

# **National Indigenous Reform Agreement: PI 06—Under five mortality rate by leading cause, 2016**

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# National Indigenous Reform Agreement: PI 06— Under five mortality rate by leading cause, 2016

## Identifying and definitional attributes

<b>Metadata item type:</b>	Indicator
<b>Indicator type:</b>	Indicator
<b>Short name:</b>	PI 06—Under five mortality rate by leading cause, 2016
<b>METEOR identifier:</b>	611173
<b>Registration status:</b>	<a href="#">Indigenous</a> , Superseded 01/07/2016
<b>Description:</b>	<p>Mortality rates for children aged less than five years, by leading causes of death (ICD-10 chapter level), by Indigenous status.</p> <p>The Australian Bureau of Statistics (ABS) data for this indicator are for perinatal mortality, infant mortality (0–&lt;1 year), child 1–4 years mortality and child 0–4 years mortality.</p>
<b>Rationale:</b>	High level of public interest. Key measure for the ' <i>Closing the Gap</i> ' indicator of halving the gap in mortality rates between Indigenous and non-Indigenous children aged under 5.
<b>Indicator set:</b>	<a href="#">National Indigenous Reform Agreement (2016)</a> <a href="#">Indigenous</a> , Superseded 01/07/2016
<b>Outcome area:</b>	<a href="#">Indigenous children have the same health outcomes as other Australian children</a> <a href="#">Indigenous</a> , Standard 21/07/2010

## Collection and usage attributes

<b>Population group age to:</b>	<p>This indicator uses a number of different population group age bands:</p> <ul style="list-style-type: none"><li>• For perinatal: All fetal deaths of at least 20 completed weeks' gestation or at least 400 grams birthweight, and all live-born babies who died within 28 days of birth (refer to definition under Computation)</li><li>• For infants: Live births, from birth to less than 1 year of age</li><li>• For children aged 1–4 years: population from 1 year of age to less than 5 years of age</li><li>• For children aged 0–4 years: population less than 5 years of age.</li></ul>
<b>Computation description:</b>	<p>Rates are calculated for Indigenous and non-Indigenous Australians.</p> <p>For children aged 1–4 years and children aged 0–4 years:</p> <ul style="list-style-type: none"><li>• Rates for single year use single year for numerator and average of three years (with reference year as middle year) for denominator.</li><li>• Rates for five years combined use average of five years for numerator and denominator.</li></ul> <p>Variability bands are to be calculated for rates (single year and national data for 5 years combined) using the standard method (see definition below).</p> <p>Reporting is only for those jurisdictions which have adequate levels of Indigenous identification (NSW, Qld, WA, SA and the NT from 1998).</p> <p>For trends: Percentage change and statistical significance of change are to be calculated (required for assessment of progress against targets).</p> <p>Excludes deaths where Indigenous status was not stated.</p> <p>Rate ratios and rate differences are calculated for comparisons between Indigenous and non-Indigenous Australians.</p> <p>Note: Causes of death to be listed from highest to lowest Indigenous percentage</p>

for the most recent period (5 years combined).

**Presentation:**

Number, percentage; rate per 1,000 of all births (perinatal), rate per 1,000 live births (infant), rate per 100,000 population (children 1–4 years and children 0–4 years), rate ratio, rate difference and variability bands.

Note: causes of death to be listed from highest to lowest Indigenous percentage.

**Definitions:**

**'Standard method' for variability band computation:**

Rates derived from administrative data counts are not subject to sampling error but may still be subject to natural random variation, especially for small counts. A 95% confidence interval for an estimate is a range of values which is very likely (95 times out of 100) to contain the true unknown value. Where the 95% confidence intervals of two estimates do not overlap it can be concluded that there is a statistically significant difference between the two estimates. This is the standard method used in Australian Institute of Health and Welfare (AIHW) publications for which formulas can be sourced from Breslow and Day (1987) in the publication 'Statistical methods in cancer research'. Typically in the standard method, the observed rate is assumed to have natural variability in the numerator count (for example, deaths, hospital visits) but not in the population denominator count. Also, the rate is assumed to have been generated from a normal distribution ("Bell curve"). Random variation in the numerator count is assumed to be centred around the true value - that is, there is no systematic bias.

