

# Deaths due to suicide: the effects of certification and coding practices in Australia

## Abstract

**Objective:** To highlight issues relating to suicide coding that have an impact on the final reported mortality data by the Australian Bureau of Statistics.

**Method:** This paper presents an outline of the way in which the official Australian suicide data is captured and coded and highlights issues relating to the classification used, coronial processes, documentation requirements and data sources that have an impact on the final reported data, especially deaths associated with coronial investigations.

**Results:** Issues related to the coding of Australian suicide data are:

- Disparity between jurisdictions due to differences in documentation about accidental or undetermined causes of death.
- Lack of standardisation in the way that coronial deaths are reported across Australia.
- Lack of a standard form for police reports.
- Administrative processes that cause delays in reporting the results of coronial investigations.
- Reluctance on the part of some coroners to report deaths as suicides.

**Conclusions:** Researchers and policy makers need to be aware of the constraints under which suicide can be reported as such in the official data before interpreting time trends.

**Key words:** Mortality; suicide; International Classification of Diseases; ICD-10; death certificates; cause of death.

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In two recent commentaries, published in the *Medical Journal of Australia*, differing views about the interpretation of official suicide statistics reported by the Australian Bureau of Statistics (ABS) are discussed.<sup>1,2</sup> We believe it is important to understand the official suicide data in light of the issues inherent in death registration, certification and coding practices before interpreting suicide trend data. This paper explores these matters.

Suicide is a term used to describe a person deliberately taking his or her own life. To be classified as a suicide, a death must be recognised as due to other than natural causes and established by a coronial inquiry that the death is a result of a deliberate act of the deceased with the intention of taking his or her own life.<sup>3,4</sup>

There have been several fluctuations (upwards and downwards) in officially reported Australian suicide data during recent years. In the past two decades, the suicide death rate trended upwards from the late 1980s and reached a peak in 1997 at 14.6 per 100,000 of the standard population. Since then, rates have declined steadily each year.<sup>4,5</sup> For 2004 and 2005 deaths, the ABS reported standardised mortality rates of 10.4 and 10.3 per 100,000 respectively.<sup>5,6</sup>

Doubts have been raised with respect to the accuracy and validity of cross-national comparisons and trends within countries in suicide death rates, because of variations in diagnostic and coding practices and changes

in coding rules.<sup>7,8</sup> A number of studies in Australia and overseas have pointed out that analysing deaths due to suicide registered in a calendar year rather than the year of occurrence and changes in coronial practices and medical certification of causes of death are important factors affecting suicide trends.<sup>4</sup> Suicide death rates are believed to be under-reported,<sup>7,9-11</sup> with the degree of this varying between jurisdictions within and between countries.<sup>9,11-14</sup> Changes in personnel and policy approaches can have significant effects. Over the past decade, approximately 7% of all suicides in Australia have not been registered until the year after they occurred,<sup>4,5</sup> a rate similar to that seen in Ireland.<sup>14,15</sup> Studies using Australian suicide data indicate that changes in coronial practices and an increase in the use of the undetermined intent and accident categories may misclassify causes of death and have an impact on published suicide rates.<sup>13,16</sup> It is therefore important for researchers to understand suicide registration, certification and coding practices. The aim of this paper is to report on the aspects that have an impact on the reliability of mortality rates for suicides in Australia.

## Background

Causes of death in Australia are coded and reported by the Australian Bureau of Statistics. ABS coders are provided

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with electronic or hard copy data files containing fact of death information (i.e. demographic data) and copies of the medical certificate of cause of death for each decedent by State and Territory Registrars of Births, Deaths and Marriages. The medical certificates are based on the World Health Organization (WHO) recommendation for collection of cause of death information, although the actual death certificates are slightly different in each jurisdiction. For cases referred for coronial investigation, ABS officers delay the coding until the coroner's findings are handed down. If a coronial finding is not available at the time of finalisation of data processing, coding is undertaken based on the medical and legal information available at that time. Cases referred for coronial investigation are those which are referred to as 'reportable deaths'. Reportable deaths vary by jurisdiction and legislation but generally include deaths where:

