**TECHNICAL NOTE**

**PSA IMPLEMENTATION OF IRIS SOFTWARE: UNDERSTANDING CODING AND PROCESS IMPROVEMENTS**

In 2017 the Philippines Statistical Authority (PSA) implemented Iris, an automated software program which assigns codes from the International Classification of Diseases 10th Revision (ICD-10) to death records, and assists in the selection of an underlying cause of death. This replaces the previous process where mortality coding rules were applied manually.

The implementation of Iris has enabled the PSA to update mortality coding processes and mortality statistical outputs, bringing the coding of Philippines mortality data up to date with international best practice.

The Iris implementation project is part of a large scale initiative the Government of Philippines has undertaken with the Bloomberg Philanthropies Data for Health/Vital Strategies initiative to improve civil registration and vital statistics in the Philippines. As part of this project a number of initiatives have been undertaken which relate directly to death certification, registration and data analytics. These initiatives include:

* Courses in medical certification for doctors across major hospitals in the Philippines;
* Campaigns to improve death registration rates;
* Training in medical certification for cause of death coders and data analysts; and
* Training in ICD-10 coding rules as governed by the World Health Organization.

The move to Iris, alongside the additional CRVS initiatives being undertaken in the Philippines all have the potential to impact statistical outputs. It should be noted that updates applied to the ICD-10 are regulated by the World Health Organization (WHO) and are adopted only where they enhance accuracy or reflect improved medical understanding. To that end the changes in this issue will improve the quality of the Philippines’ mortality dataset.

The purpose of this Technical Note is to provide a summary of changes that have occurred as a result of software and coding updates. This technical note provides a resource for data users to understand where changes have occurred within the dataset and the impact of those changes moving forward.

**PSA INVESTIGATIONS INTO IRIS**

PSA investigations into Iris were conducted throughout 2016 and 2017. A key element of these investigations was a dual coding exercise conducted where records were coded through Iris and manually. Approximately 200,000 records from the 2016 and 2017 reference year were processed through both techniques (Iris and manual) with outputs being analysed thoroughly. Results showed that Iris would provide a strong platform for future autocoding and enable best practice in mortality coding and statistical output to be sustained. The Iris software is language independent, and as such is being used extensively around the world. Updates made to ICD-10 by the WHO are rapidly implemented in Iris, meaning that cause of death coding practices and statistical outputs will remain up to date.

**KEY CHANGES IN OUTPUT DUE TO IRIS IMPLEMENTATION**

The PSA is committed to communicating to data users how Iris has changed statistical output. This technical note will assist users in understanding what may be a legitimate change in disease process as opposed to administrative by-products of recent changes to the death certification, registration and analytical system.

The PSA annually publishes the leading causes of death in the Philippines, with output based on Mortality Tabulation List 1 of the ICD-10 of suggested statistical outputs. The following analysis will be based on this leading cause of death tabulation. For details on other changes to coding and statistical output please contact the PSA-VSD.

**LEADING CAUSES OF DEATH, 2017**

The leading cause of death in 2017 in the Philippines was ischaemic heart disease, followed by neoplasms and cerebrovascular diseases (see table below). Although the ischaemic heart diseases were the leading cause of death in 2016, the numerical change is statistically significant.

LEADING CAUSES OF DEATH – TIME SERIES WITH NUMBER

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cause of Death** | **2013** | **2014** | **2015** | **2016** | **2017** |
| Ischaemic heart diseases | 65,378 | 65,551 | 68,572 | 74,134 | 84,120 |
| Neoplasms | 53,601 | 55,588 | 58,715 | 60,470 | 64,125 |
| Cerebrovascular diseases | 54,578 | 52,894 | 58,310 | 56,938 | 59,774 |
| Pneumonia | 53,101 | 53,689 | 49,595 | 57,809 | 57,210 |
| Diabetes Mellitus | 27,064 | 31,539 | 34,050 | 33,295 | 30,932 |
| Hypertensive diseases | 29,067 | 34,902 | 34,506 | 33,452 | 26,471 |
| Chronic lower respiratory infections | 23,867 | 24,686 | 23,760 | 24,365 | 24,818 |
| Respiratory tuberculosis | 22,013 | 23,157 | 24,644 | 24,462 | 22,523 |
| Other heart diseases | 33,027 | 34,141 | 31,729 | 28,641 | 22,134 |
| Remainder of diseases of the genitourinary system | 16,785 | 17,220 | 18,061 | 19,759 | 15,717 |

A key coding change with the introduction of Iris has been in regards to ischaemic heart disease and hypertension. Prior practice based on local coding rules was to combine hypertension and ischaemic heart diseases into a hypertensive heart disease regardless of placement of the two diseases on the death certificate. With the implementation of Iris, ischaemic heart disease is retained as the underlying cause of death in many of these cases, meaning the number of deaths coded to I20-I25 (ischaemic heart diseases) has increased and the number of deaths coded to hypertensive diseases (I10-I15) has decreased.