'Perinatal mortality' is defined as death of an infant within 28 days of birth (neonatal death) or of a fetus (unborn child) of at least 20 completed weeks of gestation or with a birthweight of at least 400 grams.

Aboriginal and Torres Strait Islander Health Performance Framework 'Leading causes of death' are classified using ICD-10 codes as follows:

**Perinatal mortality:**

Main condition in the fetus/infant:

Other conditions originating in the perinatal period (P10–P15 and P50–P96); Disorders related to length of gestation and fetal growth (P05–P08); Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99); Respiratory and cardiovascular disorders specific to the perinatal period (P20–P29); Infections specific to the perinatal period (P35–P39); Other conditions; Total deaths.

Main condition in the mother, fetus and newborn affected by:

Complications of placenta, cord and membranes (P02); Maternal complications of pregnancy (P01); Maternal conditions that may be unrelated to present pregnancy (P00); Other complications of labour and delivery and noxious influences transmitted via placenta or breast milk (P03–P04); Total deaths.

**Infant mortality:**

Certain conditions originating in the perinatal period (P00–P96); Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99); Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99); Sudden infant death syndrome (R95); Injury and poisoning (V01–Y98); Diseases of the respiratory system (J00–J99); Diseases of the circulatory system (I00–I99); Certain infectious and parasitic diseases (A00–B99); Other causes; All causes.

**Child 1-4 mortality:**

Injury and poisoning (V01–Y98); Diseases of the respiratory system (J00–J99); Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99); Diseases of the nervous system (G00–G99); Diseases of the circulatory system (I00–I99); Certain infectious and parasitic diseases (A00–B99); Certain conditions originating in the perinatal period (P00–P96); Symptoms, signs and

abnormal clinical and laboratory findings, not elsewhere classified (R00–R99);  
Other causes; All causes.

Child 0-4 mortality:

Certain conditions originating in the perinatal period (P00–P96); Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99); Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99); Injury and poisoning (V01–Y98); Diseases of the respiratory system (J00–J99); Diseases of the circulatory system (I00–I99); Diseases of the nervous system (G00–G99); Certain infectious and parasitic diseases (A00–B99); Other causes; All causes.

**Computation:**

Perinatal and infant mortality rates:  $1000 \times (\text{Numerator} \div \text{Denominator})$ .

Children 1–4 and 0–4 mortality rates:  $100,000 \times (\text{Numerator} \div \text{Denominator})$ .

Rate ratio: Indigenous rate divided by non-Indigenous rate.

Rate difference: Indigenous rate minus non-Indigenous rate.

Variability band: to be calculated using the standard method for estimating 95% confidence intervals as follows.

Crude rate:

$$CI(CR)_{95\%} = p \pm 1.96 \times \sqrt{\frac{pq}{n}}$$

Where CI = confidence interval

CR = crude rate

$p$  = mortality rate

$q = 1-p$

$n$  = denominator used to calculate mortality rate.

Percentage change: Calculated by multiplying the average annual change over the period by the number of data points less 1. This is then divided by the rate for the first year in the series and multiplied by 100.

The average annual change in rates, rate ratios and rate differences are calculated using linear regression which uses the least squares method to calculate a straight line that best fits the data and returns an array that best describes the line. The simple linear regression line,  $Y = a + bX$ , or 'slope' estimate was used to determine the average annual change in the data over the period. The formula used to calculate the slope estimate and standard error of the slope in Microsoft Excel is:

LINEST (known\_y's, known\_x's, true) entered as an array formula (Ctrl, Shift, Enter).

Statistical significance of change: The 95% confidence intervals (CIs) for the standard error of the slope estimate (average annual change) are used to determine whether the apparent increases or decreases in the data are statistically significant at the  $p < 0.05$  level. The formula used to calculate the CIs for the standard error of the slope estimate is:

$$95\% CI(x) = x \pm 1.96 \times SE(x)$$

where  $x$  is the average annual change (slope estimate).

