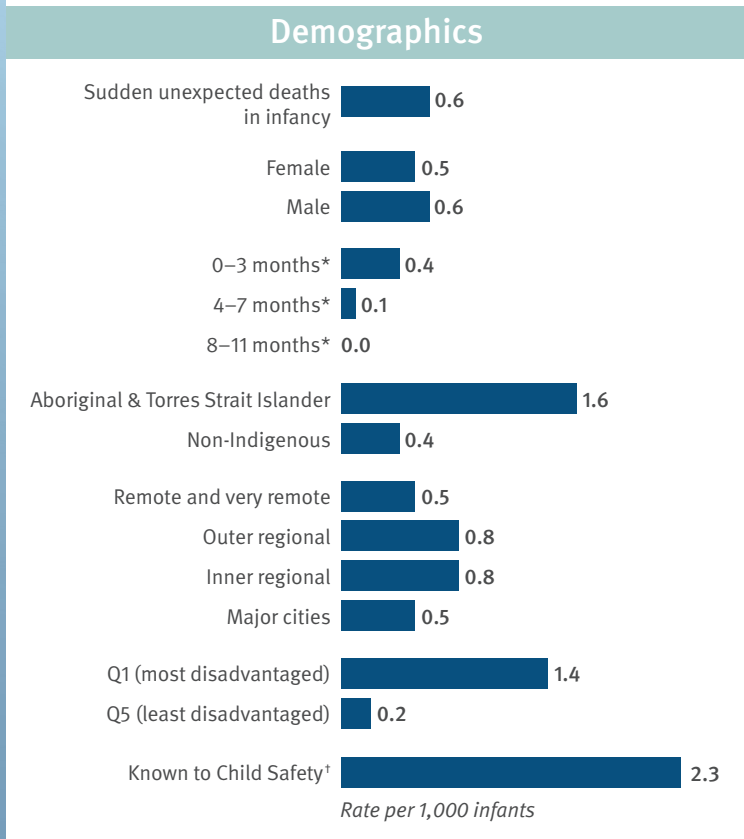
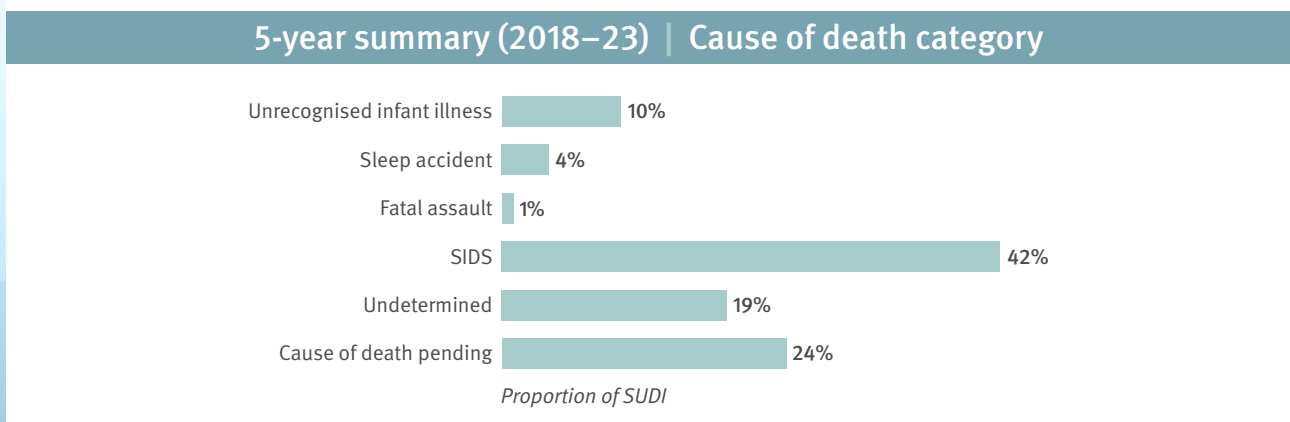
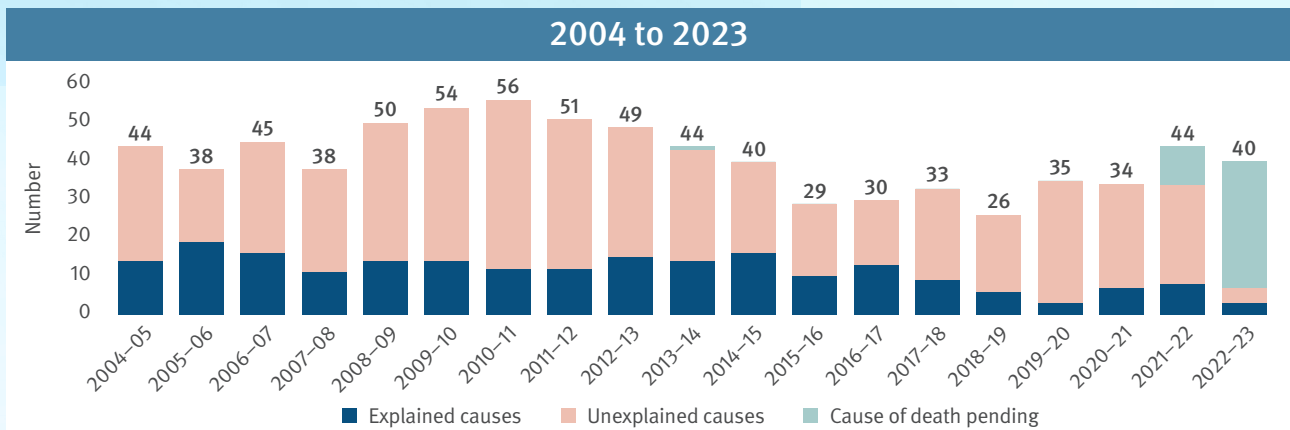


