed from http://www.keepthemsafe.nsw.gov.au/__data/assets/pdf_file/0004/57145/Keep_Them_Safe.pdf on 11 April 2019.

An Implementation Board made up of senior executives from six NSW Government departments – Education, FACS, Health, Justice, Premier and Cabinet, and Treasury – has been established to oversee and drive reform progress, and lead cross-government collaboration. Immediate actions in place include family preservation and restoration programs, establishing a trauma treatment service for children in care, and other initiatives targeting earlier intervention and permanency.[276]

The NSW Practice Framework

In November 2017, FACS launched its refreshed NSW Practice Framework. This framework brings together practice approaches, reforms and priorities to guide FACS work across systems, policies and practice. FACS has advised it has begun a state-wide training initiative on the capabilities of the framework – for example, there are workshops on assessment and case planning. This complements a state-wide rollout to train all practice leaders in facilitating group supervision.[277] Group supervision is now mandated for all casework teams each week. A casework specialist or psychologist takes on the role of consultant in the group discussion.

In addition to the framework, FACS practice kits are now available for all practitioners on their internal casework practice site. The kits are aimed at building greater practice skills in working with families experiencing problems, such as alcohol and other drug misuse, and delving deeper into practice with families where particular concerns – such as mental illness – may be present. For example, FACS's Domestic and Family Violence Practice Kit contains information about how to ally with women and children and engage men who use violence, as well as advice about working with specific groups, safety assessments and planning, risk assessments, and case planning in a way that promotes reflection and provides quick access to research.

FACS has also implemented changes to its screening and response priority tool definitions which better capture domestic and family violence dynamics, lethality risks and the extent and severity of violence. It has also incorporated changes to language when describing domestic and family violence.[278]

12.2.2. NSW Health

The role of NSW Health in identifying and responding to children at risk extends from providing health services to children and early home visiting – to services for parents with mental illness or alcohol and other drug problems. NSW Health workers are also required to promote the health, safety, welfare and wellbeing of children and young people when providing health care to children and young people and to parents/carers or pregnant women. This includes identifying potential child protection and wellbeing concerns, working with families to help address concerns and, where necessary, working with FACS and/or other service providers to better support families experiencing vulnerabilities.

The revised NSW Health mandatory eLearning module 'Child Wellbeing and Child Protection', released on 12 March 2018, prompts Health workers to consider adult health issues that may affect parenting capacity. NSW Health staff are encouraged to:

- Ask adult patients if they have children in their care
- Remain alert to vulnerabilities that can increase the risk of child abuse and neglect
- Remain alert to possible indicators or child abuse or neglect.

Children of parents with mental illness

We have previously made recommendations to NSW Health focused on the review of the *Children of Parents with a Mental Illness (COPMI) Framework for Mental Health Services 2010-2015.* The COPMI Framework focuses on the needs of children whose parent or parents have a mental illness.

276. Additional information about Their Futures Matter can be accessed from https://www.theirfuturesmatter.nsw.gov.au/home.
277. Correspondence from FACS to NSW Ombudsman in October 2018.
278. Correspondence from FACS to NSW Ombudsman on 17 November 2017.

NSW Health have previously advised that review of the COPMI Framework would be informed by a literature review to identify the evidence base and current best practice approaches to identifying and supporting parents with a mental illness, their dependent children and families.[279]

In September 2018, NSW Health advised that work is well underway on completing the review,[280] but that:

> *During the life of the current COPMI Framework it was agreed across all stakeholders that the program needed to be expanded to incorporate the identification and direct engagement of adults in their parenting role, to acknowledge its significance and the impact the parenting role has on self-esteem and on the parental recovery journey. The expansion of the scope of the Framework will continue to recognise the potential impacts of parental mental illness on infant, child and family mental health, wellbeing, development and safety.*

NSW Health also advised that it has established an expert advisory group to oversee the development of the next framework document. A draft of the revised framework has been completed and distributed to stakeholders for feedback and endorsement of key strategic directions.

The *Family Focused Recovery Framework 2019-2023* is an operational extension to the current COPMI Framework, and it is planned to integrate the COPMI Framework review into the *Family Focused Recovery Framework* (FFRF) in order to incorporate considerations for both children and their parents. The resulting integrated framework will apply to both children and young people and to adult mental health services. NSW Health indicated that the framework will acknowledge the interrelationship of parents, dependent children and families living with mental illness, and contain updated data and research on identifying and working with parents with mental illness, their infants, dependent children and their families.

NSW Health anticipates the expanded FFRF will be finalised by March 2019, and will be accompanied by an implementation monitoring plan.

Injury presentations

In our Report of Reviewable Deaths in 2014 and 2015, we recommended that NSW Health, together with the Clinical Excellence Commission, should establish a process for comprehensively reviewing suspicious child deaths if the child had previously presented to a NSW public health facility with a physical injury.[281]

In April 2018, NSW Health advised that the Ministry of Health and the Clinical Excellence Commission have agreed to a methodology and process for implementing these internal reviews.[282]

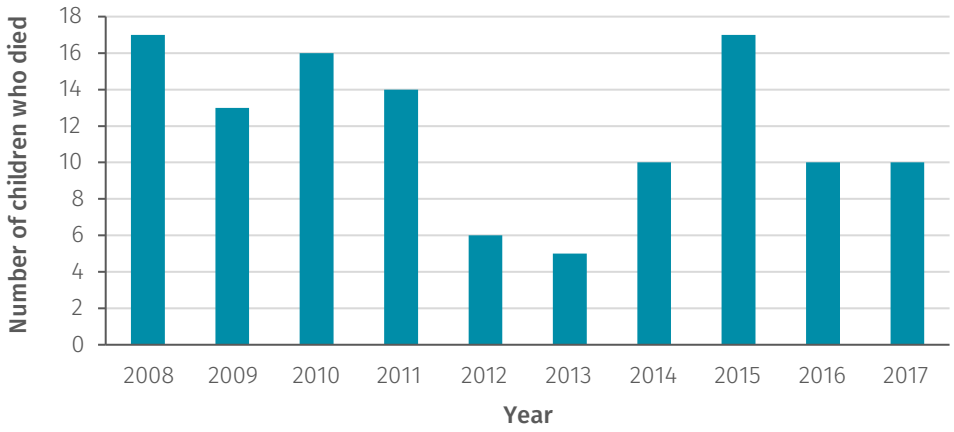
12.3. Trends in abuse and neglect-related deaths in NSW, 2008-17

Over the 10-year period 2008-17, 118 children died in circumstances of abuse or neglect in NSW – a rate of 0.71 per 100,000 children.

These 118 deaths represent 2% of all child deaths during the 10-year period.[283] Because of the relatively small number of abuse and neglect-related deaths, there are considerable fluctuations from year to year (Figure 90). Two thirds (80) of the 118 deaths were homicides. The remaining deaths occurred in neglect-related (20) or suspicious (18) circumstances.[284]

279. The review was undertaken by the Sax Institute, and was completed in August 2015.
280. NSW Health 2010. Children of parents with a mental illness (COPMI) framework for mental health services, policy directive (PD2010_037) accessed from https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2010_037.pdf on 23 August 2019.
281. NSW Ombudsman 2017. Report of reviewable deaths in 2014 and 2015. NSW Ombudsman, Sydney.
282. Correspondence from NSW Health to the NSW Ombudsman on 12 April 2018.
283. The deaths of 5412 children are registered during the 10-year period 2008-2017.
284. Using the revised definition of neglect.

Figure 90. Deaths due to abuse and neglect of children aged 0-17 years, 2008-17



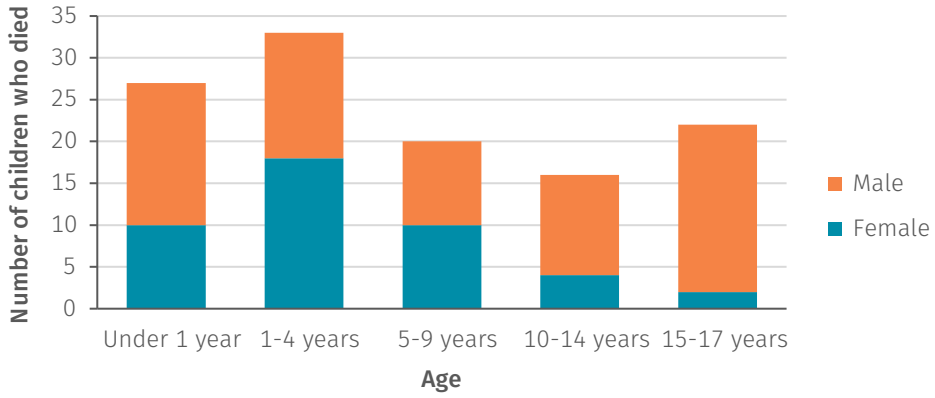
12.3.1. Age and gender

Over the 10 years to 2017, children under five years of age have accounted for half of all deaths due to abuse and neglect (60 of 118). In each of these cases, the persons of interest were parents or carers.

In 2016 and 2017 – consistent with previous years – around half of the children (11) who died were less than five years old, including six infants under one. Two children were aged five to nine years, four children were 10-14 years old, and three were aged between 15 and 17 years.

Figure 91 shows that, over time, male children are over-represented in abuse and neglect-related deaths (74 of 118). Deaths of older children and adolescents (10-17 years) primarily involve male victims (84%), whereas deaths involving younger children (under 10 years) are more evenly divided – males account for 53% and females for 47%.

Figure 91. Deaths due to abuse and neglect of children by age and gender, 2008-17

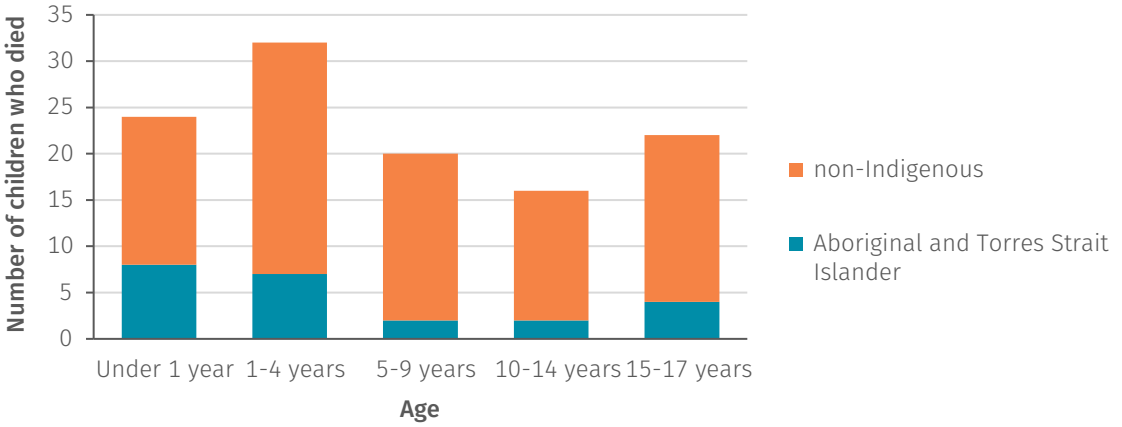


12.3.2. Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander children are over-represented in deaths that occur in circumstances of abuse or neglect. Over the 10-year period 2008-17, one in five (20%) of the children who died were Indigenous (Figure 92).[285] By comparison, ABS data indicates 5% of all children in NSW were Aboriginal or Torres Strait Islander.[286] In 2016 and 2017, two of the 20 children who died were identified as Aboriginal.

285. Aboriginal and Torres Strait Islander children were identified from the Registry of Births, Deaths and Marriages.
286. Australian Bureau of Statistics 2014. Estimates and projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026, Cat. no. 3238.0, ABS, Canberra.
Australian Bureau of Statistics 2018, Estimated resident population by single year of age, New South Wales, Cat no. 3101.0, ABS, Canberra.

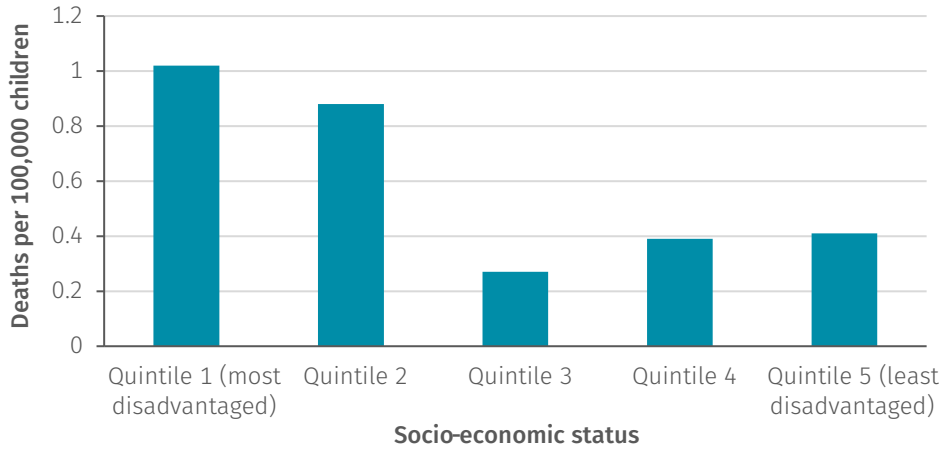
Figure 92. Deaths due to abuse and neglect of children by age and Aboriginal and Torres Strait Islander status, 2008-17



12.3.3. Remoteness and socio-economic status

All the children who died in circumstances of abuse or neglect over the past five years (2013-17) lived in major cities (33) or regional areas (18). No children were living in remote areas of NSW.[287]

Figure 93. Deaths due to abuse and neglect of children aged 0-17 years by socio-economic status, 2013-17



The children who died in abuse or neglect-related circumstances were from families living in all socio-economic areas of NSW. However, as shown in Figure 93, in the five years to 2017 more children lived in areas of greater disadvantage (64% in Quintile 1 and 2) compared to areas of highest socio-economic advantage (27% Quintile 4 and 5).[288]

When we further examined socio-economic status for the level of education and occupational-related skills in an area, we found one quarter of children (23%) were living in the most disadvantaged areas.[289]

12.3.4. Child protection history

Over half (54%) of the families of children who died from abuse and neglect during the 10-year period 2008-17 had a child protection history. This proportion is much higher than the proportion of children with a child protection history for deaths from all causes (21%), and indicates a strong association between fatal abuse and neglect, and previous maltreatment.

287. As per the ABS accessibility and remoteness index of Australia (ARIA+).
288. As per the ABS index of socio-economic disadvantage.
289. Children were in Quintile 1 for both the ABS index of socio-economic disadvantage, as well as the ABS index for education and occupation.

Research has consistently shown that mortality rates are higher for children from families with a child protection history, and that these children have much higher mortality rates for particular injury-related causes of death including assault.[290]

12.3.5. People causing harm

Our work over the past decade in relation to abuse and neglect-related deaths has shown that almost all the persons of interest were people with whom the child had a family relationship and, in most cases, the person was a parent.[291]

The deaths of all children less than five years of age involved a family member as the person causing harm, whereas the majority of deaths involving older adolescents (15-17 years) involved a peer or other unrelated individual.

Across the 10-year period, two thirds (68%) of the family members who were persons of interest or responsible for the child's death were birth parents – 48 mothers and 32 fathers. Other familial roles include the male intimate partner of a biological mother (23), extended family member (12), and others acting as carers (3). This observation is consistent with research, which shows the three most common perpetrators of filicide are mothers, fathers and step-fathers.[292]

Overwhelmingly, females identified as causing harm were the biological mothers of the children who died, whereas male persons of interest had a range of relationships with the children – they were biological fathers, male partners or step-fathers, peers, or other unrelated individuals.

12.4. Risk factors associated with abuse and neglect-related deaths

Understanding risk and protective factors is important when considering effective prevention and early intervention strategies, and identifying families who are most likely to benefit from additional support.[293]

The context and circumstances of child homicide varies depending on a range of factors – including motives of offenders, precipitating events, and the personal characteristics of both victims and perpetrators.[294] Neglect-related deaths may involve inaction on the part of a carer (failure to provide) or commission of an act (exposing a child to foreseeable harm).

Our reviews have identified factors in many of the families in which children died as a result of abuse or neglect or in suspicious circumstances that are well-recognised child protection issues – particularly an offender history of domestic or other violence, alcohol and other drug abuse, and mental illness.[295]

Although these factors can place children at risk, they are not clear predictors of fatal abuse or serious injury and they can also be present in families not characterised by child homicide.[296] However:

> *They are (especially in combination) risk factors for child maltreatment and emotional harm, where child death or serious injury is always a possibility. Recognising these risk factors is an important step in helping and protecting children at all levels of intervention.*[297]

290. NSW Child Death Review Team 2018, spatial analysis of child deaths in New South Wales, prepared by the Australian Institute of Health and Welfare. NSW Ombudsman, Sydney.
NSW Child Death Review Team 2014. Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.
291. NSW Ombudsman 2017. Report of reviewable deaths in 2014 and 2015. NSW Ombudsman, Sydney.
292. Brown T, Tyson D, & Fernandez Arias P 2018. Filicide in Australia, in When Parents Kill Children. Current issues in criminal justice, 30.
293. Australian Institute of Family Studies 2017. Risk and protective factors for child abuse and neglect, accessed from https://aifs.gov.au/cfca/publications/risk-and-protective-factors-child-abuse-and-neglect on 12 November 2018.
294. Cussen T and Bryant W 2015. Domestic/family homicide in Australia. Australian Institute of Criminology, Canberra.
Sidebotham 2013. Rethinking filicide. Child abuse review, 22, pp.305-310.
295. Family and Community Services. Annual report 2012-13. FACS, Sydney.
296. Mayers, J et al. (2010). Risk factors for intra-familial unlawful and suspicious child deaths: a retrospective study of cases in London. The Journal of Homicide and Serious Incident Investigation, vol. 6, no. 1, pp 77-96.
297. Brandon M et al 2009. Understanding serious case reviews and their impact: a biennial analysis of serious case review 2005-2007. University of East Anglia, Norwich.

The CDRT has previously identified that children with a child protection history are 6.3 times more likely to die from fatal abuse than children without a child protection history.[298]

Fatal abuse and neglect can also occur in families where there is no known history of risk or previous evidence of abuse. In six of the 16 families where a child died in 2016 and 2017 and the person of interest was a family member, there was little or no child protection history – and no known or minimal indication that the offender posed any risk to the child before their death. However, in some of these families, post death investigations identified that risks were present at the time. This included evidence of carer substance abuse, unwanted pregnancy, and a lack of preparation for parenting that had not come to the attention of any external agency.

There are also specific risk factors associated with the gender and role of the person causing harm – for example, a biological mother may present with a different risk profile to a male defacto partner.[299]

A review of national data on child deaths from abuse and neglect also highlights the co-occurrence (with family/parental factors) of multiple social and environmental factors in child death incidents – particularly financial disadvantage, often associated with family homelessness and poverty.[300]

These observations highlight the complexity of fatal abuse and neglect – and the need to understand the interaction of risk factors, in combination with protective factors, to help develop approaches to preventing such deaths.

12.5. Risks identified for children who died in 2016 and 2017

The following discussion focuses on key risks identified for the 20 children who died in circumstances of abuse or neglect in 2016-17.

Of the 11 children who died in abuse-related circumstances, the person of interest in eight cases was a parent or a person acting in a parental role. Four of the children died in murder-suicide incidents. Three teenagers were also killed by unrelated individuals, including one death in the context of peer affray.

The two neglect-related deaths involved children who died in separate transport crashes while in the care of drivers who were affected by methyl amphetamine. One driver was also found to have consumed both illicit drugs and multiple prescription benzodiazepines. Other factors identified in the crashes included speed, driver fatigue, incorrect use of child restraints, and texting while driving.

Of the seven children who died in suspicious circumstances, four infants (including two newborns) died in circumstances where there was evidence that the actions of the carer were likely contributory. In two of these cases, the carers were significantly impaired by alcohol. In each case the carer's behaviour exposed the infants to a foreseeable high risk of serious injury or death. For example, a very young infant whose carer was affected by drugs and alcohol was left unchecked and unfed in an extremely hot environment without fluids for an extended period of time. Evidence indicates that another child, also an infant, died from injuries sustained during an incident of fatal abuse by a carer. Two children died after being exposed to extreme hazards – including one child who died from methadone toxicity and one child who was shot with an unsecured firearm.

As the majority of deaths involve familial abuse or neglect, the following discussion focuses on risks within the child's family and posed by the parents or carers responsible for causing harm.

298. NSW Child Death Review Team 2014. Causes of death of children with a child protection history 2002-2011. NSW Ombudsman, Sydney.
299. Brown T, Tyson D, & Fernandez Arias P 2018. Filicide in Australia, in When Parents Kill Children. Current issues in criminal justice, 30.
300. Australian Institute of Family Studies 2017. Risk and protective factors for child abuse and neglect, accessed from https://aifs.gov.au/cfca/publications/risk-and-protective-factors-child-abuse-and-neglect on 12 November 2018.

12.5.1. Carer mental illness

A history of mental illness has been identified as a risk factor among filicide perpetrators, particularly mothers.[301]

In Australia, approximately one in five children live in families in which a parent has a mental illness.[302] A parental diagnosis does not necessarily confer risk – many parents who experience mental illness are able to care well for their children.[303] In some cases, however, a parent's mental health condition can have an impact on their parenting behaviour and capacity, particularly if their illness is not well managed or there are other concurrent risk issues (such as substance abuse) present.

NSW Health has acknowledged an important association exists between parental mental illness and child fatalities.[304] Although small in number, these deaths highlight the importance of knowing which individuals are parents, and considering the parenting responsibilities of adults and the needs of their children.

Of the 19 familial persons of interest in the abuse and neglect related deaths of children in 2016 and 2017, just over one third (7) were identified as having a previously diagnosed mental health condition.[305] These conditions included psychotic illness, mood disorders such as depression, and other disorders.

Our reviews found parent or carer mental illness was a significant factor in the abuse-related deaths of four children, and a likely contributing factor in the death of another child. In each case, the families were currently – or had recently been – involved with NSW Health mental health services. In two of the families, carers were experiencing significant alcohol and other drug problems as well as mental illness.

12.5.2. Domestic and other violence

A background of domestic and family violence is frequently a feature of families where a child has died in circumstances of fatal abuse involving a family member.[306]

Nearly one third (6) of the 19 familial persons of interest in the abuse or neglect-related deaths of children in 2016 and 2017 were known to police as perpetrators of violence before the child's death. In each case, the parents or carers were also known to police for other offences such as drug use and/or supply, robbery and theft, fraud and anti-social behaviour. The extent of their past violence, the level of risk identified, and the relevance of this history to the child's death varied.

The six persons of interest were responsible for the deaths of five children. Three of the children died as a result of an inflicted injury. In one of these cases, the person had a history of violence against other children and had been reported to FACS as a person causing physical harm to children. The other three persons of interest had recorded incidents of intimate partner and/or family violence or assault outside the home. For one, a report had been made to FACS about verbal abuse of children.

Two of the children died in suspicious circumstances that did not involve intentional inflicted injury by the person of interest. In these cases, the parent or carer's history of violence did not result in the deaths of the children – in both cases, the children died as a result of unintentional injury in circumstances of neglect.

301. Ericksson L et al 2016. Maternal and paternal filicide: case studies from the Australian Homicide Project. Child Abuse Review, 25, pp 17-30.
302. Reupert A, Maybery D, Kowalenko N 2012. Children whose parents have a mental illness: prevalence, need and treatment. Medical Journal of Australia Open, 1 suppl 1, pp.7-9
303. Kowalenko N, Mares S, Newman L, Williams A, Powrie R, van Doesum K 2012. Family matters: infants, toddlers and pre-schoolers of parents affected by mental illness. Medical Journal of Australia Open, 1 Suppl 1, pp.14-17.
304. NSW Health 2010. NSW Children of Parents with a Mental Illness (COPMI): Framework for Mental Health Services 2010-2015. NSW Health, Sydney.
305. One additional person of interest may also have had a mental health condition, based on information held in police records, however at the time of writing this has not been confirmed.
306. NSW Ombudsman 2017. Report of Reviewable Deaths 2014 and 2015. NSW Ombudsman, Sydney.

Previous and unreported physical abuse of children

Post-death investigations found evidence that three children who died in circumstances of abuse had sustained previous physical injuries that were not known, and were not reported to, child protection authorities until after the child's death. These injuries were identified at the time of the child's presentation to hospital after the fatal incident, through post mortem examinations and police interviews. Injuries included rib fractures, burns, human bite marks, bruising and internal injuries.

