Get every one in the picture

Cause of death certification and ICD coding

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Common quality problems in cause of death reporting

- Not all deaths are medically certified
- High proportion of ill-defined deaths
- Frequent use of “garbage codes” e.g. Heart Failure, cardiac arrest, Cardio respiratory failure
- Mode of death (i.e. the immediate cause) is reported instead of the underlying cause

Example of deficient cause of death data: Egypt

- 80% completeness
- 382,000 deaths
- High proportion 'other cardiac' and 'ill-defined'

	10 leading causes of death		
	Female		
1	**Other cardiac diseases**	41,621	***24.1***
2	**Ill-defined diseases**	41,164	***23.8***
3	Lower respiratory infections	9,973	*5.8*
4	Cerebrovascular disease	9,764	*5.7*
5	Hypertensive disease	9,142	*5.3*
6	Diarrhoeal diseases	6,668	*3.9*
7	Other digestive diseases	5,721	*3.3*
8	Cirrhosis of the liver	5,133	*3.0*
9	Ischaemic heart disease	4,071	*2.4*
10	Nephritis and nephrosis	3,915	*2.3*
	Males		
1	**Other cardiac diseases**	50,916	***24.3***
2	**Ill-defined diseases**	40,277	***19.2***
3	Cerebrovascular disease	11,837	*5.6*
4	Lower respiratory infections	10,412	*5.0*
5	Other digestive diseases	10,044	*4.8*
6	Cirrhosis of the liver	9,512	*4.5*
7	Hypertensive disease	8,743	*4.2*
8	Nephritis and nephrosis	5,759	*2.7*
9	Diarrhoeal diseases	5,647	*2.7*
10	Ischaemic heart disease	5,623	*2.7*

Leading causes of deaths registered in Thailand, 2005

Cause of death	% of all deaths
Ill-defined causes	38.2
Septicemia	5.8
Other external causes	4.8
Other cancers	4.0
Stroke	4.0
Dis of GU system	3.2
Cancer of liver	3.2
Pneumonia	3.1
Ischaemic heart dis	2.9
Road Traffic Acc	2.8

52.8%

Philippine Causes of Death

MORTALITY: TEN (10) LEADING CAUSES
NUMBER AND RATE/100,000 POPULATION
Philippines
5-Year Average (2000-2004) & 2005

CAUSES	5-Year Average (2000-2004)		2005*	
	Number	Rate	Number	Rate
1. Diseases of the Heart	66,412	83.3	77,060	90.4
2. Diseases of the Vascular System	50,886	63.9	54,372	63.8
3. Malignant Neoplasms	38,578	48.4	41,697	48.9
4. Pneumonia	32,989	41.4	36,510	42.8
5. Accidents**	33,455	42.0	33,327	39.1
6. Tuberculosis	27,211	34.2	26,588	31.2
7. Chronic lower respiratory diseases	18,015	22.6	20,951	24.6
8. Diabetes Mellitus	13,584	17.0	18,441	21.6
9.Certain conditions originating in the perinatal period	14,477	18.2	12,368	14.5
10. Nephritis, nephrotic syndrome and nephrosis	9,166	11.5	11,056	13.0

How much??

Note: Excludes ill-defined and unknown causes of mortality

*reference year

** External Causes of Mortality

Quality of national vital statistics systems

	Criteria				WHO member states¶	% Total population‖
	ICD*	Code level†	Completeness‡	Ill-defined codes§		
High quality	Recent	3–4	90–100%	0–10%	31	13%
Medium–high quality	Recent	3–4	70–100%	0–15%	24	7%
Medium–low quality	Recent or Recent	3–4 2–1	70–100% 70–100%	15–20% 0–20%	26	8%
Low quality	Old ICD or alternate list or completeness 50–70% or ill-defined codes >20%				26	7%
Limited use	Data before 1996 or completeness <50% or data in non-standard format or data of partial coverage				17	41%
No report	No cause-of-death data received by WHO				68	24%
Total					192	100%