- The person died unexpectedly and the cause of death is unknown.
- The person died in a violent or unnatural manner.
- The person died during or as a result of an anaesthetic.
- The person was 'held in care' or in custody immediately before they died.
- A doctor has been unable to sign a death certificate giving the cause or death.
- The identity of the person who has died is not known.<sup>17</sup>

ABS coders are responsible for the assignment of codes from the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) to represent the causes of death reported on death certificates or from coronial findings. Looking at historical versions of the international classification, the classification of suicide was first introduced in the seventh revision of the ICD (ICD-7, used in Australia 1964-1967), in which deaths due to self-inflicted injuries were coded as suicide unless the death certificate contained a statement that no intent was evident. With the introduction of the ICD-8 (used in Australia 1968-1978), a category for undetermined deaths was added and a change in the burden of proof required was instituted. Thus suicide was only coded if it was determined that the injury was self-inflicted. In ICD-9 (used in Australia 1979-1996), the classification was similar in design to ICD-10. For ICD-9 and ICD-10, the classification requires that coders have documentation that states that an injury was both self-inflicted and the intent was suicide before the codes for suicide are used. In ICD-10, it is specified that this documentation must come from a medical or legal authority.

In 1967, the Twentieth World Health Assembly defined the causes of death to be entered on the medical certificate of cause of death as "all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries".<sup>18</sup> Use of the international certificate of cause of death facilitates selection of the underlying cause of death when two or more causes are reported. The underlying cause of death is principally used for tabulation and reporting of mortality statistics.

The WHO definition of underlying cause is: (a) the disease or

injury that initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence that produced the fatal injury.<sup>18</sup>

ICD-10 codes are assigned by ABS coders for each reported cause. This creates a reference file for each certificate coded at the ABS. At this stage, no attempt is made to relate any cause to any other reported cause on the certificate. Subsequently, the international mortality coding rules and conventions are applied to uniquely identify the underlying cause of death.

For coronial deaths for which findings have been reported, ABS coders access data held on the National Coroners Information System (NCIS) to assist with the coding process. Data is added to the NCIS database progressively as it becomes available. Delays in details being added to the database also affect the final codes that ABS coders are able to assign. The data elements collected on the NCIS, which are required for the coding of coroners' cases, include:

- Location of the incident.
- Activity at time of incident.
- Intent (both suspected at time death reported and final).
- Mechanism of injury (primary, secondary and tertiary).
- Object or substance involved (primary, secondary and tertiary).
- Medical cause of death.
- Where the death is related to a motor vehicle accident.
- Vehicle type.
- Driver/passenger.
- Context.
- User.<sup>17</sup>

Additionally, full text reports available on the NCIS, which provide details that may assist with the assignment of specific codes, are:

- Police narrative of circumstances.
- Autopsy report.
- Toxicology report.
- The coroner's findings.<sup>17</sup>

The ABS requires that it "be established by coronial enquiry that the death resulted from a deliberate act of the deceased with the intention of ending his or her own life" in order for suicide to be coded as the underlying cause of death.<sup>6</sup>

### ICD-10 classification structure and coding rules for suicides

The ICD-10 contains two chapters of specific relevance to the coding of suicide deaths. These are:

- Chapter XIX Injury, poisoning and certain other consequences of external causes (S00-T98), and
- Chapter XX External causes of morbidity and mortality (V01-Y98).

Chapter XX is used to code the underlying cause of death, being the chapter in the classification which describes the circumstances of the accident or violence. Chapter XIX is used to capture the resultant injuries or poisoning that arise as a consequence of the

external cause. If any other diseases or causes are reported on the death certificate, these are also coded, usually to other chapters of the ICD-10.

For the coding of suicide deaths, the external cause code becomes the underlying cause of death, with other reported causes and diagnoses (including the injury or poisoning) coded as multiple causes.

The primary axis of classification in chapter XX is designed to capture intent. There are certain blocks of codes that enable capture of information about the circumstances in which the cause of death took place. These relate to external causes described as being:

- Accidental (codes V01-X59).
- Intentional self harm (X60-X84).
- Assault (X85-Y09).
- Event of undetermined intent (Y10-Y34).
- Legal intervention and operation of war (Y35-Y36).
- Complications of medical and surgical care (Y40-Y84).<sup>18</sup>

In chapter XIX, codes describe the injurious results of the incident or the accident – for example, asphyxiation from hanging, open wound for a cutting incident, poisoning by class of drug, medicament or other substance or other injury to describe other consequences of external causes of death.

