National capacity in CRVS
2nd workshop
Session 5
Cause of Death (CoD)

Workshop for national CRVS focal points
6-10 March 2017
Cause of death: WHO promotes...

- easy storage, retrieval and analysis of health information for **evidenced-based decision-making**;
- **sharing and comparing health information** between hospitals, regions, settings and countries; and
- data **comparisons in the same location** across different time periods.
Relevance of cause of death information

**Legal**
- To certify the occurrence of a death
- To define the nature: natural causes or not
- Civil Registration / vital statistics
- Inheritance

**Statistical**
- Demographic aspects: sex, age, ethnic group, residence, socioeconomic data
- Inform policies and the public

**Epidemiology / public health**
- Cause(s)
- Data for specific groups: infant and maternal deaths
Structure of presentation

• Recommended procedure
• Organisational setup
• Assignment
Recommended procedure: Certification

• **Certification of death by medical doctor**, preferably one that has been treating the diseased.

• More important to have one that knows the medical history of the diseased, than one that sees the dead.

• In many countries it is mandatory for the certifier to see the corps (probably either to confirm that he or she is actually dead, or to eliminate external courses (like a road traffic accident or that someone is shot)
Attending doctor - ideally:

- Establish diagnosis
- Complete medical certificate of cause (International form – WHO)
# INTERNATIONAL FORM OF MEDICAL CERTIFICATE OF CAUSE OF DEATH

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Approximate interval between onset and death</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong></td>
<td></td>
</tr>
<tr>
<td>Disease or condition directly leading to death*</td>
<td>(a) ...........................................</td>
</tr>
<tr>
<td></td>
<td>due to (or as a consequence of)</td>
</tr>
<tr>
<td><strong>Antecedent causes</strong></td>
<td>(b) ...........................................</td>
</tr>
<tr>
<td>Morbid conditions, if any, giving rise to the above cause, stating the underlying condition last</td>
<td>due to (or as a consequence of)</td>
</tr>
<tr>
<td>(c) ...........................................</td>
<td></td>
</tr>
<tr>
<td></td>
<td>due to (or as a consequence of)</td>
</tr>
<tr>
<td>(d) ...........................................</td>
<td></td>
</tr>
<tr>
<td><strong>II</strong></td>
<td></td>
</tr>
<tr>
<td>Other significant conditions contributing to the death, but not related to the disease or condition causing it</td>
<td>...........................................</td>
</tr>
</tbody>
</table>

*This does not mean the mode of dying, e.g. heart failure, respiratory failure. It means the disease, injury, or complication that caused death.*
Recommended procedure: Coding system

• **Use ICD -10**

• ICD-10 is internationally recognized, is maintained and has a lot of tools to support it.

• Disadvantage: Not available in all languages.
ICD-10

- International Classification of Diseases (ICD)
  - Volume 1 – Tabular List - 9700 terminal codes; 30000 terms
  - Volume 2 – Instruction and guidelines manual
  - Volume 3 – Alphabetical index – 90K – 1.5 M terms, some user guidance
- Originally used for classification of causes of death
- Now used for both mortality and morbidity
- Statistical classification
  - Groups similar diseases into categories
  - Uses an alphanumeric coding system
CHAPTER I

Certain infectious and parasitic diseases (A00-B99)

Intestinal infectious diseases (A00-A09)

A00  Cholera

A00.0  Cholera due to *Vibrio cholerae* 01, biovar *cholerae*

Classical cholera

A00.1  Cholera due to *Vibrio cholerae* 01, biovar *eltor*

Cholera eltor

A00.9  Cholera, unspecified
The ICD-10 Short Mortality List (SMoL)

- 115 categories
- Focus on causes of death
- Fully compatible with ICD
- Expandable to full list of ICD later
- Simplified set of rules for underlying cause
- Death Certificate form in line with ICD-10 2016
Full ICD-10

- 9700 terminal codes
- Several pages of rules for selecting cause of death
- Standard death certificate
- Index some 400 K terms addressed
- Need own software
- IRIS

ICD SMoL

- 115 terminal codes
- 25 rules for selecting cause of death
- Near standard death certificate
- Some 6 k terms (or less)
- DHIS2 ready to collect and tabulate
- IRIS
Recommended procedure (?) Coding by certifier