8 Sudden unexpected deaths in infancy (SUDI)



Key points

SUDI
Infants who die suddenly, usually during sleep, with no immediately obvious cause

36 SUDIs per year
on average in last 5 years

SIDS and undetermined causes
Cause remains unexplained after investigation
Leading cause of death for infants 1–11 months

Unsafe sleep factors
present for many SUDIs

Notes: Counting is by date of death registration. Percentages may not add to 100 due to rounding.
* rate per 1,000 births.
† in the 12 months prior to death.

Key findings

Classification of Sudden unexpected death in infancy (SUDI)

SUDI is a research classification which is defined as the death of an infant aged less than 12 months, that is sudden and unexpected and where the cause was not immediately apparent at the time of death. Cases of SUDI with an official cause of death are grouped into the following categories and sub-categories:

Explained SUDI—infant deaths for which a cause was not immediately obvious; but for which post-mortem examinations were able to identify a specific reason:

- Infant illnesses or condition unrecognised at the time of death
- Sleep accidents
- Non-accidental injury (fatal assault).

Unexplained SUDI—those infant deaths for which a cause could not be determined:

- Sudden infant death syndrome (SIDS)⁶⁸
- Undetermined causes.⁶⁹

During 2022–23, there were 40 SUDI cases in Queensland, the second highest number of SUDIs in the last 8 years. Of the 40 SUDIs, 33 were pending a cause at the time of reporting—this reflects the longer timeframes for SUDI cases due to the complexity of the post-mortems and coronial investigation.

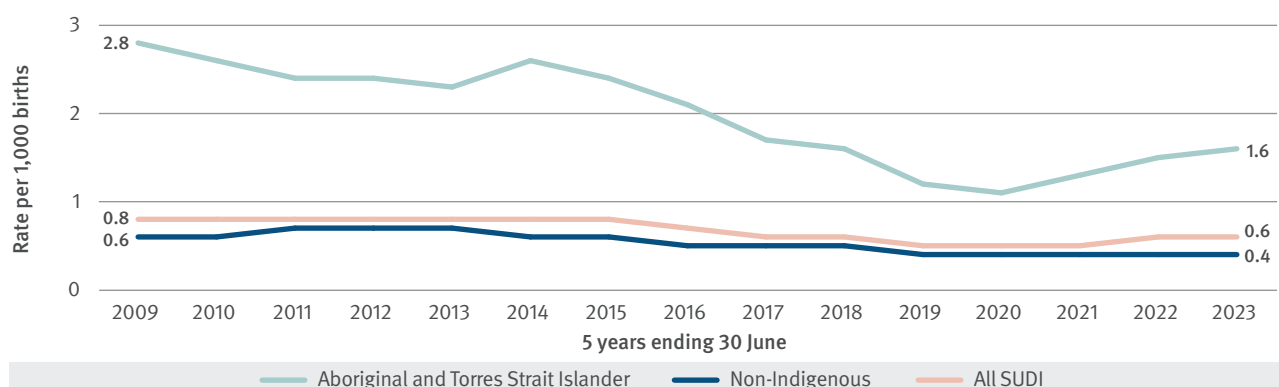
Table A.11 in Appendix A provides summary data on SUDIs in the last 5 years. Explained SUDIs are also included in the chapter relating to the specific causes of death.