None of the children – two infants and a young child – were presented for medical treatment or assessment of physical harm in relation to the injuries sustained.

In one case, there is no evidence that any agency was aware of the child's circumstances or that the child was being subjected to ongoing abuse before the fatal incident. While post death investigation found some evidence that extended family members may have held concerns about injuries, such as bite marks and bruising, this information was not reported. This family was known to child protection authorities, but the reports were not recent and no reports were made during the year before the child's death.

Neither of the other two families were known to NSW child protection services. In one case, due to the child's very young age and the absence of visible injuries, the services that did have contact with the child were not aware of any risks to the infant.

12.5.3. Alcohol and other drug use

The risks to children associated with carer substance abuse are well known, and where parenting capacity is affected the impact on children can be significant.

Similar to family violence, a background of carer drug and alcohol abuse is frequently a characteristic of families where a child has died in circumstances of abuse or neglect.[307] Our review of the deaths of 124 children in neglect-related circumstances over the 10-year period 2006-15 identified that alcohol and/or other drug abuse was the most significant single risk factor contributing to the neglect-related deaths of children, and the predominant risk in the background of the children who died.[308]

More than one third (6) of the families in which children died in circumstances of familial abuse or neglect in 2016 and 2017 were known to child protection, health services, police or corrective services for current and/or previous drug or alcohol abuse. In some cases, this background of substance misuse was extensive.

Our reviews identified parent or carer drug and/or alcohol use was a significant factor in the deaths of four children. In all of these cases, post death investigations identified the persons of interest were affected by substances at the time of the fatal incident and that this was a contributory factor in the child's death:

- Two children died in motor vehicle crashes while in the care of drug-affected adults. Police investigations into the deaths found both drivers were regular users of illicit drugs, including methyl amphetamine ('ice') and cannabis, and that one of the drivers had also consumed prescription drugs with a sedative effect before the crash.
- Two children, both infants, died suddenly and unexpectedly in unclear circumstances while in the care of parents who were significantly intoxicated with alcohol, or a combination of alcohol and other drugs. In both cases, there had been previous – but not recent – contact with health and/or child protection in relation to alcohol or other drug use. Post death investigations revealed family and friends of both parents held current concerns about the carers' drug and/or alcohol use but had not raised these concerns with services.

One child died after exposure to drugs kept in the home environment.

307. NSW Ombudsman 2017. Report of Reviewable Deaths 2014 and 2015. NSW Ombudsman, Sydney.
308. As above.

12.5.4. Other familial risk factors

Family breakdown

Family breakdown – including parental separation or significant marital difficulties – has often been identified as a factor associated with the death of children in circumstances of abuse or neglect.[309] In our 10-year review of 83 familial abuse-related deaths in NSW,[310] we found two thirds of the families had experienced separation or family breakdown before the child's death. In 2016 and 2017, we identified three of the families were experiencing family breakdown – and in one case of murder-suicide this appears to have been a primary contributing factor.

Risk presented by new partners

Our previous reviews of deaths that occurred in circumstances of abuse have found that many children were living in households with adults who were unrelated to them – primarily adult males. The majority of male intimate partners were new to the family, and had formed a relationship with the birth parent less than a year before the child's death. Research indicates that such children have a higher risk of dying from maltreatment than children in households with two biological parents.

In 2016 and 2017, a person of interest in one of the 11 abuse-related deaths was a new partner to the child's biological parent.[311]

The identification and assessment of risk presented by new partners is recognised as an issue by FACS, as reflected in its 'New Partners and New Household Members' practice tool.[312]

12.6. Responses to identified risk in 2016 and 2017

12.6.1. Family and Community Services (FACS)

Of the 17 children who died in the context of familial abuse or neglect, almost two thirds (11) had a child protection history.[313] The 11 children were from 10 families, with most (7) of the families subject to a report assessed by FACS to indicate risk of significant harm (ROSH) relating to the child who died or their sibling within the three years before the death. The remaining three families had been the subject of a report about the child and/or sibling that was screened by FACS as non-ROSH, or a report made to a Child Wellbeing Unit. For just over half (6) the 10 families, reports were made in the 12 months before the child's death. The families of two children who died were open child protection matters with an allocated FACS caseworker at the time the child died.

Reported issues most often related to concerns about the behaviour of parents – domestic and family violence, drug and/or alcohol abuse, neglect, and psychological harm or risk of harm – as well as parental mental health and the impact of a parent's mental state on a child's safety and wellbeing. In some of these cases, the family's child protection history highlighted the presence of chronic problems likely to pose ongoing risk to children. For six of the 10 families, the parents' own history of childhood trauma suggested a pattern of intergenerational abuse and neglect.

Of the 10 families, the number of reports received over the three years ranged from one (2 families) to 11 (one family) – with half the families subject to between five and seven reports. For most (7) of the families, at least one report was screened as ROSH.[314]

309. Chapter 5 from NSW Ombudsman 2015. Report of Reviewable Deaths 2012 and 2013. NSW Ombudsman, Sydney.
310. As above.
311. Harbert A, Tucker-Tatlow J, & Hughes K 2010. Review of the literature: child maltreatment fatalities – risk factors and lessons learned. South Area Consortium of Human Services, USA.
312. Family & Community Services 2012, Practice Tool - New Partners and New Household Members. FACS, Sydney.
313. Refer to Appendix 3 Definitions.
314. There were a total of 22 reports screened as ROSH for the seven families.

Face-to-face response to child protection concerns

Half of the 10 families received a face-to-face response from FACS at some time in the three years before the child's death – three of these families were seen in the 12 months before.

Two cases were allocated to a caseworker at the time of the child's death:

- In one case, FACS became involved with the family several months before the child's death in response to concerns about the parent's deteriorating mental health, non-compliance with medication, and alcohol misuse. A week before the child's death, caseworkers working with the family assessed the child was at very high risk of harm because the parent had not demonstrated ongoing engagement or willingness to change. Evidence of escalating risk – including increased alcohol use, non-adherence with mental health treatment, and statements about feeling stressed and overwhelmed – indicated the need for a revised approach to ensure the child's safety. Our review found FACS's response was incident-based, was not informed by a reassessment of the child's safety in response to signs of escalating risks, lacked urgency, and did not take account of the very young child's cumulative experiences of the parent's alcohol misuse, mental health problems or violent behaviours.
- In the other case, FACS had been involved with the family due to ongoing concerns about significant domestic violence. This violence led to the temporary removal of the children from the care of their parents, followed by restoration with a Children's Court supervision order in place. During the six weeks before the child's death, there was little evidence of active casework despite the supervision order. Reports made about the family in the preceding months show FACS was aware the mother was withdrawing from services, was refusing to speak with the police domestic violence liaison officer, and had retracted previous statements made about the family violence. Post-death investigations indicate an AVO was not effective in preventing the father from attending the home, and that the mother was no longer willing to seek assistance from services. Changing circumstances warranted a reassessment of intervention with the family.

FACS's own internal review of one of these cases found caseworkers overestimated the parent's ability to care for a child while managing their own mental health and other life stressors, and that at a time of crisis – when the child needed to be at the centre of any casework response – the child appeared to have been lost in the escalating situation. Their review found that a more intensive casework response was needed in light of the changing circumstances, and that intervention needed to be focused on increasing the parent's access to quality mental health services and involving the child's other parent to improve safety for the child. The review also noted that stronger communication with the FACS Clinical Issues Unit, the private health provider and community mental health services could have challenged the caseworkers' beliefs about the interplay and impact of the parent's mental health and problematic alcohol use on the child, and may have led to a more targeted and well-coordinated intervention and treatment plan.

Whether or not cases resulted in a face-to-face response, our reviews of deaths in 2016 and 2017 identified a number of issues that have been consistently raised in our work in past years.

Premature case closure

In some cases, child protection services appeared to have closed cases prematurely and without sufficient evidence of meaningful change or safety.

For example, in one case a child was killed in the context of the parent's unmanaged mental illness. The parent had a longstanding history of diagnosed mental illness, and caseworkers had previously worked closely with the family and other services involved to ensure the child's safety. The case was closed at a time when the parent was reportedly receiving regular support from mental health services and no acute risks were evident. Our review identified that – although the risk to the child at the time of closure was not immediate – given the parent's ongoing mental health needs it was crucial that services were in place to monitor the parent's mental state and the child's safety. In this case, FACS did not confer with services to confirm the parent's mental health status and understand the level of support being provided to the family on an ongoing basis before closing the case. FACS's own internal review of the case also identified the closure of the case was 'premature, inappropriate and highly risky'.

Competing priorities

The families of nine children had been the subject of multiple ROSH reports. In a number of cases, reports screened as ROSH were unable to be responded to and were closed due to 'competing priorities' at the local Community Services Centre (CSC).

For example, in one case FACS received five separate ROSH reports which raised concerns about the behaviour of a parent – who themselves had been in out-of-home care as a child and who was responsible for the care of an 18-month old child. The reports raised concerns about parental substance abuse, domestic violence, physical and supervisory neglect, psychological harm/risk of harm, and transience. Together, the reports suggested a pattern of poor parenting and behaviour that placed the child at high risk of harm. All five reports were closed due to competing priorities. The child's sibling died in suspicious circumstances, while the parent was significantly intoxicated and unable to meet the child's needs.

Screening of reports

Incorrect screening or handling of reports at the Helpline sometimes affected the adequacy of FACS's response to, and understanding of, the extent of risk present in a family. In some cases, reports screened as non-ROSH should have been assessed as ROSH based on the seriousness of the reported risks. In other matters, contact reports did not include key information that should have been recorded.

For example, in one case our review identified that reported information had been summarised to the extent that important contextual details were lost, and crucial information about roles and relationships the reporter/s had with the family were not passed on to the CSC. In another case, our review identified that the Helpline's incorrect screening of a report as non-ROSH may have had an impact on whether the case was prioritised for a face-to-face response. In both cases, FACS internal reviews also identified screening of reports at the Helpline as an issue. In one matter, this prompted FACS to conduct an expanded review of the Helpline's use of their screening and response priority tool – which includes a review of information gathering and documentation processes.

We have previously reported the need for FACS to ensure their child protection staff conduct comprehensive and timely safety and risk assessments that lead to action that is commensurate with the level of risk – as well as the need for caseworkers to regularly assess progress in a case, and to monitor the effectiveness of intervention and the potential need for alternative courses of action.[315]

At the time of writing, FACS had completed a review of their involvement with seven of the 10 families with a child protection history who died in circumstances of abuse or neglect.[316] These reviews consider how FACS systems at a local and organisational level had an impact on practice with the families of children who died. The review process seeks to examine learning opportunities for practitioners who work with families by identifying areas for practice improvement as well as promoting good practice. In some cases, FACS's review is referred to a Serious Case Review Panel,[317] which meets quarterly to discuss complex reviews and make recommendations arising from those reviews.

Children with no child protection history

Just over one third (6) of the 17 children who died in circumstances of familial abuse or neglect did not have a child protection history in the three years before their death.

Four of these children were infants aged less than one year, including two newborn children.

Our reviews considered whether these families should have been known to child protection services, but were not – and whether any other agencies involved with the families had knowledge of circumstances indicating the children were, or may have been, at risk.

315. NSW Ombudsman 2017. Report of Reviewable Deaths 2014 and 2015. NSW Ombudsman, Sydney.
NSW Ombudsman 2015. Report of Reviewable Deaths 2012 and 2013. NSW Ombudsman, Sydney.
316. FACS' Serious Case Review unit (SCR) reviews FACS involvement with the families of children who have died where the child (and/or their siblings) were reported to be at risk of significant harm within three years prior to their death. The unit also completes a review where a child was in care when they died.
317. The Serious Case Review Panel (SCRP) is made up of the Senior Executive from across FACS, and is overseen and monitored by the FACS Executive Board.

In one case, post death investigations showed the child (an infant) was likely to have experienced previous physical abuse – evidenced by the discovery of earlier rib fractures. However, there is no information to indicate this was known or that any services held concerns about the family or their care of the infant before the fatal incident.

In the other cases, there was no documented information to indicate the children were at risk of significant harm.

12.6.2. Health services

NSW Health had significant involvement with many of the 17 families where children died in the context of familial abuse or neglect. In a number of cases, this contact included the involvement of specialist mental health and/or drug and alcohol services.

Our reviews have consistently identified the need for mental health services to understand and support the needs of parents with mental illness, and ensure that treatment and intervention is provided within the context of their parenting and family responsibilities.

In relation to child deaths in 2016 and 2017, child protection responsibilities were not fully recognised, and at times the mental health needs of carers were not met. Some of these issues have also been reflected in RCA reviews. Some common issues identified in these cases include:

- A lack of recognition of risk – including staff not completing a mandatory reporter guide when risk to a child warranted this.
- No or limited information documented about the child, the parent's role in caring for their child and possible stressors, and parent-child interactions.
- Failure by health staff to assess child protection risks to the child during the parent's inpatient admissions or engagement with an acute care team.
- Inadequate information exchange and/or follow up and corroboration of information, resulting in an uninformed assessment of the mental health of a parent.

We have previously reported the need for NSW Health to develop strategies to promote appropriate clinical practice and competency in relation to recognising and responding to any potential risk to children of parents with mental illness.[318]

In addition to ensuring that due regard is given to children of mental health patients, an effective response to carers is critical. For two persons of interest in 2016 and 2017, RCAs found that a comprehensive mental health assessment was not completed by the treating service. This contributed to a poor understanding of the person's mental illness, and a missed opportunity to identify and respond to the emergence of early warning signs of their deteriorating mental health.

CASE STUDY

A child died in circumstances of abuse by a parent who was subsequently found not guilty of murder due to mental illness in the Supreme Court. For over a year before the child's death, the parent was a client of a Community Mental Health Team. The parent missed a number of appointments and therefore had minimal face-to-face consultation with the service. The parent was last seen in-person by the service approximately nine months before the child's death, at which time a possible relapse of symptoms was identified.

A NSW Health RCA review was completed and found that – during the contacts that did occur – there was either no or limited information documented about the child, the parent's role in caring for their child and possible stressors, and parent-child interactions.

318. NSW Ombudsman 2017. Report of Reviewable Deaths 2014 and 2015. NSW Ombudsman, Sydney.
NSW Ombudsman 2015. Report of Reviewable Deaths 2012 and 2013. NSW Ombudsman, Sydney.

The RCA found there was a lack of comprehensive mental health assessment and engagement with the parent, which led to a poor understanding of their mental illness and a failure to respond to the emergence of early warning signs of their mental health deterioration. Assessment and interventions that did occur were often brief, superficial and done by telephone, and there was inadequate contact with those who might have been able to help such as the parent's GP. The RCA found staff did not comply with their child protection responsibilities because they did not consider the safety and wellbeing of the child throughout the intervention, did not use the mandatory reporter guide, and did not seek advice from an experienced child protection unit (such as the Child Wellbeing Unit or local Child Wellbeing Coordinator). The RCA also found staff did not comply with a number of other policies and guidelines, such as the missed appointments guideline.[319]

12.6.3. Other service providers

A range of other agencies or organisations had contact with some of the families with a child protection history. In most cases, our reviews did not identify practice issues that warranted further action. In one case, however, we identified concerns about a private medical practitioner – this case remains open at the time of writing.

In another case, Corrective Services NSW completed an internal critical incident review after the death of a child. The review considered issues such as release planning and case management, particularly the impact of backdated court sentences and the management of offenders released on court based parole. The review identified systemic issues and made a number of recommendations for systems improvements. However, there was no evidence that the measures identified would have changed the outcome in this case.

12.7. Observations and recommendations

Frontline services have a key role in identifying and responding to child protection issues in vulnerable families, and it is imperative that practitioners have the skills and necessary focus to recognise and understand risk and seek sufficient information to make informed assessments.

For deaths in 2016 and 2017, we observed risk was not consistently recognised or responded to by the child protection system.

Mental health services need to ensure that the treatment and support of parents with mental illness is provided within the context of the adult's parenting and family responsibilities.

For deaths in 2016 and 2017, we observed the principles of COPMI were not consistently applied.

Our reviews of abuse and neglect-related deaths in 2016 and 2017 continue to highlight practice and systems issues within agencies that need to be addressed to better protect children and support vulnerable families.

The following discussion focuses on some of the key issues identified through our reviews.

319. NSW Health guideline reference MH_SWSLHD_GL2015_022.

12.7.1. Risk was not consistently recognised or responded to by the child protection system

Seven children who died in circumstances of familial abuse or neglect in 2016 and 2017 (or their siblings) had been reported to FACS as being at ROSH in the three years before their death. A number of these reports received no response from FACS due to competing priorities.

FACS has undertaken significant reforms to its systems and practices to improve how they work with children and families.[320] However, they continue to face critical capacity issues in relation to the low face-to-face response rates for ROSH reports.[321] In 2016-17, FACS data indicates a face-to-face assessment was achieved for one third (32.3%) of children who were subject to a ROSH report.[322]

In 2018, the NSW Coroner's Court published findings from an inquest into the deaths of two vulnerable children.[323] The inquest considered FACS's triage and case closure policies in detail. The Coroner accepted evidence presented by FACS that 'a seismic shift' in the organisation had already occurred over the last few years relating to better training, increased caseworker numbers, better data collection, improved CSC performance and the Their Futures Matter reform. However, the Coroner described the inability of FACS to respond to ROSH reports as 'an ongoing crisis'.

The Ombudsman has also identified the lack of capacity to respond to children identified as being at ROSH as a critical issue requiring increased capacity across the system – not only within FACS, but also in partner agencies.[324] Our reports of reviewable child deaths have consistently outlined cases in which risk to children was not recognised, assessed holistically, or prioritised for intervention.[325]

The NSW Ombudsman / FACS Integrated Governance Framework – which monitors FACS's progress in addressing both individual and systemic issues – includes a key systemic reform area of improving capacity to meet ROSH demand. Key achievements noted by FACS against this reform area include:

- Expanding the 'Seeing More Children' project which supports managers to implement a range of strategies to improve CSC operational efficiency.
- Brighter Futures lead agencies working with families and children at ROSH.
- Implementing the ChildStory system so caseworkers can spend more time working with families and less time in the office.
- Establishing a mobile child protection unit in Western Sydney.
- Improving strategies to recruit and retain caseworkers resulting in decreased caseworker vacancy rates.[326]

12.7.2. The principles of COPMI were not consistently applied

In 2016 and 2017, parent or carer mental illness was a significant factor in the abuse-related deaths of four children. Our reviews have again highlighted the importance of ensuring comprehensive and appropriate clinical practice and competency in relation to recognising and responding to any potential risk to children of parents with mental illness.

320. NSW Government 2017. Child deaths 2016 annual report: learning to improve services. Family and Community Services, Sydney.
321. NSW Ombudsman 2018. Joint Ombudsman and FACS report card https://www.ombo.nsw.gov.au/__data/assets/pdf_file/0003/57522/Joint-Ombudsman-and-FACS-Report-Card_July-2018.pdf
322. Department of Family and Community Services 2018, Dashboard 3: ROSH reports, accessed from https://www.facs.nsw.gov.au/resources/statistics/statistical-report/children-young-people/dashboard on 27 August 2018; FACS report by financial year from 30 June 2011 to 30 June 2016.
323. NSW Coroner's Court 2018, accessed from http://www.coroners.justice.nsw.gov.au/Documents/UPDATED%20BLGNDCG%20Findings%20with%20further%20NPO%20(final)%20(REDACTED).pdf on 12 November 2018.
324. NSW Ombudsman 2016 submission to the General Purpose Standing Committee Inquiry into child protection services in NSW. https://www.parliament.nsw.gov.au/lcdocs/submissions/55906/0074%20NSW%20Ombudsman.pdf
325. NSW Ombudsman 2017. Report of reviewable deaths in 2014 and 2015, NSW Ombudsman, Sydney.
326. NSW Ombudsman 2018 Joint Ombudsman and FACS 'Report Card', https://www.ombo.nsw.gov.au/news-and-publications/news/joint-ombudsman-and-facs-report-card.

Common issues identified in these cases include:

- A lack of visibility of the child in mental health assessments – our reviews identified the safety and wellbeing of children was not always considered, or the risks to dependent children understood, by mental health services working with parents. This resulted in missed opportunities for child protection intervention at crucial times, poor utilisation of available resources (such as the mandatory reporter guide and Child Wellbeing Unit), and assessments completed without the benefit of input from experienced child protection professionals.
- Information sharing and communication across services – our reviews identified the importance of adequate communication across health services, private practitioners and other service providers to enable the coordination of mental health supports and appropriate follow up. In some cases, a lack of communication affected the accuracy of assessments, the understanding of roles and responsibilities, an awareness of risks present for a child, and ultimately the effectiveness of treatment and intervention.
- Connecting with and seeking information from family and friends – in a number of cases, our reviews emphasised the need for services to seek information from family and friends who were in close contact with parents caring for dependent children. These individuals often held critical information about a parent's deteriorating mental health, non-compliance with medication, and/or concerning presentation that, if shared, would have contributed to a more informed mental health assessment and may – in some instances – have resulted in a change in the treatment provided and potentially the clinical outcomes.

NSW Health are in the process of finalising a review of the current *Children of Parents with a Mental Illness (COPMI) Framework for Mental Health Services 2010-2015*, and have established an expert advisory group to oversee the development of the next framework document. They are planning to integrate the review into their Family Focused Recovery Framework to achieve an expanded and fully integrated framework that acknowledges the interrelationship of parents, dependent children and families living with mental illness.

Against the background of issues identified through our reviews about the effectiveness of current strategies and initiatives, and in light of NSW Health's advice about the new framework and the accompanying implementation monitoring plan, **we recommend that:**

17. **NSW Health, as part of the planned implementation of the *Family Focused Recovery Framework 2019-2023*, should develop an evaluation strategy to ensure the benefits of the framework can be measured and adjusted as needed.**

Appendices

Appendix 1: NSW Child Death Review Team

Members (at 2018)

Statutory members

Mr Michael Barnes
Convenor
NSW Ombudsman

Mr Steve Kinmond
Community and Disability Services Commissioner
Deputy Ombudsman

Mr Andrew Johnson
NSW Advocate for Children and Young People

Agency representatives

Ms Kate Alexander
Executive Director, Office of the Senior Practitioner
Department of Family and Community Services

Ms Robyn Bale
Director, Student Engagement and Interagency Partnerships
Department of Education

Ms Clare Donnellan
District Director, South Western Sydney
Department of Family and Community Services

Ms Jane Gladman (to September 2018)
Coordinator of the Coronial Information and Support Program
State Coroner's Office

Associate Professor Elisabeth Murphy
Senior Clinical Adviser, Child and Family Health
NSW Health

Mr Daniel Noll (to September 2018)
Director Criminal Law Specialist
Department of Attorney General and Justice

Ms Larisa Michalko (from November 2018)
Director Criminal Law Specialist
Department of Attorney General and Justice

Detective Superintendent Michael Willing (to March 2018)
Commander Homicide
NSW Police Force

Detective Superintendent Scott Cook (from April 2018)
Commander Homicide
NSW Police Force

Independent experts

Professor Ngiare Brown
Executive Manager, Research
National Aboriginal Community Controlled Health Organisation

Professor Kathleen Clapham
Australian Health Services Research Institute
University of Wollongong

Dr Susan Adams
Director, Division of Surgery and Senior Staff Specialist
Paediatric General Surgeon,
Sydney Children's Hospital

Dr Susan Arbuckle
Paediatric/Perinatal pathologist
The Children's Hospital at Westmead

Dr Isabel Brouwer
Statewide Clinical Director
Department of Forensic Medicine

Dr Luciano Dalla-Pozza
Head of Department and Senior Staff Specialist (Oncology)
The Children's Hospital at Westmead

Dr Jonathan Gillis (to May 2018)
Deputy Convenor
Paediatrician

Dr Bronwyn Gould
General Practitioner

Professor Philip Hazell
Director Child and Adolescent Mental Health Services, Sydney Local Health District
Conjoint Professor of Child and Adolescent Psychiatry, Sydney Medical School

Professor Heather Jeffery
International Maternal and Child Health
University of Sydney/Royal Prince Alfred Hospital

Professor Ilan Katz
Director, Social Policy Research Centre
University of NSW

Dr Helen Somerville
Visiting Medical Officer, Department of Gastroenterology
The Children's Hospital at Westmead

Appendix 2: Monitoring previous recommendations

In addition to the new recommendations made in this report, we continue to monitor agency progress in implementing some of our earlier recommendations.