- **Coding by certifier:** The doctor sees/knows the deceased, and it is easier to get supplementary information if it is necessary to do the coding.
- Disadvantage 1: Use of medical doctors time, time that may be better spent treating patients, saving lives.
- Disadvantage 2: Doctors does not fill in death certificates all that often and will be unfamiliar with causes of death that do not happened all that often. We will get an underestimation of rare causes.
Recommended procedure: Coding by central team

• **Coding by central team of coders:** Specialize to do the coding efficiently
• standardised coding, can use electronic tools (Iris)
• know rare causes better, saves medical doctors time
Coding by *e.g. Statistical Office*—ideally centralized

- Code causes of death (ICD code for each cause listed)
- Classify cause of death (select a single underlying cause of death for statistics according to ICD selection rules)
- Check validity, query
Recommended procedure when no doctor around

- **Verbal autopsy**
  - Used when there is no medical doctor to certify the death.
  - Is an interview with someone close to the deceased; Preferably someone who knew her, what she suffered from and how she died.
  - Can be used as an electronic form, e.g. on phones or as a paper questionnaire.
Verbal autopsy

- Imperfect method,
  - necessary in populations where vital registrations with death certificates are not available.
- Long history
  - since 1930ies – maybe earlier since 1600
- Different Instruments - limited comparability
- International Standard
  - 2004 VA review meeting: need international standard
  - 2007 WHO and HMN standard VA tools
  - 2012 WHO and partners simplified VA tool for routine use
  - 2016 WHO and partners amendment of the simplified instrument: fully compatible to existing analytical software (SmartVA, InterVA, InSilicoVA)
Verbal Autopsy

- Notification that there was a death
- Ask close relative or friends (questionnaire)
- Assess cause of death based on report of interview
  - 2 physicians
  - Software
    - Fast
    - Cheap
    - Internally consistent
    - Does not need physician time
    - Can be processed on hand-held devices
- WHO standards,
  - 2012/2014, for routine use – internationally agreed, evidence based reviews
  - 2007 for research
Sections of the WHO 2014 Verbal Autopsy Questionnaire

1. **Personal information**
   1. Age, sex
   2. Date and place of death, place of residence, marital status, parents, education, economic activity

2. **Information on the respondent**

3. **Cause of death related indicators**
   1. Medical history
   2. General signs and symptoms
   3. Signs and symptoms associated with pregnancy
   4. Neonatal and child history, signs and symptoms
   5. History of injuries and accidents
   6. Risk factors
   7. Health service utilization

4. **Background and context**

5. **Optional open narrative text field**

6. **Death certification and health record**
## SECTIONS. GENERAL SIGNS AND SYMPTOMS ASSOCIATED WITH FINAL ILLNESS

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>YES</th>
<th>NO</th>
<th>DK</th>
<th>Ref.</th>
<th>3B130</th>
<th>3B130</th>
<th>3B180</th>
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</thead>
<tbody>
<tr>
<td>3B100</td>
<td>Did (s)he have a fever?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3B110</td>
<td>How many days did the fever last?</td>
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<tr>
<td>3B115</td>
<td>How severe was the fever?</td>
<td></td>
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<tr>
<td>3B120</td>
<td>Did (s)he have night sweats?</td>
<td></td>
<td></td>
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<tr>
<td>3B130</td>
<td>Did (s)he have a cough?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3B140</td>
<td>For how many days did (s)he have a cough?</td>
<td></td>
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<tr>
<td>3B150</td>
<td>Was the cough productive, with sputum?</td>
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</tbody>
</table>
General signs and symptoms associated with final illness