There were 179 SUDIs in the last 5 years, of which 61% were found to be unexplained SUDI (SIDS and undetermined causes) while 15% were explained SUDI (illness, sleep accident and fatal assault). A further 24% were pending a cause at the time of reporting.

The SUDI mortality rate was 0.6 per 1,000 live births (5-year average).

Figure 8.1 shows the trends in the 5-year rolling rates of Aboriginal and Torres Strait Islander SUDIs, non-Indigenous SUDIs and all SUDIs in Queensland. The SUDI rate for Aboriginal and Torres Strait Islander infants was around 4 times the non-Indigenous SUDI rate between 2009 and 2016. Rates of Aboriginal and Torres Strait Islander SUDI dropped considerably between 2014 and 2020, reducing from 4.1 to 2.5 times the non-Indigenous rate in 2020.⁷⁰ In more recent periods the rates of Aboriginal and Torres Strait Islander SUDIs have been increasing.

Figure 8.1: SUDI by Aboriginal and Torres Strait Islander status (5-year rolling rate), 2004–09 to 2018–23



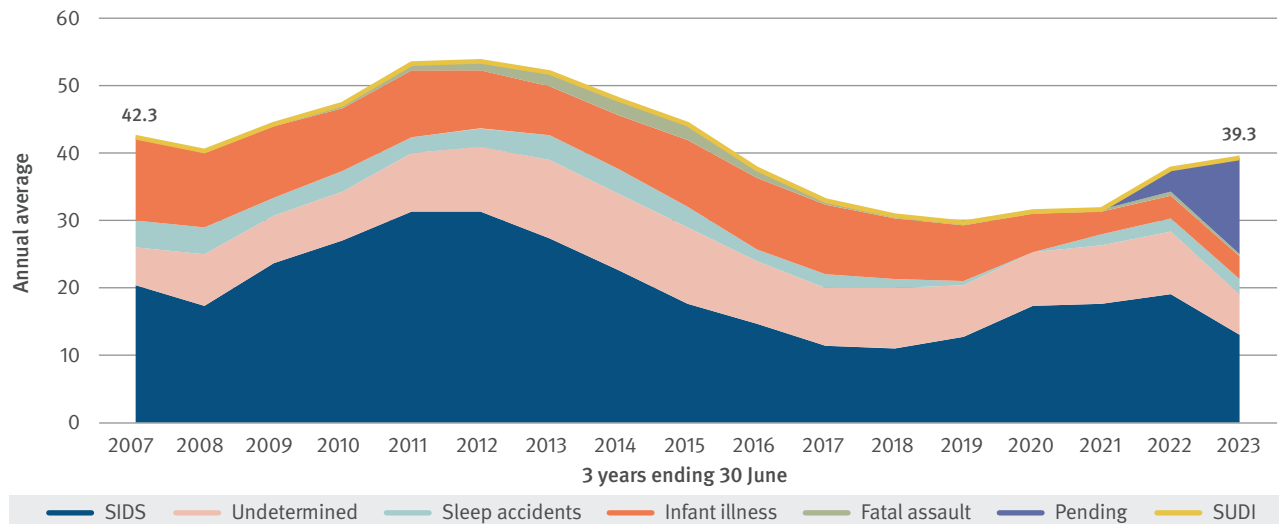
68 Krous HF, Beckwith JB, Byard RW, Rognum TO, Bajanowski T, Corey T, Cutz E, Hanzlick R, Keens TG, Mitchell EA (2004) 'Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach', *Pediatrics*, 114:234–8, doi:10.1542/peds.114.1.234

69 A finding where: natural disease processes are detected and are not considered sufficient to cause death but preclude a diagnosis of SIDS; there are signs of significant stress; non-accidental, but non-lethal, injuries are present; toxicology testing detects non-prescribed but non-lethal drugs; or a full autopsy has not been performed and a cause is not otherwise identified.

