

Capturing health information: a perspectives paper

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[Please note that a Letter to the Editor, based on the work reported in this paper, was published in the March 2006 issue of the WHO Bulletin. This can be viewed at <http://www.who.int/bulletin/volumes/84/3/en/index.html>. Although the Letter reports similar information, the current paper is more comprehensive and sufficiently different to the Letter to warrant publication of the full report. Permission to publish the expanded article has been granted by the WHO Bulletin Editor].

Abstract

In a recent study published in the Bulletin of the World Health Organization, Mathers et al. (2005) discussed the current status of global reporting of mortality data, and several indicators of quality and completeness of coded data were examined. Unfortunately, no recognition was attributed to the capacity, knowledge and skills of individual coders to impact upon the quality of the data (Walker 2006). This paper explores some of the quality issues relating to coders, as identified in an international needs assessment study conducted through a joint collaboration between the Education Committee of the World Health Organization Family of International Classifications (WHO-FIC) and the International Federation of Health Records Organizations (IFHRO) (Walker & McKenzie 2004). The study provides the first comprehensive view of coders of mortality and morbidity data internationally. This paper reports selected results from that survey, highlighting the need for recognised standards of uniform education for coders internationally.

Key words (MeSH):

Public Health; Mortality; Morbidity; ICD-10; Coders; Data Quality

Introduction

The World Health Organization (WHO) has a series of collaborating centre networks which function cooperatively to support work on WHO's priority health programs (World Health Organization n.d.a). One such network, the WHO Collaborating Centres for the Family of International Classifications (WHO-FIC), operates through various national and regional centres with expertise in health classification, coding, and terminology development and application (World Health Organization n.d.b). The WHO-FIC Education Committee assists and advises WHO in improving the quality of use of the WHO classifications in member states through the development of training and certification strategies, the identification of best training practices

and by providing a network for sharing expertise and experiences on education and training (World Health Organization n.d.c; National Center for Health Statistics n.d.). Of specific interest to the Education Committee is the provision of support to small, developing, and the so-called 'information paradox' countries, which are countries with significant health problems but little information to support management of these issues:

Information is essential for public health action: it is the foundation for policy-making, planning, programming, and accountability. Health information is not simply an end in itself, but provides the foundation for better health. Thus, it matters not just to policy-makers and epidemiologists, but also to communities and health care providers. Unfortunately, sound

information is rarely available in low-income developing countries due to under-investment in health information systems (HIS) that are essential for data collection, analysis, dissemination, and use. Today, countries face unprecedented demands for reliable and timely health data to support decision-making, especially in the context of health sector reform. Sound data are needed to ensure accountability for resources and to meet global challenges such as the Millennium Development Goals (MDGs). (Health Metrics Network n.d.)

The WHO-FIC Education Committee’s work is based on the premise that good health outcomes depend crucially on the availability and use of good health information. Decision makers in small countries need to be able to make evidence-based judgments in health, and therefore rely on sound information, yet often the countries with the biggest health problems are also those with the weakest health information systems (Walker & Longmire 2000). Although at various points on the spectrum of change, many such countries are in a state of epidemiological transition. Meeting the basic health needs of their people has long been one of the greatest challenges faced by such countries. Yet, in competing for available resources, the health sector often figures relatively low among national development priorities. Additionally, within the health sector, health information system development often gets sidelined for more critical issues.

A few countries have fairly well developed computerised national databases, while others still rely on intermittent national surveys to

capture essential data elements for such indicators as, for example, crude birth and death rates, contraceptive prevalence rate and the proportion of women having trained assistance at delivery (World Health Organization Regional Office for South East Asia n.d.). However, even in countries with advanced health information systems, the quality of data recorded at facility level and received at central government offices is often poor. Routinely collected morbidity and mortality data are known to be especially problematic, with frequent inadequate recording of diagnoses, unreliable coding, and statistical output not being produced in a timely manner (Bradshaw et al. 2006; Health Metrics Network 2005; Kruse 2003).