Did (s)he have a fever? *

- Yes
- No
- DK
- Ref

How many days did the fever last? *

Less than 1 day = “0”. Use 1 week = 7 days to determine the number of weeks
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>VA</th>
<th>ICD</th>
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</thead>
<tbody>
<tr>
<td>VAs-01.01</td>
<td>Sepsis</td>
<td>A41</td>
<td>A40-A41</td>
</tr>
<tr>
<td>VAs-01.02</td>
<td>Acute respiratory infection, including pneumonia</td>
<td>J22</td>
<td>J00-J22</td>
</tr>
<tr>
<td>VAs-01.03</td>
<td>HIV/AIDS related death</td>
<td>B24</td>
<td>B20-B24</td>
</tr>
<tr>
<td>VAs-01.04</td>
<td>Diarrheal diseases</td>
<td>A09</td>
<td>A00-A09</td>
</tr>
<tr>
<td>VAs-01.05</td>
<td>Malaria</td>
<td>B54</td>
<td>B50-B54</td>
</tr>
<tr>
<td>VAs-01.06</td>
<td>Measles</td>
<td>B05</td>
<td>B05</td>
</tr>
</tbody>
</table>
Organisational setup
Coordination at high level

To ensure that you can allocate time and money to the work.

- Ministry of health
- Statistical office
- Ministry of interior affairs
- Ministry of justice

High level coordinating group
Interagency technical group
Workflow - dataflow

Need to be part of the design from the begin

A. Reporting

B. Data collection

C. Coding

D. Feedback - Quality assurance

E. Report statistics on causes of death
   - Local – subnational – national
   - International
Communication and training

They all need to know and understand use and implications.

- Political
- Senior management
- Data personnel
- Physicians
- Coders
Regulatory and legal base

Ensure that there is continuity and responsibility, and resources can be mobilized.

- Reporting
- Coding
- Data access
Resources

Have the means to carry out the different steps.

- Form
- Hardware
- Coding tools
- Staff
- Budget
Planning

- Project description with
  - Clear tasks,
  - Specified roles
  - Timelines set
  - Feedback loops
  - Indicators for monitoring
Project group

- 9 months assessment + planning
- Operational plan for
  - Roll out
  - Running the system
- Pilot - national centre of excellence?
- Adjust operational plan
- Apply plan
- Review outcomes and adjust
Start simple

- Hospitals – urban – link existing other mechanisms (e.g. violent death reporting system)

- Expand stepwise
  - Budget
  - Plan

- No interference
  - Competing for human resources
  - Competing for attention
  - Competing for ownership of data
Assignment:

*If you collect CoD data:*
Describe the process today
Identify challenges
Suggest how the model can be improved

*If you do not collect CoD data:*
Suggest a collection process
<table>
<thead>
<tr>
<th>Occurrence of death</th>
<th>Certifying</th>
<th>Coding</th>
<th>Making VS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deceased</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Family of the deceased</td>
<td></td>
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<tr>
<td>Medical doctor</td>
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<tr>
<td>Other health personnel</td>
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<tr>
<td>Police</td>
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<tr>
<td>Other official</td>
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<tr>
<td>Ministry of Justice</td>
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<td>Ministry of Health</td>
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<tr>
<td>Civil Registration authority</td>
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<td>National Statistics Office</td>
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<tr>
<td>Activity</td>
<td>Certifying</td>
<td>Coding</td>
<td>Making VS</td>
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<td>-----------------------------------------------</td>
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<td>-------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Occurrence of death</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Deceased</td>
<td>Die</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family of the deceased</td>
<td>Contribute to VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical doctor</td>
<td>Certify hospital deaths</td>
<td>Code deaths in hospitals</td>
<td></td>
</tr>
<tr>
<td>Other health personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Police</td>
<td>Fill in death form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other official</td>
<td></td>
<td></td>
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<tr>
<td>Ministry of Justice</td>
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<td></td>
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<tr>
<td>Ministry of Health</td>
<td>Coding by a central team of coders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Registration authority</td>
<td></td>
<td></td>
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<tr>
<td>National Statistics Office</td>
<td></td>
<td></td>
<td>Analyse data and disseminate statistics</td>
</tr>
<tr>
<td>Occurrence of death</td>
<td>Certifying</td>
<td>Coding</td>
<td>Making VS</td>
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</tr>
<tr>
<td>Deceased</td>
<td>Die</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical doctor</td>
<td>Certifies all deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norwegian Institute of Public Health</td>
<td></td>
<td>Codes all deaths using Iris</td>
<td>Analyse data and disseminate statistics</td>
</tr>
<tr>
<td>Coroner/Pathologist</td>
<td>If suspicious/unnatural</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>