70 Tables with data for 2004–2023 are available online at www.qfcc.qld.gov.au/sector/child-death/child-death-reports-and-data

Fluctuations in the number and causes of SUDIs (rolling average) are shown in Figure 8.2. While the number of SUDI deaths has decreased since 2011, average annual numbers have increased again since 2020.⁷¹ While deaths from infant illness, undetermined causes and sleep accidents remained comparatively stable across the entire period, SIDS deaths rose and fell, driving the changes in SUDI totals. However, some caution is warranted as assigning definitive causes for SUDIs remains complex and developments in cause of death classification are ongoing.⁷²

Figure 8.2: Cause of SUDI death (3-year rolling average number), 2004–07 to 2020–23



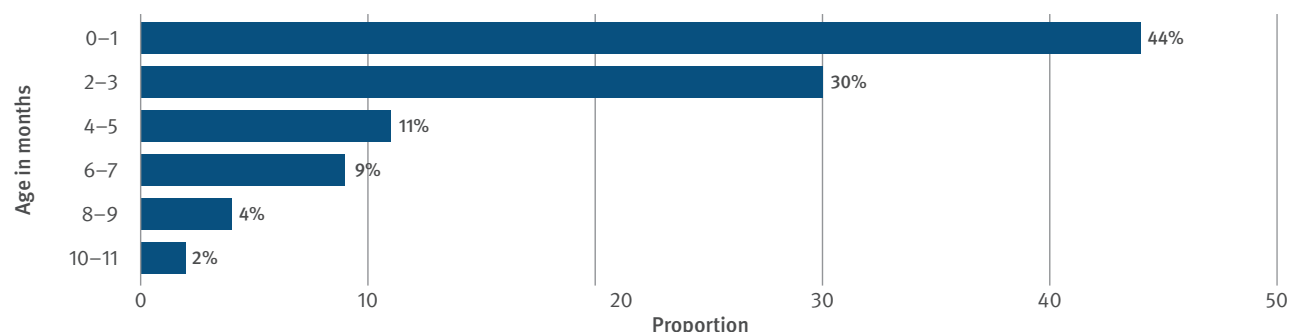
SUDIs later found to be the result of fatal assault or neglect are excluded from the analyses presented throughout the remainder of this chapter.

Sex and age

A slightly larger proportion of SUDIs in the last 5 years were males (57% male compared with 43% female), but there was not a significant difference in rates at 0.6 per 1,000 male births compared to 0.5 per 1,000 female births.

Figure 8.3 shows SUDI by age at death in the last 5 years. Two-thirds of sudden unexpected deaths (74%) occurred among infants aged 0–3 months.

Figure 8.3: SUDI by age in months (proportion), 2018–19 to 2022–23



Notes: Excludes SUDIs from fatal assault and neglect. Percentages may not add to 100 due to rounding.

⁷¹ An expanded table on SUDIs since 2004 is available on the report web page.

⁷² An expert panel review of Queensland post-neonatal SUDI deaths from 2013 recoded around half of the deaths to a different cause, with shifts occurring from explained to unexplained causes and vice versa. McEniery J, Cruice D (2018) 'The voice of the infant: Cause of death coding does not always reflect what really mattered in the life of the infant who died suddenly and unexpectedly' [poster presentation], *Perinatal Society of Australia and New Zealand Conference*, Auckland. www.childrens.health.qld.gov.au/chq/health-professionals/qpac/

Risk factors for SUDI deaths

A number of factors have been associated with an increased risk of SUDI.⁷³ These can be classified according to whether they are associated with the infant, the family or the sleep environment.

Infant factors: Prematurity and low birth weight, multiple gestation (twins, triplets), neonatal health problems, male sex and recent history of minor viral respiratory infections and/or gastrointestinal illness.

