National Indigenous Reform Agreement: PI 02—Mortality rate by leading causes, 2016

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Identifying and definitional attributes

Metadata item type: Indicator

Indicator type: Indicator

Short name: PI 02—Mortality rate by leading causes, 2016

METEOR identifier: 611147

Registration status: Indigenous, Superseded 01/07/2016

Description: Mortality rates for Australians by leading causes of death (ICD-10 chapter level), by Indigenous status.

Rationale: Achieving the Closing the Gap target of closing the life expectancy gap within a generation requires monitoring mortality rates for different diseases so that it is understood which diseases are major contributors to mortality among Indigenous Australians and where programs are succeeding and where they are not.

Indicator set: National Indigenous Reform Agreement (2016)
Indigenous, Superseded 01/07/2016

Outcome area: Indigenous Australians achieve health outcomes comparable to the broader population
Indigenous, Standard 21/07/2010

Collection and usage attributes

Computation description: Mortality rates for Australians by the leading causes of death, by Indigenous status.

Crude rates are calculated for Indigenous Australians.

Age-standardised rates are calculated for Indigenous and non-Indigenous Australians.

Rate ratios and rate differences are calculated for comparisons between Indigenous and non-Indigenous Australians.

Note: Causes of death to be listed from highest to lowest Indigenous percentage for the most recent period (5 years combined).

Variability bands are to be calculated for rates (single year data and national data for 5 years combined) using the standard method (see definition below).

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

For trends: Percentage change and statistical significance of change are to be calculated (required for assessment of progress over time as annual proxy measure against life expectancy target).

Excludes deaths where Indigenous status was not stated.

Where age is not stated, pro-rating should be applied.

Presentation:

Number, percentage, rate per 100,000 persons; rate ratios, rate differences, variability bands; and causes of death (as per list contained in 'Definitions' below) listed from highest to lowest Indigenous percentage.

Definitions:

This measure refers to 'leading causes of death'. Data are provided for 'selected causes of death' according to the ICD-10 codes used for 'leading causes of death'

in the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW 2015):

- Circulatory diseases (I00–I99)
- Neoplasms (C00–D48)
- Malignant neoplasms—Cancer (C00–C97, D45, D46, D47.1, D47.3, D47.4, D47.5)
- Malignant neoplasms of digestive organs (C15–C26)
- Malignant neoplasm of bronchus and lung (C34)
- Malignant neoplasm of cervix uteri (C53)
- Non-malignant neoplasms (D00–D44, D47.0, D47.2, D47.7–D48)
- External causes of morbidity and mortality (V01–Y98)
- Endocrine, metabolic and nutritional disorders (E00–E89)
- Diabetes mellitus (E10–E14)
- Respiratory diseases (J00–J99)
- Digestive diseases (K00–K93)
- Kidney diseases (N00–N29)
- Conditions originating in the perinatal period (P00–P96)
- Nervous system diseases (G00–G99)
- Infectious and parasitic diseases (A00–B99)
- Other causes (that is, causes not listed above)
- Total (all causes)

For single year data, the following top 5 causes of death are to be reported:

- Circulatory diseases (I00–I99)
- Neoplasms (C00–D48)
- External causes of morbidity and mortality (V01–Y98)
- Endocrine, metabolic and nutritional disorders (E00–E89)
- Respiratory diseases (J00–J99)
- Total (top 5 causes)
- Other causes (that is, causes other than the top 5)
- Total (all causes)

The top 5 causes of death need to be re-assessed each reporting period. If a change is identified, data may need to be backcast to the baseline year for the most recent set of top 5 causes to ensure a consistent time series.

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.

Computation:

Mortality rates:

Crude percentage: number of deaths by cause divided by all deaths.

Crude rate: 100,000 x (Numerator ÷ Denominator).

Age-standardised rate: calculated using the direct method using five-year age groups from 0–4 years to 75 years and over, with the Australian standard population as at 30 June 2001 as the standard. Age-standardisation should be done in accordance with the National Indigenous Reform Agreement Performance Information Management Group (NIRAPIMG) agreed principles for direct age-standardisation (see the Comments section below).