For example, to capture a case documented as suicide by hanging in bedroom at home, two codes are required:

Underlying cause of death:

X70.0 Intentional self-harm by hanging, strangulation and suffocation, place of occurrence – home

Multiple cause:

T71 Asphyxiation

If the decedent also had a medical or psychiatric condition that was thought to have led to the immediate cause of death or otherwise contributed to the death – for example a malignant neoplasm, depression or bipolar disorder – these are also coded as multiple causes. The ICD coding rules give preference to the coding of suicide as the underlying cause of death, even in circumstances in which another disease is believed to have given rise to the suicidal intention. Section 4.2.2 of volume 2 of ICD-10 specifies that deaths reported as suicide due to other causes are considered non-acceptable sequences for selection and coding of the underlying cause of death. In other words, for coding purposes, another condition cannot cause a suicide. It is important to note that the rules for the selection of underlying cause are designed to identify diseases or circumstances that are amenable to prevention and public health activities, hence the underlying cause from a medical perspective may differ from that determined statistically using the ICD-10.<sup>18</sup>

The undetermined intent category is not used unless the coroner's investigation has not been able to determine, on the balance of the evidence available, that the intent was a suicide or intentional self-harm, accidental, homicidal, etc. In such cases, the default in the classification is to code the cause as an accident.<sup>18</sup> This means that the accuracy and comprehensiveness of coronial documentation about intent directly affects the code assignment, as does the availability of the coronial finding itself.<sup>16</sup>

## Problems with coding of Australian deaths associated with coronial cases

Without a definitive statement from the coroner, the default accident code block is used by the ABS coders, as the ICD requires. However, in Queensland, the State Coroner has indicated that if the death is believed to be accidental or undetermined, this will be specifically documented. In cases where there is no such documentation, coders have been advised that it may be assumed that the death is intentional.<sup>19</sup> Such differences between jurisdictions make comparability difficult.

Rather than place strict reliance on a coroner's finding, as is ABS practice, an alternative could be to permit the coder to make a decision on all the information available (including the coroner's report). Other information, such as police reports or reports from relatives, could be seen as sufficient evidence for coders to make a decision on the balance of probabilities to code a death as suicide. Such a change would be a significant departure from current practice and result in a break in series for suicide statistics.

There has also been concern raised that delays in coronial investigations or delays in reporting the coroner's findings to the NCIS may result in Australian suicide statistics being under-reported. Problems arise when coronial investigations are not finalised prior to the cut-off date for the ABS to finalise its annual mortality publication. In recent years, this publication has been released approximately 12-15 months after the end of the reference period. In the circumstance of incomplete investigation at the time of the data year cut-off, the source documentation used for coding of these so-called 'open' coronial cases is limited to the medical and legal information available. Use of such information could lead to codes that may not represent the true causes of death, as established by the later coronial findings. Cases still open at the cut-off date are coded as 'X59 Exposure to unspecified factor' or are coded to the default accident block, depending on the documentation available to the coder.

A recent study in Australia reported by Henley highlights the problem of misclassification of causes of death.<sup>16</sup> While reported suicides fell from 2,720 in 1997 to 2,101 in 2005, X59 deaths increased from 826 in 1997 to 1,102 in the later year.<sup>16</sup> It is likely that this increase may be partly a result of the delays in coronial reporting.

Another Australian study by Cantor and Dunne<sup>20</sup> looked at the changes in suicide data and the use of the 'undetermined' death classification over the period 1968-1985 within each State. It revealed that, apart from a general trend for the decreasing use of the undetermined category, there was considerable intra- and inter-state variability in use of the undetermined category rather than suicide. This difference is partly due to different coding rules in versions of the ICD in relation to use of the undetermined categories and partly due to the differences in use of coroners' verdicts routinely in death coding between States. Prior to the mid 1990s, ABS mortality coding was decentralised and performed in its State offices. ABS coders relied on the coroners' verdicts in Victoria, South Australia, Western Australia, Tasmania and Northern Territory, while in New South Wales and Queensland,

the ABS coders did not just code from the information from coroners, but also collected information from court reports, hospital and police records. Subsequently, mortality coding has been centralised in the ABS Queensland office and therefore these State differences no longer exist. Looking at more recently published data, deaths due to undetermined intent increased from 51 in 2000 to 81 in 2004. These changes are less likely to be due to coding and reporting differences because of the use of coding software at the ABS and because the process for data capture and coding has been standardised.