The NSW Child Death Review Team Annual Report 2017-18 provides detailed information about the progress agencies reported to us in 2018 in relation to CDRT recommendations[327]

NSW Child Death Review Team recommendations

Sudden Unexpected Death in Infancy (SUDI): Investigation

Child Death Review Report 2015: Recommendations 2 and 3

The NSW Government, in the context of previous CDRT recommendations and the work of Garstang et al[328]:

- Consider a centralised model for SUDI response and investigation in NSW. This would be staffed by specialist health professionals to work with police, the family, pathologists and the Coroner to respond immediately and consistently to SUDI.
- Devise a joint agency policy and procedure governing the individual and coordinated roles and responsibilities of NSW Health, the NSW Police Force and the NSW Coroner in SUDI investigation. The policy and procedure should incorporate all elements of a joint agency response to SUDI:
    a. Expert paediatric assistance in death scene investigation and interviews with the family (noting that investigation of any suspicious deaths would be the responsibility of police).
    b. Specialised training and development of resources for police in SUDI investigation.
    c. Identified specialists to take the SUDI medical history, and review of the SUDI medical history form and the immediate post mortem findings to enable further specific history taking where necessary.
    d. Application and monitoring of standardised protocols for SUDI pathology, with specific requirements for standard screens in sudden unexpected infant death.
    e. The conduct of SUDI post mortems by specialist paediatric pathologists. Minimally, where post mortems are not conducted by paediatric pathologists, there should be consultation with paediatric specialists.
    f. Multi-disciplinary review following post mortem. The review should be chaired by an informed paediatrician, and involve relevant health providers to review the case. Review should consider all available information and provide advice to assist the Coroner in determining cause of death, to advise on possible genetic issues and necessary investigations for surviving children and parents, and prevention strategies for the family in the context of identified risks.
    g. The introduction of clear procedures to ensure families are provided with:
        i. appropriate advice and referral, particularly where genetic causes are indicated or suspected, and
        ii. ongoing contact, including for provision of grief counselling.

327. NSW Child Death Review Team 2018, CDRT Annual Report, NSW Ombudsman, Sydney.
328. Garstang J, Ellis C, & Sidebotham, P. (2015), op cit, is derived from work completed for NSW Kids and Families, through the Sax Institute.

Sudden Unexpected Deaths in Infancy: unintentional bed sharing

Child Death Review Report 2015: Recommendation 6

Noting observations from our work about risks arising from unintentional bed sharing, we recommend that NSW Health, in consultation with Red Nose, should review current advice and educational strategies, with a view to:

- the inclusion of advice and preventive strategies to parents and carers in relation to unintentional bed sharing as part of NSW Health education and advice programs, and the Red Nose 'Safe Sleep My Baby' public health program.
- Strategies targeted to young mothers, including use of alternative avenues of advice through social media and parenting blogs, and targeting grandmothers for safe sleep education.

Drowning: Publication of annual data from the swimming pool register

Child Death Review Report 2015: Recommendation 10

The Office of Local Government should publish annual data from its analysis of the swimming pool register, including but not limited to:

a. the number of pools registered
b. the number of pools that have been inspected
c. the proportion of inspected swimming pools that were deemed non-compliant with the Act at the time of inspection
d. the main defects identified at the time of inspection, and
e. whether or not owners have rectified defects within a reasonable period of time.

NSW Ombudsman recommendations: Reviewable child deaths

Department of Family and Community Services (FACS) systemic issues – such as response to reports of risk of significant harm – are monitored through the NSW Ombudsman/FACS integrated governance framework.

https://www.ombo.nsw.gov.au/news-and-publications/news/joint-ombudsman-and-facs-report-card

Suicide and risk-taking deaths of young people in care

Report of reviewable deaths in 2014 and 2015 (child deaths): Recommendation 1

Family and Community Services (FACS) should consider the issues raised in this report relating to the suicide and risk-taking deaths of young people in care, in particular:

a. Response to reports of risk of significant harm (ROSH), particularly relating to self-harming and risk taking behaviour (including suicide attempts and threats of suicide, and substance abuse)
b. Identification of, and response to, escalating risk-taking behaviour
c. Lack of placement stability and homelessness

FACS should provide details of current or proposed strategies to address these issues.

Children of parents with a mental illness

Report of reviewable deaths in 2014 and 2015 (child deaths): Recommendation 2

If a child dies in suspicious circumstances within 12 months of being presented to a NSW public health facility with a physical injury, and the NSW Ombudsman considers an internal review is warranted, NSW Health, in conjunction with the Clinical Excellence Commission, should establish a process for comprehensive review of the interaction of that facility with the child and their family.

Report of reviewable deaths in 2014 and 2015 (child deaths): Recommendation 3

NSW Health should provide advice on the outcome of the review of the Children of Parents with a Mental Illness (COPMI) Framework for Mental Health Services 2010-2015

Appendix 3: Definitions

Child: a person under the age of 18 years.

Child in care: a child or young person under the age of 18 years:

- who is under the parental responsibility of the Minister administering the *Children and Young Persons (Care and Protection) Act 1998*
- for whom the Secretary of the Department of Family and Community Services or a designated agency has the care responsibility under s49 of the *Children and Young Persons (Care and Protection) Act 1998*
- who is a protected person within the meaning of s135A of the *Children and Young Persons (Care and Protection) Act 1998*
- who is the subject of an out-of-home care arrangement under the *Children and Young Persons (Care and Protection) Act 1998*
- who is the subject of a sole parental responsibility order under s149 of the *Children and Young Persons (Care and Protection) Act 1998*
- who is otherwise in the care of a service provider.

Child protection history: a child is considered to have a child protection history if – within three years before their death – the child and/or their siblings were the subject of a report about safety, welfare or wellbeing made to the Department of Family and Community Services (FACS) or a Child Wellbeing Unit (CWU).

Co-sleeping and bed-sharing: a child or children sleeping with an adult (adults) on a shared surface such as a bed, sofa or mattress. The term co-sleeping is used when a child is intentionally placed for sleep – bed-sharing includes situations were an adult carer unintentionally falls asleep with a child while feeding or settling.

Confidence interval: a confidence interval is a quantitative estimate of the uncertainty of a statistic. It is used in this report primarily for the Crude Mortality Rate (see below). Although we know the number of children who died and lived in 2013, the numbers are not static, with children being born, dying and having birthdays throughout the year. This means that the Crude Mortality Rate is a measurement of a sample population, with all other intervals of one year being alternative sample populations (eg a year starting on 1 May rather than 1 January). The confidence interval estimates the range within which 95% of all possible sample populations would occur.

Crude Mortality Rate (CMR): the rate per 100,000 persons (for this report, persons are all those aged under 18 years). In this report, rates are not calculated for numbers less than four because of lack of reliability.

Mortality Rate: a directly standardised mortality rate per 100,000 children under 18 years of age. It is adjusted by gender, age and Indigenous status when stated. In this report, rates are not calculated for numbers less than four because of lack of reliability.

Fatal abuse: Abuse deaths are those which involve an act of violence by any person directly against a child or young person that causes injury or harm leading to death.

Incident Rate Ratio: the ratio of the mortality rates for two exclusive classes of people, such as male and female.

Infant: a child under one year of age.

Infant Mortality Rate (IMR): the rate of death per 1,000 live births. In this report, rates are not calculated for numbers less than four because of lack of reliability.

International Classification of Diseases (ICD): the ICD is the international standard health classification published by the World Health Organisation (WHO) for coding diseases for statistical aggregation and reporting purposes.[329] International Classification of Diseases – Australian Modification – the ICD-10-AM contains additional codes that are useful in the Australian setting, but is otherwise equivalent to the ICD-10.

Neonatal period: the period from birth to within 28 completed days of birth.

Perinatal period: the period inclusive of late pregnancy, birth and within 28 completed days of birth.

Post neonatal period: the period after 28 days of birth and within 365 days of birth.

P-value: a quantitative measurement of the likelihood that a statistic occurred by chance. A *p*-value of 0.05 means that there is only a 5% probability that the result obtained was due to a chance variation. A *p*-value of 0.05 is the conventional level for statistical significance. *P*-values are valid only when the distribution of the observation is the same as, or very close to, the theoretical distribution used to calculate the statistic. All *p*-values noted in this report are statistically significant.

Remoteness: a measure of distance from services. There are five levels of remoteness specified in this report: major cities (highly accessible), regional areas – where inner regional (accessible) and outer regional (moderately accessible) were combined, remote and very remote – which were also combined.[330]

Socio-economic status: a measure of the relative material resources of an individual or group.

Sudden Unexpected Death in Infancy (SUDI): the death of an infant aged less than 12 months that is sudden and unexpected, where the cause was not immediately apparent at the time of death. Excluded from this definition are infants who died unexpectedly as a result of injury – for example, transport fatalities – and deaths that occurred in the course of a known acute illness in a previously healthy infant.

Sudden Infant Death Syndrome (SIDS): SIDS is a category of SUDI and is a diagnosis of exclusion. In this report, SIDS is defined as the sudden and unexpected death of an infant under one year of age, with onset of the lethal episode apparently occurring during sleep and that remains unexplained after a thorough investigation – including performance of a complete autopsy and review of the circumstances of death and the clinical history. There are a number of sub-classifications of SIDS.

Young person: a person aged 15 to 17 years.

329. World Health Organization 2010, International Statistical Classification of Diseases and Related Health Problems, 10th Revision. Geneva: WHO.
330. Australian Bureau of Statistics 2018, The Australia Statistical Geography Standard (ASGS) Remoteness Structure, accessed on 4 December 2018 http://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure

Appendix 4: Methods

Baseline measurements

The report methodology is underpinned by survey data and estimates produced by the Australian Bureau of Statistics (ABS).

Population estimates

The comparative population size for mortality rate calculations are sourced from a range of ABS reports, including tables supplied by the ABS to order.[331]

The base populations of children in NSW were taken from a current release of the ABS Australian Demographic Statistics publication by sex and single year of age.[332]

The base populations by Remoteness and Socio-economic Index (SEIFA) as Index of Relative Disadvantage (IRSD) quintiles were taken from a table supplied to order by ABS.[333] The most recent figures available were for 2015 and 2016.

Infant mortality rates were calculated from the number of live births in NSW in 2017[334], including breakdowns for Aboriginal and Torres Strait Islander births, and deaths by remoteness area. The estimated population of children below one year of age by socio-economic quintile (IRSD) was used as a proxy for number of births by quintile. This was sourced from a table supplied to order by ABS.[335]

Population estimates for all Aboriginal and Torres Strait Islander children were sourced from the ABS publication *'Estimates of Aboriginal and Torres Strait Islander Australians'* which is based on data from the 2011 census.[336]

Remoteness

The breakdown of population by age categories and by remoteness areas as of 30 June 2016 was supplied by the ABS to order. The delimitation criteria for remoteness areas are based on the Accessibility/ Remoteness Index of Australia (ARIA+).[337] The ARIA+ Index is a measure of access to services using proxy measures of distance to the five nearest centres of defined populations.[338]

The product supplied by the ABS contains estimates of the resident populations (ERPs) by 2016 Statistical Area Level 1 (SA1) derived areas of Australia, produced by the ABS. These estimates correspond with the preliminary 30 June 2014 ERP as released in Regional Population Growth, Australia, 2013-14 (cat. no. 3218.0) and Population by Age and Sex, Regions of Australia 2014 (cat. no. 3235.0). The SA1 and SA1-based ERPs are not standard ABS output, but rather are customised data available for purchase as an information consultancy. These estimates are not published on the ABS website.

The ABS changes the boundaries of its underlying geographic spatial structures over time. Consequently, geographic patterns may have changed slightly across time and from previous reports. While it is likely that the changes are minimal at the level of remoteness grouping (a high level of grouping), caution should be applied when analysing and interpreting changes through time.

331. 'To order' refers to tables and data we specifically requested from ABS, on a fee-for-service basis.
332. Australian Bureau of Statistics, 2017, 3101.0 Australian Demographic Statistics, Sept 2017 release, Canberra: ABS.
333. Australian Bureau of Statistics, 2015 and 2016 Estimated Resident Population, by selected age groups, sex, remoteness areas and socioeconomic factors, Canberra: ABS.
334. Australian Bureau of Statistics (2018). Accessed on 11 January 2019 http://stat.data.abs.gov.au/Index.aspx?DatasetCode=BIRTHS_SUMMARY
335. Australian Bureau of Statistics, 2015 and 2016 Estimated Resident Population, by selected age groups, sex, remoteness areas and socioeconomic factors, Canberra: ABS.
336. Australian Bureau of Statistics, 2014, 3238.0 Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026, Canberra: ABS.
337. Australian Bureau of Statistics, 2018, 1270.0.55.005 Australian Statistical Geography Standard (ASGS): Volume 5 – Remoteness Structure Australia July 2016, Canberra; ABS.
338. Australian Population and Migration Research Centre, ARIA (Accessibility/Remoteness Index of Australia), Adelaide: APMRC. http://www.adelaide.edu.au/apmrc/research/projects/category/about_aria.html, accessed 31 August 2016.

For the majority of children who died in 2016 and 2017, categorisation of remoteness areas and socio-economic groupings was done through direct translation of the latitude and longitude coordinates of the address of usual residence. This enables the most accurate categorisation of usual residence using the ASGS. In this report, the measure for 'regional areas' comprised the ARIA+ categories of inner and outer regional areas combined, and the measure for 'remote areas' comprised the ARIA+ categories of remote and very remote areas combined.

Relative socio-economic status

Socio-economic status refers to the relative access to material resources of an individual or group. The indicators of the socio-economic status of a child used in this report are the Index of Relative Social Disadvantage (IRSD) and the Index of Education and Occupation (IEO) of the area in which a child usually lived.

IRSD status is reported in quintiles. Quintile 1 represents the relatively most disadvantaged 20%, and quintile 5 represents the relatively least disadvantaged 20%.

IEO reflects the general level of education and occupation-related skills of people within an area. In this report, IEO measures reflect the general level of parental/carer qualifications achieved and occupation category. The index reports 'low' and 'high' measures of education and occupation. For example, a low score on the IEO index indicates relatively lower education and occupation status of people in the area in general.

In this report, socio-economic status is not included in calculations for children whose usual residence was outside of the state or overseas, or for those where insufficient information was available for their usual place of residence. In 2015 and 2016, 22 children did not have an IRSD score and IEO score and 16 children did not have ARIA score.

Calculations

Mortality rates

The Crude Mortality Rates (CMR) were calculated as rates per 100,000 persons. This was done by dividing the number of deaths in a given category by the population that was appropriate for the category. For example, the CMR for deaths of children from all causes in 2016 was (463/1726915 x 100000) = 26.81.

Directly Standardised Mortality Rates (DSMR) were also calculated as rates per 100,000 persons. The DSMR differs from the CMR in that it is adjusted for the difference in the age structure of the current population compared with a standard population (in this case, 2001). The adjustment allows comparison between years.

Here, the age-adjustment method used the number of deaths in each year age category for each year and the population in each year age category for each year (and number of deaths and populations separately by gender where appropriate).

Infant Mortality Rates (IMR) are calculated as rates per 1,000 live births. The number of infant deaths in a given category is divided by the total number of live births for the year and multiplied by 1,000. For example, in 2016 the IMR for infants (under 1 year) (260/96083 x 1,000) = 2.71. Where reporting infant deaths IMR are reported unless otherwise stated.

Mortality rates were not calculated where there were less than four deaths.

Confidence intervals

If the number of observed cases was less than 100, confidence intervals were calculated directly from the Poisson distribution – as recommended by the Washington State Department of Health.[339] When the number of cases was 100 or more, the normal approximation was used to calculate the confidence intervals. The equation applied was: *(±1.96 x (CMR or appropriate rate)/√(number of deaths))*.

339. Washington State Department of Health 2012, Guidelines for Using Confidence Intervals for Public Health Assessment, Olympia, WA: DOH http://www.doh.wa.gov/Portals/1/Documents/1500/ConfIntGuide.pdf, accessed 4 December 2018.

Rate ratios

Rate ratios are a pairwise comparison of mortality rates. In this report, they were calculated to compare male with female rates and Aboriginal/Torres Strait Islander with non-Aboriginal/Torres Strait Islander rates. Where the ratio is equal to one, rates were equal. Where the ratio was greater than one, male or Aboriginal/Torres Strait Islander rates were higher. Where they were less than one, female or non-Aboriginal/Torres Strait Islander rates were higher.

Significance

This report examined differences in mortality rates and other factors for age, gender, Aboriginal and Torres Strait Islander children and non-Indigenous populations. We examined changes in trend between three time periods (2003-07, 2008-12, 2013-17) and for other periods when stated. Where appropriate, we examined differences in proportions using chi-squared tests and differences in average mortality rates by t-tests between two groups, or ANOVA with Bonferroni corrections for three or more groups. At times, logistic regression with a subsequent Wald Chi-squared test has been used to test for the significance of a trend in mortality rate across the yearly time-series. Significance was reported where p values were less than 0.05 – that is, we report the probability that there is a difference at a 95% confidence level.

Software

Much of the data extraction and summarisation was done using Microsoft SQL Server 2016 and Microsoft Excel. Statistical analysis was performed using SPSS and SAS software.

Classification of cases

In relation to cause of death, individual cases are – with the exception of Sudden Unexpected Death in Infancy (SUDI) – reported against a specific category within the report. SUDI is not a cause of death. For this reason, SUDI cases with known underlying causes of death are also reported in the sections relating to those underlying causes.

For natural cause deaths, reporting categories align with chapter levels of the International Statistical Classification of Diseases and Related Health Problems (ICD). This is also generally (but not always) the case for external cause deaths, where precedence may be determined according to the most appropriate category for considering prevention.

Causes of death

ICD-10 is the International Statistical Classification of Diseases and Related Health Problems, 10th revision (World Health Organisation). The ICD-10 has more than 12,000 unique codes in more than 2,000 categories. The highest level classification is the chapter level (22 chapters). ICD-10-AM is the Australian modification of ICD-10.

Underlying cause of death is defined by the World Health Organisation as the *'disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury'*. Unless otherwise indicated, in this report the cause of death relates to underlying cause. The underlying cause of death is recognised as the single most essential element to understanding causes of death.[340]

Direct cause of death is the final condition or event that results in death. Intervening causes of death are other conditions that may have given rise to the immediate cause of death. Contributory causes of death are conditions or events that were present during the sequence leading to death, but may not have been necessary influences.

340. National Centre for Health Information Research and Training 2011 Review and recommendations for the annual reporting of child deaths in NSW. Sydney: NSW Ombudsman. Unpublished.

Natural causes of death

Name	Description	ICD codes
Certain conditions originating in the perinatal period	Includes conditions such as prematurity; complications of labour, including hypertension and maternal haemorrhage; and disorders associated with foetal growth. It may also include certain respiratory, cardiovascular and infectious diseases associated with the perinatal period, such as aspiration of meconium and respiratory distress of the newborn.	P00-P96
Congenital malformations and chromosomal abnormalities	Includes a range of conditions, including congenital hydrocephalus, trisomy 18 (Edwards syndrome), and Down syndrome.	Q00-Q99
Neoplasms	Cancers and tumours.	C00-D48
Diseases of the nervous system	Includes disorders such as epilepsy, cerebral palsy and muscular dystrophy, as well as inflammatory and degenerative conditions.	G00-G99
Diseases of the respiratory system	Includes conditions such as pneumonia, influenza and asthma.	J00-J99
Endocrine, nutritional and metabolic diseases	Includes conditions such as diabetes, malnutrition and Cushing's syndrome.	E00-E89
Diseases of the circulatory system	Includes conditions such as cardiac and blood vessel malformations and disorders of metabolism that lead to blocking of blood vessels.	I00-I99
Certain infectious and parasitic diseases	Infectious diseases are caused by organisms such as bacteria, viruses, parasites or fungi, and can be passed directly or indirectly from person to person.[15] Examples include influenza, gastroenteritis and meningococcal disease.	A00-B99
Other diseases/ morbid conditions	Includes: Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism; Mental and behavioural disorders; Diseases of the eye and adnexa; Diseases of the ear and mastoid process; Diseases of the digestive system; Diseases of the skin and subcutaneous tissue; Diseases of the genitourinary system; and Pregnancy, childbirth and the puerperium.	D50-D89, F00-F99, H00-H59, H60-H95, K00-K93, L00-L99, N00-N99, O00-O99

External causes of death

Name	ICD code	Notable inclusions
Drowning	W65-W74, Y21	
Fatal assault	X85-Y09	Assault involving drowning (X92) or a motor vehicle (Y02-Y03) would be included with deaths from fatal assault.
Suicide	X60-X84	Includes intentional crashing of a vehicle and intentional self-harm by drowning.
Transport	V01-V99, Y31-Y32	
Other unintentional external cause death		A number of unintentional external cause deaths occur that are not due to transport fatalities, assault, suicide or drowning. Due to the small number and great variety of these deaths, they are described in one section of the report.

341. World Health Organisation 2011, Infectious Diseases, Geneva: WHO. Accessed http://www.who.int/topics/infectious_diseases/en/,

Identification of Aboriginal and Torres Strait Islander children

Individual children are identified as Aboriginal or Torres Strait Islander if:

- The child has been identified as either Aboriginal or Torres Strait Islander on their NSW Births Deaths and Marriages (BDM) death certificate.
- The child or their parent/s have been identified as either Aboriginal or Torres Strait Islander on their NSW Births Deaths and Marriages birth certificate.
- Agency records identify the child as Aboriginal or Torres Strait Islander through a number of records, which are corroborative. Records used to do this include the NSW Police Computer Operated Policing System and Community Services' KIDS client database, which often hold information that can support Aboriginal or Torres Strait Islander identity. NSW Health and other agency records were also used to assess the child and family background.

Data description

The child death register records information on all children whose deaths occurred in NSW, including whether any of the children were Aboriginal or Torres Strait Islander Australians.

Data on Aboriginal and Torres Strait Islander status is compiled from a range of sources. The number and source of the records is partially dependent on the cause of death for each child. Some sources in the list below are requested for every child, and some are only requested where applicable.

Record requests can take some time after a death has been registered, and information is added as it becomes available. Data published in this report for 2015 Aboriginal and Torres Strait Islander status and mortality rates are therefore subject to change.

Changes since 2013

In line with recommendations by the Australian Institute of Health and Welfare (AIHW), the CDRT's process for collecting Aboriginal and Torres Strait Islander status for the register changed in 2013.[342] Previously, information from BDM was used as the primary source, with other sources taken into account where other records clearly indicated the child was Aboriginal or Torres Strait Islander.

Identification of the child's Indigenous status was based on expert assessment of the information. However, information from sources other than BDM was not held in the register – reporting was based on a single data field that contained the final decision.

From 2013 onwards, information about a child's Aboriginal or Torres Strait Islander status has been collected from all sources available for each case. Business rules have been applied to assign Aboriginal and Torres Strait Islander status for each child. Where a child has been identified as Indigenous in any source collected by the CDRT in the course of the case review, the child has been nominated as Aboriginal and/or Torres Strait Islander in the register and the case reported as such.

For reporting on trends in deaths over time, only BDM birth and death data has been used. BDM data is the primary source for Indigenous status, and should be used exclusively to analyse trends to avoid compounding errors from differences in accuracy of secondary data sources through time. BDM data has been used for reporting all trends in deaths over time.

342. Australian Institute of Health and Welfare, 2013, Identification and reporting of Aboriginal and Torres Strait Islander Children by the New South Wales Child Death Review Team, Advisory Report, Canberra; AIHW.

List of sources

- BDM death
- BDM birth
- National Coronial Information System (NCIS)
- Other coronial records
- Police databases (COPS/PODS)
- Other police records
- Education records
- NSW Health records
- Community Services (KiDS and ChildStory)
- Other Community Services records
- CWU database – Wellnet
- Other CWU records
- GP/private practitioner records
- NGO records

Other sources

Sources of Aboriginal and Torres Strait Islander identification of deaths 2016 and 2017.

As shown in table 3 below, of the 124 children who were identified as Aboriginal and/or Torres Strait Islander in 2016 and 2017, 99 (80%) were identified by two or more sources. The remaining 25 (20%) children were identified as Aboriginal and/or Torres Strait Islander by only one source.

Of the 124 children, 80 (65%) were identified in BDM and other records. BDM information (birth and/or death) was the only source of identification for 21 children, 13 of whom were identified using a single BDM source (birth or death). There were 23 children identified as Aboriginal and/or Torres Strait Islander only by sources other than BDM.