Rate ratio: Indigenous age-standardised rate divided by non-Indigenous age-standardised rate

Rate difference: Indigenous age-standardised rate minus non-Indigenous age-standardised rate

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

Crude rate:

$$CI\ (CR)_{95\%} = CR \pm 1.96 \times \frac{CR}{\sqrt{\sum_{i=1}^{I} d}}$$

Where CI = confidence interval

CR = crude rate

d = the number of deaths

Age-standardised rate:

$$CI\,(ASR)_{95\%} = ASR \pm 1.96 \times \sqrt{\sum_{i=1}^{I} \frac{w_i^2 d_i}{n_i^2}}$$

Where CI = confidence interval

ASR = age-standardised rate

w_i = the proportion of the standard population in age group i

d_i = the number of deaths in age group i

n_i = the number of people in the population in age group i

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.

Numerator: Number of deaths

Numerator data elements:

Data Element / Data Set

Person—date of birth

Data Source

ABS Death Registrations Collection

Guide for use

Data source type: Administrative by-product data

Data Element / Data Set

Person—date of death

Data Source

ABS Death Registrations Collection

Guide for use

Data source type: Administrative by-product data

Data Element / Data Set

Person—date of birth

Data Source

ABS Causes of Death Collection

Guide for use

Data source type: Administrative by-product data

Data Element / Data Set

Person—date of death

Data Source

ABS Causes of Death Collection

Guide for use

Data source type: Administrative by-product data

Denominator: Total number of all people in relevant population at 30 June.

Denominator data elements:

Data Element / Data Set

Person—estimated resident population of Australia

Data Source

ABS Estimated resident population (2011 Census-based)

Guide for use

Data source type: Derived from Census, Census PES and estimates of fertility, mortality, net migration, etc.

Data Element / Data Set

Person—estimated resident population of Australia

Data Source

ABS Indigenous estimates and projections (2011 Census-based)

Guide for use

Data source type: Derived from Census, Census Post Enumeration Survey (PES) and estimates of fertility, mortality, net migration etc. Backcast population estimates and Series B projections.

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 - 2009–2013 (by cause of death) and 2010–2014 (all causes of death):

For Indigenous only (crude rates, and percentage):

- State/territory (including total) by selected causes of death including total (ICD-10 chapter level and some sub-chapter level).
- Total (selected states/territories) by sex by selected causes of death (ICD-10 chapter level and some sub-chapter level).
- State/territory (including total) by Indigenous status: all causes of death.

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

- State/territory (including total) by selected causes of death including total (ICD-10 chapter level and some sub-chapter level).
- Total (selected states/territories) by sex by selected causes of death (ICD-10 chapter level and some sub-chapter level).
- State/territory (including total): all causes of death.

Time series - Cause of death: 2006, 2007, 2008, 2009, 2010 (historical data available previously), 2011 (revised), 2012 (revised), 2013 (current).

All causes of death: 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 (historical data available previously), 2014 (current).

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

- Total (selected states/territories) by sex by Indigenous status: all causes of death.
- State/territory (including total) by Indigenous status: all causes of death.
- State/territory (including total) by selected causes of death including total (top 5 ICD-10 chapter levels as listed under ‘definitions’), by Indigenous status.

Disaggregation data elements:

Data Element / Data Set

Person—Indigenous status

Data Source

ABS Death Registrations Collection

Guide for use

Data source type: Administrative by-product data

Data Element / Data Set

Person—sex

Data Source

ABS Death Registrations Collection

Guide for use

Data source type: Administrative by-product data

Data Element / Data Set

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

Data Source

ABS Causes of Death Collection

Guide for use

Data source type: Administrative by-product data

Comments:

Most recent data available for 2016 report is 2014 for all causes of death and 2013 by cause of death. Revised data are also provided for 2011 and 2012 (for cause of death).

Data are based on reference year.

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

Single year data will be used for time series (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014 for all causes and 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 for specific causes, all data for the years listed have been supplied previously). Revised single year cause of death data are to be resupplied for 2011 and 2012 only.

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 the Australian Bureau of Statistics (ABS) *Implementation of the Iris Software: Understanding Coding and Process Improvements*.

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, only data from selected states/territories are considered of acceptable quality for reporting mortality of Indigenous persons (NSW, Qld, WA, SA and the NT from 1998).

National rates should include these five jurisdictions only.

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

Due to the small number of Indigenous deaths reported each year, 5 year combined data will be reported for the current reporting period (computation for 5 year combined is average of 5 years for the numerator and use of mid-point year for the denominator). Single year data will be used for reporting time series.

To report trends, the assessment body should separately request percentage change and statistical significance testing for this indicator directly from the AIHW on data supplied by the ABS.