Methods

In 2004 the WHO-FIC Education Committee distributed a multilingual survey to WHO member states to request information about the international coder workforce. The survey employed a mixture of restricted choice and free-text questions, and was designed to collect data separately about morbidity and mortality coder groups. The survey included questions regarding the implementation and use of ICD-10 and perceived barriers to its implementation. Also examined were regional characteristics of people who perform the coding function including coders’ roles, responsibilities, and educational backgrounds, how coding training is obtained, proficiency levels, views about the development of an international credentialing process for coders, and additional support required to

Table 1: Respondents’ profile

REGION	NUMBER OF MEMBER STATES	MORBIDITY RESPONSES	% OF TOTAL	MORTALITY RESPONSES	% OF TOTAL	OVERALL RESPONSE RATE
African region	46	14	30.4	12	26.1	28.3
Eastern Mediterranean region	21	5	23.8	4	19.0	21.4
European region	52	23	44.2	24	46.2	45.2
Pan American region	35	28	80.0	31	88.6	84.3
South East Asia region	11	6	54.5	3	27.3	40.9
Western Pacific region	27	13	48.1	17	63.0	55.6
Totals	192	89	46.4	91	47.4	46.9

promote coding in each country (See Appendix A for further detail).

Eighty-nine survey responses were returned for morbidity coders, and a similar number were received for mortality coders (n=91). This represents an almost 50% response rate from the 192 WHO member states. The highest percentage of respondents came from countries represented by the Pan American Health Organization (AMRO) (84.3%), and the lowest rate from the Eastern Mediterranean region (21.4%). Australia is one of the 27 countries of the Western Pacific region; the list of other countries in this region can be found on the WHO Western Pacific Regional Office website: <<http://www.who.int/about/regions/wpro/en/index.html>>.

Results

How complete is the coding of hospital separations or deaths?

Analysis of the survey responses show that there is sometimes confusion regarding the responsibility for data collection, processing and coding, resulting in either the absence of a suitable data collection process, or the existence of duplicate systems. Both of these effects can result in loss in terms of data completeness and quality. Notably, 8% of respondents reported that no coding of mortality data is done at all in their country, and 6% indicated that morbidity coding is not done. However, it must be recognised that the limited number of responses within some regions may have introduced some inherent biases.

Specifically considering the completeness of reporting of mortality data, 82% of respondent countries indicated that they code the underlying cause of death for all reported deaths in their country. The remaining 18% code only deaths that occur in a hospital, or data collected from special studies or only from specific health clinics.

For morbidity coding, 66% of respondents reported that coding of diagnoses is conducted in all hospitals in their country. Twenty one percent stated that diagnoses are only coded in some hospitals, and the remaining 13% stated that only a percentage of separations are coded in some of their hospitals. Certain countries reported very low levels of coding coverage, specifically relating to the coding only of special surveys conducted at

certain times. In other words, not all hospitals in every country follow the practice of Australia in coding data for all separations.

The reasons provided for either not coding at all, or coding incompletely, included: a lack of high-level political commitment for the implementation of coding, a lack of financial resources for the purchase of coding books, training or modifying computer systems to accept new codes; insufficient coders; insufficient or inexperienced educators; a lack of translations of the classification in local languages, and a lack of knowledge about the usefulness of the resultant statistical data.

Source documents used for coding

Coding of morbidity and mortality data is a highly specialised task which requires a good practical knowledge of medical terminology and medical science, and an in-depth knowledge of the WHO rules and guidelines for coding. This is in addition to suitable clinical source documents from which data can be abstracted.

For mortality purposes, respondents to the survey reported that coding is principally completed from death certificates documented by medical officers and legal officials (such as coroners), and in some countries, by village health workers or other administrative personnel. The international format of death certificate recommended by WHO in Volume II of the ICD-10 (World Health Organization 2004) was most commonly reported as the source document for mortality coding.

Survey results showed that whilst morbidity coding for hospital or health service attendance is done from the full hospital medical record in larger more developed countries, in the case of many small countries diagnoses are recorded on only the medical record front sheet or on a special summary sheet. Coding is done using this documentation alone.

Who codes and what coding education have they received?

Respondents to the survey were asked to indicate the occupational group that undertakes coding in their country. Overall, around 16% of countries have a coding workforce that has, as its specific role, the coding of morbidity or mortality data.