72% of worlds population

Source: *Lancet*, 370: 1726-35

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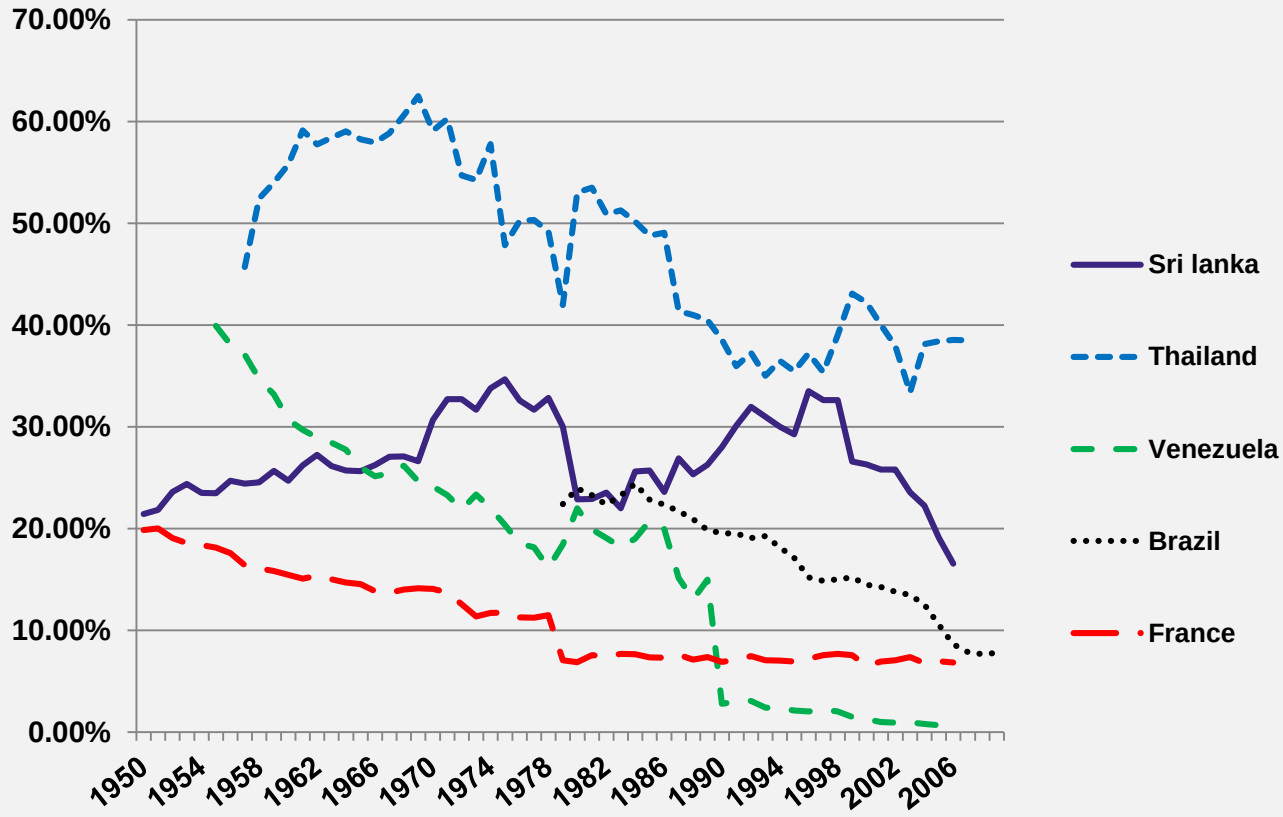
Trends in percentage of deaths assigned to ill-defined codes, selected countries, 1950–2008



Sources for cause of death in registration data

- Medical certification in health facilities/at home/ in absentia
- Coroner’s / police records
- Verbal autopsy
- Lay reporting
- No cause

Medical certificate of cause of death

INTERNATIONAL FORM OF MEDICAL CERTIFICATE OF CAUSE OF DEATH

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

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

Death certification and ICD coding

- **I.a:** Disease or condition directly leading to death (not *mode* of dying)
- **I.b-x:** Antecedent causes. Those morbid conditions giving rise to the above cause, stating the <u>underlying condition last</u>
- **II:** Other significant conditions contributing to death, but not related to the disease or condition causing it

INTERNATIONAL FORM OF MEDICAL CERTIFICATE OF CAUSE OF DEATH

Cause of death		Approximate interval between onset and death
I		
Disease or condition directly leading to death*	(a) . . . . **Direct cause**	. . . . .
	due to (or as a consequence of)	
Antecedent causes Morbid conditions, if any, giving rise to the above cause, stating the underlying condition last	(b) . . . **Intervening cause of (a)**	. . . . .
	due to (or as a consequence of)	
	(c) . . . **Intervening cause of (b)**	. . . . .
	due to (or as a consequence of)	
	(d) . . . **Underlying cause**	. . . . .
II		
Other significant conditions contributing to the death, but not related to the disease or condition causing it	. . . . .	. . . . .
	. . . . .	. . . . .