Variability bands accompanying mortality data should be used for the purpose 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 of NIRA target (Close the life expectancy gap within a generation) is 2006 using the three-year average of 2005–2007; baseline year for this indicator is 2006; target year is 2031.

Measures are derived from estimated resident populations (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 back cast and projections. First release total population ERP is to be used until rebased. Rates may not be comparable with overall rates reported elsewhere in national reporting.

NIRAPIMG agreed Principles for reporting directly age-standardised rates for administrative data are as follows:

Overarching principle: Before undertaking age-standardisation, analysts must investigate the data being used to understand the age-specific distribution and any limitations that may impact on the results.

Principle 1: The standard population used should be the Australian estimated resident population as at 30 June 2001 from the 2001 Census.

The population used as the denominator for the calculation of Indigenous age-standardised rates should be Series B of Indigenous estimates and projections 2001 to 2026 based on the 2011 Census.

Principle 2: If the denominator is less than 30 in any one age group, then do not attempt to produce age-standardised rates.

Age groups may be collapsed to obtain a denominator of 30 or more (provided that this is in accordance with principles 3 and 4).

Principle 3: If the total number of Indigenous events (for example, deaths, hospital separations) is less than 20, then do not attempt to produce age-standardised rates.

Combining several years of data or aggregating jurisdictions should be considered to obtain a total of 20 or more events.

If this does not meet the purpose (that is, data are required for time series or jurisdictional comparisons) or does not result in a total of 20 or more events, then other measures and contextual information should be reported instead of age-standardised rates which could include total number of events, crude rates, age-specific rates, age-specific rate ratios and median age at death.

Principle 4: Age-standardised rates should be calculated using the 5-year age groupings of 0–4 years to 75 years and over (provided Principles 2 and 3 for denominator and numerator are met).

10-year age groups may be used to overcome small numbers (20-year age groups are too wide and should not be used).

Principle 5: Additional contextual information (most importantly age-specific rates

and ratios) should be provided in addition to age-standardised rates when:

a) the age-standardised rates and rate ratios lie largely outside the range of the age-specific rates and rate ratios.

b) the pattern of age-specific rates of the Indigenous and non-Indigenous populations differ substantially (for example, deaths from a certain cause concentrate on younger ages for the Indigenous population while for the non-Indigenous population, they may occur at older ages).

c) the age-specific rates depart from the assumption of a uniform increase in death with age (for example, injury which peaks in the young adult to middle ages and certain cancers amenable to treatment for some age groups).

d) the condition of interest is largely confined to a specific age range (for example, sexually transmitted infections (STIs) and women who give birth). In such instances, age-standardisation could be restricted to include the age groups within this age range only.

Principle 6: For conditions restricted to a specific age group (for example, conditions originating in the perinatal period and sudden infant death syndrome (SIDS), it is recommended to report the age-specific rate for the age group of interest instead of the age-standardised rate.

Representational attributes

Representation class:	Rate
Data type:	Real
Unit of measure:	Person
Format:	N[NN].N

Indicator conceptual framework

Framework and dimensions:	Deaths

Data source attributes

Data sources:

Data Source

ABS Estimated resident population (2011 Census-based)

Frequency

Quarterly

Data custodian

Australian Bureau of Statistics

Data Source

ABS Death Registrations Collection

Frequency

Annual

Data custodian

Australian Bureau of Statistics

Data Source

ABS Indigenous estimates and projections (2011 Census-based)

Frequency

Periodic

Data custodian

Australian Bureau of Statistics

Data Source

ABS Causes of Death Collection

Frequency

Annual

Data quality statement

ABS causes of death collection, QS

Data custodian

Australian Bureau of Statistics

Accountability attributes

Reporting requirements: National Indigenous Reform Agreement.

Organisation responsible for providing data: Australian Bureau of Statistics

Further data development / collection required: Specification: Long-term.

Improve the quality of Indigenous identification in deaths data.

Source and reference attributes

Steward:	National Indigenous Reform Agreement Performance Information Management Group
Reference documents:	AIHW (Australian Institute of Health and Welfare) 2015. Aboriginal and Torres Strait Islander Health Performance Framework data. Canberra: AIHW. Viewed 29 October 2015, http://www.aihw.gov.au/indigenous-data/health-performance-framework/. 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 02-Mortality rate by leading causes, 2015 Indigenous, Superseded 18/11/2015 Has been superseded by National Indigenous Reform Agreement: PI 02—Mortality rate by leading causes, 2017 Indigenous, Superseded 06/06/2017