The remainder use a combination of administrative personnel, medical officers, nurses, epidemiologists, health information managers/medical record personnel, statisticians or statistical assistants, or as reported in one small country, 'any person may code'. The responses from Australia indicate that morbidity coding is largely the responsibility of Health Information Managers and educated clinical coders. For mortality coding, administrative personnel working in the Australian Bureau of Statistics are responsible for coding death certificate data.

The implications for the provision of standardised coder education for people with such a variety of backgrounds are obvious, as are the likely effects of unqualified coders being asked to undertake such a specialised role. Respondents were asked to indicate what they believed was the skill level of coders in the different occupa-

tional groups in their countries, using definitions supplied by the survey team. (See Appendix B).

Overall, 28% of respondents indicated that their coders were at entry level, and a further 26% reported an intermediate level. Only 14% of respondent countries indicated that they had coders at the most skilled level, known as nosologists.

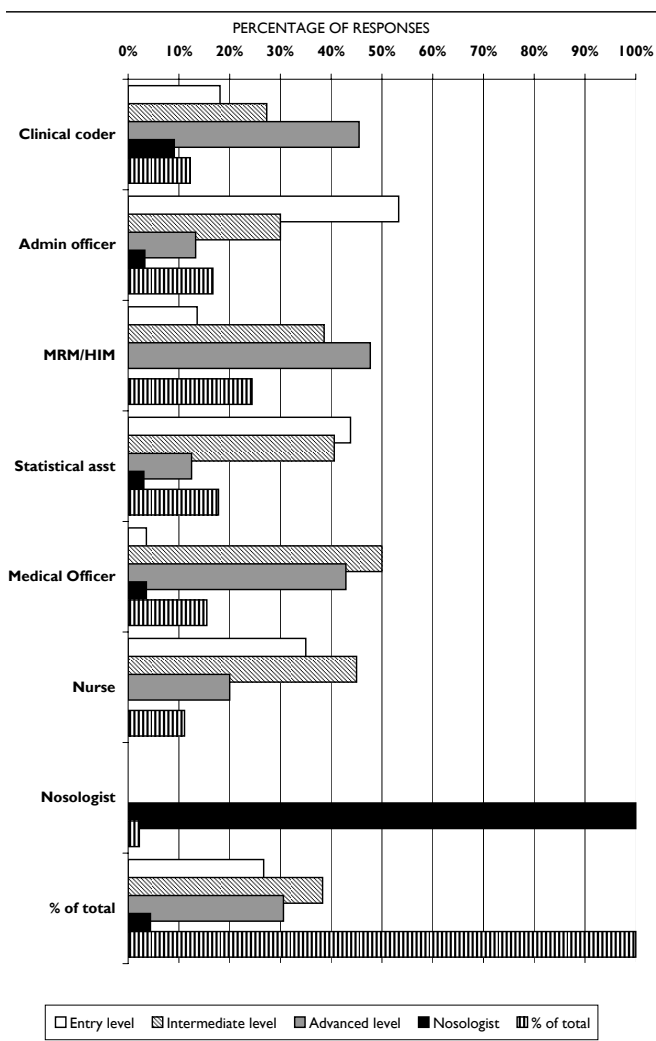
With regard to entry level coders, respondents were asked whether formal education is required by coders before they begin to code. Forty-four percent of respondents indicated that formal education is required, whilst 56% of coders are taught solely 'on the job'. Formal education is provided by universities (8.6%), community colleges (7.5%), distance education (4.3%), or short courses by trainers from other countries (17.2%). Twenty-eight percent of respondents listed 'Other means' of education, this included local short courses provided by national trainers or institutions (public health departments, medical record technicians, statisticians, ministries of health), '8 years of schooling', and through WHO-FIC Centres.

In small and developing countries, the majority of coders learn to code through a short course conducted either by international consultants or, less often, local trainers with little formal education in coding. Of concern is the short duration of the training courses, a lack of supporting courses in subjects such as medical terminology, and the lack of a formal mechanism for follow up and assistance to newly-trained coders after the completion of a short course. Approximately 40% of respondents believe that coder training in their country is inadequate for these reasons. Nearly 40% of respondents believe that it takes more than 12 months to become a proficient coder, making the issue of ongoing support an important one as coders gain proficiency.