In Europe, Chishti et al.<sup>21</sup> found similar results to Cantor and Dunne. Chishti et al. examined suicide trends and undetermined deaths in the 15 European Union countries for the period of 1984-98 and concluded that "misclassification appears to contribute to a minor proportion of the variation in suicide rates in the EU but does not explain it". The changing suicide rates could not be explained by misclassification for most of the countries. However, significant inverse relationships between suicide rates and the undetermined death rates were found in Belgium, Germany, Ireland and Spain, which indicated that misclassification might explain some of the geographical and temporal variation in the suicide rates in these four countries. Similar results have been found in Brazil<sup>22</sup> and Malaysia.<sup>23</sup>

The ABS has a policy that once a year's data is 'finalised' and published, any additional information subsequently received is not coded and changes to the original data file are not made, even if the original data is found to be erroneous or misleading. Updating of data when further information comes to hand, along with publication of revised data on a regular basis, could overcome or lessen current difficulties and uncertainties.

A further issue arises due to the method of reporting by coroners. In Australia, there are eight different coronial jurisdictions. The coroners within these jurisdictions rely in certain circumstances on the autopsy results provided by a Government pathologist or similarly authorised person to provide information regarding the medical causes of death. The medical information, combined with the investigative findings and police reports, the presence of a note that indicates intentional self harm, or information from others relating to the individual's state of mind, are used to determine the legal cause of death. The information is used to determine the identity of the deceased, the circumstances surrounding the death, the cause of death and the particulars needed to register the death. There has been reluctance to document suicide in certain jurisdictions due to legislative barriers, sympathy with the feelings and needs of family members, societal concerns and difficulties with satisfying burden of proof requirements.<sup>24,25</sup> Differences in reporting formats, structures and forms used in different States and Territories means that there is a lack of standardisation in the way that coronial deaths are reported across Australia. Even without the issue of a lack of a formal determination of suicide, the differences in the way the deaths are certified causes difficulties in assigning the WHO coding rules consistently. This is true for cases of natural deaths as well as for deaths due to an external factor.

The ABS usually reports annual data according to the year of

registration of a death, rather than the year the death actually occurred. This means that administrative processes that delay the registration will affect the reported annual statistical data. In Australia, death registrations must be lodged with the State Registrars of Births Deaths and Marriages within 7-14 days of a death, by the relatives, funeral director or person disposing of the body. Administrative processing delays in various jurisdictions may affect the numbers of registered deaths in a given year.<sup>6</sup> These delays influence the number of death records that are available for coding and analysis at the ABS. In 2005, the ABS noted reduced registration numbers in two States (New South Wales and Queensland) believed to be partly due to processing delays at the Registries of Births, Deaths and Marriages in those States.<sup>6</sup> This means that comparisons of ABS data with data collected and reported by year of occurrence will inevitably vary.

The various sources of delay described here combine to make interpretation of published suicide data a complex exercise. In particular, caution should be employed in relying on recently reported drops in suicide deaths.

## Recommendations to improve the quality of Australian suicide data

A first step to improving the data would be for the ABS to continue to update its cause of death coding after the current cut-off. Updating should continue for as long as a significant amount of new cause-of-death information becomes available (perhaps up to five years). This would allow the coroner's final verdict to be utilised in the coding of intent rather than using the default option outlined previously, whereby coders assign an 'accidental' intent code in the absence of a definitive statement from the coroner.

Second, once updating is in place, statistics on cause of death should be revised each year. Emphasis should then move to reporting by year of occurrence, as well as by year of registration.

Finally, standardisation in coronial reporting processes and forms, potentially with use of a tick box to document intent, would facilitate comparability and assist with the ABS's coding process.

This paper attempts to explain some of the issues relating to the certification and coding of suicide data in Australia, which form the basis for the official statistics for suicide published by the ABS. Researchers and policy makers need to be aware of the constraints under which suicide can be reported as such in the official data before interpreting time trends.

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