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

Death certification

- **Example 1**

	Mode of dying
Cardiac arrest	**Ia**
Congestive heart failure	**Ib**
Myocardial infarction	
Metastatic lung cancer	**II**

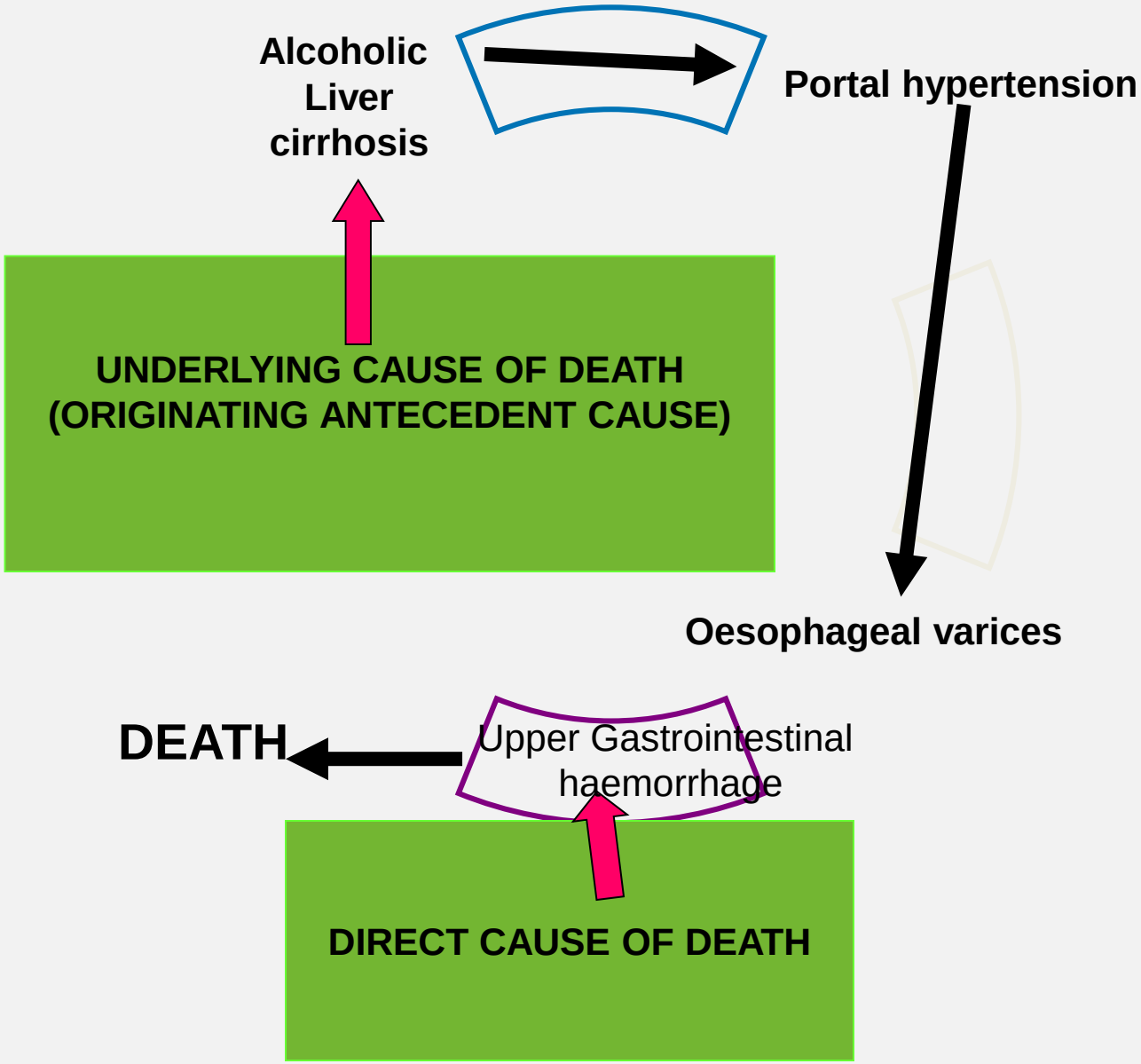
Underlying cause of death: Myocardial infarction