Discussion

The results of this survey identify a number of key issues with regards to the capacity of individual coders and regional practices to impact upon the quality of coded morbidity and mortality data. Internationally, mortality coding was found to be more complete than that of morbidity.

Figure 1: Morbidity coders internationally – occupational groups and experience levels



One identified cause of poor data quality is an insufficiency in the source documents used for coding. Whilst compliance with adoption of the WHO recommended format for death certificates is reasonably high, source documentation used for morbidity coding is far more varied in format and quality. In many small countries diagnoses are recorded on a summary sheet, rather than by accessing a full medical record. International educators working with the WHO-FIC Education Committee have experience teaching in small and developing countries and have anecdotal stories of source documents for morbidity coding which range from excellent to appalling. The advantage of the full medical record approach is that the documented diagnoses can be substantiated or further specificity obtained, from other documentation available in the medical record, such as pathology and X-ray reports. In the summary sheet approach there is inability to verify the completeness and accuracy of the diagnoses and the responsible party for determining which diagnosis or diagnoses should be recorded. In the personal experience of the author, in some countries coding is done on the basis of checkmarks made by administrative staff on a table with columns labeled with broad groups of 'diagnoses'. These may or may not reflect legitimate ICD code groupings. Being confident of the quality of the data collected using such systems presents difficulties.

For countries where coding was reported to be performed inconsistently, or not at all, a large number of resource-related issues were identified as the primary reasons for incomplete data collections. In particular, a lack of resourcing for the implementation and ongoing maintenance of coding and coder education was highlighted.

The importance of mortality and morbidity data collections should not be underestimated given the resultant output statistics produced from the coded data, and the variety of management and resource decisions that are based on such information. Therefore, it is of great concern that more than 50% of coding internationally is performed by the least-skilled personnel, those who have only received 'on the job' training. Contrasting these results to a recent survey regarding external cause codes conducted by the National Centre for Classification in Health

(Brisbane), only 3.2% of Australian coders who responded to the survey indicated that the only form of education they had had was 'on the job'. The majority of Australian coders are now taught through university programs (44.7%), or through the distance education courses conducted by the Health Information Management Association of Australia (32.7%) (Harding, Enraght-Moony & McKenzie 2006).

The Joint WHO-FIC/IFHRO Collaboration

The WHO-FIC Education committee has joined forces with the International Federation of Health Records Organizations to work on addressing these issues through a Joint Collaboration (International Federation of Health Records Organizations n.d.). The Joint Collaboration's work is currently focused on the development of a standard curriculum for use by educators in developing and conducting training courses in coding for entry level coders.

The standard curriculum is based on a modular approach, with specific modules potentially available from a variety of sources. Educators who have relevant modules have been invited to submit their materials to the Joint Collaboration in order to be considered for approval as meeting the committee's 'Standard' for training. Additionally, the committee is developing a web-based tracking package that will be available in mid to late 2007, which is based on the modules 'The International Classification of Diseases' and 'How to Code' contained in the core curriculum. The Joint Collaboration welcomes further submissions of materials from educators.¹ A process for evaluating the competency of educators is also currently being finalised. It is planned that coders who complete all modules in the full curriculum, taught by approved educators (whether from one source or many) will be eligible to apply for a certificate of recognition. These certificates will provide coders with acknowledgement of their competence and will hopefully assist them with gaining recognition for their work.¹

¹ Further information regarding submission of materials or further details about the work of the Joint Committee is available from the Co-Chairs of the Joint Committee, Sue Walker at the Queensland University of Technology via email s.walker@qut.edu.au or Margaret Skurka at the Indiana University Northwest via email mskurk@iun.edu

Conclusion

Through improved understanding of the vital place of individual coders in the process of creating health information, it is hoped to enhance coders' working conditions and their needs for support and encouragement. The work of the Joint Collaboration, based on the survey results reported in this paper, aims to reduce health information quality issues that relate to the knowledge and skills of coders. Additionally, a certificated education level for coders provides a uniform base from which to build universal coding consistency. Ultimately, it is hoped that this work will improve the quality, consistency and timeliness of the coded health data on which so many decisions are based:

Policies and programmes to combat diseases and injuries should properly be based on current, timely information about the nature and extent of health problems, their determinants, and how the impact of such diseases and injuries is changing, both with respect to magnitude and distribution in populations. (Mathers et al. 2005).

