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DATA FOR HEALTH INITIATIVE

CRVS technical guide

Manual ICD-10 mortality coding quality assessment tool: User guide

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Resources available from the University of Melbourne, Bloomberg Philanthropies Data for Health Initiative

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Interactive and practical resources designed to influence and align CRVS processes with established international or best-practice standards. These resources, which are used extensively in the Initiative's training courses, aim to change practice and ensure countries benefit from such changes by developing critical CRVS capacity among technical officers and ministries.

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Manual ICD-10 mortality coding quality assessment tool: User guide

This user guide describes how to conduct an evaluation of the quality of ICD coding using the *Manual ICD-10 mortality coding quality assessment tool*, developed by the Bloomberg Philanthropies Data for Health Initiative at the University of Melbourne, available at: https://crvsgateway.info/Library~23

Background and rationale for tool

Code accuracy is defined as the extent to which the International Statistical Classification of Diseases and Related Health Problems (ICD) nosologic codes reflects a patient's disease pattern and underlying cause that led to death. Code accuracy directly impacts the quality of decisions based on the data derived from medical records and death certificates, and is therefore is of great importance to code users. A number of factors influence the quality of coding and can lead to errors, such as: available diagnostic or disease information on the death certificate; ability to communicate with certifiers; clinician's knowledge and experience, and; the experience and quality of the training of the coder.

Periodic evaluation of coding is recommended to ensure that quality is maintained and to determine the need for retraining. The training of coders is always on a smaller scale than that of physician death certification training, since there are far fewer coders than physicians. Given the smaller scale, an evaluation of the quality of ICD coding practices is relatively straightforward, particularly if coding is a centralised processes within a country's civil registration and vital statistics (CRVS) system.

Procedure for manually assessing the quality of ICD-10 coding

Evaluating the quality of ICD coding consists of re-coding a sample of death certificates. The re-coding can be done either by a coding expert, or Iris automated coding.[1] Re-coding of the selected death certificates is based on established criteria as described in Volume 2 of the ICD Tenth Revision (ICD-10),[2] and involves the coding expert comparing the underlying cause of death and multiple cause codes from the certificate received from the coder's office.

The persons involved in the quality assessment are:

- Person A: Original coder or the group of coders
- Person B: Nosologist (coding expert) or Iris automated coding

1 For more information on Iris automated coding, see: https://crvsgateway.info/Iris-ICD-coding-tool~397

2 Available at: https://www.who.int/classifications/icd/ICD-10_2nd_ed_volume2.pdf

Selection of death certificates and tabulation of scores

The assessor (coding expert) selects a minimum systematic sample of 40 coded certificates from each coding site (the final number will be revised based on a pilot evaluation). To select the sample, the assessor divides the total number of records within the assessment period by the sample size of 40. This provides the sampling interval. For example, if there are 2000 coded records during the assessment period, the sampling interval is 2000 / 40 = 50. The assessor then selects every 50th record from 2000 coded records, starting at a randomly generated number between 1 and 50. For example, the assessor may start from record number 30, selecting every 50th record onwards.

The scoring and evaluation of the certificates is based on the three criteria described in **Table 1**.

Table 1: Coding assessment criteria and scoring

Criterion	Assessment description	Scoring
Totality of codes	Assessment of the number of ICD-10 codes assigned for all causes listed on the death certificate.	Points are assigned out of a total of 25% to reflect the total number of causes on the certificate (calculated based on earlier inputs).
Accuracy of individual cause of death codes	Assessment of the accuracy of ICD-10 codes for each individual cause of death stated in Part 1 and 2 of Frame A of the death certificate.	Assessment of the accuracy of ICD-10 codes for each individual cause of death stated in Part 1 and 2 of Frame A of the death certificate. Points are assigned out of a total of 25% to reflect the total number of accurate codes (calculated based on earlier inputs).
Accuracy of the final underlying cause of death code	Assessment of the accuracy of the final underlying cause of death (FUCOD) code entered on the lowest line used.	If the underlying cause of death entered by the original coder is the same as that entered by the nosologist, the score will be 50%. If, it is different, the score is nil.

Using the scoring tool

The scoring form is an Excel tool used to enter and calculate the scores of the coding assessment. A new form should be created in a different Excel sheet for each coding site.

Figure 1: Scoring tool form

Scoring Tool Form

Healthcare facility name:

Enter name of coding / statistical office / hospital plus month/year of audit above.