Sources of Aboriginal and Torres Strait Islander identification, 2016 and 2017

Decision	Source	Total number of source(s)	Number of children
ATSI	BDM birth only	1	6
	BDM death only	1	7
	BDM birth and BDM death only	2	8
	BDM and other sources	2	19
		3	31
		4	13
		5	5
		6	8
		7	3
		8	1
	Other source(s) only	1	12
		2	7
		3	2
		4	1
		5	1
	Total		**124**
non-ATSI	BDM and other sources		863
	Total		**981**

Appendix 5: SUDI classifications

Sudden Unexpected Death in Infancy: proposed classifications

Sudden Unexpected Death in Infancy (SUDI) is the death of an infant aged less than 12 months that is sudden and unexpected, where the cause was not immediately apparent at the time of death. Around 15% of all infant deaths in NSW are SUDI.[343]

SUDI are either:

- Explained SUDI – deaths where a cause is found after investigation.
- Unexplained SUDI – deaths where the cause remains unidentified after all investigations are completed. This includes deaths that are classified as Sudden Infant Death Syndrome (SIDS).

The most commonly accepted framework for classifying SUDI is that proposed by Krous et al in 2004 ('the San Diego definition'), which was broadly adopted at the SIDS and Kids Pathology Workshop in 2004.[344] As noted by Mitchell and Krous in 2015, there has been a major shift in SIDS diagnosis over the last decade and a major advance has been the identification of 'modifiable risk factors'.[345]

The following paper presents a revised classification framework for SUDI that takes into account key extrinsic risk factors (risks in the child's environment that were modifiable at the time of the child's death) and intrinsic risk factors (risks that were non-modifiable at the time of the child's death).[346] The aim is to provide for a consistent approach to SUDI by coroners, pathologists and the NSW CDRT.

In NSW, there is no consistent classification of SUDI where a cause of death remains unexplained after investigation. Consistent classification can help to identify factors that may contribute to infant deaths, which is a key first step toward preventing future infant deaths.

While recognising that a sleep environment is the primary environment for an infant, the framework does not limit SUDI to circumstances where an infant is specifically placed for sleep. The classifications would apply in circumstances where, for example, an adult fell asleep while holding or feeding an infant or where an infant was placed in a stroller or rocker for any purpose.

Background: Intrinsic and extrinsic risk factors for Sudden Unexpected Death in Infancy

Intrinsic or 'non-modifiable' risk factors

Mitchell and Krous note that the *'epidemiology of SIDS has been well described and has been largely consistent over time and place,'* with non-modifiable or intrinsic risk factors including certain social and personal characteristics (eg male preponderance) and:[347]

- Low birth weight (less than 2500g).
- Preterm birth (less than 37 weeks' gestation).
- Small for gestational age (less than 10th percentile weight for age at birth) or small for age on relevant intergrowth 21 or WHO charts respectively.

http://www.who.int/childgrowth/standards/en/

https://intergrowth21.tghn.org/articles/intergrowth-21st-newborn-size-birth-chart

343. NSW Child Death Review Team 2016 Child Death Review Report 2015. NSW Ombudsman, Sydney. p.40.
344. http://www.sidsandkids.org/research/sids-and-kids-2004-pathology-workshop/
345. Mitchell, E and Krous, H 2015, 'Sudden unexpected death in infancy: a historical perspective', Journal of paediatrics and Child Health, 51, 108 – 112.
346. Intrinsic risks include some preventable risks (eg maternal smoking) but the impact of these risks could not be changed at the time the child died.
347. Mitchell, E and Krous, H 2015, 'Sudden unexpected death in infancy: a historical perspective', Journal of paediatrics and Child Health, 51, 108 – 112.

http://www.who.int/childgrowth/standards/en/

https://intergrowth21.tghn.org/articles/intergrowth-21st-postnatal-growth-standards-and-z-scores-preterm-infants/

- Maternal smoking during pregnancy.[348]
- Preceding infectious illness.

Extrinsic or 'modifiable' risk factors

There are also well evidenced modifiable or extrinsic risk factors for SUDI – including placing infants to sleep prone (on their front), sharing a bed with an infant, particularly very young infants and where other risks are present, placing infants in bedding not designed for them, exposing infants to tobacco smoke, excess thermal insulation and overheating, and placing loose bedding or other items in an infant's sleep environment.

Prone sleeping:[349] Placing an infant to sleep in a prone (on their front) position is a significant risk factor for SUDI. The prone position increases the risk of re-breathing expired gases,[350] over-heating,[351] and accidental suffocation – particularly for very young infants with limited head control and/or infants placed on soft bedding.[352] Placing an infant to sleep on their side is also not recommended as it may promote the infant rolling into a prone position.[353]

Bed-sharing:[354] Sleeping in the same bed as a baby can be unsafe if the infant gets caught under adult bedding or pillows, becomes wedged in gaps between the mattress and wall, or is rolled on or covered by an adult who sleeps very deeply, is affected by drugs or alcohol, and/or is extremely tired. Infants under 12 weeks have an increased risk of SUDI even if the parents do not smoke or drink alcohol and the infant is breast-fed.[355] Bed-sharing can be intentional or unintentional – for example, if a carer falls asleep while holding or feeding an infant.

Bedding that is not designed for infants and/or for sleeping, eg a sofa:[356] Placing a baby for sleep or leaving a baby to sleep on a surface not specifically designed for infants to sleep increases the risk of SUDI. Examples of inappropriate surfaces include sofas, chairs, adult bedding, car seats, strollers and slings.[357] Risks to infants placed to sleep on these surfaces include suffocation, entrapment, strangulation and assuming positions that can cause airway obstruction.[358] Infant bedding that does not meet safety standards (eg mattresses too small, broken cot railings) also poses risk.

Exposure to smoking:[359] Exposure to tobacco smoke has been shown to adversely affect infant arousal and to increase the risk of premature birth and low birth weight, both of which are risk factors for SIDS. Tobacco smoke exposure is also linked to decreased lung growth and increased rates of respiratory tract infections, otitis media (ear infection) and childhood asthma – with the severity of these problems increasing with increased exposure.[360, 361] Research indicates that bed sharing with an infant greatly

348. Moon, R. Y. 2011, op cit, e1341-e1367.
349. Mitchell, Edwin and Krous, Henry (2015), op cit, p 108.
350. Resulting in unusually high levels of carbon dioxide in the blood and inadequate oxygen supply.
351. By decreasing the rate of heat loss and increasing body temperature compared with infants sleeping supine (on their backs)
352. Moon R.Y. (2011), SiDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment, Pediatrics, Vol 128 (5).
353. American Academy of Pediatrics, 2005, 'The changing concept of Sudden Infant Death Syndrome: diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk', Pediatrics, Vol 116 (5).
354. Mitchell, E and Krous, H 2015, op cit, p 108.
355. Carpenter R et al 2013, 'Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case–control studies' BMJ Open http://bmjopen.bmj.com/content/3/5/e002299.full
356. Moon R.Y 2011, op cit, 128 (5).
357. SIDS and Kids do not promote or support specific products. Infant 'snuggle beds' do not meet the SIDS and Kids guidelines for a safe sleeping surface.
358. SIDS and Kids, http://www.sidsandkids.org/wp-content/uploads/SIDS053-Safe-Sleeping-Long-Brochure-Updates-web.pdf, accessed 2/6/16.
359. Zhang K & Wang, X 2013, 'Maternal smoking and increased risk of sudden infant death syndrome: a meta-analysis' Legal Medicine, 15 (3), 115-121, http://www.legalmedicinejournal.com/article/S1344-6223(12)00170-8/abstract
360. DiFranza, J. R., Aligne C. A., Weitzman M. 2004, Prenatal and postnatal environmental tobacco smoke exposure and children's health. Pediatrics 113 (Supplement 3): 1007-1015.
361. SIDS and Kids Information statement: smoking, http://www.sidsandkids.org/wp-content/uploads/SIDS_SafeSleeping_A4_IS_SmokingLR3.pdf, accessed 1/6/16.

increases the risk for SIDS if either or both of the parents smoke. Strategies to minimise a baby's exposure to tobacco smoke – such as keeping windows open, avoiding smoking near the baby, or smoking outside – are not completely effective in reducing an infant's exposure to tobacco smoke.[362, 363, 364]

Excess bedding and clothing:[365] The risk of dying suddenly and unexpectedly is increased if an infant is placed prone, and that risk is even further increased if the infant is placed prone under heavy bedding or if their head becomes covered by bedding in any position.[366] Excessive clothing and/or bedding can contribute to the risk of thermal stress by providing insulation which prevents infants from regulating their temperature.[367] This can occur when a baby's head or face becomes covered by bedding or clothing, or when an infant is wrapped or dressed in overly warm clothing and is unable to cool down by evaporation of sweat.[368]

Soft pillows or other objects in sleep environment:[369] Loose soft items in an infant's sleep environment pose a potential risk of suffocation or overheating. Pillows, quilts, sheepskins and other soft surfaces have been noted to increase the risk of SIDS five-fold, independent of sleep position.[370]

What is a 'safe environment' for infants?

- The infant is placed to sleep on their back – not on their front or side.
- For the first six months after birth, the infant is placed on their own safe infant-specific bedding that, where standards exist, is compliant with those standards.
- The environment is free from tobacco smoke.
- The infant is dressed appropriately for the conditions (not overdressed) and their head and face are uncovered.
- The infant's environment is free from pillows or other soft objects that pose a suffocation risk – such as adult blankets or quilts, or soft toys.

362. SIDS and Kids Information statement: smoking, http://www.sidsandkids.org/wp-content/uploads/SIDS_SafeSleeping_A4_IS_SmokingLR3.pdf, accessed 1/6/16.
363. Moon, R. Y and Fu, L 2012, 'Sudden Infant Death Syndrome: An update' Pediatrics in Review 33 p. 316, American Academy of Paediatrics.
364. Groner, J.A et al 2005, 'Screening for children's exposure to environmental tobacco smoke in a pediatric primary care setting' Archives of Pediatric and Adolescent Medicine, 159(5): 450-455.
365. Mitchell E and Krous H, 2015, op cit 51, 108.
366. SIDS and Kids Information statement: bedding amount recommended for safe sleep. http://www.sidsandkids.org/wp-content/uploads/SIDS_SafeSleeping_A4_IS_BeddingAmountweb4.pdf
367. British Columbia Coroner's Service (2009), 'Child Death Review Unit, Safe and sound: a five-year retrospective report on sudden infant death in sleep-related circumstances', http://www.childdeathreview.org/wp-content/uploads/Publications/British-Columbia_SuddenInfantDeath.pdf, accessed 1/6/16.
368. SIDS and Kids Information Sheet: room temperature, op cit.
369. Hauck, F.R., et al, 2003, 'Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study' Pediatrics, 111(5), Pt 2, 1207-14.
370. Moon, R. Y. 2011, op cit e1341-e1367.

SUDI Classification

Classification	Definition
SUDI 0	Post-death investigation is not sufficient, and a cause of death cannot be determined or excluded with certainty because of lack of information: • Death scene examination is undocumented or insufficient.[371] • No or insufficient review of medical history of the child/family, including family interview (as per protocol) and review of clinical records. • Autopsy not in compliance with the SIDS protocol[372], or missing tests or screens necessary to confirm or exclude a cause.
SUDI 0 +	As above – AND one or more intrinsic and/or extrinsic risk factor(s) were able to be identified.
SUDI 1	The infant was found in a safe environment with no evidence of accidental death, unexplained trauma, or abnormal presentation[373] before death. Following thorough investigation, all other possible causes have been excluded. Safe environment in this context means that the infant was: • placed to sleep on their back – not on their front or side • for the first six months after birth, placed on their own safe infant-specific bedding that, where standards exist, is compliant with those standards. • in an environment free from tobacco smoke • dressed appropriately for the conditions (not overdressed) and their head and face are uncovered • in an environment free from pillows or other soft objects that posea suffocation risk – such as adult blankets or quilts, pillows and soft toys. Thorough investigation includes a minimum of: • sufficient[374] and documented death scene examination • review of medical, social and family history of the child/family, including family interview with protocol and review of birth and clinical records • autopsy sufficient[375] and in compliance with the SIDS protocol.
SUDI 2	As above, with the exception that non-modifiable (intrinsic) risk factors are identified: • low birth weight (less than 2500g) • pre-term birth (less than 37 weeks) • Small for gestational age (less than 10th percentile weight for age at birth) or small for age on relevant intergrowth 21 or WHO charts respectively • preceding infectious illness (within the last two weeks) • maternal smoking during pregnancy
SUDI 3	The infant was found in an unsafe environment with modifiable (extrinsic) risk factors present, and following thorough investigation, mechanical asphyxia or suffocation cannot be determined or excluded with certainty. Unsafe environment in this context means the infant was: • placed to sleep prone or on their side • bed-sharing with an adult (if aged less than 6 months)[376], or bed sharing with an adult at any age if the adult is under the influence or likely influence of alcohol or other drugs • placed on their own in bedding not specifically designed for infant sleep (eg adult mattress, pram, sofa), in infant-specific bedding that was non-compliant with existing standards or was otherwise unsafe • exposed to tobacco smoke after birth • dressed inappropriately for the conditions (overdressed) and/or their head and/or face was covered • placed in an environment with pillows or other soft objects that pose a suffocation risk.

Classification	Definition
SUDI Explained	Regardless of sufficiency of post death investigation, a cause of death can be determined with certainty.
SUDI Explained +	A cause of death can be determined with certainty AND post-death investigation identified one or more intrinsic and /or extrinsic risk factor(s).
Undetermined	A finding of undetermined should only be applied in a SUDI context where the above classifications are insufficient. This would include where there was abnormal acute presentation before death (for example, sudden onset illness) but this is not sufficient to explain a cause of death.

371. 'Sufficient' to be determined in NSW, pending review of SUDI investigation. Complete history includes detailed history of events leading up to the death, together with medical, social and family history, plus an explicit review of any evidence suggesting past neglect or abuse of this child or other children in the family.
372. Refer appendix D of Death – Management of Sudden Unexpected Death in Infancy http://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2008_070.pdf The NSW protocol is based on the autopsy protocol developed by a working group convened by the Royal College of Pathologists and the Royal College of Paediatrics and Child Health See https://www.rcpch.ac.uk/system/files/protected/news/SUDI%20report.pdf
373. Abnormal presentation includes sudden acute illness or unusual symptoms (for example, seizures) observed in the 24 hours prior to death.
374. 'Sufficient' to be determined in NSW, pending review of SUDI investigation. Complete death scene investigation - detailed review of the scene of death by Police with paediatric assistance in the light of the history given by the parents or carers.
375. 'Sufficient' to be determined in NSW, pending review of SUDI investigation. Currently as per SUDI Protocol.
376. This is a conservative threshold. Some studies suggest an independent risk of bed sharing (in the absence of any other risk factor) applies to infants aged less than 3 months. We will monitor this threshold over time.

Applying the SUDI Classification

The checklist below provides a summary of factors described before. Once completed, the classification can be determined using the attached criteria.

Part A: Family history and post-death investigation			
1. History	2. Death scene examination	3. Pathology	4. Abuse or neglect excluded?
☐ **Yes** - sufficient[1]	☐ **Yes** - sufficient[2]	☐ **Yes** - sufficient[3]	☐ **Yes**
☐ **No** - Insufficient	☐ **No** - insufficient	☐ **No** - insufficient	☐ **No** - cannot be excluded[2]

Part B: Cause of death

Has a cause of death been determined? ☐ Yes ☐ No

Part C: Intrinsic ('non-modifiable') risk factors

Have intrinsic risk factors been identified?

☐ **Yes** - intrinsic risk factors

(tick all that apply)

- ☐ Pre-term birth (less than 37 weeks)
- ☐ Low birth weight
- ☐ Small for gestational age (<10th percentile) or small for age
- ☐ Preceding infectious disease (2 weeks)
- ☐ Smoking during pregnancy

☐ **No** intrinsic risk factors

☐ **Not known** (information incomplete)

Part D: Extrinsic ('modifiable') risk factors

Have extrinsic risk factors been identified?

☐ **Yes** extrinsic risk factors

(tick all that apply)

- ☐ Placed to sleep prone/on side (infant any age)
- ☐ Bed-sharing (infant aged <6 months)
- ☐ Bed-sharing + drugs/alcohol evidence or suspected (infant any age)
- ☐ Non-infant specific bedding (eg sofa, adult mattress) or not compliant with standards/unsafe
- ☐ Exposed to smoking post birth
- ☐ Soft pillows/quilts/adult bedding in infant space, or head/face covered

☐ **No** extrinsic risk factors

☐ **Not known** (information incomplete)

1. Complete history includes detailed history of events leading up to the death, together with medical, social and family history, plus an explicit review of any evidence suggesting past neglect or abuse of this child or other children in the family.
2. Complete death scene investigation – detailed review of the scene of death by Police with paediatric assistance in the light of the history given by the parents or carers.
3. Complete pathological investigations to a standardised protocol – including gross pathology, histology, microbiology, toxicology, radiology, clinical chemistry and any relevant metabolic investigations, including frozen section of liver stained for fat and genetic testing where appropriate.
4. No evidence of unexplained trauma, abuse, neglect or unintentional injury (Krous).

Framework drawn from Fleming PJ et al 2004, Investigating Sudden Unexpected Deaths in Infancy and childhood: an integrated multi-agency approach. BMJ vol 328 pg 331 - 334

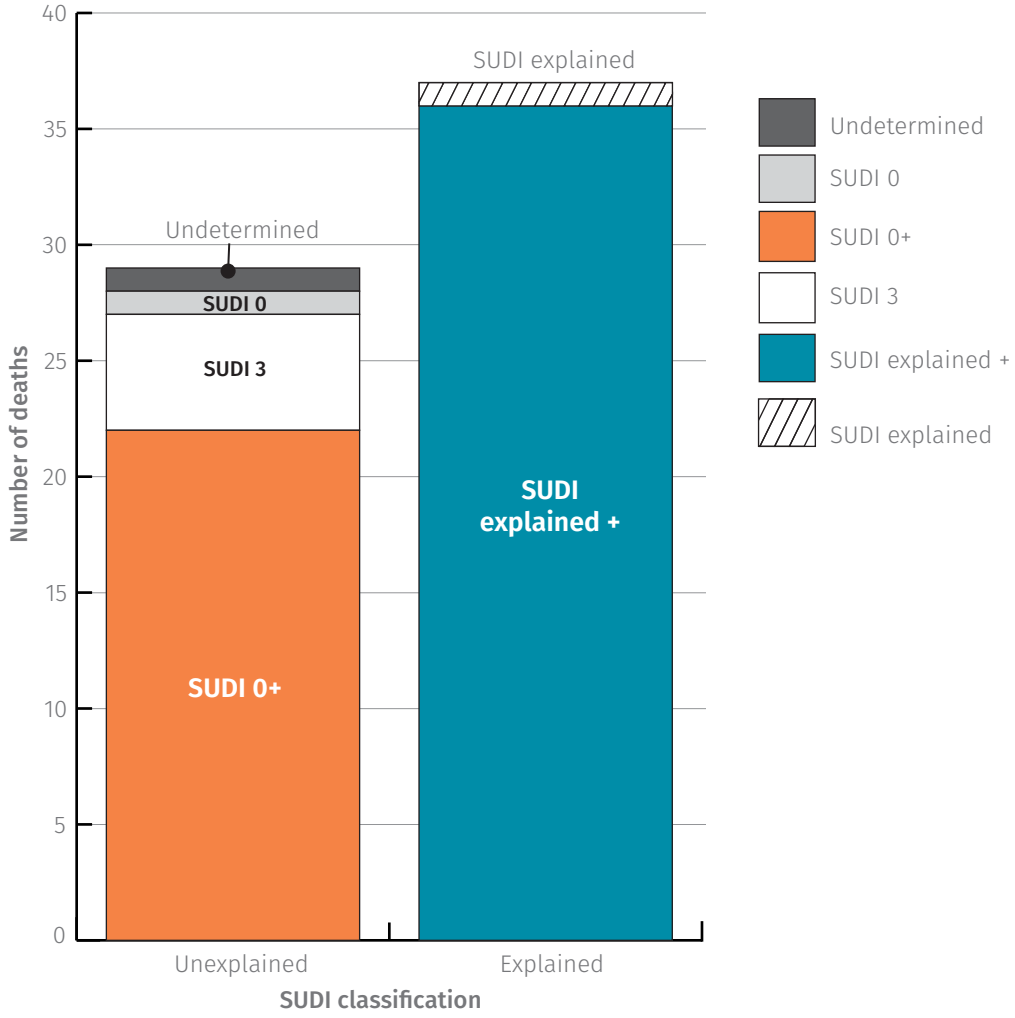
Classification criteria

Criteria	Classification	Summary
If any question in part A is 'no' **and** Part B is 'no' **and** all questions in part C and D are 'no' or 'not known'	SUDI 0	Information not collected or incomplete to determine cause
If any question in part A is 'no' **and** Part B is 'no' **and** any question in part C or D is 'yes'	SUDI 0 +	Information not collected or incomplete to determine cause AND intrinsic and/or extrinsic risk factors identified
If all questions in part A are 'yes' **and** Part B is 'no' **and** all questions in part C and D are 'no'	SUDI 1	All causes excluded Infant in safe environment Information complete, full investigation
If all questions in part A are 'yes' **and** Part B is 'no' **and** any question in part C is 'yes' **and** all questions in Part D are 'no'	SUDI 2	Safe environment, full investigation – AND non-modifiable (intrinsic) risk factors identified
If all questions in part A are 'yes' **and** Part B is 'no' **and** any question in Part D is 'yes' *(part C can be any answer)*	SUDI 3	Unsafe environment, full investigation With modifiable risk (extrinsic) factors^, uncertain of contribution to death
If Part B ('has a cause of death been determined') is 'yes' **and** all questions in part C and D are 'no' or 'not known'	Explained *[add determined cause]*	Cause of death able to be determined
If Part B is 'yes' **and** any question in part C or D is 'yes'	Explained + *[add determined cause]*	Cause of death able to be determined – AND intrinsic and/or extrinsic risk factors identified
If not SUDI 0, 1, 2 or 3 do not apply	Undetermined/ unascertained	

SUDI classification 2016 and 2017

Figure 92 shows that the majority of classifications – whether the death is explained or not – identify that one or more intrinsic and/or extrinsic risk factors were able to be identified. No deaths were classified as SUDI 1 (safe environment and thorough investigation which excludes all possible causes) or SUDI 2 (as for SUDI 1, with intrinsic risk factors identified).

Finalised SUDI by CDRT classification, 2016 and 2017



The purpose of the alternative classification is to have a simple and consistent way of classifying SUDI that can be applied by the Coroner and the CDRT, and which takes into account shifts in the epidemiology of SUDI and advances in our understanding and identification of risk factors that may contribute to SUDI.

Baby check[377]

Symptom	Score
If your baby has an unusual cry	2
In the last 24 hours: • If your baby has taken a little less fluid than usual; or • If your baby has taken about half as much fluid as usual; or • If your baby has taken very little fluid	 3 4 9
If your baby has vomited at least half the feed after every one of the last three feeds	4
If your baby has had green vomit	13
If your baby has passed less urine than usual	3
If there has been a large amount of obvious blood in your baby's nappy (not just a streak on the stool)	11
If your baby has been drowsy and less alert than usual when awake, score as follows: • Occasionally drowsy; or • Drowsy most of the time	 3 5
If your baby seems more floppy than usual	4
If your baby is watching you less than usual	4
If your baby is responding less than usual to what is going on around	5
If a baby has breathing difficulty the lower chest and upper tummy will dip in with each breath. This is called "indrawing". • If there is indrawing just visible with each breath; or • If there is obvious or deep indrawing with each breath	 4 15
If your baby's body is much paler than usual; or If your baby has had an episode of going very pale at any time during the last 24 hours	3 3
If your baby is wheezing when breathing out	3
If your baby's nails are blue	3
Gently squeeze his or her big toe to make it white: • If your baby's toe was completely white before the squeeze • If your baby's toe colour does not return within three seconds	 3 3
If your baby has a rash which covers a large part of the body; or If your baby has a rash which is raw or weeping and is bigger than the shaded area shown	4 4
If there is a bulge in the groin or scrotum which gets bigger with crying	13
In a baby below 3 months, if the temperature is 38.0 °C or more In a baby above 3 months, if the temperature is 39.0 °C or more	4 4
If your baby has cried during the checks (more than a little grizzle)	3

What the total score means	
0 to 7	Your baby is only a little unwell, and medical attention should not be necessary.
8 to 12	Your baby is unwell, but is unlikely to be seriously ill. You may want to advice from your doctor, health visitor or midwife.
13 to 19	Your baby is ill. Contact your doctor and arrange for your baby to be seen.
20+	Your baby is seriously ill and should be seen by a doctor straight away.