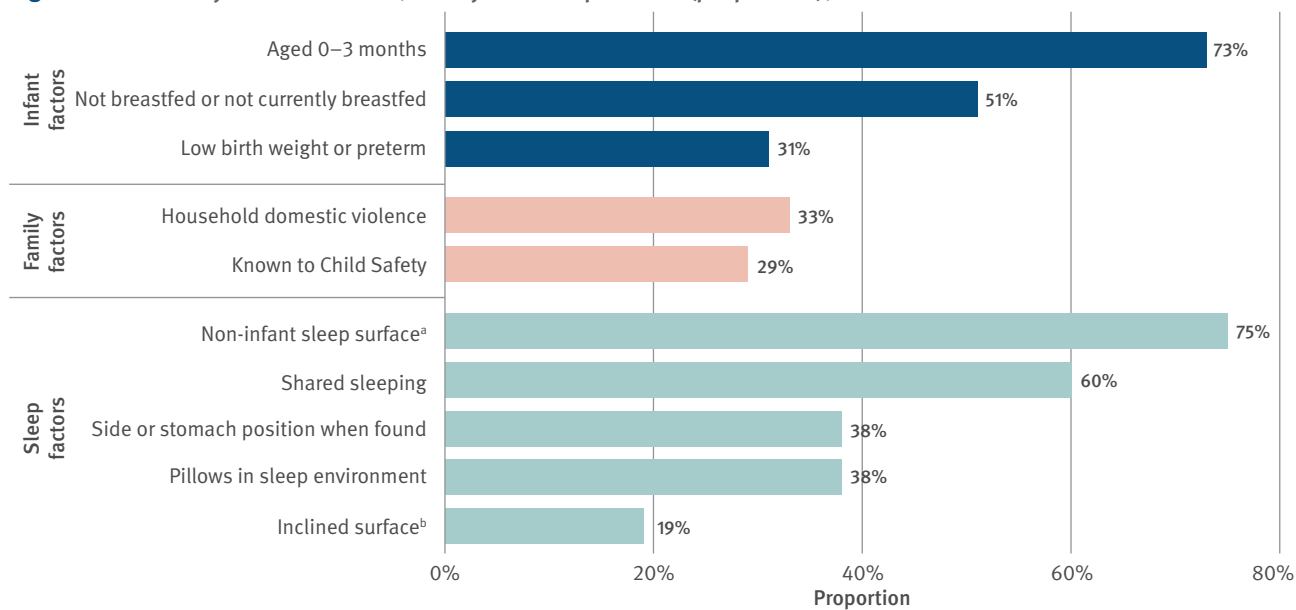
Family factors: Cigarette smoking during pregnancy and after birth, young maternal age (≤ 20 years), single marital status, high parity (number of births by mother) and short intervals between pregnancies, poor or delayed prenatal care, abuse or family violence, high-risk lifestyles including alcohol and illicit drug abuse, and social disadvantage and poverty.

Sleep environment factors: Sleeping on soft surfaces and loose bedding, prone (stomach) and side sleeping position, some forms of shared sleeping, and overwrapping or overheating.

Selected characteristics of the infant, family and unsafe sleep factors in 177 SUDI deaths over the last 5 years are shown in Figure 8.4. These indicate increased risk in the first months and for infants born with low birth weight. Breastfeeding is indicated as a potentially protective factor.

Using non-infant sleep surfaces (75% of SUDIs), sharing a sleep surface (60%) and sleep position on side or stomach (38%) are all reported to increase the risk of sudden unexpected infant deaths, as are pillows (38%) and excess bedding in the sleep space.

Figure 8.4: SUDI by selected infant, family and sleep factors (proportion), 2018–19 to 2022–23



^a Includes adult sleep surfaces and other surfaces such as a couch/chair or infant product not primarily for sleep (e.g. pram/stroller, baby capsule).

^b Includes infants propped on pillows or other items, and products with an inclined surface: pram/stroller; infant swing/rocker; baby capsule/car seat.

Notes: Excludes SUDIs from fatal assault and neglect.

⁷³ The Triple Risk Model proposes SUDI risk increases with combined factors of vulnerable infant; critical development period; and external stressors <https://rednose.org.au/article/the-triple-risk-model>

Clinical guidelines: Safer infant sleep

The *Queensland clinical guidelines safer infant sleep*⁷⁴ describe infant care practices that are associated with reducing the risk of sudden unexpected deaths in infancy.

Safer sleep messages for SUDI risk reduction

Place infant in a safe sleep position in a safe sleep environment:

- place infant on their back for every sleep
- keep head and face uncovered
- smoke free before and after birth
- keep sleep space clear for every sleep
- safe sleep place in the same room as caregiver for first 6–12 months
- breastfeeding is recommended.