1	2	3	4	5	6	7	8	9	10	11	12
Death Certificate No.	No. codes (Person A) (a)	No. codes (Person B) (b)	Missing codes (1/0)*	No. correct codes (c)	FUCOD correct (1/0)	All codes correct (1/0)**	Score totality (d) (a/b * 25)***	Score accuracy (e) (c/b * 25)	Score FUCOD (f) (correct = 50)	Total score (d+e+f)	Quality P=0-25; M=26-50; G=51-74; VG=75-99; E=100

Step 1: Entering the data

The scoring form consists of 12 columns requiring data input or calculation. For each death certificate:

Column 1: Death certificate number

- Enter the number for each death certificate.

Column 2: Number of codes (Person A) (a)

- Enter the total number of codes assigned by the original coder.

Column 3: Number of codes (Person B) (b)

- Enter the total number of codes assigned by the nosologist.

Column 4: Missing codes

- Indicate whether the original coder has missed any codes.

  i. Missed = 1
  ii. Not missed = 0

Column 5: Number of correct codes (c)

- Enter the number of correct codes assigned by the original coder.

Column 6: FUCOD correct

- Indicate the accuracy of the FUCOD code assigned by the original coder:

  i. If correct = 1
  ii. If incorrect = 0

Column 7: Coding errors

- Indicate the presence or absence of any coding errors:

  i. All codes are correct (no coding errors) = 1
  i. At least one code is wrong (coding errors present) = 0

Column 8: Score totality (d) (maximum score 25)

- Calculate totality = $\frac{\text{(no. codes (Person A) (a)}}{\text{(no. codes (Person B) (b)}} \times 25$

Column 9: Score accuracy (e) (maximum score 25)

- Calculate accuracy = $\frac{\text{(no. correct codes (Person A) (c)}}{\text{(no. codes (Person B) (b)}} \times 25$

Column 10: Score FUCOD (f)

- Indicate the accuracy of the original coder's FUCOD:

  i. If correct = 50
  ii. If incorrect = 0

Column 11: Total score (d+e+f)

- Calculate the total score = Score totality (d)+Score accuracy (e) + Score FUCOD (f)

Column 12: Quality

- Assign one of the following three broad categorisations for each individual record:

  i. Poor quality (P) 0 – 50
  ii. Moderate quality (M) 51 – 74
  iii. Good quality (G) 75 – 100

Step 2: Calculating results

For each coding site, once the data has been entered for all of the sample death certificates, four results will be calculated (**Figure 2**):

1. Number and percentage of records with missing codes;
2. Number and percentage of records with incorrect FUCOD;
3. Number and percentage of records without any errors;
4. Number and percentage of records in each of the five quality categorisations: (1) Poor quality; (2) Moderate quality; (3) Good quality; (4) Very good quality, and; (5) Excellent quality.

Figure 2: Form calculations

Scoring Tool Form

Healthcare facility name:

Enter name of coding / statistical office / hospital plus month/year of audit above.

1	2	3	4	5	6	7	8	9	10	11	12
Death Certificate No.	No. codes (Person A) (a)	No. codes (Person B) (b)	Missing codes (1/0)*	No. correct codes (c)	FUCOD correct (1/0)	All codes correct (1/0)**	Score totality (d) (a/b * 25)***	Score accuracy (e) (c/b * 25)	Score FUCOD (f) (correct = 50)	Total score (d+e+f)	Quality P=0-25; M=26-50; G=51-74; VG=75-99; E=100
TOTAL											

Category	Number	%
Records with missing codes		
Records with correct UCOD		
Records without errors		

Quality category	Number	%
Poor (P): 0 - 25		
Moderate (M): 26 - 50		
Good (G): 51 - 74		
Very good (VG): 75 - 99		
Excellent (E): 100		

The coding group will examine the results of the tabulated ICD-10 score in two axes:

a) For each individual, to determine areas that need require individual action

b) The quality of all ICD-10 codes by country, by computing the average of all individual coder's ICD-10 scores to derive an evaluation of the country's quality of ICD-10 coding.

Frequency for evaluation of ICD-10 mortality coding quality

Based on the experiences of the Bloomberg Philanthropies Data for Health Initiative at the University of Melbourne in conducting coding quality assessments, we suggest each country conduct assessments on a regular basis. It is recommended that only experienced, senior coders act as experts (Person B).

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