377. Sidebotham P, Bates F, Ellis C, Lyus L, 2018, 'Preventive Strategies for Sudden Infant Death Syndrome', in J.R. Duncan & R.W. Byard (eds), Sudden infant and early childhood death: The past, the present and the future, University of Adelaide Press, Adelaide, p. 241.

Appendix 6: Supplementary data

Table 4a. Total deaths of children in NSW aged 0-17 years, 2003-17

Year	Population	Deaths	Crude Mortality Rate	95% Confidence Interval	Directly Standardised Mortality Rate	95% Confidence Interval
2003	1594914	652	40.88	37.74 - 44.02	41.09	37.94 - 44.25
2004	1589345	617	38.82	35.76 - 41.88	39.00	35.92 - 42.08
2005	1588682	659	41.48	38.31 - 44.65	41.31	38.16 - 44.47
2006	1591812	622	39.07	36.00 - 42.15	38.09	35.10 - 41.09
2007	1602269	605	37.76	34.75 - 40.77	35.67	32.83 - 38.51
2008	1612212	605	37.53	34.54 - 40.52	35.31	32.49 - 38.12
2009	1623266	574	35.36	32.47 - 38.25	33.10	30.39 - 35.81
2010	1635207	596	36.45	33.52 - 39.37	34.14	31.40 - 36.88
2011	1641477	578	35.21	32.34 - 38.08	33.69	30.95 - 36.44
2012	1654892	509	30.76	28.09 - 33.43	29.06	26.54 - 31.59
2013	1669955	557	33.35	30.58 - 36.12	31.35	28.74 - 33.95
2014	1686246	506	30.01	27.39 - 32.62	28.95	26.42 - 31.47
2015	1705326	506	29.67	27.09 - 32.26	28.70	26.20 - 31.20
2016	1726915	463	26.81	24.37 - 29.25	25.70	23.36 - 28.05
2017	1740030	518	29.77	27.21 - 32.33	30.38	27.77 - 33.00

Table 4b. Deaths of female children in NSW aged 0-17 years, 2003-17

Year	Population	Deaths	Crude Mortality Rate	95% Confidence Interval	Directly Standardised Mortality Rate	95% Confidence Interval
2003	777401	284	36.53	32.28 - 40.78	36.58	32.33 - 40.84
2004	774593	274	35.37	31.18 - 39.56	35.49	31.29 - 39.69
2005	773802	280	36.18	31.95 - 40.42	36.04	31.82 - 40.26
2006	775535	242	31.20	27.27 - 35.14	30.25	26.43 - 34.06
2007	780106	262	33.59	29.52 - 37.65	31.60	27.78 - 35.43
2008	784630	236	30.08	26.24 - 33.92	27.94	24.38 - 31.51
2009	789406	244	30.91	27.03 - 34.79	28.70	25.10 - 32.30
2010	795075	227	28.55	24.84 - 32.26	26.55	23.09 - 30.00
2011	797479	254	31.85	27.93 - 35.77	30.26	26.54 - 33.98
2012	803974	205	25.50	22.01 - 28.99	24.04	20.75 - 27.33
2013	811619	248	30.56	26.75 - 34.36	28.63	25.06 - 32.19
2014	819579	238	29.04	25.35 - 32.73	27.86	24.32 - 31.40
2015	829077	222	26.78	23.25 - 30.30	25.74	22.36 - 29.13
2016	839834	196	23.34	20.07 - 26.61	22.12	19.02 - 25.21
2017	846450	224	26.46	23.00 - 29.93	26.80	23.29 - 30.31

Table 4c. Deaths of male children in NSW aged 0-17 years, 2003-17

Year	Population	Deaths	Crude Mortality Rate	95% Confidence Interval	Directly Standardised Mortality Rate	95% Confidence Interval
2003	817513	368	45.01	40.42 - 49.61	45.39	40.75 - 50.03
2004	814752	343	42.10	37.64 - 46.55	42.34	37.86 - 46.82
2005	814880	379	46.51	41.83 - 51.19	46.32	41.65 - 50.98
2006	816277	380	46.55	41.87 - 51.23	45.65	41.06 - 50.23
2007	822163	343	41.72	37.30 - 46.13	39.52	35.34 - 43.71
2008	827582	369	44.59	40.04 - 49.14	42.35	38.03 - 46.67
2009	833860	330	39.57	35.31 - 43.84	37.32	33.29 - 41.35
2010	840132	369	43.92	39.44 - 48.40	41.39	37.17 - 45.62
2011	843998	324	38.39	34.21 - 42.57	36.96	32.94 - 40.99
2012	850918	304	35.73	31.71 - 39.74	33.83	30.03 - 37.64
2013	858336	309	36.00	31.99 - 40.01	33.96	30.17 - 37.74
2014	866667	268	30.92	27.22 - 34.63	29.97	26.39 - 33.56
2015	876249	284	32.41	28.64 - 36.18	31.53	27.86 - 35.19
2016	887081	267	30.10	26.49 - 33.71	29.11	25.62 - 32.60
2017	893580	294	32.90	29.14 - 36.66	33.79	29.93 - 37.66

Table 4d. Deaths of Aboriginal and Torres Strait Islander children in NSW aged 0-17 years, 2003-17

Year	Population	Deaths	Crude Mortality Rate	95% Confidence Interval	Directly Standardised Mortality Rate	95% Confidence Interval
2003	81825	48	58.66	43.25 - 77.78	60.56	43.25 - 77.78
2004	83067	45	54.17	39.51 - 72.49	57.12	39.51 - 72.49
2005	84380	51	60.44	45.00 - 79.47	61.84	45.00 - 79.47
2006	85895	62	72.18	55.34 - 92.53	73.44	55.34 - 92.53
2007	87454	56	64.03	48.37 - 83.15	64.40	48.37 - 83.15
2008	88377	53	59.97	44.92 - 78.44	62.75	44.92 - 78.44
2009	89247	32	35.86	24.53 - 50.62	35.72	24.53 - 50.62
2010	90026	60	66.65	50.86 - 85.79	70.01	50.86 - 85.79
2011	90436	57	63.03	47.74 - 81.66	65.57	47.74 - 81.66
2012	90840	47	51.74	38.02 - 68.80	52.61	38.02 - 68.80
2013	91079	68	74.66	57.98 - 94.65	77.40	57.98 - 94.65
2014	91472	48	52.48	38.69 - 69.57	53.38	38.69 - 69.57
2015	92077	45	48.87	35.65 - 65.39	48.44	35.65 - 65.39
2016	92856	54	58.15	43.69 - 75.88	56.00	43.69 - 75.88
2017	93794	47	50.11	36.82 - 66.64	47.96	36.82 - 66.64

Table 4e. Deaths of non-Indigenous children in NSW aged 0-17 years, 2003-17

Year	Population	Deaths	Crude Mortality Rate	95% Confidence Interval	Directly Standardised Mortality Rate	95% Confidence Interval
2003	1513089	597	39.46	36.29 - 42.62	39.60	36.43 - 42.78
2004	1506278	567	37.64	34.54 - 40.74	37.73	34.62 - 40.83
2005	1504302	606	40.28	37.08 - 43.49	40.07	36.88 - 43.26
2006	1505917	557	36.99	33.92 - 40.06	36.01	33.02 - 39.01
2007	1514815	548	36.18	33.15 - 39.20	34.11	31.25 - 36.96
2008	1523835	548	35.96	32.95 - 38.97	33.66	30.84 - 36.48
2009	1534019	534	34.81	31.86 - 37.76	32.40	29.65 - 35.14
2010	1545181	535	34.62	31.69 - 37.56	32.29	29.55 - 35.02
2011	1551041	521	33.59	30.71 - 36.47	32.00	29.25 - 34.75
2012	1564052	461	29.47	26.78 - 32.17	27.72	25.19 - 30.26
2013	1578876	487	30.84	28.11 - 33.58	28.87	26.31 - 31.44
2014	1594774	458	28.72	26.09 - 31.35	27.69	25.15 - 30.22
2015	1613249	458	28.39	25.79 - 30.99	27.47	24.96 - 29.99
2016	1634059	406	24.85	22.43 - 27.26	23.80	21.48 - 26.11
2017	1646236	468	28.43	25.85 - 31.00	29.12	26.48 - 31.75

Table 4f. Deaths of children in NSW by age group, 2003-17

NSW	Under 1 year					1-4 years			5-9 years			10-14 years			15-17 years		
Year	Births	Population	Deaths	IMR	CMR	Population	Deaths	CMR	Population	Deaths	CMR	Population	Deaths	CMR	Population	Deaths	CMR
2003	86344	85563	384	4.45	448.79	344948	98	28.41	443120	44	9.93	454411	41	9.02	266872	85	31.85
2004	85894	85285	366	4.26	429.15	343326	93	27.09	439663	42	9.55	454586	51	11.22	266485	65	24.39
2005	91224	86480	427	4.68	493.76	341744	79	23.12	437467	47	10.74	453635	40	8.82	269356	66	24.50
2006	92188	89501	387	4.20	432.40	342033	70	20.47	436668	44	10.08	450788	52	11.54	272822	69	25.29
2007	96351	94650	378	3.92	399.37	348186	73	20.97	435344	36	8.27	448605	49	10.92	275484	69	25.05
2008	100276	95642	390	3.89	407.77	358623	70	19.52	436096	50	11.47	446767	35	7.83	275084	60	21.81
2009	98231	97157	358	3.64	368.48	368809	66	17.90	437887	36	8.22	445894	44	9.87	273519	70	25.59
2010	101266	97771	371	3.66	379.46	376470	68	18.06	441071	35	7.94	445481	43	9.65	274414	79	28.79
2011	99054	94818	359	3.62	378.62	378587	67	17.70	447973	38	8.48	445949	42	9.42	274150	72	26.26
2012	98508	98264	310	3.15	315.48	383368	51	13.30	455643	45	9.88	444148	36	8.11	273469	67	24.50
2013	100462	99334	354	3.52	356.37	389601	70	17.97	465206	40	8.60	444846	37	8.32	270968	56	20.67
2014	91074	96432	315	3.46	326.66	396287	56	14.13	476622	42	8.81	446180	38	8.52	270725	55	20.32
2015	100079	98021	296	2.96	301.98	397963	56	14.07	488710	50	10.23	448513	34	7.58	272119	70	25.72
2016	96083	100820	260	2.71	257.89	400150	77	19.24	498238	29	5.82	453750	39	8.60	273957	58	21.17
2017	96591	91319	310	3.21	339.47	402890	51	12.66	504653	42	8.32	465964	50	10.73	275204	65	23.62

Table 5. Total deaths of children in NSW aged 0-17 years by cause, 2003-17

Total		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	465	451	490	443	430	472	428	455	438	378	430	385	380	342	389
	CMR	29.16	28.38	30.84	27.83	26.84	29.28	26.37	27.83	26.68	22.84	25.75	22.83	22.28	19.80	22.36
SUDI	N	62	52	55	58	68	46	46	56	48	48	53	51	45	35	48
	IMR	0.72	0.61	0.60	0.63	0.71	0.46	0.47	0.55	0.48	0.49	0.53	0.56	0.45	0.36	0.50
Injury	N	130	122	116	125	114	92	103	102	97	90	81	79	96	101	84
	CMR	8.15	7.68	7.30	7.85	7.11	5.71	6.35	6.24	5.91	5.44	4.85	4.68	5.63	5.85	4.83
Transport	N	58	55	46	66	45	31	44	35	33	37	27	23	34	32	34
	CMR	3.64	3.46	2.90	4.15	2.81	1.92	2.71	2.14	2.01	2.24	1.62	1.36	1.99	1.85	1.95
Drowning	N	20	15	10	16	22	19	13	14	17	13	13	9	9	15	7
	CMR	1.25	0.94	0.63	1.01	1.37	1.18	0.80	0.86	1.04	0.79	0.78	0.53	0.53	0.87	0.40
Suicide	N*	16	18	18	11	16	13	19	14	17	19	18	21	27	26	28
	CMR‡	2.22	2.50	2.49	1.52	2.21	1.80	2.64	1.94	2.36	2.65	2.51	2.93	3.75	3.57	3.78

*Children between 10 and 17 years of age.
‡ Rates are calculated on 10 - 17 years population.

Table 6a. Deaths of female children in NSW aged 0-17 years by cause, 2003-17

Female		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	211	208	213	192	192	192	189	186	195	160	199	182	168	148	183
	CMR	27.14	26.85	27.53	24.76	24.61	24.47	23.94	23.39	24.45	19.90	24.52	22.21	20.26	17.62	21.62
SUDI	N	25	20	24	20	30	20	18	19	23	19	22	24	21	18	21
	IMR	0.60	0.48	0.54	0.45	0.64	0.41	0.38	0.39	0.48	0.40	0.45	0.54	0.43	0.38	0.45
Injury	N	46	52	46	30	44	28	37	31	39	28	29	39	41	39	21
	CMR	5.92	6.71	5.94	3.87	5.64	3.57	4.69	3.90	4.89	3.48	3.57	4.76	4.95	4.64	2.48
Transport	N	21	23	15	18	16	7	20	11	15	10	9	14	14	6	12
	CMR	2.70	2.97	1.94	2.32	2.05	0.89	2.53	1.38	1.88	1.24	1.11	1.71	1.69	0.71	1.42
Drowning	N	4	7	5	3	10	6	6	3	4	3	2	2	3	5	3
	CMR	0.51	0.90	0.65	-	1.28	0.76	0.76	-	0.50	-	-	-	-	0.60	-
Suicide	N*	6	7	6	2	5	5	3	6	4	8	9	9	13	10	4
	CMR ‡	1.71	1.99	1.70	-	1.42	1.42	-	1.71	1.14	2.29	2.59	2.58	3.71	2.83	1.11

* Children between 10 and 17 years of age.
‡ Rates are calculated on 10 - 17 years population.

Table 6b. Deaths of male children in NSW aged 0-17 years by cause, 2003-17

Male		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	254	243	277	251	238	280	239	269	243	218	231	203	212	194	206
	CMR	31.07	29.83	33.99	30.75	28.95	33.83	28.66	32.02	28.79	25.62	26.91	23.42	24.19	21.87	23.05
SUDI	N	37	32	31	38	38	26	28	37	25	29	31	27	24	17	27
	IMR	0.83	0.72	0.66	0.80	0.77	0.51	0.56	0.71	0.49	0.57	0.60	0.58	0.47	0.35	0.55
Injury	N	84	70	70	95	70	64	66	71	58	62	52	40	55	62	63
	CMR	10.28	8.59	8.59	11.64	8.51	7.73	7.91	8.45	6.87	7.29	6.06	4.62	6.28	6.99	7.05
Transport	N	37	32	31	48	29	24	24	24	18	27	18	9	20	26	22
	CMR	4.53	3.93	3.80	5.88	3.53	2.90	2.88	2.86	2.13	3.17	2.10	1.04	2.28	2.93	2.46
Drowning	N	16	8	5	13	12	13	7	11	13	10	11	7	6	10	4
	CMR	1.96	0.98	0.61	1.59	1.46	1.57	0.84	1.31	1.54	1.17	1.28	0.81	0.69	1.13	0.45
Suicide	N*	10	11	12	9	11	8	16	8	13	11	9	12	14	16	24
	CMR ǂ	2.71	2.98	3.24	2.42	2.96	2.16	4.33	2.16	3.51	2.98	2.45	3.26	3.78	4.28	6.30

* Children between 10 and 17 years of age.
ǂ Rates are calculated on 10 - 17 years population.

Table 7a. Deaths of Aboriginal and Torres Strait Islander children in NSW aged 0-17 years by cause, 2003-17

Aboriginal and Torres Strait Islander		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	25	28	31	35	40	35	15	40	35	29	42	32	19	35	35
	CMR	30.55	33.71	36.74	40.75	45.74	39.60	16.81	44.43	38.70	31.92	46.11	34.98	20.63	37.69	37.32
SUDI	N	15	11	8	12	12	7	4	7	10	7	15	11	16	8	9
	IMR	4.61	3.11	2.12	2.86	2.51	1.38	0.77	1.23	1.78	1.27	2.52	2.16	2.63	1.39	1.47
Injury	N	13	11	12	15	6	11	15	16	17	12	15	7	14	14	6
	CMR	15.89	13.24	14.22	17.46	6.86	12.45	16.81	17.77	18.80	13.21	16.47	7.65	15.20	15.08	6.40
Transport	N	7	3	4	10	2	3	7	5	4	5	6	3	6	3	0
	CMR	8.55	-	4.74	11.64	-	-	7.84	5.55	4.42	5.50	6.59	-	6.52	-	-
Drowning	N	4	0	1	2	0	5	1	1	6	0	2	0	2	0	0
	CMR	4.89	-	-	-	-	5.66	-	-	6.63	-	-	-	-	-	-
Suicide	N*	1	0	1	0	0	1	2	2	2	4	1	2	4	6	5
	CMR ǂ	-	-	-	-	-	-	-	-	-	10.06	-	-	10.20	15.21	12.60

* Children between 10 and 17 years of age. ǂ Rates are calculated on 10 - 17 years population.

Table 7b. Deaths of non-indigenous children in NSW aged 0-17 years by cause, 2003-17

Non-Indigenous		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	433	421	458	407	389	436	405	414	403	348	387	353	359	307	354
	CMR	28.62	27.95	30.45	27.03	25.68	28.61	26.40	26.79	25.98	22.25	24.51	22.13	22.25	18.79	21.50
SUDI	N	47	40	46	45	56	38	42	49	38	41	37	40	28	27	38
	IMR	0.57	0.49	0.53	0.51	0.61	0.40	0.45	0.51	0.41	0.44	0.39	0.47	0.30	0.30	0.42
Injury	N	117	110	104	109	108	79	88	86	80	78	66	72	81	84	77
	CMR	7.73	7.30	6.91	7.24	7.13	5.18	5.74	5.57	5.16	4.99	4.18	4.51	5.02	5.14	4.68
Transport	N	51	51	42	55	43	28	37	30	29	32	21	20	28	29	34
	CMR	3.37	3.39	2.79	3.65	2.84	1.84	2.41	1.94	1.87	2.05	1.33	1.25	1.74	1.77	2.07
Drowning	N	16	15	9	14	22	14	12	13	11	13	11	9	6	15	7
	CMR	1.06	1.00	0.60	0.93	1.45	0.92	0.78	0.84	0.71	0.83	0.70	0.56	0.37	0.92	0.43
Suicide	N*	15	18	17	11	16	10	17	12	15	15	17	19	23	19	23
	CMR ǂ	2.17	2.62	2.47	1.60	2.33	1.46	2.50	1.76	2.20	2.21	2.51	2.80	3.38	2.76	3.28

* Children between 10 and 17 years of age ǂ Rates are calculated on 10 - 17 years population

Table 8a. Deaths of infants in NSW aged under one year by cause, 2003-17

Under 1		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	332	320	370	320	315	351	308	323	315	269	304	267	260	232	270
	IMR	3.85	3.73	4.06	3.47	3.27	3.50	3.14	3.19	3.18	2.73	3.03	2.93	2.60	2.41	2.80
Injury	N	6	11	12	17	9	3	12	13	6	8	8	9	13	10	7
	IMR	0.07	0.13	0.13	0.18	0.09	-	0.12	0.13	0.06	0.08	0.08	0.10	0.13	0.10	0.07
Transport	N	1	2	2	3	0	1	2	2	1	1	0	1	1	0	0
	IMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drowning	N	1	1	1	2	0	1	2	1	0	1	3	1	0	1	0
	IMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suicide	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	IMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*SUDI presented separately

Table 8b. Deaths of infants classified as SUDI in NSW, 2003-17

SUDI		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Under 1 week	N	4	1	4	2	2	4	3	6	2	3	1	4	1	3	4
	IMR	0.05	-	0.04	-	-	0.04	-	0.06	-	-	-	0.04	-	-	0.04
1 week – under 29 days	N	8	4	6	5	10	4	3	7	6	8	12	8	7	2	7
	IMR	0.09	0.05	0.07	0.05	0.10	0.04	-	0.07	0.06	0.08	0.12	0.09	0.07	-	0.07
29 days – 3 months	N	30	27	32	33	35	16	27	25	21	23	25	21	28	18	26
	IMR	0.35	0.31	0.35	0.36	0.36	0.16	0.27	0.25	0.21	0.23	0.25	0.23	0.28	0.19	0.27
4 – 6 months	N	15	12	11	11	17	17	9	13	13	7	11	12	5	8	5
	IMR	0.17	0.14	0.12	0.12	0.18	0.17	0.09	0.13	0.13	0.07	0.11	0.13	0.05	0.08	0.05
6 months – under 1 year	N	5	8	2	7	4	5	4	5	6	7	4	6	4	4	6
	IMR	0.06	0.09	-	0.08	0.04	0.05	0.04	0.05	0.06	0.07	0.04	0.07	0.04	0.04	0.06

Table 8c. Deaths of children in NSW aged 1-4 years by cause, 2003-17

1-4 years		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	53	54	45	42	36	37	40	45	40	32	49	39	38	53	34
	CMR	15.36	15.73	13.17	12.18	10.34	10.32	10.85	11.95	10.57	8.35	12.58	9.84	9.55	13.25	8.44
Injury	N	39	34	28	25	32	28	22	20	26	12	17	16	16	22	15
	CMR	11.31	9.90	8.19	7.31	9.19	7.81	5.97	5.31	6.87	3.13	4.36	4.04	4.02	5.50	3.72
Transport	N	18	10	6	9	9	5	8	3	6	2	3	6	6	8	6
	CMR	5.22	2.91	1.76	2.63	2.58	1.39	2.17	-	1.58	-	-	1.51	1.51	2.00	1.49
Drowning	N	10	10	7	10	13	14	5	8	9	7	6	3	7	9	6
	CMR	2.90	2.91	2.05	2.92	3.73	3.90	1.36	2.13	2.38	1.83	1.54	0.76	1.76	2.25	1.49
Suicide	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8d. Deaths of children in NSW aged 5-9 years by cause, 2003-17

5-9 years		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	29	26	30	25	25	39	24	24	28	31	25	30	35	25	27
	CMR	6.54	5.91	6.86	5.73	5.74	8.94	5.48	5.44	6.25	6.80	5.37	6.29	7.16	5.02	5.35
Injury	N	15	16	16	19	10	11	12	11	10	14	15	11	13	4	11
	CMR	3.39	3.64	3.66	4.35	2.30	2.52	2.74	2.49	2.23	3.07	3.22	2.31	2.66	0.80	2.18
Transport	N	6	11	7	12	3	2	4	6	4	9	9	2	7	0	10
	CMR	1.35	2.50	1.60	2.75	-	-	0.91	1.36	0.89	1.98	1.93	-	1.43	-	1.98
Drowning	N	4	1	1	2	5	2	3	2	3	3	1	3	2	1	0
	CMR	0.90	-	-	-	1.15	-	-	-	-	-	-	-	-	-	-
Suicide	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8e. Deaths of children in NSW aged 10-15 years by cause, 2003-17

10-15 years		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	20	29	29	31	28	26	30	34	29	21	29	25	17	20	33
	CMR	4.40	6.38	6.39	6.88	6.24	5.82	6.73	7.63	6.50	4.73	6.52	5.60	3.79	4.41	7.08
Injury	N	21	19	10	21	21	9	14	9	12	15	8	12	16	19	14
	CMR	4.62	4.18	2.20	4.66	4.68	2.01	3.14	2.02	2.69	3.38	1.80	2.69	3.57	4.19	3.00
Transport	N	12	8	6	12	12	4	10	4	4	9	1	3	6	7	4
	CMR	2.64	1.76	1.32	2.66	2.67	0.90	2.24	0.90	0.90	2.03	-	-	1.34	1.54	0.86
Drowning	N	0	2	0	1	0	0	1	1	2	1	1	1	0	3	1
	CMR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suicide	N	4	7	1	4	4	3	0	2	3	2	4	4	5	4	8
	CMR	0.88	1.54	0.22	0.89	0.89	0.67	-	0.45	0.67	0.45	0.90	0.90	1.11	0.88	1.72