References

- Bradshaw, D., Groenewald, P., Bourne, D., Mahomed, H., Nojilana, B., Daniels, J. and Nixon, J. (2006). Making COD statistics useful for public health at local level in the city of Cape Town. *Bulletin of the World Health Organization* 84(3): 211-215.
- Harding, L., Enraght-Moony, E. and McKenzie, K. (2006). *Developing and enhancing the quality of national injury-related hospital morbidity data: preliminary findings Stage Two Survey* [unpublished report]. Brisbane, National Centre for Classification in Health.
- Health Metrics Network (n.d.). *Health Metrics Network: what it is, what it will do and how countries can benefit*. Available at: <<http://www.who.int/healthmetrics/en/>> (accessed 22 April 2005).
- Health Metrics Network (2005). *Issues in health information*. Available at: <http://www.who.int/healthmetrics/library/issue_1_05apr.doc> (accessed 26 November 2005).
- International Federation of Health Records Organizations (n.d.). *What is IFHRO?* Available at: <www.ifhro.org> (Accessed 25 November 2005).
- Kruse, S-E. (2003). *National health information systems: analysis of strengths and weaknesses; a meta-evaluation*. Unpublished document produced for the Interim Secretariat of the Health Metrics Network. Melbourne, World Health Organization.
- Mathers, C.D., Ma Fat, D., Inoue, M., Rao, C. and Lopez, A.D. (2005). Counting the dead and what they died from: an assessment of the global status of cause of death data. *Bulletin of the World Health Organization* 83(3): 171-177.
- National Center for Health Statistics (n.d.). *WHO-FIC Education Committee*. Available at: <http://www.cdc.gov/nchs/about/otheract/icd9/nacc_ed_committee.htm> (accessed 25 November 2005).
- Walker, S. (2006). Capturing health information – A coding perspective (Letter to the Editor). *Bulletin of the World Health Organization* 84(3): 255.
- Walker, S. and McKenzie, K. (2004). Report on findings of the ICD-10 Coder Needs Assessment Surveys. *Proceedings of the World Health Organization WHO-FIC Annual meeting WHO/FIC/04.027*. Reykjavik, Iceland: World Health Organization. Available at: <<http://www.nordclass.uu.se/WHOFIC/papers/reykjavik27.pdf>> (accessed 25 November 2005).
- Walker, S. and Longmire, C. (2000). Developments in education in Health Information Management in South East Asia. *Proceedings of 13th International Health Records Congress 2-6 October 2000*. Melbourne, Health Information Management Association of Australia.
- World Health Organization (n.d. a). *WHO collaborating centres general information*. Available at: <<http://www.who.int/kms/initiatives/whocoinformation/en/index.html>> (accessed 26 November 2005).
- World Health Organization (n.d. b). *The WHO-FIC network*. Available at: <<http://www.who.int/classifications/network/en/>> (accessed 26 November 2006).
- World Health Organization (n.d. c). *The WHO-FIC committees*. Available at: <<http://www.who.int/classifications/committees/en/index.html>> (accessed 25 November 2006).
- World Health Organization (2004) *International statistical classification of diseases and related health problems, 10th revision (Second edition)*. Geneva, WHO.
- World Health Organization South East Asia Regional Office (n.d.). *Evidence and health information: health system development*. Available at: <<http://www.searo.who.int/EN/Section1243/Section1382.htm>> (accessed 25 November 2005]

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Appendix A

NEEDS ASSESSMENT QUESTIONNAIRE FOR ICD MORBIDITY CODERS

This questionnaire has been developed by the Education Committee of the network of World Health Organization Collaborating Centres for the Family of International Classifications. The purpose of the questionnaire is to gather information about the capacity, skills and responsibilities of ICD morbidity coders responsible for coding in a hospital inpatient setting in member countries.