If the upper and lower 95% confidence intervals do not include zero, then it can be concluded that there is statistical evidence of an increasing or decreasing trend in the data over the study period.

Definitions:

'Perinatal mortality' is defined by the ABS as death of a baby within 28 days of birth (neonatal death) or of a fetus (unborn child) of at least 20 completed weeks of gestation or with a birthweight of at least 400 grams.

**Numerator:**

Perinatal: Number of perinatal deaths (fetal and neo-natal)

Infant: Number of deaths among children aged less than 1 year

Children 1–4: Number of deaths among children aged 1–4 years

Children 0–4: Number of deaths among children aged 0–4 years

**Numerator data elements:****Data Element / Data Set****Data Element**

Person—age

**Data Source**

[ABS Death Registrations Collection](#)

**Guide for use**

Data source type: Administrative by-product data

Infant and child numerator data source

**Data Element / Data Set****Data Element**

Person—date of birth

**Data Source**

[ABS Causes of Death Collection](#)

**Guide for use**

Data source type: Administrative by-product data

Infant and child numerator data source

**Data Element / Data Set****Data Element**

Person—date of death

**Data Source**

[ABS Causes of Death Collection](#)

**Guide for use**

Data source type: Administrative by-product data

Infant and child numerator data source

**Data Element / Data Set****Data Element**

Birth—birth status

**Data Source**

[ABS Perinatal Deaths Collection](#)

**Guide for use**

Data source type: Administrative by-product data

Perinatal numerator data source

**Data Element / Data Set**

**Data Element**

Number of fetal and neonatal deaths

**Data Source**

[ABS Perinatal Deaths Collection](#)

**Guide for use**

Data source type: Administrative by-product data

Perinatal numerator data source

**Denominator:**

Perinatal: Number of all births (including live births, and stillbirths of at least 20 completed weeks of gestation or with a birthweight of at least 400 grams).

Infant: Number of registered live births

Children 1–4: Population aged 1–4 years

Children 0–4: Population aged 0–4 years

**Denominator data elements:**

**Data Element / Data Set**

**Data Element**

Birth—birth status

**Data Source**

[ABS birth registration data](#)

**Guide for use**

Data Source type: Administrative by-product data

Perinatal and infant denominator data source

**Data Element / Data Set**

**Data Element**

Person—age

**Data Source**

[ABS Estimated resident population \(2011 Census-based\)](#)

**Guide for use**

Data Source type: ERP is derived from Census, Census PES and estimates of fertility, mortality, net migration etc.

Child 1–4 and 0–4 years denominator data source

**Data Element / Data Set**

**Data Element**

Person—estimated resident population of Australia

**Data Source**

[ABS Estimated resident population \(2011 Census-based\)](#)

**Guide for use**

Data Source type: Estimated resident population (ERP) is derived from Census, Census Post Enumeration Survey (PES) and estimates of fertility, mortality, net migration etc.

Child 1–4 and 0–4 years denominator data source.

**Data Element / Data Set**

**Data Element**

Person—age

**Data Source**

[ABS Indigenous estimates and projections \(2011 Census-based\)](#)

**Guide for use**

Data Source type: Indigenous population data are derived from Census, Census PES and estimates of fertility, mortality, net migration etc.

Child 1–4 and 0–4 years denominator data source

**Data Element / Data Set**

**Data Element**

Person—estimated resident population of Australia

**Data Source**

[ABS Indigenous estimates and projections \(2011 Census-based\)](#)

**Guide for use**

Data Source type: Indigenous population data are derived from Census, Census PES and estimates of fertility, mortality, net migration etc.

Child 1–4 and 0–4 years denominator data source



**Disaggregation:**

Reporting is only for those jurisdictions which have adequate levels of Indigenous identification (NSW, Qld, WA, SA and the NT from 1998).

**Current period:** Five-year aggregate:

- 2009–2013 (perinatal, infant, child 1–4 years, and child 0–4 years by causes of death, and perinatal all causes of death).
- 2010–2014 (infant, child 1–4 years, child 0–4 years all causes of death).