Table 8f. Deaths of children in NSW aged 15-17 years by cause, 2003-17

15-17 years		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural causes	N	31	22	16	25	26	19	26	29	26	25	23	24	30	12	25
	CMR	11.62	8.26	5.94	9.16	9.44	6.91	9.51	10.57	9.48	9.14	8.49	8.87	11.02	4.38	9.08
Injury	N	49	42	50	43	42	41	43	49	43	41	33	31	38	46	37
	CMR	18.36	15.76	18.56	15.76	15.25	14.90	15.72	17.86	15.68	14.99	12.18	11.45	13.96	16.79	13.44
Transport	N	21	24	25	30	21	19	20	20	18	16	14	11	14	17	14
	CMR	7.87	9.01	9.28	11.00	7.62	6.91	7.31	7.29	6.57	5.85	5.17	4.06	5.14	6.21	5.09
Drowning	N	5	1	1	1	1	2	2	1	3	1	2	1	0	1	0
	CMR	1.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suicide	N	12	11	17	7	12	10	19	12	14	17	14	17	22	22	20
	CMR	4.50	4.13	6.31	2.57	4.36	3.64	6.95	4.37	5.11	6.22	5.17	6.28	8.08	8.03	7.27

Table 9a. Deaths of children in NSW aged 0-17 years by cause and remoteness, 2016 and 2017

Remoteness			2016	2017
All deaths	Major cities	N	318	361
		CMR	25.19	28.15
	Regional areas	N	133	143
		CMR	30.65	32.85
	Remote areas	N	5	5
		CMR	55.02	55.74
Natural causes	Major cities	N	249	289
		CMR	19.73	22.53
	Regional areas	N	84	87
		CMR	19.36	19.98
	Remote areas	N	2	5
		CMR	-	55.74
SUDI	Major cities	N	22	24
		IMR	0.30	0.32
	Regional areas	N	13	23
		IMR	0.65	1.11
	Remote areas	N	0	0
		IMR	-	-
Injury	Major cities	N	56	46
		CMR	4.44	3.59
	Regional areas	N	42	37
		CMR	9.68	8.50
	Remote areas	N	3	0
		CMR	-	-
Transport	Major cities	N	19	17
		CMR	1.51	1.33
	Regional areas	N	11	16
		CMR	2.53	3.68
	Remote areas	N	2	0
		CMR	-	-
Drowning	Major cities	N	9	5
		CMR	0.71	0.39
	Regional areas	N	6	2
		CMR	1.38	-
	Remote areas	N	0	0
		CMR	-	-
Suicide	Major cities	N	8	17
		CMR	1.53	3.20
	Regional areas	N	18	11
		CMR	9.31	5.68
	Remote areas	N	0	0
		CMR	-	-

Table 9b. Deaths of children in NSW aged 0-17 years by cause and socioeconomic status, 2016 and 2017

Socio-economic status (IRSD) & Education and Occupation (IEO)			Socio-economic Disadvantage (IRSD)		Education and Occupation (IEO)	
			2016	2017	2016	2017
All deaths	Quintile 5 (least disadvantaged)	N	61	77	72	93
		CMR	15.14	18.67	19.12	24.22
	Quintile 4	N	69	67	77	72
		CMR	22.64	21.53	22.37	20.59
	Quintile 3	N	84	95	97	96
		CMR	28.40	31.74	29.13	28.4
	Quintile 2	N	88	116	91	112
		CMR	27.34	35.85	28.01	34.21
	Quintile 1 (most disadvantaged)	N	151	151	91	133
		CMR	40.38	40.49	36.12	41.46
Natural causes	Quintile 5 (least disadvantaged)	N	51	60	58	75
		CMR	12.66	14.55	15.40	19.53
	Quintile 4	N	54	50	60	59
		CMR	17.72	16.07	17.43	16.87
	Quintile 3	N	62	67	75	68
		CMR	20.96	22.38	22.53	20.11
	Quintile 2	N	59	82	63	77
		CMR	18.33	25.34	19.39	23.52
	Quintile 1 (most disadvantaged)	N	107	120	77	100
		CMR	28.62	32.18	23.97	31.17
SUDI	Quintile 5 (least disadvantaged)	N	1	5	0	5
		CMR	-	0.24	-	0.21
	Quintile 4	N	1	7	4	6
		CMR	-	0.38	0.21	0.31
	Quintile 3	N	7	5	4	12
		CMR	0.41	0.28	0.21	0.62
	Quintile 2	N	7	12	11	11
		CMR	0.35	0.59	0.60	0.59
	Quintile 1 (most disadvantaged)	N	19	18	16	13
		CMR	0.84	0.78	0.87	0.69
Injury	Quintile 5 (least disadvantaged)	N	9	10	14	12
		CMR	2.23	2.42	3.72	3.12
	Quintile 4	N	14	9	15	7
		CMR	4.59	2.89	4.36	2.00
	Quintile 3	N	19	21	18	15
		CMR	6.42	7.02	5.41	4.44
	Quintile 2	N	25	23	22	26
		CMR	7.77	7.11	6.77	7.94
	Quintile 1 (most disadvantaged)	N	33	20	31	23
		CMR	8.83	5.36	9.65	7.17

continued overleaf

Socio-economic status (IRSD) & Education and Occupation (IEO)			Socio-economic Disadvantage (IRSD)		Education and Occupation (IEO)	
			2016	2017	2016	2017
Transport	Quintile 5 (least disadvantaged)	N	2	3	2	3
		CMR	-	-	-	-
	Quintile 4	N	4	3	8	2
		CMR	1.31	-	2.32	-
	Quintile 3	N	10	11	7	7
		CMR	3.38	3.67	2.10	2.07
	Quintile 2	N	9	10	7	12
		CMR	2.80	3.09	2.15	3.67
	Quintile 1 (most disadvantaged)	N	6	6	7	9
		CMR	1.60	1.61	2.18	2.81
Drowning	Quintile 5 (least disadvantaged)	N	3	0	2	1
		CMR	-	-	-	-
	Quintile 4	N	2	1	4	0
		CMR	-	-	1.16	-
	Quintile 3	N	3	2	2	2
		CMR	-	-	-	-
	Quintile 2	N	3	1	3	2
		CMR	-	-	-	-
	Quintile 1 (most disadvantaged)	N	4	3	4	2
		CMR	1.07	-	1.25	-
Suicide	Quintile 5 (least disadvantaged)	N	1	6	5	8
		CMR		3.27	3.25	5.06
	Quintile 4	N	3	4	1	2
		CMR	-	3.08	-	-
	Quintile 3	N	3	4	4	1
		CMR	-	3.19	2.81	-
	Quintile 2	N	6	7	7	7
		CMR	4.46	5.23	5.04	5.05
	Quintile 1 (most disadvantaged)	N	13	7	9	10
		CMR	8.40	4.58	6.59	7.39

Table 9c. Deaths of children in NSW aged 0-17 years by cause and socioeconomic status, 2016 and 2017

Most disadvantaged IRSD and IEO		2016	2017
All deaths	N	91	93
	Percentage	20	18
Natural causes	N	60	71
	Percentage	18	18
SUDI	N	12	11
	Percentage	34	23
Injury	N	24	14
	Percentage	24	17
Transport	N	5	5
	Percentage	16	15
Drowning	N	4	2
	Percentage	27	29
Suicide	N	8	5
	Percentage	31	18

*Children in Quintile 1 for both IRSD and IEO indicators

Table 10a. Total deaths of children in NSW by cause, five year trends

All deaths	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Mortality Rate	95% Confidence Interval	No.	%	Mortality Rate	95% Confidence Interval	No.	%	Mortality Rate	95% Confidence Interval
Total	**3,155**	**100**	**39.60**	**38.22 - 40.98**	**2,862**	**100**	**35.04**	**33.76 - 36.33**	**2,550**	**100**	**29.90**	**28.74 - 31.06**
Gender												
Female	1,342	43	34.57	32.72 - 36.42	1166	41	29.37	27.68 - 31.05	1128	44	27.20	25.62 - 28.79
Male	1,813	57	44.38	42.33 - 46.42	1696	59	40.41	38.49 - 42.34	1422	56	32.45	30.76 - 34.14
Age												
Under 1 year	1,942	62	439.89 (IMR = 4.30) †	420.32 - 459.45	1788	62	369.69 (IMR = 3.60) †	352.55 - 386.82	1535	60	315.89 (IMR = 3.17) †	300.09 - 331.69
1-4 years	413	13	24.01	21.69 - 26.32	322	11	17.26	15.37 - 19.14	310	12	15.60	13.87 - 17.34
5-9 years	213	7	9.72	8.41 - 11.02	204	7	9.19	7.93 - 10.46	203	8	8.34	7.19 - 9.49
10-14 years	233	7	10.30	8.98 - 11.62	200	7	8.98	7.73 - 10.22	198	8	8.76	7.54 - 9.98
15-17 years	354	11	26.20	23.47 - 28.93	348	12	25.39	22.72 - 28.06	304	12	22.30	19.80 - 24.81
Aboriginal and Torres Strait Islander status*												
Aboriginal and Torres Strait Islander	262	8	61.99	54.49 - 69.50	249	9	55.47	48.58 - 62.36	262	10	56.80	49.92 - 63.68
Not Aboriginal and Torres Strait Islander	2,875	91	38.11	36.71 - 39.50	2599	91	33.67	32.38 - 34.97	2277	89	28.23	27.07 - 29.38
Remoteness **												
Major cities	2,181	69	-	-	2026	71	-	-	1792	71	28.86	27.52 - 30.19
Regional areas	917	29	-	-	791	28	-	-	704	28	32.29	29.90 - 34.67
Remote areas	31	1	-	-	24	1	-	-	25	1	53.06	34.34 - 78.33
Socio-economic status (IRSD) ***												
Quintile 5 (least disadvantaged)	555	18	-	-	421	15	-	-	374	15	19.27	17.32 - 21.22
Quintile 4	459	15	-	-	446	16	-	-	342	13	22.42	20.04 - 24.79
Quintile 3	490	16	-	-	478	17	-	-	444	17	29.78	27.01 - 32.55
Quintile 2	642	20	-	-	587	21	-	-	530	21	33.17	30.34 - 35.99
Quintile 1 (most disadvantaged)	967	31	-	-	898	31	-	-	814	32	43.72	40.72 - 46.73
Education and Occupation (IEO) ****												
Quintile 5 (least disadvantaged)	464	15	-	-	431	15	-	-	412	16	23.15	20.92 - 25.39
Quintile 4	537	17	-	-	476	17	-	-	401	16	23.67	21.35 - 25.98
Quintile 3	553	18	-	-	512	18	-	-	488	19	29.50	26.89 - 32.12
Quintile 2	728	23	-	-	650	23	-	-	521	20	31.53	28.83 - 34.24
Quintile 1 (most disadvantaged)	831	26	-	-	761	27	-	-	683	27	41.68	38.56 - 44.81
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	621	20	-	-	581	20	-	-	517	20	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 18 children in 2003-2007, 14 children in 2008-12 and 11 children in 2013-17.

**Remoteness was not available for 26 children in 2003-2007, 21 children in 2008-12 and 29 children in 2013-17.

***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 42 children in 2003-07, 32 children in 2008-12 and 46 children in 2013-17.

****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 42 children in 2003-07, 32 children in 2008-12 and 46 children in 2013-17.

*****Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10b. Deaths of children from natural causes in NSW, five year trends

Natural causes	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Mortality Rate	95% Confidence Interval	No.	%	Mortality Rate	95% Confidence Interval	No.	%	Mortality Rate	95% Confidence Interval
Total	**2,279**	**100**	**28.61**	**27.43 - 29.78**	**2,171**	**100**	**26.58**	**25.46 - 27.70**	**1926**	**100**	**22.58**	**21.57 - 23.59**
Gender												
Female	1,016	45	26.18	24.57 - 27.79	922	42	23.22	21.72 - 24.72	880	46	21.22	19.82 - 22.62
Male	1,263	55	30.91	29.21 - 32.62	1,249	58	29.76	28.11 - 31.41	1,046	54	23.87	22.42 - 25.32
Age												
Under 1 year	1,657	73	375.33 (IMR = 3.67) †	357.26 - 393.40	1,566	72	323.79 (IMR = 3.15) †	307.75 - 339.82	1,333	69	274.32 (IMR = 2.75) †	259.60 - 289.05
1-4 years	230	10	13.37	11.64 - 15.10	194	9	10.40	8.93 - 11.86	213	11	10.72	9.28 - 12.16
5-9 years	135	6	6.16	5.12 - 7.20	146	7	6.58	5.51 - 7.65	142	7	5.84	4.88 - 6.80
10-14 years	137	6	6.06	5.04 - 7.07	140	6	6.28	5.24 - 7.32	124	6	5.49	4.52 - 6.45
15-17 years	120	5	8.88	7.29 - 10.47	125	6	9.12	7.52 - 10.72	114	6	8.36	6.83 - 9.90
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	159	7	37.62	31.77 - 43.47	154	7	34.30	28.89 - 39.72	163	8	35.34	29.91 - 40.76
Not Aboriginal and Torres Strait Islander	2,108	92	27.94	26.75 - 29.13	2,006	92	25.99	24.85 - 27.13	1,760	91	21.82	20.80 - 22.84
Remoteness **												
Major cities	1,681	74	-	-	1,629	75	-	-	1,431	74	23.04	21.85 - 24.24
Regional areas	558	24	-	-	509	23	-	-	457	24	20.96	19.04 - 22.88
Remote areas	18	1	-	-	13	1	-	-	16	1	33.96	19.41 - 55.15
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	438	19	-	-	342	16	-	-	307	16	15.82	14.05 - 17.59
Quintile 4	327	14	-	-	331	15	-	-	262	14	17.17	15.09 - 19.25
Quintile 3	355	16	-	-	381	18	-	-	335	17	22.47	20.06 - 24.87
Quintile 2	461	20	-	-	428	20	-	-	387	20	24.22	21.81 - 26.63
Quintile 1 (most disadvantaged)	670	29	-	-	659	30	-	-	600	31	32.23	29.65 - 34.81
Education and Occupation ****												
Quintile 5 (least disadvantaged)	375	16	-	-	359	17	-	-	339	18	17.46	15.61 - 19.32
Quintile 4	400	18	-	-	359	17	-	-	321	17	21.04	18.74 - 23.34
Quintile 3	397	17	-	-	388	18	-	-	376	20	25.22	22.67 - 27.77
Quintile 2	518	23	-	-	508	23	-	-	372	19	23.28	20.91 - 25.65
Quintile 1 (most disadvantaged)	561	25	-	-	521	24	-	-	483	25	25.94	23.63 - 28.26
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	415	18	-	-	395	18	-	-	368	19	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 12 children in 2003-07, 11 children in 2008-12 and 3 children in 2013-17.
**Remoteness was not available for 22 children in 2003-07, 20 children in 2008-12 and 22 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 28 children in 2003-07, 30 children in 2008-12 and 35 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 28 children in 2003-07, 30 children in 2008-12 and 35 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10c. Deaths of children from perinatal conditions in NSW, five year trends

Perinatal conditions	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**1,070**	**100**	**2.37**	**2.23 - 2.51**	**949**	**100**	**1.91**	**1.79 - 2.03**	**823**	**100**	**1.70**	**1.58 - 1.82**
Gender												
Female	472	44	2.16	1.96 - 2.35	384	40	1.59	1.43 - 1.74	355	43	1.51	1.35 - 1.66
Male	598	56	2.57	2.36 - 2.77	565	60	2.21	2.03 - 2.40	468	57	1.88	1.71 - 2.05
Age												
Under 1 day	565	53	1.25	1.15 - 1.35	546	58	1.10	1.01 - 1.19	494	60	1.02	0.93 - 1.11
1 day – under 1 week	304	28	0.67	0.60 - 0.75	241	25	0.48	0.42 - 0.55	169	21	0.35	0.30 - 0.40
1 week – 28 days	130	12	0.29	0.24 - 0.34	99	10	0.20	0.16 - 0.24	92	11	0.19	0.15 - 0.23
29 days – under 1 year	64	6	0.14	0.11 - 0.18	51	5	0.10	0.08 - 0.13	64	8	0.13	0.10 - 0.17
1 year and over	7	1	0.02	0.01 - 0.03	12	1	0.02	0.01 - 0.04	4	0	0.01	0.00 - 0.02
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	82	8	4.20	3.34 - 5.21	80	8	2.95	2.34 - 3.68	85	10	2.93	2.34 - 3.62
Not Aboriginal and Torres Strait Islander	980	92	2.27	2.12 - 2.41	862	91	1.83	1.71 - 1.96	737	90	1.62	1.50 - 1.74
Remoteness **												
Major cities	787	74	2.31	2.15 - 2.47	726	77	1.91	1.77 - 2.05	607	74	1.63	1.50 - 1.76
Regional areas	269	25	2.57	2.26 - 2.88	214	23	1.90	1.64 - 2.15	196	24	1.90	1.63 - 2.17
Remote areas	11	1	3.54	1.77 - 6.34	4	0	1.29	0.35 - 3.31	6	1	2.18	0.80 - 4.75
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	214	20	-	-	152	16	-	-	135	16	CMR 1.36	1.13 - 1.59
Quintile 4	155	14	-	-	151	16	-	-	104	13	CMR 1.18	0.95 - 1.40
Quintile 3	174	16	-	-	163	17	-	-	137	17	CMR 1.57	1.31 - 1.84
Quintile 2	217	20	-	-	186	20	-	-	167	20	CMR 1.72	1.46 - 1.98
Quintile 1 (most disadvantaged)	303	28	-	-	287	30	-	-	256	31	CMR 2.30	2.02 - 2.58
Education and Occupation ******												
Quintile 5 (least disadvantaged)	205	19	-	-	165	17	-	-	153	19	CMR 1.37	1.15 - 1.58
Quintile 4	190	18	-	-	167	18	-	-	144	17	CMR 1.52	1.27 - 1.76
Quintile 3	197	18	-	-	156	16	-	-	139	17	CMR 1.49	1.24 - 1.74
Quintile 2	200	19	-	-	208	22	-	-	151	18	CMR 1.64	1.38 - 1.90
Quintile 1 (most disadvantaged)	271	25	-	-	243	26	-	-	212	26	CMR 2.33	2.02 - 2.64
Most disadvantaged IRSD and IEO *******												
Quintile 1 (IRSD) and Quintile 1 (IEO)	205	19	-	-	191	20	-	-	157	19	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 8 children in 2003-07, 7 children in 2008-12 and 1 child in 2013-17.
**Remoteness was not available for 3 children in 2003-07, 5 children in 2008-12 and 14 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 7 children in 2003-07, 10 children in 2008-12 and 24 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 7 children in 2003-07, 10 children in 2008-12 and 24 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10d. Deaths of children from congenital conditions in NSW, five year trends

Congenital & Chromosomal	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**458**	**100**	**5.75**	**5.22 - 6.28**	**559**	**100**	**6.84**	**6.28 - 7.41**	**432**	**100**	**5.07**	**4.59 - 5.54**
Gender												
Female	205	45	5.28	4.56 - 6.00	257	46	6.47	5.68 - 7.26	210	49	5.06	4.38 - 5.75
Male	253	55	6.19	5.43 - 6.96	302	54	7.20	6.38 - 8.01	222	51	5.07	4.40 - 5.73
Age												
Under 1 year	398	87	90.15 (IMR = 0.88) †	81.29 - 99.01	463	83	95.73 (IMR = 0.93) †	87.01 - 104.45	369	85	75.94 (IMR = 0.76) †	68.19 - 83.69
1-4 years	35	8	2.03	1.42 - 2.83	36	6	1.93	1.35 - 2.67	33	8	1.66	1.14 - 2.33
5-9 years	11	2	0.50	0.25 - 0.90	17	3	0.77	0.45 - 1.23	13	3	0.53	0.28 - 0.91
10-14 years	8	2	0.35	0.15 - 0.70	26	5	1.17	0.76 - 1.71	11	3	0.49	0.24 - 0.87
15-17 years	6	1	0.44	0.16 - 0.97	17	3	1.24	0.72 - 1.99	6	1	0.44	0.16 - 0.96
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	26	6	6.15	4.02 - 9.01	37	7	8.24	5.80 - 11.36	31	7	6.72	4.57 - 9.54
Not Aboriginal and Torres Strait Islander	429	94	5.69	5.15 - 6.22	520	93	6.74	6.16 - 7.32	401	93	4.97	4.48 - 5.46
Remoteness **												
Major cities	359	78	-	-	427	76	-	-	322	75	5.19	4.62 - 5.75
Regional areas	93	20	-	-	121	22	-	-	100	23	4.59	3.69 - 5.49
Remote areas	1	0	-	-	5	1	-	-	6	1	12.73	4.67 - 27.72
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	83	18	-	-	84	15	-	-	63	15	3.25	2.49 - 4.15
Quintile 4	63	14	-	-	90	16	-	-	63	15	4.13	3.17 - 5.28
Quintile 3	68	15	-	-	94	17	-	-	71	16	4.76	3.72 - 6.01
Quintile 2	93	20	-	-	113	20	-	-	85	20	5.32	4.25 - 6.58
Quintile 1 (most disadvantaged)	146	32	-	-	170	30	-	-	145	34	7.79	6.52 - 9.06
Education and Occupation ****												
Quintile 5 (least disadvantaged)	67	15	-	-	94	17	-	-	73	17	4.10	3.22 - 5.16
Quintile 4	82	18	-	-	86	15	-	-	74	17	4.37	3.43 - 5.48
Quintile 3	69	15	-	-	104	19	-	-	92	21	5.56	4.48 - 6.82
Quintile 2	114	25	-	-	145	26	-	-	81	19	4.9	3.89 - 6.09
Quintile 1 (most disadvantaged)	121	26	-	-	122	22	-	-	107	25	6.53	5.29 - 7.77
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	85	19	-	-	83	15	-	-	87	20	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 3 children in 2003-07 and 2 children in 2008-12.
**Remoteness was not available for 5 children in 2003-07, 6 children in 2008-12 and 4 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 5 children in 2003-07, 8 children in 2008-12 and 5 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 5 children in 2003-07, 8 children in 2008-12 and 5 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10e. Deaths of children from tumours and cancers in NSW, five year trends

Tumours and cancers	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**224**	**100**	**2.81**	**2.44 - 3.18**	**192**	**100**	**2.35**	**2.02 - 2.68**	**219**	**100**	**2.57**	**2.23 - 2.91**
Gender												
Female	109	49	2.81	2.28 - 3.34	86	45	2.17	1.73 - 2.67	109	50	2.63	2.14 - 3.12
Male	115	51	2.81	2.30 - 3.33	106	55	2.53	2.05 - 3.01	110	50	2.51	2.04 - 2.98
Age												
Under 1 year	21	9	4.76 (IMR = 0.05) †	2.94 - 7.27	13	7	2.69 (IMR = 0.03) †	1.43 - 4.60	8	4	1.65 (IMR = 0.02) †	0.71 - 3.24
1-4 years	57	25	3.31	2.51 - 4.29	44	23	2.36	1.71 - 3.17	62	28	3.12	2.39 - 4.00
5-9 years	50	22	2.28	1.69 - 3.01	52	27	2.34	1.75 - 3.07	63	29	2.59	1.99 - 3.31
10-14 years	41	18	1.81	1.30 - 2.46	45	23	2.02	1.47 - 2.70	42	19	1.86	1.34 - 2.51
15-17 years	55	25	4.07	3.07 - 5.30	38	20	2.77	1.96 - 3.81	44	20	3.23	2.35 - 4.33
Aboriginal and Torres Strait Islander status *												
Not Aboriginal and Torres Strait Islander	10	4	2.37	1.13 - 4.35	6	3	1.34	0.49 - 2.91	10	5	2.17	1.04 - 3.99
Aboriginal and Torres Strait Islander	214	96	2.84	2.46 - 3.22	185	96	2.40	2.05 - 2.74	209	95	2.59	2.24 - 2.94
Remoteness **												
Major cities	153	68	-	-	140	73	-	-	175	80	2.82	2.40 - 3.24
Regional areas	64	29	-	-	47	24	-	-	42	19	1.93	1.39 - 2.60
Remote areas	1	0	-	-	0	0	-	-	0	0	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	50	22	-	-	35	18	-	-	51	23	2.63	1.96 - 3.45
Quintile 4	41	18	-	-	31	16	-	-	22	10	1.44	0.90 - 2.18
Quintile 3	37	17	-	-	38	20	-	-	49	22	3.29	2.43 - 4.34
Quintile 2	40	18	-	-	38	20	-	-	47	21	2.94	2.16 - 3.91
Quintile 1 (most disadvantaged)	48	21	-	-	44	23	-	-	48	22	2.58	1.90 - 3.42
Education and Occupation ****												
Quintile 5 (least disadvantaged)	35	16	-	-	33	17	-	-	53	24	2.98	2.23 - 3.90
Quintile 4	46	21	-	-	43	22	-	-	36	16	2.12	1.49 - 2.94
Quintile 3	41	18	-	-	29	15	-	-	48	22	2.90	2.14 - 3.85
Quintile 2	52	23	-	-	46	24	-	-	39	18	2.36	1.68 - 3.23
Quintile 1 (most disadvantaged)	42	19	-	-	35	18	-	-	41	19	2.50	1.80 - 3.39
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	28	13	-	-	28	15	-	-	32	15	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 1 child in 2008-12.
**Remoteness was not available for 6 children in 2003-07, 5 children in 2008-12 and 2 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 8 children in 2003-07, 6 children in 2008-12 and 2 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 8 children in 2003-07, 6 children in 2008-12 and 2 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10f. Deaths of children from nervous system diseases in NSW, five year trends