1. Does your country code morbidity (hospital discharge) data?
 - Yes: please go to Q2
 - No: please go to Q5
2. If you answered Yes to Q1, do you code:
 - all hospital discharges from all hospitals
 - a percentage of discharges from all hospitals
 - all discharges from some hospitals
 - a percentage of discharges from some hospitals
 - other please specify
3. If you answered Yes to Q1, please indicate what is coded. (please tick all that apply)
 - Main (or principal) diagnosis only
 - Main diagnosis plus other secondary diagnoses
 - Main operation or procedure
 - Main operation plus other operations or procedures
 - External causes
 - Other please specify
4. If you answered Yes to Q1, what classification/s do you use:
 - 4.1 for diagnoses
 - ICD-10
 - ICD-9
 - other versions of the ICD (eg ICD-9-CM, ICD-10-AM) specify
 - another classification specify
 - 4.2 for operations or procedures
 - ICPM
 - OPCS
 - ICD-9-CM
 - ACHI
 - another classification specify
5. If you do not code morbidity data or if your country uses a classification other than ICD-10, do you have plans to implement ICD-10 (or a clinical modification)?
 - No please go to Q7
 - Yes
 - not applicable, we already use ICD-10
6. If you answered Yes to Q5, when do you plan to implement ICD-10 (or a clinical modification)?
7. If your country does not code morbidity data, does not currently use ICD-10 or plan to implement ICD-10, please indicate why this is the case (please tick all that apply)
 - there is a lack of high-level political commitment
 - there is a lack of financial resources to support training
 - it is too expensive to buy the coding books
 - it is too expensive or difficult to change our computer system/s
 - we don't have a computer system which will handle ICD-10 codes
 - we don't have sufficient ICD-10 trainers
 - we don't have sufficient coders
 - our coders are too inexperienced
 - there are no translations of the ICD-10 in our language
 - there is no procedure coding system with ICD-10
 - we are waiting for ICD-10-CM to be released
 - other please specify

The remainder of the survey is for countries that currently code morbidity data. If you answered Yes to Q1, please continue to answer the following questions. If you answered No to Q1, this is the end of the survey. Thank you for your time.

8. If you answered Yes to Q1, where is morbidity coding done in your country? (please tick all that apply)
 - all hospitals
 - one central hospital
 - only some hospitals
 - Ministry of Health
 - national statistical office
 - other please specify
9. How is morbidity coding done in your country?
 - manually (i.e. using coding books)
 - using coding software please specify
 - both
 - other please specify
- 10a. We are interested in the type of people who do the morbidity coding in your country. Please indicate the job title/s of the people who do the coding (please tick all that apply)
 - Clinical coder
 - Administration officer/clerk
 - Medical record officer/health information manager
 - Statistical assistant
 - Medical officer
 - Nurse
 - Nosologist
 - other please specify
- 10b. What is the employment category for coders?
 - Clerical
 - other please specify
- 10c. Are there different gradings based on knowledge and experience? If yes, please explain.
 - Yes: please explain
 - No
- 10d. Are there plans to change the category/gradings? If yes, please explain.
 - Yes: please explain
 - No
- 10e. For each category ticked in Q10a, please indicate what level of coders they can be considered, using the criteria in the definitions document that accompanied this survey (please tick all that apply)

	ENTRY LEVEL	INTERMEDIATE	ADVANCED	NOSOLOGIST
Clinical coder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Admin officer/clerk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical record officer/health information mgr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Statistical assistant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical officer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nurse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nosologist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify title/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 10f. What percentage of their time do the categories of morbidity coders specified in Q10a spend assigning morbidity codes?

	<20%	21-50%	51-80%	81-100%
Clinical coder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Admin officer/clerk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<20%	21-50%	51-80%	81-100%
Medical record officer/health information mgr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Statistical assistant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical officer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nurse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nosologist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please specify title/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. If morbidity coders in your country do not spend 100% of their time coding, what other responsibilities do they have? (please tick all that apply)

- data entry
- data analysis
- quality assurance of coded data
- report writing
- general medical record duties
- medico-legal duties
- ward clerk or ward receptionist
- other please specify

12. Think about entry level morbidity coders in your country. Before these coders initially begin the job of morbidity coding, is it necessary for them to have had formal education in how to code?