For Indigenous and non-Indigenous (numbers, rates, percentage, rate ratios, rate differences, variability bands):

- Total (selected states/territories) by leading cause of death including total (ICD-10 chapter level and some sub-chapter level) by age group (perinatal, infant, child 1–4 years, and child 0–4 years).
- Total (selected states/territories) by age group (infant, child 1–4 years, and child 0–4 years): all causes of death.
- State/territory (including total) by age group (infant, child 1–4 years, and child 0–4 years): all causes of death.

For Indigenous and non-Indigenous (numbers, rates, rate ratios, and rate differences):

- State/territory (including total) by age group (perinatal (fetal, neonatal and total perinatal), infant, child 1–4 years and child 0–4 years).
- Total (selected states/territories) by age group (infant, child 1–4 years, and child 0–4 years): all causes of death.
- State/territory (including total) by age group (infant, child 1–4 years, and child 0–4 years): all causes of death.

**Time series:**

Single year data:

- 2007, 2008, 2009, 2010, 2011, 2012, 2013 (previously provided) and 2014 (by all causes of death for infant and child 0–4 years).
- 2006, 2007, 2008, 2009, 2010, 2011, 2012 (previously provided) and 2013 (by all causes of death for perinatal).

For Indigenous and non-Indigenous (numbers, rates, rate ratios, rate differences, variability bands, percentage change and statistical significance of change):

- Total (selected states/territories) by age group (perinatal, infant, and child 0–4 years).

**Disaggregation data elements:****Data Element / Data Set****Data Element**

Person—area of usual residence, statistical area level 2 (SA2) (ASGS 2011)

**Data Source**

[ABS Death Registrations Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set****Data Element**

Person—Indigenous status

**Data Source**

[ABS Death Registrations Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set**

**Data Element**

Person—area of usual residence, statistical area level 2 (SA2) (ASGS 2011)

**Data Source**

[ABS Causes of Death Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set**

**Data Element**

Person—Indigenous status

**Data Source**

[ABS Causes of Death Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set**

**Data Element**

Person—underlying cause of death (ICD-10 2nd edn)

**Data Source**

[ABS Causes of Death Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set**

**Data Element**

Person—area of usual residence, statistical area level 2 (SA2) (ASGS 2011)

**Data Source**

[ABS Perinatal Deaths Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set**

**Data Element**

Person—Indigenous status

**Data Source**

[ABS Perinatal Deaths Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Data Element / Data Set****Data Element**

Person—underlying cause of death (ICD-10 2nd edn)

**Data Source**

[ABS Perinatal Deaths Collection](#)

**Guide for use**

Data source type: Administrative by-product data

**Comments:**

Most recent data available for 2016 report is 2014 for infant and child all causes mortality and 2013 for perinatal data and causes of death data.

Data are by reference year.

Single year data for children under 5 by leading cause of death are not produced as the numbers are too small to identify trends. The body analysing progress against targets may reconsider this for future reports.

Disaggregation by Indigenous status will be based on data only from jurisdictions for which the quality of Indigenous identification is considered acceptable.

At this stage, data from only selected states and territories (NSW, Qld, WA, SA and the NT) are considered of accepted quality for reporting Indigenous deaths for all ages.

National rates should include these five jurisdictions only.

Disaggregation by state/territory is based on state/territory of usual residence of the deceased.

Indigenous child and particularly infant mortality data are subject to high variability due to small numbers of deaths among children 0 to 4 years.

Due to the small number of Indigenous deaths reported each year, 5 year combined data are recommended for reporting for the current reporting period. Disaggregation by leading causes of death is recommended to be reported at the national level only and not by state/territory due to small numbers.

Single year data will be used for time series in the numerator and three year average for the denominator.

Infant and child mortality:

Aggregated data (2010–2014) will be reported for all causes mortality, and 2009–2013 for cause of death, for the current reporting period.

Single year data (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014) will be reported for time series analyses (all causes mortality and national level only for infants and child 0–4 years). For the 2016 report, data to be re-supplied for 2011 and 2012 for revised cause of death data.