Sudden unexpected death in infancy among vulnerable families

In 2022, the Queensland Child Death Review Board released an *Issues Paper: Sudden unexpected death in infancy among vulnerable families in Queensland*,⁷⁵ which was prepared by the Queensland Paediatric Quality Council. The paper identified a number of key points of interest:

- SUDI result from an interaction of multiple factors—90% of SUDI have more than one modifiable behavioural risk factor.
- The adversities experienced by Aboriginal and Torres Strait Islander infants contribute to a SUDI rate more than 3.5 times higher than non-Indigenous infants in Queensland.
- The most socially vulnerable families are lagging in their uptake of safer infant care and safer sleep recommendations. As a result, SUDI occur primarily in poor and marginalised populations experiencing adverse social conditions.
- Effective interventions need to address infant care practices, including decisions about infant sleep environments, for socially vulnerable or at-risk families.

Sleep environment factors

Sleep surface

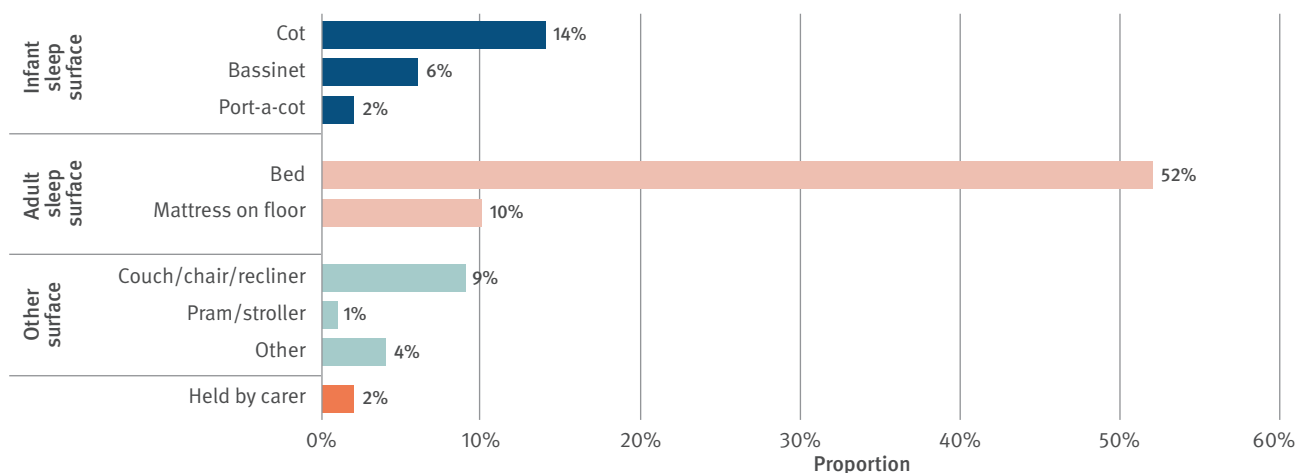
As indicated in Figure 8.5, in over half (62%) of SUDIs in the last 5 years the infant was on an adult sleep surface at the time of the incident and a further 9% were on a couch or recliner. Only 22% of the SUDIs occurred when an infant sleep product was being used.⁷⁶

⁷⁴ Available at www.health.qld.gov.au/_data/assets/pdf_file/0025/1166353/g-safer-sleep.pdf

⁷⁵ Available at www.cdrb.qld.gov.au/wp-content/uploads/2022/11/Sudden-unexpected-death-in-infancy-among-vulnerable-families-in-Queensland-SUDI-report-for-publication.pdf

⁷⁶ Percentages by surface types in Figure 8.5 may not add to sub-totals presented in this paragraph due to rounding.

Figure 8.5: Sleep surface in SUDIs (proportion), 2018–19 to 2022–23



Notes: Excludes SUDIs from fatal assault and neglect. Percentages may not add to 100 due to rounding.

Infant sleep position

Safer infant sleep advice is to place infants on their backs to sleep (supine). Once infants can roll of their own accord it remains important that the sleep surface is firm and flat—the infant’s face/nose may be obstructed if the surface is too soft.

Information from incident reports on infant sleep position is shown in Table 8.1. While 74 deceased infants in the last 5 years were placed and found on their back, a further 27 had moved from their back to stomach or side position when found. Of the 177 infants dying suddenly and unexpectedly, 67 were on their stomach or side when found (38% of SUDIs excluding those from non-accidental injury).