In addition to ischaemic heart diseases, hypertensive diseases have also been reallocated to cerebrovascular diseases with the implementation of Iris. Hypertension is a key risk factor for strokes, especially those of haemorrhagic aetiology, and there has been an increase in these conditions (I60-I62) under the new coding model.

Tuberculosis has decreased as an underlying cause of death under the implementation of Iris. There is a tendency to select tuberculosis as the underlying cause of death regardless of position placement on the death certificate under the former manual coding rules. This has now changed and the tuberculosis must legitimately have initiated the train of morbid events leading to death to be assigned as the underlying cause of death. It is also acknowledged that the Department of Health (DOH) have implemented many prevention and intervention campaigns targeted at tuberculosis in recent years. This may also have legitimately reduced number of deaths due to tuberculosis. As the administrative and real world changes are difficult to separate, caution should be taken when interpreting time series data for tuberculosis.

**LEADING CAUSES OF DEATH, 2017, BY STANDARDIZED DEATH RATE**

The prior analysis of change is based on numerical differences over a time series seen in the PSA data. To assess the impact of change at a population level data should be presented as a death rate. A death rate provides a number of deaths as expected per 100,000 density in a population and helps take into account changes in population numbers and age structure of time. The table below shows the top 10 causes of death in the Philippines over the last 5 years as standardized death rates.

LEADING CAUSES OF DEATH – TIME SERIES WITH RATES

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cause of Death** | **2013** | **2014** | **2015** | **2016** | **2017** |
| Ischaemic heart diseases | 66.6 | 65.6 | 67.5 | 71.8 | 80.2 |
| Neoplasms | 54.6 | 55.7 | 57.8 | 58.6 | 61.1 |
| Cerebrovascular diseases | 55.6 | 53.0 | 57.4 | 55.1 | 57.0 |
| Pneumonia | 54.1 | 53.8 | 48.8 | 56.0 | 54.5 |
| Diabetes Mellitus | 27.6 | 31.6 | 33.5 | 32.2 | 29.5 |
| Hypertensive diseases | 29.6 | 34.9 | 34.0 | 32.4 | 25.2 |
| Chronic lower respiratory infections | 24.3 | 24.7 | 23.4 | 23.6 | 23.7 |
| Respiratory tuberculosis | 22.4 | 23.2 | 24.3 | 23.7 | 21.5 |
| Other heart diseases | 33.6 | 34.2 | 31.2 | 27.7 | 21.1 |
| Remainder of diseases of the genitourinary system | 17.1 | 17.2 | 17.8 | 19.1 | 15.0 |

When presented as death rates, we can see that the proportional changes from 2016 to 2017 are not as large as suggested by numerical changes in the first table. It is recommended that policy makers and researchers use rates in conjunction with numbers of deaths to provide context to an area of interest.

**OTHER NOTABLE AREAS OF CHANGE WITH THE IRIS IMPLEMENTATION**

Although the focus of this technical note has been on the leading causes of death in the Philippines in 2017 there are general areas of change which should be highlighted in order to demonstrate the higher level of quality in statistical output for causes of death with this release. Notable changes are discussed below:

**Decrease in specified causes of death considered “direct”:** There has been a decrease in deaths due to cardiac arrest and respiratory failure as the underlying cause of death in Iris. These conditions are considered ill-defined and do not indicate where health funding and intervention should be targeted. These deaths are now coded to more specific diseases appearing on the death certificate.

**Improved identification of primary and secondary cancers:** There has been an increase in cancers of unknown primary cause with the implementation of Iris. This is due to an improved ability to identify secondary cancers and code them accordingly. Under previous rules, cancers were generally assumed to be primary in the majority of cases leading to an over-count of particular cancer types.

**More consistent distribution of deaths due to external causes:** Under prior coding rules there was a lack of internal business rules on how to code the intent (i.e. accident, suicide, homicide) of deaths due to injury where no intent was stated by the certifier. A set of business rules have been implemented as part of the Iris project and there is greater consistency in the output for external causes of death.

**MOVING FORWARD**

The PSA remains committed to maximising the relevance and useability of mortality data in the Philippines, ensuring alignment with international best practice for mortality coding and maintaining international comparability. To that end, this project will also instigate changes and improvements in statistical output for causes of death in the Philippines.