Perinatal data:

Aggregated data (2009–2013) will be reported for the current reporting period.

Single year data (2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 only for all causes total) will be reported for time series analyses, noting that data provided for previous years will be used unless a resupply is provided. For the 2016 report, data to be re-supplied for 2011 and 2012 for revised cause of death data.

A number of updates to the ICD-10 were applied to the 2013 causes of death data. Details of the impact of these changes on the mortality data are described in [ABS](#)

Variability bands accompanying mortality data should be used for the purposes of comparisons over time and for national estimates at a point in time for Indigenous/non-Indigenous and cause of death comparisons. They should not be used for comparing mortality rates at a single point in time between jurisdictions as the variability bands and mortality rates do not take into account differences in under-identification of Indigenous deaths between jurisdictions.

Baseline year for National Indigenous Reform Agreement (NIRA) target (Halve the gap in mortality rates for Indigenous children under 5 within a decade) is 2008; baseline year for this indicator is 2006; target year is 2018.

Child 1–4 and child 0–4 mortality measures are derived from ERPs and projections based on the 2011 Census. The non-Indigenous population will be calculated based on 2011 Census based ERP total population minus 2011 Census based projections. First release total population ERP is to be used until rebased.

Perinatal data from the AIHW National Perinatal Data Collection was reported as supplementary data for this indicator in the 2008–09 and 2009–10 reporting cycles.

## Representational attributes

<b>Representation class:</b>	Rate
<b>Data type:</b>	Real
<b>Unit of measure:</b>	Person
<b>Format:</b>	N[N].N

## Indicator conceptual framework

<b>Framework and dimensions:</b>	<a href="#">Deaths</a>
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## Data source attributes

### Data sources:

#### Data Source

[ABS birth registration data](#)

#### Frequency

Annual

#### Data custodian

Australian Bureau of Statistics

#### Data Source

[ABS Death Registrations Collection](#)

#### Frequency

Annual

#### Data custodian

Australian Bureau of Statistics

#### Data Source

[ABS Estimated resident population \(2011 Census-based\)](#)

#### Frequency

Quarterly

<b>Data custodian</b>
Australian Bureau of Statistics

#### Data Source

<a href="#">ABS Causes of Death Collection</a>
<b>Frequency</b>
Annual
<b>Data quality statement</b>
<a href="#">ABS causes of death collection, QS</a>
<b>Data custodian</b>
Australian Bureau of Statistics

#### Data Source

<a href="#">ABS Indigenous estimates and projections (2011 Census-based)</a>
<b>Frequency</b>
Periodic
<b>Data custodian</b>
Australian Bureau of Statistics

#### Data Source

<a href="#">ABS Perinatal Deaths Collection</a>
<b>Frequency</b>
Annual
<b>Data custodian</b>
Australian Bureau of Statistics

## Accountability attributes

<b>Reporting requirements:</b>	National Indigenous Reform Agreement.
<b>Organisation responsible for providing data:</b>	Australian Bureau of Statistics
<b>Further data development / collection required:</b>	Specification: Long-term. Improve the quality of Indigenous identification in deaths data.

## Source and reference attributes

<b>Steward:</b>	<a href="#">National Indigenous Reform Agreement Performance Information Management Group</a>
<b>Reference documents:</b>	Breslow NE & Day NE 1987. Statistical methods in cancer research. Lyon: International Agency for Research on Cancer.

## Relational attributes

**Related metadata  
references:**

Supersedes [National Indigenous Reform Agreement: PI 06-Under five mortality rate by leading cause, 2015](#)

[Indigenous](#), Superseded 18/11/2015

Has been superseded by [National Indigenous Reform Agreement: PI 06—Under five mortality rate by leading cause, 2017](#)

[Indigenous](#), Superseded 06/06/2017

See also [National Healthcare Agreement: PB b-Better health: halve the mortality gap for Indigenous children under five by 2018, 2015](#)

[Health](#), Superseded 08/07/2016