Table 8.1: Infant sleep position when placed and found (number), 2018–19 to 2022–23

Position when placed	Position when found						Total
	Back	Stomach	Side	Other	Held by carer	Unknown	
Back (supine)	74	19	8	0	1	5	107
Stomach (prone)	2	12	0	0	0	1	15
Side	2	9	9	0	0	2	22
Held by carer	3	5	1	4	1	1	15
Other	0	1	0	0	1	0	2
Unknown	3	3	0	0	1	9	16
Total	84	49	18	4	4	18	177

Notes: Excludes SUDIs from fatal assault and neglect.

Inclined surface

A firm, flat sleeping surface (not tilted or elevated) is recommended to reduce the risk of SUDI, including for babies with reflux.⁷⁷ Information in the Child Death Register indicates 19% of SUDIs in the last 5 years were placed on an inclined surface. Most of these involved propping infants on pillows or other items. Some incidents involved an infant product with an inclined surface, including a hammock and infant car seat.

77 Queensland Health (2022) Queensland Clinical Guidelines. Safer infant sleep, Guideline No. MN22.71V1-R27, www.health.qld.gov.au/_data/assets/pdf_file/0025/1166353/g-safer-sleep.pdf

Shared sleeping

Over half (106, 60%) of the infants whose deaths were sudden and unexpected were sharing a sleep surface with one or more people at the time of death. Not all shared sleeping was planned—in some incidents the carer has fallen asleep while nursing the infant.

Sharing a sleep surface with a baby can increase the risk of SIDS and fatal sleep accidents in some circumstances.⁷⁸ Some studies have found there is an increased risk of SIDS only when mothers who smoke share a bed with their infant, although such findings are insufficient to enable complete reassurance that bed sharing is safe for non-smokers.

Risks are also associated with shared sleeping if infants are sharing a sleep surface with a caregiver who is under the influence of alcohol or drugs which cause sedation, if the caregiver is excessively tired or there are multiple people in the bed with the infant.

Of the 106 SUDIs in a shared sleep environment over the last 5 years, the following additional risk factors were identified:

- position in sleep environment, such as placed between 2 people or on top of a co-sleeping person (29%)
- alcohol or substance use (26%)
- tobacco (41%)
- extreme fatigue (19%)
- obesity (8%).

Infant product safety

In September 2022, the QFCC made a submission⁷⁹ to the ACCC in response to their third consultation paper on infant sleep products, to inform the proposed regulatory changes for safety improvements to infant sleep products, supporting an education campaign on safer sleep practices and supporting a ban on certain inclined sleep products.

In December 2022, the QFCC raised concerns with the Australian Competition and Consumer Commission (ACCC) relating to infant products to inform the formulation of their product safety priorities in 2023–24. One of the 3 areas of concern noted related to infant swaddle suits, in the circumstances of infants being able to roll from lying on their back to their front.

Best practice guide for the design of safe infant sleeping environments

The QFCC provided infant mortality data and contributed to the Infant Safe Sleeping Working Group's industry guide for manufacturers and retailers for infant sleep products. The guide, released in March 2022, provides a comprehensive, coordinated and evidence-based approach to reduce the risk of death and life-threatening injuries to infants.⁸⁰

Unexplained deaths of children aged 1–17 years

While this chapter primarily examines sudden unexpected deaths of infants, a smaller proportion of unexplained-cause deaths were of children aged 1 year and over (see [Table A.10, Appendix A](#)). Two deaths of children aged 1–17 in 2022–23 were categorised as unexplained causes. Over the last 5 years, while 80% of unexplained deaths were infants, 14% were aged 1–4 years and 7% were aged 5–17 years.⁸¹

Some deaths in the younger age group show similarities to SUDI deaths in that they occurred during sleep with SUDI risk factors present. In some unexplained deaths, investigations have found the cause of death to be injury; however, it cannot be determined whether the cause of the injury was accidental or intentional.

78 Queensland Health (2022) *Queensland Clinical Guidelines. Safer infant sleep*, Guideline No. MN22.71V1-R27, www.health.qld.gov.au/_data/assets/pdf_file/0025/1166353/g-safer-sleep.pdf

79 Queensland Family and Child Commission, Policy submissions: www.qfcc.qld.gov.au/sector/policy-submissions

80 Infant Safe Sleeping Working Group (2022) *Best practice guide for the design of safe infant sleeping environments*, www.productsafety.gov.au/about-us/publications/best-practice-guide-for-the-design-of-safe-infant-sleeping-environments

81 Percentages may not add to 100 due to rounding.