- Yes
- No; we teach them on the job please go to Q15

13. If you answered Yes to Q12, where is this education provided? (please tick all that apply)

- university
- community college
- distance education course
- through a short course provided by trainers from another country
- through a short course provided by local trainers
- other please specify

14. What subjects do you require them to have studied before they start to code diseases and/or procedures? (please tick all that apply)

- medical terminology
- anatomy & physiology
- basic coding
- computer basics (data entry, word processing, spreadsheets)
- principles behind the use of statistical classifications
- how to use coding software
- general records management
- cancer notification
- other please specify

15. If you provide on-the-job training, which of these subjects do you provide after coders are hired but before they start to code? (please tick all that apply)

- medical terminology
- anatomy & physiology.....
- basic coding
- computer basics (data entry, word processing, spreadsheets)
- principles behind the use of statistical classifications
- how to use coding software
- cancer notification
- general records management
- other please specify

16. Are there specific training materials being used in your country for ICD morbidity coding?

- No
- Yes please specify

17. Do you feel that the training that morbidity coders get before they start to code is adequate to enable them to assign codes correctly according to coding rules applicable to the classification you use?

- Yes
- No: please specify why it is inadequate.....

18. Approximately how many morbidity coders do you estimate there are in your country?

19. Do you think you have a sufficient number of trained morbidity coders?

- Yes
- No: please specify how many more coders you think are required

20. Do you need assistance with training of morbidity coders?

- No
- Yes: please specify what assistance you would find helpful

21. After a person begins to code diagnoses and/or operations, how long do you think they need to become proficient at it?

- 0-6 months
- 7-12 months
- 13-24 months
- more than 2 years

22. After initial training in how to code, how do you ensure that your morbidity coders become expert at their jobs? (please tick all that apply)

- periodic assessment or auditing of their coding with feedback to the coder
- further on the job training
- further formal education external to the organization
- mentoring with another expert coder
- other please specify

23. Do you experience a serious problem with turnover of coders?

- No
- Yes: please specify why you think there is a problem with turnover

24. Is there some form of standard national credentialing, certification or formal examination for morbidity coders in your country?

- No (please go to Q32)
- Yes

25. If you answered Yes to Q24, please indicate how this works:

- national examination held at a central location
- national examination held at many locations
- examination held after a training course
- other please specify

26. If you answered Yes to Q24, who develops the examination?

- national health information management association
- government agency
- other please specify

27. If you answered Yes to Q24, who administers the examination?

- national health information management association
- government agency
- other please specify

28. If you answered Yes to Q24, what is the format of the examination? (please tick all that apply)

- multiple choice
- case studies
- essay
- other please specify

29. If you answered Yes to Q24, how is the examination given? (please tick all that apply)

- written
- oral
- on line (computerized)
- other please specify

30. If you answered Yes to Q24, how often is the examination given?

- twice a year
- once a year
- other please specify

31. If you answered Yes to Q24, once an individual has received the credential or certification is there a requirement for continuing education or professional development in order to retain the credential?

- Yes
- No

32. If you answered No to Q24, would you find an international credential for morbidity coders useful?

- Yes
- No: please specify why this would not be useful

33. Are there any other comments you would like to make about morbidity coding in your country?

Thank you for your time in completing this questionnaire.

Appendix B

CODER DEFINITIONS AND SKILL LEVELS

NOTE: ICD refers to the version of the International Classification of Diseases in use in each country. The current WHO version of the ICD is ICD-10, the tenth revision.

Underlying Cause Coder:

An underlying cause mortality coder assigns the ICD code for the underlying cause of death on death certificates based on the rules of the ICD as specified in Volume 2 of the ICD-10 or the relevant section of other ICD revisions. These data become the source from which national and international mortality statistics are tabulated and compared.

Multiple Causes of Death Coder:

A multiple cause of death coder assigns the ICD codes for the conditions listed on the death certificates based on the rules of the ICD and internationally-agreed rules on multiple cause coding. These data become the source from which national and international mortality statistics are tabulated and compared.

