## A ge-standardised rate

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## Identifying and D efinitional Attributes

## D ata D ictionary: <br> NHDD

Knowledgebase ID: 000769
Version number: 1
M etadata type: DERIVED DATA ELEMENT
Registration NHIMG
Authority:
Admin status: SUPERSEDED
Effective date: 01-MAR-05
Definition: A method of adjusting the crude rate to eliminate the effect of differences in population age structures when comparing crude rates for different periods of time, different geographic areas and/ or different population sub-groups (e.g. between one year and the next and/ or States and Territories, Indigenous and non-Indigenous populations).

Adjustments are usually undertaken for each of the comparison populations against a standard population (rather than adjusting one comparison population to resemble another). Sometimes a comparison population is referred to as a study population.
Context: Population health and health services research:
For valid comparisons of rates in different populations, such as incidence rates, prevalence rates, mortality rates and health service utilisation rates.

## Relational and Representational Attributes

D atatype: Numeric<br>Representational QUANTITATIVE VALUE form:<br>Representation NNNNNN.N layout:<br>Minimum Size: 1<br>Maximum Size: 8

G uide For U se: For the purposes of comparisons of population rates for A ustralia over time, and/ or populations within A ustralia (e.g. States and Territories, Indigenous and non-Indigenous) the standard population to be used is the final 30 June estimated Australian resident total population (males plus females) for the most recent
year ending in 1 (e.g. 1991, 2001).
There are two methods (namely direct and indirect) of calculating age-standardised rates. The direct method is generally used for comparisons between study groups.

Formula:
Direct method:-
SR=(SUM (ri * Pi))/ SUM Pi
Indirect method:-
SR=(C/ SUM (Ri *pi))*R
Where:
SR is the age-standardised rate for the population being studied ri is the age-group specific rate for age group $i$ in the population being studied
Pi is the population of age group i in the standard population C is the observed number of events* in the population being studied
SUM (Ripi) is the expected number of events in the population being studied
Ri is the age-group specific rate for age group i in the standard population
pi is the population for age group i in the population being studied
$R$ is the crude rate in the standard population

* 'Events' can include deaths, incident or prevalent cases of disease or other conditions, or health care utilisation occurrences.

For the purposes of comparisons of population rates for Australia over time, and/ or populations within A ustralia (e.g. States and Territories, Indigenous and non-Indigenous) the standard population to be used is the final 30June estimated Australian resident total population (males plus females) for the most recent year ending in 1 (e.g. 1991, 2001).

There are two methods (namely direct and indirect) of calculating age-standardised rates. The direct method is generally used for comparisons between study groups.

The indirect method is recommended when the age-specific rates for the population being studied are not known but the total number of events is known or when calculating rates for small populations where fluctuations in age-specific rates can affect the
reliability of rates calculated using the direct method.
The standard population used for purposes of international comparisons is generally the World Standard Population as recommended by the World Health Organization or the European Standard Population.

Five year age groups should normally be used, with the age group $0-4$ separated into 0 and 1 to 4 , and ages over 85 years combined, thus $0,1-4,5-9,10-14, \ldots \ldots . . ., 80-84,85+$. If these age groups are not used, the actual age groups should be detailed in notes accompanying the age standardised population rate information.

Standardisation separately for males and females is not usually undertaken but may be appropriate for some applications, for example, hospitalisation rates for caesarean section is best undertaken using a female standard population rather than a standard population for both sexes. If standardisation is undertaken in this way this should be detailed in notes accompanying the age standardised population rate information.

When indirect age standardisation is undertaken for comparisons with or between Indigenous populations, the latest available rates could be used as the standard. In addition, age groups older than 70-74 years could be excluded. This is as recommended in the National Performance Indicators for A boriginal and Torres Strait Islander Health Technical Specifications.
Related metadata: relates to the data element Crude rate version 1

## Administrative Attri butes

Source D ocument: Textbooks of epidemiology, demography and biostatistics. The notation used in this data element is based on A rmitage P \& Berry G 1994. Statistical Methods in Medical Research. Oxford: Blackwell Scientific Publications.

## Source Organisation: AIHW

Comments: Standardised rates are generally multiplied by 1,000 or 100,000 to avoid small decimal fractions. They are then called standardised rates per 1,000 or 100,000 population.

The indirect method is also used to calculate standardised mortality ratios (SMRs) and other standardised ratios, for example for health service utilisation. These ratios express the overall
experience of a comparison population in terms of the standard population by calculating the ratio of observed to expected deaths in the comparison population:
$\mathrm{SMR}=\mathrm{C} / \operatorname{Sum}(\mathrm{Ri} * \mathrm{Pi})$

The standard population used to calculate SM Rs can be any population to which the comparison population is being compared. For example, if death rates for birthplace groups are compared to those of the Australian-born population using SM Rs, the standard population would bethe Australian-born population.

Sometimes the SMR is multiplied by 100 to express the ratio as a percentage, although this is not universally accepted. N ot multiplying by 100 has the benefit of being able to say that the SMR was, for example, 2.3 times that expected rather than $130 \%$ higher.

Standardised ratios for hospitalisations and other events can be calculated using similar techniques.

## Data Element Links <br> Information M odel Entities linked to this Data Element <br> NHIM <br> Program evaluation <br> Data Agreements which include this D ata Element