Nervous system	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**177**	**100**	**2.22**	**1.89 - 2.55**	**134**	**100**	**1.64**	**1.36 - 1.92**	**131**	**100**	**1.54**	**1.27 - 1.80**
Gender												
Female	77	44	1.98	1.57 - 2.48	61	46	1.54	1.18 - 1.97	65	50	1.57	1.21 - 2.00
Male	100	56	2.45	1.97 - 2.93	73	54	1.74	1.36 - 2.19	66	50	1.51	1.16 - 1.92
Age												
Under 1 year	60	34	13.59 (IMR = 0.13) †	10.37 - 17.49	35	26	7.24 (IMR = 0.07) †	5.04 - 10.06	49	37	10.08 (IMR = 0.10) †	7.46 - 13.33
1-4 years	35	20	2.03	1.42 - 2.83	31	23	1.66	1.13 - 2.36	20	15	1.01	0.61 - 1.55
5-9 years	26	15	1.19	0.77 - 1.74	18	13	0.81	0.48 - 1.28	23	18	0.95	0.60 - 1.42
10-14 years	32	18	1.41	0.97 - 2.00	25	19	1.12	0.73 - 1.66	20	15	0.89	0.54 - 1.37
15-17 years	24	14	1.78	1.14 - 2.64	25	19	1.82	1.18 - 2.69	19	15	1.39	0.84 - 2.18
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	6	3	1.42	0.52 - 3.09	7	5	1.56	0.63 - 3.21	12	9	2.60	1.34 - 4.54
Not Aboriginal and Torres Strait Islander	171	97	2.27	1.93 - 2.61	127	95	1.65	1.36 - 1.93	119	91	1.48	1.21 - 1.74
Remoteness **												
Major cities	124	70	-	-	95	71	-	-	100	76	1.61	1.29 - 1.93
Regional areas	49	28	-	-	37	28	-	-	29	22	1.33	0.89 - 1.91
Remote areas	3	2	-	-	0	0	-	-	2	2	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	27	15	-	-	26	19	-	-	25	19	1.29	0.83 - 1.90
Quintile 4	24	14	-	-	19	14	-	-	20	15	1.31	0.80 - 2.02
Quintile 3	31	18	-	-	26	19	-	-	22	17	1.48	0.92 - 2.23
Quintile 2	38	21	-	-	24	18	-	-	26	20	1.63	1.06 - 2.38
Quintile 1 (most disadvantaged)	56	32	-	-	37	28	-	-	37	28	1.99	1.40 - 2.74
Education and Occupation ****												
Quintile 5 (least disadvantaged)	22	12	-	-	19	14	-	-	24	18	1.35	0.86 - 2.01
Quintile 4	23	13	-	-	26	19	-	-	19	15	1.12	0.68 - 1.75
Quintile 3	33	19	-	-	34	25	-	-	23	18	1.39	0.88 - 2.09
Quintile 2	57	32	-	-	24	18	-	-	29	22	1.76	1.18 - 2.52
Quintile 1 (most disadvantaged)	41	23	-	-	29	22	-	-	35	27	2.14	1.49 - 2.97
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	32	18	-	-	20	15	-	-	25	19	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages.
**Remoteness was not available for 1 child in 2003-07, 2 children in 2008-12.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 1 child in 2003-07, 2 children in 2008-12 and 1 child in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 1 child in 2003-07, 2 children in 2008-12 and 1 child in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10g. Deaths of children from respiratory system diseases in NSW, five year trends

Respiratory	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**64**	**100**	**0.80**	**0.62 - 1.03**	**69**	**100**	**0.84**	**0.66 - 1.07**	**92**	**100**	**1.08**	**0.87 - 1.32**
Gender												
Female	25	39	0.64	0.42 - 0.95	32	46	0.81	0.55 - 1.14	37	40	0.89	0.63 - 1.23
Male	39	61	0.95	0.68 - 1.30	37	54	0.88	0.62 - 1.22	55	60	1.26	0.95 - 1.63
Age												
Under 1 year	24	38	5.44 (IMR = 0.05) †	3.48 - 8.09	25	36	5.17 (IMR = 0.05) †	3.35 - 7.63	24	26	4.94 (IMR = 0.05) †	3.16 - 7.35
1-4 years	22	34	1.28	0.80 - 1.94	15	22	0.80	0.45 - 1.33	30	33	1.51	1.02 - 2.16
5-9 years	6	9	0.27	0.10 - 0.60	10	14	0.45	0.22 - 0.83	5	5	0.21	0.07 - 0.48
10-14 years	11	17	0.49	0.24 - 0.87	12	17	0.54	0.28 - 0.94	17	18	0.75	0.44 - 1.20
15-17 years	1	2	-	-	7	10	0.51	0.21 - 1.05	16	18	1.17	0.67 - 1.91
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	11	17	2.60	1.30 - 4.66	9	13	2.00	0.92 - 3.81	9	10	1.95	0.89 - 3.70
Not Aboriginal and Torres Strait Islander	53	83	0.70	0.53 - 0.92	60	87	0.78	0.59 - 1.00	83	90	1.03	0.82 - 1.28
Remoteness **												
Major cities	38	59	-	-	39	57	-	-	67	74	1.08	0.84 - 1.37
Regional areas	25	39	-	-	28	41	-	-	24	26	1.10	0.71 - 1.64
Remote areas	0	0	-	-	2	3	-	-	0	0	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	13	20	-	-	8	12	-	-	9	10	0.46	0.21 - 0.88
Quintile 4	9	14	-	-	4	6	-	-	11	12	0.72	0.36 - 1.29
Quintile 3	5	8	-	-	14	20	-	-	13	14	0.87	0.46 - 1.49
Quintile 2	15	23	-	-	12	17	-	-	19	21	1.19	0.72 - 1.86
Quintile 1 (most disadvantaged)	21	33	-	-	29	42	-	-	39	42	2.09	1.49 - 2.86
Education and Occupation ****												
Quintile 5 (least disadvantaged)	10	16	-	-	6	9	-	-	10	11	0.56	0.27 - 1.03
Quintile 4	12	19	-	-	6	9	-	-	10	11	0.59	0.28 - 1.09
Quintile 3	8	13	-	-	11	16	-	-	18	20	1.09	0.64 - 1.72
Quintile 2	13	20	-	-	19	28	-	-	24	26	1.45	0.93 - 2.16
Quintile 1 (most disadvantaged)	20	31			25	36	-	-	29	32	1.77	1.19 - 2.54
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	15	23	-	-	21	30	-	-	21	23	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages.
**Remoteness was not available for 1 child in 2003-07.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 1 child in 2003-07, 2 children in 2008-12 and 1 child in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 1 child in 2003-07, 2 children in 2008-12 and 1 child in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10h. Deaths of children from circulatory system diseases in NSW, five year trends

Circulatory diseases	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**86**	**100**	**1.08**	**0.86 - 1.33**	**81**	**100**	**0.99**	**0.79 - 1.23**	**56**	**100**	**0.66**	**0.50 - 0.85**
Gender												
Female	42	49	1.08	0.78 - 1.46	37	46	0.93	0.66 - 1.28	18	32	0.43	0.26 - 0.69
Male	44	51	1.08	0.78 - 1.45	44	54	1.05	0.76 - 1.41	38	68	0.87	0.61 - 1.19
Age												
Under 1 year	17	20	3.85 (IMR = 0.04) †	2.24 - 6.17	23	28	4.76 (IMR = 0.05) †	3.01 - 7.14	15	27	3.09 (IMR = 0.03) †	1.73 - 5.09
1-4 years	19	22	1.10	0.66 - 1.72	15	19	0.80	0.45 - 1.33	14	25	0.70	0.39 - 1.18
5-9 years	11	13	0.50	0.25 - 0.90	16	20	0.72	0.41 - 1.17	9	16	0.37	0.17 - 0.70
10-14 years	18	21	0.80	0.47 - 1.26	12	15	0.54	0.28 - 0.94	9	16	0.40	0.18 - 0.76
15-17 years	21	24	1.55	0.96 - 2.38	15	19	1.09	0.61 - 1.81	9	16	0.66	0.30 - 1.25
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	9	10	2.13	0.97 - 4.04	4	5	0.89	0.24 - 2.28	4	7	0.87	0.24 - 2.22
Not Aboriginal and Torres Strait Islander	77	90	1.02	0.81 - 1.28	76	94	0.98	0.78 - 1.23	51	91	0.63	0.47 - 0.83
Remoteness **												
Major cities	67	78	-	-	64	79	-	-	41	73	0.66	0.47 - 0.90
Regional areas	18	21	-	-	16	20	-	-	15	27	0.69	0.39 - 1.13
Remote areas	0	0	-	-	1	1	-	-	0	0	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	15	17	-	-	9	11	-	-	6	11	0.31	0.11 - 0.67
Quintile 4	8	9	-	-	12	15	-	-	12	21	0.79	0.41 - 1.37
Quintile 3	14	16	-	-	16	20	-	-	9	16	0.60	0.28 - 1.15
Quintile 2	23	27	-	-	11	14	-	-	7	13	0.44	0.18 - 0.90
Quintile 1 (most disadvantaged)	25	29	-	-	33	41	-	-	22	39	1.18	0.74 - 1.79
Education and Occupation ****												
Quintile 5 (least disadvantaged)	11	13	-	-	12	15	-	-	8	14	0.45	0.19 - 0.89
Quintile 4	13	15	-	-	10	12	-	-	8	14	0.47	0.20 - 0.93
Quintile 3	13	15	-	-	15	19	-	-	13	23	0.79	0.42 - 1.34
Quintile 2	31	36	-	-	22	27	-	-	12	21	0.73	0.38 - 1.27
Quintile 1 (most disadvantaged)	17	20	-	-	22	27	-	-	15	27	0.92	0.51 - 1.51
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	13	15	-	-	19	23	-	-	12	21	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 1 child in 2008-12 and 2013-17.
**Remoteness was not available for 1 child in 2003-07.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 1 child in 2003-07.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 1 child in 2003-07.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10i. Deaths of children from endocrine, nutritional and metabolic diseases in NSW, five year trends

Endocrine Nutritional and Metabolic	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**60**	**100**	**0.75**	**0.57 - 0.97**	**77**	**100**	**0.94**	**0.74 - 1.18**	**77**	**100**	**0.90**	**0.71 - 1.13**
Gender												
Female	27	45	0.70	0.46 - 1.01	29	38	0.73	0.49 - 1.05	41	53	0.99	0.71 - 1.34
Male	33	55	0.81	0.56 - 1.13	48	62	1.14	0.84 - 1.52	36	47	0.82	0.58 - 1.14
Age												
Under 1 year	13	22	2.94 (IMR = 0.03) †	1.57 - 5.04	31	40	6.41 (IMR = 0.06) †	4.35 - 9.10	18	23	3.70 (IMR = 0.04) †	2.20 - 5.85
1-4 years	22	37	1.28	0.80 - 1.94	20	26	1.07	0.65 - 1.66	18	23	0.91	0.54 - 1.43
5-9 years	12	20	0.55	0.28 - 0.96	7	9	0.32	0.13 - 0.65	17	22	0.70	0.41 - 1.12
10-14 years	9	15	0.40	0.18 - 0.76	6	8	0.27	0.10 - 0.59	11	14	0.49	0.24 - 0.87
15-17 years	4	7	0.30	0.08 - 0.76	13	17	0.95	0.51 - 1.62	13	17	0.95	0.51 - 1.63
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	3	5	-	-	1	1	-	-	4	5	0.87	0.24 - 2.22
Not Aboriginal and Torres Strait Islander	57	95	0.76	0.57 - 0.98	76	99	0.98	0.78 - 1.23	73	95	0.90	0.71 - 1.14
Remoteness **												
Major cities	50	83	-	-	58	75	-	-	53	69	0.85	0.64 - 1.12
Regional areas	10	17	-	-	19	25	-	-	24	31	1.10	0.71 - 1.64
Remote areas	0	0	-	-	0	0	-	-	0	0	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	10	17	-	-	10	13	-	-	12	16	0.62	0.32 - 1.08
Quintile 4	10	17	-	-	15	19	-	-	12	16	0.79	0.41 - 1.37
Quintile 3	11	18	-	-	7	9	-	-	16	21	1.07	0.61 - 1.74
Quintile 2	11	18	-	-	22	29	-	-	15	19	0.94	0.53 - 1.55
Quintile 1 (most disadvantaged)	18	30	-	-	23	30	-	-	22	29	1.18	0.74 - 1.79
Education and Occupation ****												
Quintile 5 (least disadvantaged)	9	15	-	-	12	16	-	-	11	14	0.62	0.31 - 1.11
Quintile 4	12	20	-	-	9	12	-	-	13	17	0.77	0.41 - 1.31
Quintile 3	12	20	-	-	15	19	-	-	17	22	1.03	0.60 - 1.65
Quintile 2	15	25	-	-	24	31	-	-	15	19	0.91	0.51 - 1.50
Quintile 1 (most disadvantaged)	12	20	-	-	17	22	-	-	21	27	1.28	0.79 - 1.96
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	621	1035	-	-	581	755	-	-	517	671	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages.
**Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage.
***Education and occupation was determined by the ABS Index of Education and Occupation.
**** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10j. Deaths of children from infectious diseases in NSW, five year trends

Infectious diseases	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**63**	**100**	**0.79**	**0.61 - 1.01**	**49**	**100**	**0.60**	**0.44 - 0.79**	**36**	**100**	**0.42**	**0.30 - 0.58**
Gender												
Female	22	35	0.57	0.36 - 0.86	15	31	0.38	0.21 - 0.62	20	56	0.48	0.29 - 0.74
Male	41	65	1.00	0.72 - 1.36	34	69	0.81	0.56 - 1.13	16	44	0.37	0.21 - 0.59
Age												
Under 1 year	29	46	6.57 (IMR = 0.06) †	4.40 - 9.43	20	41	4.14 (IMR = 0.04) †	2.53 - 6.39	12	33	2.47 (IMR = 0.02) †	1.28 - 4.31
1-4 years	16	25	0.93	0.53 - 1.51	14	29	0.75	0.41 - 1.26	18	50	0.91	0.54 - 1.43
5-9 years	10	16	0.46	0.22 - 0.84	8	16	0.36	0.16 - 0.71	1	3	-	-
10-14 years	6	10	0.27	0.10 - 0.58	5	10	0.22	0.07 - 0.52	3	8	-	-
15-17 years	2	3	-	-	2	4	-	-	2	6	-	-
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	9	14	2.13	0.97 - 4.04	5	10	1.11	0.36 - 2.60	2	6	-	-
Not Aboriginal and Torres Strait Islander	53	84	0.70	0.53 - 0.92	44	90	0.57	0.41 - 0.77	33	92	0.41	0.28 - 0.57
Remoteness *												
Major cities	45	71	-	-	37	76	-	-	23	64	0.37	0.23 - 0.56
Regional areas	16	25	-	-	11	22	-	-	12	33	0.55	0.28 - 0.96
Remote areas	1	2	-	-	1	2	-	-	0	0	-	-
Socioeconomic status (IRSD) **												
Quintile 5 (least disadvantaged)	8	13	-	-	9	18	-	-	1	3	-	-
Quintile 4	9	14	-	-	2	4	-	-	6	17	0.39	0.14 - 0.86
Quintile 3	7	11	-	-	9	18	-	-	9	25	0.60	0.28 - 1.15
Quintile 2	11	17	-	-	11	22	-	-	10	28	0.63	0.30 - 1.15
Quintile 1 (most disadvantaged)	27	43	-	-	18	37	-	-	9	25	0.48	0.22 - 0.92
Education and Occupation (IEO) ***												
Quintile 5 (least disadvantaged)	7	11	-	-	8	16	-	-	4	11	0.22	0.06 - 0.58
Quintile 4	6	10	-	-	9	18	-	-	7	19	0.41	0.17 - 0.85
Quintile 3	12	19	-	-	10	20	-	-	8	22	0.48	0.21 - 0.95
Quintile 2	16	25	-	-	8	16	-	-	9	25	0.54	0.25 - 1.03
Quintile 1 (most disadvantaged)	21	33	-	-	14	29	-	-	7	19	0.43	0.17 - 0.88
Most disadvantaged IRSD and IEO ****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	18	29	-	-	10	20	-	-	5	14	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 1 child in 2003-07 and 2013-17.
**Remoteness was not available for 1 child in 2003-07 and 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 1 child in 2003-07 and 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 1 child in 2003-07 and 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10k. Deaths of infants classified as SUDI in NSW, five year trends

SUDI	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**295**	**100**	**0.65**	**0.58 - 0.73**	**244**	**100**	**0.49**	**0.43 - 0.55**	**232**	**100**	**0.48**	**0.42 - 0.54**
Gender												
Female	119	40	0.54	0.45 - 0.64	99	41	0.41	0.33 - 0.50	106	46	0.45	0.36 - 0.54
Male	176	60	0.76	0.64 - 0.87	145	59	0.57	0.48 - 0.66	126	54	0.51	0.42 - 0.60
Age												
Under 1 week	13	4	0.03	0.02 - 0.05	18	7	0.04	0.02 - 0.06	13	6	0.03	0.01 - 0.05
1 week - under 29 days	33	11	0.07	0.05 - 0.10	28	11	0.06	0.04 - 0.08	36	16	0.07	0.05 - 0.10
29 days - 3 months	157	53	0.35	0.29 - 0.40	112	46	0.23	0.18 - 0.27	118	51	0.24	0.20 - 0.29
4 - 6 months	66	22	0.15	0.11 - 0.19	59	24	0.12	0.09 - 0.15	41	18	0.08	0.06 - 0.11
6 months - Under 1 year	26	9	0.06	0.04 - 0.08	27	11	0.05	0.04 - 0.08	24	10	0.05	0.03 - 0.07
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	58	20	2.97	2.25 - 3.84	35	14	1.29	0.90 - 1.80	59	25	2.03	1.55 - 2.62
Not Aboriginal and Torres Strait Islander	234	79	0.54	0.47 - 0.61	208	85	0.44	0.38 - 0.50	170	73	0.37	0.32 - 0.43
Remoteness **												
Major cities	173	59	-	-	157	64	-	-	142	61	0.38	0.32 - 0.44
Regional areas	117	40	-	-	83	34	-	-	85	37	0.82	0.66 - 1.02
Remote areas	5	2	-	-	4	2	-	-	1	0	-	-
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	21	7	-	-	16	7	-	-	14	6	CMR 0.14	0.08 - 0.24
Quintile 4	33	11	-	-	29	12	-	-	23	10	CMR 0.26	0.17 - 0.39
Quintile 3	37	13	-	-	31	13	-	-	33	14	CMR 0.38	0.26 - 0.53
Quintile 2	58	20	-	-	57	23	-	-	49	21	CMR 0.51	0.37 - 0.67
Quintile 1 (most disadvantaged)	144	49	-	-	110	45	-	-	108	47	CMR 0.97	0.79 - 1.15
Education and Occupation ***												
Quintile 5 (least disadvantaged)	23	8	-	-	20	8	-	-	18	8	CMR 0.16	0.10 - 0.25
Quintile 4	27	9	-	-	29	12	-	-	23	10	CMR 0.24	0.15 - 0.36
Quintile 3	45	15	-	-	44	18	-	-	39	17	CMR 0.42	0.30 - 0.57
Quintile 2	67	23	-	-	49	20	-	-	52	22	CMR 0.57	0.42 - 0.74
Quintile 1 (most disadvantaged)	131	44	-	-	101	41	-	-	95	41	CMR 1.04	0.84 - 1.28
Most disadvantaged IRSD and IEO ****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	108	37	-	-	89	36	-	-	77	33	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 3 children in 2003-07, 1 child in 2008-12 and 3 children in 2013-17.
**Remoteness was not available for 4 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 2 children in 2003-07, 1 child in 2008-12 and 5 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 2 children in 2003-07, 1 child in 2008-12 and 5 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10l. Injury-related deaths of children in NSW, five year trends

Injury related deaths	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**607**	**100**	**7.62**	**7.01 - 8.23**	**484**	**100**	**5.93**	**5.40 - 6.45**	**441**	**100**	**5.17**	**4.69 - 5.65**
Gender												
Female	218	36	5.62	4.87 - 6.36	163	34	4.11	3.47 - 4.74	169	38	4.08	3.46 - 4.69
Male	389	64	9.52	8.58 - 10.47	321	66	7.65	6.81 - 8.49	272	62	6.21	5.47 - 6.95
Age												
Under 1 year	55	9	12.46 (IMR = 0.12) †	9.39 - 16.22	42	9	8.68 (IMR = 0.08) †	6.26 - 11.74	47	11	9.67 (IMR = 0.10) †	7.11 - 12.86
1-4 years	158	26	9.18	7.75 - 10.62	108	22	5.79	4.70 - 6.88	86	20	4.33	3.46 - 5.35
5-9 years	76	13	3.47	2.73 - 4.34	58	12	2.61	1.99 - 3.38	54	12	2.22	1.67 - 2.90
10-14 years	92	15	4.07	3.28 - 4.99	59	12	2.65	2.02 - 3.42	69	16	3.05	2.38 - 3.87
15-17 years	226	37	16.73	14.55 - 18.91	217	45	15.83	13.73 - 17.94	185	42	13.57	11.62 - 15.53
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	57	9	13.49	10.22 - 17.47	71	15	15.82	12.35 - 19.95	56	13	12.14	9.17 - 15.77
Not Aboriginal and Torres Strait Islander	548	90	7.26	6.66 - 7.87	411	85	5.33	4.81 - 5.84	380	86	4.71	4.24 - 5.18
Remoteness **												
Major cities	337	56	-	-	257	53	-	-	247	56	3.98	3.48 - 4.47
Regional areas	259	43	-	-	216	45	-	-	183	41	8.39	7.18 - 9.61
Remote areas	8	1	-	-	10	2	-	-	8	2	16.98	7.33 - 33.46
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	90	15	-	-	62	13	-	-	54	12	2.78	2.09 - 3.63
Quintile 4	94	15	-	-	93	19	-	-	56	13	3.67	2.77 - 4.77
Quintile 3	102	17	-	-	68	14	-	-	85	19	5.70	4.55 - 7.05
Quintile 2	129	21	-	-	114	24	-	-	106	24	6.63	5.37 - 7.90
Quintile 1 (most disadvantaged)	181	30	-	-	146	30	-	-	134	30	7.20	5.98 - 8.42
Education and Occupation ****												
Quintile 5 (least disadvantaged)	62	10	-	-	50	10	-	-	58	13	3.26	2.47 - 4.21
Quintile 4	106	17	-	-	82	17	-	-	59	13	3.48	2.65 - 4.49
Quintile 3	112	18	-	-	90	19	-	-	78	18	4.72	3.73 - 5.89
Quintile 2	152	25	-	-	106	22	-	-	112	25	6.78	5.52 - 8.03
Quintile 1 (most disadvantaged)	164	27	-	-	155	32	-	-	129	29	7.87	6.51 - 9.23
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	116	19			114	24			90	20		

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 2 children in 2003-07, 2 children in 2008-12 and 5 children in 2013-17.
**Remoteness was not available for 3 children in 2003-07, 1 child in 2008-12 and 3 children in 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 11 children in 2003-07, 1 child in 2008-12 and 6 children in 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 11 children in 2003-07, 1 child in 2008-12 and 5 children in 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10m. Transport-related deaths of children in NSW, five year trends