Morbidity Coder:

A morbidity clinical coder accurately extracts clinical data from a health record, assigns the correct ICD code for each condition documented by the clinician and correctly selects the main condition.

For each type of coder, there are differing levels of competency – entry-level, intermediate, advanced and nosologist, as defined below. The functions of each level are also indicated.

Entry-level coder (trainee)

An entry-level coder has the ability to read and comprehend a standard death certificate or health record and to recognize and select the proper ICD code, based on established conventions for use of the ICD. S/he must demonstrate a capacity for accurately verifying coded work in compliance with complex instructions and rules. S/he exerts a high degree of discipline in adapting to the technical requirements of various classifica-

tion activities and procedures. S/he must work towards a high rate of consistency and productivity. All work of a trainee should be subject to verification by a more experienced coder before being released.

An entry-level coder should have the equivalent of a secondary school education and good reading skills. An entry-level coder must be able to consult source books and instructional manuals on the use of the ICD. S/he must be able to review medical books and technical journals to acquire familiarity with the etiology, symptoms and pathology of diseases.

The functions of the entry level coder include assigning the appropriate ICD code/s from health records and death certificates that contain legible entries and use traditional terminology, that contain all required information, and that use terms for which there are specified codes and rules in the ICD. The entry level coder identifies the need to query the health practitioner or certifier for clarification.

Intermediate level coder

An intermediate level coder has the ability to read and comprehend a standard death certificate or health record and to recognize and select the proper ICD codes based on established conventions for use of the ICD. S/he is able to determine the diseases or procedures to be coded on more complex death certificates, health records or case notes than an entry-level coder. The source documents may be made more complex by, for example, the sequencing of the reported causes of death or diagnoses, the nature or manner of illness, procedures or circumstances of death, or incomplete or imprecise information S/he will have significant experience and abstracting skills to accurately identify and assign the correct underlying cause of death or main condition and relevant secondary conditions such as co-morbidities. S/he must accurately verify coded work

in compliance with complex instructions and rules. S/he exerts a high degree of discipline in adapting to the technical requirements of various classification activities and procedures. S/he must maintain a high rate of consistency and productivity and be able to work independently without direct supervision. The work of an intermediate level coder should be verified by an advanced coder periodically.

An intermediate level coder should have at least two years of experience coding death certificates or health records. An intermediate level coder should have successfully completed training in anatomy and physiology and medical terminology.

Advanced level coder

An advanced level coder possesses all of the skills of an intermediate level coder. An advanced level coder has achieved a high level of expertise in the rules governing the assignment codes for morbidity purposes or for the cause/s of death, and in the interpretation and application of the ICD classification. S/he is able to train new coders and participate in special projects and quality assurance on coded data.

An advanced level coder should be a credentialed intermediate level coder with at least five years of coding experience. S/he should demonstrate an ability to train others in ICD coding.

Nosologist

A nosologist has achieved a high level of expertise in the rules governing the assignment of codes for causes of death or diseases and procedures, and in the interpretation and application of the current and previous revisions of the ICD classification. A nosologist should have an understanding of the intentions behind the ICD rules and guidelines. S/he is able to develop content for training programs and conduct training for new mortality or morbidity coders. S/he also conducts or contributes to projects that involve

an understanding or interpretation of rule or code modifications that could influence changes in ICD coding practices, including updates and revisions to the classification, and national and international statistics. Such studies include projects where the comparability of classification between countries is examined or where different versions of the ICD or changes made to the classification are evaluated. These projects require recognition of problems and consistent interpretation of new and highly technical instructions for determining code assignment. The nosologist consults clinical and other experts, including WHO Family of International Classifications Collaborating Centres, about the definition, recognition and coding of non-indexed conditions. Additionally, a nosologist has the ability to create statistical reports and analyses on data extracted from death certificate or morbidity codes.

A nosologist has a detailed understanding of the history of the ICD, its uses and its development. S/he has the ability to contribute to coding and classification policies and strategies at the national and international levels. A nosologist demonstrates expertise in application, interpretation and intentions of the classification. S/he responds to questions posed by peers nationally and internationally and is viewed as an expert with definitive knowledge of the procedures and techniques used to classify underlying cause of death or diseases. ■