Transport	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**270**	**100**	**3.39**	**2.98 - 3.79**	**180**	**100**	**2.20**	**1.88 - 2.53**	**150**	**100**	**1.76**	**1.48 - 2.04**
Gender												
Female	93	34	2.40	1.93 - 2.94	63	35	1.59	1.22 - 2.03	55	37	1.33	1.00 - 1.73
Male	177	66	4.33	3.69 - 4.97	117	65	2.79	2.28 - 3.29	95	63	2.17	1.75 - 2.65
Age												
Under 1 year	8	3	1.81 (IMR = 0.02) †	0.78 - 3.57	7	4	1.45 (IMR = 0.01) †	0.58 - 2.98	2	1	-	-
1-4 years	52	19	3.02	2.26 - 3.96	24	13	1.29	0.82 - 1.91	29	19	1.46	0.98 - 2.10
5-9 years	39	14	1.78	1.27 - 2.43	25	14	1.13	0.73 - 1.66	28	19	1.15	0.76 - 1.66
10-14 years	50	19	2.21	1.64 - 2.91	31	17	1.39	0.95 - 1.97	21	14	0.93	0.58 - 1.42
15-17 years	121	45	8.96	7.36 - 10.55	93	52	6.79	5.48 - 8.31	70	47	5.14	4.00 - 6.49
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	26	10	6.15	4.02 - 9.01	24	13	5.35	3.43 - 7.95	18	12	3.90	2.31 - 6.17
Not Aboriginal and Torres Strait Islander	242	90	3.21	2.80 - 3.61	156	87	2.02	1.70 - 2.34	132	88	1.64	1.36 - 1.92
Remoteness **												
Major cities	134	50	-	-	81	45	-	-	77	51	1.24	0.98 - 1.55
Regional areas	133	49	-	-	95	53	-	-	67	45	3.07	2.38 - 3.90
Remote areas	1	0	-	-	4	2	-	-	4	3	8.49	2.31 - 21.74
Socioeconomic status ***												
Quintile 5 (least disadvantaged)	30	11	-	-	21	12	-	-	12	8	0.62	0.32 - 1.08
Quintile 4	48	18	-	-	36	20	-	-	20	13	1.31	0.80 - 2.02
Quintile 3	46	17	-	-	27	15	-	-	35	23	2.35	1.64 - 3.26
Quintile 2	65	24	-	-	44	24	-	-	35	23	2.19	1.53 - 3.05
Quintile 1 (most disadvantaged)	78	29	-	-	52	29	-	-	45	30	2.42	1.76 - 3.23
Education and Occupation ****												
Quintile 5 (least disadvantaged)	14	5	-	-	14	8	-	-	8	5	0.45	0.19 - 0.89
Quintile 4	45	17	-	-	25	14	-	-	23	15	1.36	0.86 - 2.04
Quintile 3	54	20	-	-	35	19	-	-	26	17	1.57	1.03 - 2.30
Quintile 2	75	28	-	-	43	24	-	-	42	28	2.54	1.83 - 3.44
Quintile 1 (most disadvantaged)	79	29	-	-	63	35	-	-	48	32	2.93	2.16 - 3.88
Most disadvantaged IRSD and IEO *****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	53	20	-	-	41	23	-	-	33	22	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 2 children in 2003-07.
**Remoteness was not available for 2 children in 2003-07 and 2013-17.
***Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 3 children in 2003-07 and 2013-17.
****Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 3 children in 2003-07 and 2013-17.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10n. Deaths of children from drowning in NSW, five year trends

Drowning	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**83**	**100**	**1.04**	**0.83 - 1.29**	**76**	**100**	**0.93**	**0.73 - 1.16**	**53**	**100**	**0.62**	**0.47 - 0.81**
Gender												
Female	29	35	0.75	0.50 - 1.07	22	29	0.55	0.35 - 0.84	15	28	0.36	0.20 - 0.60
Male	54	65	1.32	0.99 - 1.72	54	71	1.29	0.97 - 1.68	38	72	0.87	0.61 - 1.19
Age												
Under 1 year	5	6	1.13 (IMR = 0.01) †	0.37 - 2.64	5	7	1.03 (IMR = 0.01) †	0.34 - 2.41	5	9	1.03 (IMR = 0.01) †	0.33 - 2.40
1-4 years	51	61	2.96	2.21 - 3.90	44	58	2.36	1.71 - 3.17	31	58	1.56	1.06 - 2.21
5-9 years	14	17	0.64	0.35 - 1.07	13	17	0.59	0.31 - 1.00	7	13	0.29	0.12 - 0.59
10-14 years	4	5	0.18	0.05 - 0.45	5	7	0.22	0.07 - 0.52	6	11	0.27	0.10 - 0.58
15-17 years	9	11	0.67	0.30 - 1.26	9	12	0.66	0.30 - 1.25	4	8	0.29	0.08 - 0.75
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	7	8	1.66	0.67 - 3.41	13	17	2.90	1.54 - 4.95	4	8	0.87	0.24 - 2.22
Not Aboriginal and Torres Strait Islander	76	92	1.01	0.79 - 1.26	63	83	0.82	0.63 - 1.04	48	91	0.60	0.44 - 0.79
Remoteness												
Major cities	49	59	-	-	40	53	-	-	30	57	0.48	0.33 - 0.69
Regional areas	33	40	-	-	35	46	-	-	23	43	1.05	0.67 - 1.58
Remote areas	1	1	-	-	1	1	-	-	0	0	-	-
Socioeconomic status (IRSD) **												
Quintile 5 (least disadvantaged)	17	20	-	-	12	16	-	-	9	17	0.46	0.21 - 0.88
Quintile 4	15	18	-	-	16	21	-	-	5	9	0.33	0.11 - 0.76
Quintile 3	14	17	-	-	9	12	-	-	12	23	0.80	0.42 - 1.41
Quintile 2	14	17	-	-	21	28	-	-	7	13	0.44	0.18 - 0.90
Quintile 1 (most disadvantaged)	21	25	-	-	18	24	-	-	20	38	1.07	0.66 - 1.66
Education and Occupation (IEO) ***												
Quintile 5 (least disadvantaged)	11	13	-	-	8	11	-	-	5	9	0.28	0.09 - 0.66
Quintile 4	14	17	-	-	12	16	-	-	10	19	0.59	0.28 - 1.09
Quintile 3	11	13	-	-	14	18	-	-	10	19	0.60	0.29 - 1.11
Quintile 2	23	28	-	-	13	17	-	-	14	26	0.85	0.46 - 1.42
Quintile 1 (most disadvantaged)	22	27	-	-	29	38	-	-	14	26	0.85	0.47 - 1.43
Most disadvantaged IRSD and IEO ******												
Quintile 1 (IRSD) and Quintile 1 (IEO)	15	18	-	-	17	22	-	-	14	26	-	-

*Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 1 child in 2013-17.
**Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 2 children in 2003-07.
***Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 2 children in 2003-07.
****Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 10o. Deaths of children and young people from suicide, five year trends

Suicide	2003 - 07				2008 - 12				2013 - 17			
	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval	No.	%	Infant Mortality Rate	95% Confidence Interval
Total	**79**	**100**	**2.19**	**1.73 - 2.73**	**82**	**100**	**2.28**	**1.81 - 2.83**	**120**	**100**	**3.31**	**2.72 - 3.91**
Gender												
Female	26	33	1.48	0.96 - 2.16	26	32	1.49	0.97 - 2.18	45	38	2.56	1.86 - 3.42
Male	53	67	2.86	2.14 - 3.74	56	68	3.03	2.29 - 3.93	75	63	4.03	3.17 - 5.05
Age												
10-14 years	20	25	0.88	0.54 - 1.37	10	12	0.45	0.22 - 0.83	25	21	1.11	0.72 - 1.63
15-17 years	59	75	4.37	3.32 - 5.63	72	88	5.25	4.11 - 6.62	95	79	6.97	5.64 - 8.52
Aboriginal and Torres Strait Islander status *												
Aboriginal and Torres Strait Islander	2	3	-	-	11	13	5.61	2.80 - 10.04	18	15	9.13	5.41 - 14.43
Not Aboriginal and Torres Strait Islander	77	97	2.24	1.77 - 2.80	69	84	2.03	1.58 - 2.57	101	84	2.95	2.37 - 3.52
Remoteness *												
Major cities	50	63	-	-	46	56	-	-	67	56	2.58	2.00 - 3.27
Regional areas	26	33	-	-	35	43	-	-	51	43	5.14	3.83 - 6.76
Remote areas	2	3	-	-	1	1	-	-	2	2	-	-
Socioeconomic status **												
Quintile 5 (least disadvantaged)	20	25	-	-	15	18	-	-	19	16	2.22	1.34 - 3.47
Quintile 4	10	13	-	-	21	26	-	-	16	13	2.47	1.41 - 4.02
Quintile 3	15	19	-	-	11	13	-	-	22	18	3.45	2.16 - 5.22
Quintile 2	15	19	-	-	17	21	-	-	27	23	3.98	2.62 - 5.79
Quintile 1 (most disadvantaged)	18	23	-	-	18	22	-	-	35	29	4.47	3.11 - 6.22
Education and Occupation ***												
Quintile 5 (least disadvantaged)	18	23	-	-	15	18	-	-	27	23	3.69	2.43 - 5.37
Quintile 4	10	13	-	-	15	18	-	-	15	13	2.06	1.15 - 3.40
Quintile 3	15	19	-	-	21	26	-	-	16	13	2.24	1.28 - 3.64
Quintile 2	23	29	-	-	17	21	-	-	29	24	4.04	2.71 - 5.80
Quintile 1 (most disadvantaged)	12	15	-	-	14	17	-	-	33	28	4.64	3.19 - 6.51
Most disadvantaged IRSD and IEO ****												
Quintile 1 (IRSD) and Quintile 1 (IEO)	8	10	-	-	12	15	-	-	21	18	-	-

* Aboriginal and Torres Strait Islander status was determined from the Registry of Births, Deaths and Marriages. This was not available for 2 children in 2008-12 and 1 child in 2013-17.
** Remoteness was not available for 1 child in 2003-07
*** Socio-economic status was determined by the ABS Index of Relative Socio-economic Disadvantage. This was not available for 1 child in 2003-07 and 2013-17.
**** Education and occupation was determined by the ABS Index of Education and Occupation. This was not available for 1 child in 2003-07.
***** Most disadvantaged was determined as children who were Quintile 1 for both IRSD and IEO.

Table 11a. Leading cause of deaths by age group, 2003-17 vs 2016 and 2017

Age group	Rank	N	2003-17	Rank	N	2016-17
			Cause of death (IMR/CMR/N/%)			**Cause of death (IMR/CMR/N/%)**
Under 1 year	1	2,819	Perinatal (1.97†/199.78/2,819/53.5)	1	307	Perinatal (1.59†/159.78/307/53.9)
	2	1,230	Congenital (0.86†/87.17/1,230/23.4)	2	147	Congenital (0.76†/76.51/147/ 25.8)
	3	144	Nervous system (0.10†/10.21/144/2.7)	3	14	Accidental threats to breathing (0.07†/7.29/14/2.5)
	4	73	Respiratory (0.05†/5.17/73/1.4)	4	11	Respiratory (0.06†/5.73/11/1.9)
	5	70	Accidental threats to breathing (0.05†/4.96/70/1.3)	4	11	Nervous system (0.06†/5.73/11/1.9)
				5	6	Endocrine (0.03†/3.12/6/1.1)
				5	6	Infectious/Parasitic (0.03†/3.12/6/1.1)
				5	6	Circulatory (0.03†/3.12/6/1.1)
			Cause of death (CMR/N/%)			**Cause of death (CMR/N/%)**
1-4 years	1	163	Neoplasm (2.92/163/15.6)	1	27	Neoplasm (3.36/27/21.1)
	2	126	Drowning (2.26/126/12.1)	2	15	Drowning (1.87/15/11.7)
	3	105	Transport (1.88/105/10.0)	3	14	Transport (1.74/14/10.9)
	4	104	Congenital (1.87/104/10.0)	4	11	Congenital (1.37/11/8.6)
	5	86	Nervous system (1.54/86/8.2)	5	10	Respiratory (1.25/10/7.8)
			Cause of death (CMR/N/%)			**Cause of death (CMR/N/%)**
5-9 years	1	165	Neoplasm (2.41/165/26.6)	1	25	Neoplasm (2.49/25/35.2)
	2	92	Transport (1.34/92/14.8)	2	10	Transport (1.00/10/14.1)
	3	67	Nervous system (0.98/67/10.8)	3	8	Endocrine (0.80/8/11.3)
	4	41	Congenital (0.60/41/6.6)	4	6	Nervous system (0.60/6/8.5)
	5	36	Circulatory (0.53/36/5.8)	5	5	Circulatory (0.50/5/7.0)
	5	36	Endocrine (0.53/36/5.8)			
			Cause of death (CMR/N/%)			**Cause of death (CMR/N/%)**
10-14 years	1	128	Neoplasm (1.90/128/20.3)	1	20	Neoplasm (2.17/20/22.5)
	2	102	Transport (1.51/102/16.2)	2	12	Suicide (1.30/12/13.5)
	3	77	Nervous system (1.14/77/12.2)	3	11	Transport (1.20/11/12.4)
	4	55	Suicide (0.81/55/8.7)	4	8	Endocrine (0.87/8/9.0)
	5	45	Congenital (0.67/45/7.1)	5	7	Respiratory (0.76/7/7.9)
			Cause of death (CMR/N/%)			**Cause of death (CMR/N/%)**
15-17 years	1	284	Transport (6.95/284/28.2)	1	42	Suicide (7.65/42/34.1)
	2	226	Suicide (5.53/226/22.5)	2	31	Transport (5.64/31/25.2)
	3	137	Neoplasm (3.35/137/13.6)	3	15	Neoplasm (2.73/15/12.2)
	4	68	Nervous system (1.66/68/6.8)	4	6	Nervous system (1.09/6/4.9)
	5	45	Circulatory (1.10/45/4.5)	5	4	Respiratory (0.73/4/3.3)
				5	4	Circulatory (0.73/4/3.3)
				5	4	Congenital (0.73/4/3.3)

Table 11b. Leading cause of deaths by gender, 2003-17 vs 2016 and 2017

Gender	Rank	N	2003-17	Rank	N	2016-17
Female			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	1211	Perinatal (10.09 / 1211 / 33.3)	1	134	Perinatal (7.95 / 134 / 31.9)
	2	672	Congenital (5.60 / 672 / 18.5)	2	79	Congenital (4.68 / 79 / 18.8)
	3	304	Neoplasm (2.53 / 304 / 8.4)	3	40	Neoplasm (2.37 / 40 / 9.5)
	4	211	Transport (1.76 / 211 / 5.8)	4	22	Nervous system (1.30 / 22 / 5.2)
	5	203	Nervous system (1.69 / 203 / 5.6)	5	18	Transport (1.07 / 18 / 4.3)
Male			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	1631	Perinatal (12.88 / 1631 / 33.1)	1	174	Perinatal (9.77 / 174 / 31.0)
	2	777	Congenital (6.14 / 777 / 15.8)	2	91	Congenital (5.11 / 91 / 16.2)
	3	389	Transport (3.07 / 389 / 7.9)	3	50	Neoplasm (2.81 / 50 / 8.9)
	4	331	Neoplasm (2.61 / 331 / 6.7)	4	48	Transport (2.70 / 48 / 8.6)
	5	239	Nervous system (1.89 / 239 / 4.8)	5	40	Suicide (2.25 / 40 / 7.1)

Table 11c. Leading cause of deaths in Aboriginal and Torres Strait Islander children by age group, 2003-17 vs 2016 and 2017

Aboriginal and Torres Strait Islander (BDM)						
Age group	**Rank**	**N**	**2003-17**	**Rank**	**N**	**2016-17**
Under 1 year			**Cause of death (IMR/CMR/N/%)**			**Cause of death (IMR/CMR/N/%)**
	1	246	Perinatal (3.25†/305.44/246/47.6)	1	35	Perinatal (2.94†/291.74/35/50.0)
	2	80	Congenital (1.06†/99.33/80/15.5)	2	13	Congenital (1.09†/108.36/13/18.6)
	3	18	Respiratory (0.24†/22.35/18/3.5)	3	4	Accidental threats to breathing (0.34†/33.34/4/5.7)
	4	16	Accidental threats to breathing (0.21†/19.87/16/3.1)	4	3	Respiratory (0.25†/25.01/3/4.3)
	5	11	Nervous system (0.15†/13.66/11/2.1)	5	2	Neoplasm (0.17†/16.67/2/2.9)
1-4 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	16	Drowning (5.17/16/17.4)	1	2	Circulatory (4.55/2/28.6)
	2	14	Transport (4.53/14/15.2)	2	1	Endocrine (2.27/1/14.3)
	3	8	Assault (2.59/8/8.7)	2	1	Neoplasm (2.27/1/14.3)
	3	8	Exposure to smoke/fire/flames (2.59/8/8.7)	2	1	Respiratory (2.27/1/14.3)
	4	6	Congenital (1.94/6/6.5)	2	1	Blood/Blood forming organs (2.27/1/14.3)
	4	6	Neoplasm (1.94/6/6.5)	2	1	Transport (2.27/1/14.3)
	5	5	Circulatory (1.62/5/5.4)			
5-9 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	10	Transport (2.65/10/20.8)	1	2	Neoplasm (3.88/2/33.3)
	2	7	Neoplasm (1.85/7/14.6)	2	1	Nervous system (1.94/1/16.7)
	3	5	Nervous system (1.32/5/10.4)	2	1	Respiratory (1.94/1/16.7)
	3	5	Congenital (1.32/5/10.4)	2	1	Contact with venomous animals/plants (1.94/1/16.7)
	4	4	Respiratory (1.06/4/8.3)			
	5	3	Drowning (0.79/3/6.3)			
10-14 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	8	Transport (2.21/8/25.0)	1	1	Nervous system (2.01/1/50.0)
	2	6	Circulatory (1.66/6/18.8)	1	1	Suicide (2.01/1/50.0)
	3	4	Nervous system (1.10/4/12.5)			
	3	4	Suicide (1.10/4/12.5)			
	4	2	Exposure to smoke/fire/flames (0.55/2/6.3)			
	4	2	Respiratory (0.55/2/6.3)			
	4	2	Congenital (0.55/2/6.3)			
	4	2	Endocrine (0.55/2/6.3)			
	5	1	Infectious/Parasitic (0.28/1/3.1)			
	5	1	Drowning (0.28/1/3.1)			
15-17 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	31	Transport (15.31/31/36.9)	1	10	Suicide (34.09/10/62.5)
	2	27	Suicide (13.33/27/32.1)	2	2	Transport (6.82/2/12.5)
	3	7	Neoplasm (3.46/7/8.3)	3	1	Falls (3.41/1/6.3)
	4	3	Assault (1.48/3/3.6)	3	1	Circulatory (3.41/1/6.3)
	4	3	Drowning (1.48/3/3.6)	3	1	Neoplasm (3.41/1/6.3)
	5	2	Exposure to inanimate mechanical forces (0.99/2/2.4)	3	1	Nervous system (3.41/1/6.3)
	5	2	Nervous system (0.99/2/2.4)			
	5	2	Respiratory (0.99/2/2.4)			
	5	2	Endocrine (0.99/2/2.4)			

Table 11d. Leading cause of deaths in non-Indigenous children by age group, 2003-17 vs 2016-17

Non-Indigenous						
Age group	**Rank**	**N**	**2003-17**	**Rank**	**N**	**2016-17**
			Cause of death (IMR/CMR/N/%)			**Cause of death (IMR/CMR/N/%)**
Under 1 year	1	2557	Perinatal (1.88 † / 192.18 / 2557 / 54.2)	1	272	Perinatal (1.50 † / 150.99 / 272 / 54.6)
	2	1146	Congenital (0.84 † / 86.13 / 1146 / 24.3)	2	134	Congenital (0.74 † / 74.39 / 134 / 26.9)
	3	133	Nervous system (0.10 † / 10.00 / 133 / 2.8)	3	10	Nervous system (0.06 † / 5.55 / 10 / 2.0)
	4	61	Endocrine (0.04 † / 4.58 / 61 / 1.3)	3	10	Accidental threats to breathing (0.06 † / 5.55 / 10 / 2.0)
	5	55	Respiratory (0.04 † / 4.13 / 55 / 1.2)	4	8	Respiratory (0.04 † / 4.44 / 8 / 1.6)
				5	6	Circulatory (0.03 † / 3.33 / 6 / 1.2)
1-4 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	157	Neoplasm (2.98 / 157 / 16.5)	1	26	Neoplasm (3.43 / 26 / 21.7)
	2	109	Drowning (2.07 / 109 / 11.5)	2	15	Drowning (1.98 / 15 / 12.5)
	3	98	Congenital (1.86 / 98 / 10.3)	3	13	Transport (1.71 / 13 / 10.8)
	4	91	Transport (1.73 / 91 / 9.6)	4	11	Congenital (1.45 / 11 / 9.2)
	5	83	Nervous system (1.58 / 83 / 8.7)	5	9	Nervous system (1.19 / 9 / 7.5)
5-9 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	158	Neoplasm (2.44 / 158 / 27.7)	1	23	Neoplasm (2.42 / 23 / 35.4)
	2	81	Transport (1.25 / 81 / 14.2)	2	10	Transport (1.05 / 10 / 15.4)
	3	62	Nervous system (0.96 / 62 / 10.9)	3	8	Endocrine (0.84 / 8 / 12.3)
	4	36	Congenital (0.56 / 36 / 6.3)	4	5	Circulatory (0.53 / 5 / 7.7)
	5	35	Endocrine (0.54 / 35 / 6.1)	4	5	Nervous system (0.53 / 5 / 7.7)
				5	4	Congenital (0.42 / 4 / 6.2)
10-14 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	128	Neoplasm (2.00 / 128 / 21.5)	1	20	Neoplasm (2.30 / 20 / 23.5)
	2	94	Transport (1.47 / 94 / 15.8)	2	11	Transport (1.26 / 11 / 12.9)
	3	73	Nervous system (1.14 / 73 / 12.3)	3	10	Suicide (1.15 / 10 / 11.8)
	4	49	Suicide (0.77 / 49 / 8.2)	4	8	Endocrine (0.92 / 8 / 9.4)
	5	42	Congenital (0.66 / 42 / 7.1)	5	7	Respiratory (0.80 / 7 / 8.2)
15-17 years			**Cause of death (CMR/N/%)**			**Cause of death (CMR/N/%)**
	1	252	Transport (6.49 / 252 / 27.4)	1	32	Suicide (6.16 / 32 / 30.2)
	2	198	Suicide (5.10 / 198 / 21.5)	2	29	Transport (5.58 / 29 / 27.4)
	3	130	Neoplasm (3.35 / 130 / 14.1)	3	14	Neoplasm (2.69 / 14 / 13.2)
	4	66	Nervous system (1.70 / 66 / 7.2)	4	5	Nervous system (0.96 / 5 / 4.7)
	5	44	Circulatory (1.13 / 44 / 4.8)	5	4	Respiratory (0.77 / 4 / 3.8)

Table 12a. Injury-related deaths of children in NSW by age group, 2003-17

Type of external cause	Under 1 year	1-4 years	5-9 years	10-14 years	15-17 years	Total
All unintentional injuries						
Transport	17	105	92	102	284	**600**
Drowning	15	126	34	15	22	**212**
Threats to breathing	70	26	7	8	4	**115**
Exposure to other force	2	12	14	5	15	**48**
Fire	1	22	11	6	2	**42**
Poisoning	0	3	5	4	24	**36**
Falls	1	6	3	3	11	**24**
Medical complications	4	4	1	4	4	**17**
Other	4	3	0	0	6	**15**
All intentional injuries						
Assault	30	45	21	18	28	**142**
Suicide	0	0	0	55	226	**281**
Total	**144**	**352**	**188**	**220**	**628**	**1,532**

Table 12b. Injury-related deaths of children in NSW by age group, 2016-17

Type of external cause	Under 1 year	1-4 years	5-9 years	10-14 years	15-17 years	Total
All unintentional injuries						
Transport	0	14	10	11	31	**66**
Drowning	1	15	1	4	1	**22**
Threats to breathing	14	1	0	0	1	**16**
Exposure to force	1	1	0	2	1	**5**
Poisoning	0	0	1	1	2	**4**
Falls	0	0	0	1	2	**3**
Fire	0	1	1	0	0	**2**
Medical complications	0	0	1	0	0	**1**
Other	0	0	0	0	0	**0**
All intentional injuries						
Assault	1	5	1	2	3	**12**
Suicide	0	0	0	12	42	**54**
Total	**17**	**37**	**15**	**33**	**83**	**185**

nsw cdrt child death review team

2016 and 2017

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