Definition of underlying Cause of Death

- When only one cause: select for tabulation
- When several causes: “underlying” = the disease or injury, which initiated the train of morbid events leading directly to death, or the circumstance of the accident or violence which produced the fatal injury.

Underlying Cause of Death

- For example
- Patient with alcoholic liver cirrhosis develops portal hypertension, leading to oesophageal varices; which rupture and cause massive upper gastrointestinal haemorrhage, leading to death


Alcoholic Liver cirrhosis
Portal hypertension
UNDERLYING CAUSE OF DEATH (ORIGINATING ANTECEDENT CAUSE)
Oesophageal varices
DEATH
Upper Gastrointestinal haemorrhage
DIRECT CAUSE OF DEATH

Factors influencing CoD attribution

- **Mix of information sources**
  - Medical records
  - Accounts of observations of health care providers/ relatives
  - Reports of *postmortem* examination
- **Training / qualification of certifying official**
- **Length of time certifier has known patient**

General Guidance

- One entry per line
- No abbreviations
- Writing should be legible
- Enter all the conditions leading to death in sequence
- Most recent (immediate) cause on the first line
- Last or condition started the events leading to death in the last line (Underlying cause of death)

Deciding part 1 or 11

- For some cases it may be difficult to decide whether a certain condition fits into part A or part B
- Condition in part 1 should represent a distinct sequence leading to death
- If it does not fits into that sequence enter that in part 11

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Remember

- The cause-of-death information should be the physician's best medical OPINION.
- Report each disease, abnormality, injury, or poisoning that the physician believes adversely affected the decedent.

External Cause of death

- For Fatal injuries, always report
- a) Impairment of function (E.g air embolism, haemorrhage) that contributed to death (direct cause)
- b) the trauma (E.g transection of subclavian vein, fracture neck of femur, parietal bone fracture) (intervening cause),
- c) The nature of trauma e.g. stab wound of chest, blunt injury to thigh, head injury (antecedent cause)
- AND
- d) The EXTERNAL cause (Fall, assault, murder, suicide, road traffic accident etc) (Underlying cause)

Physician certification : specific issues

- Biases in reporting
  - external causes, especially with medico legal implications
  - conditions with social implications eg TB, HIV
- Fashions in physician certification
  - Cardiovascular diseases : stroke-hypertension; COPD - heart failure etc
  - Pneumonia following surgery, cancers etc
  - Diabetes mellitus
- Changes induced by ICD revisions – additional lines in certificate, guidelines for specific underlying causes etc

Common problems in death certification

- Sometimes it may be difficult to identify the sequence of event leading to death with confidence
- **Can use terms like** ‘‘probable’’ or ‘‘presumed’’ to indicate that the description provided is not completely certain.
- If the certifier cannot determine the etiology, can use terms like unknown, undetermined, or unspecified,
- However, reporting a cause of death as unknown should be a last resort**.**

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Death of an elderly Person

- The elderly decedent should have a clear and distinct etiological sequence for cause of death, if possible.
- Terms such as infirmity, old age, and advanced age have little value for public health or medical research.
- Age is recorded elsewhere

Ill defined

- Ill defined causes of death are of no public health value
- Do not report ill defined causes as underlying cause of death
- Avoid using mode of dying like respiratory failure, Cardio-respiratory failure and sepsis as cause of death without indicating its etiology.

Minimum requirements for the content of training in certifying causes of death

Knowledge Cluster	**Content**
1.Medical science related to ascertaining cause(s) of death	•Concept of aetiology and risk factors •Patho-physiology •Forensic medicine •Post mortem examination and autopsy
1.Principles for certifying causes of death	•Structure of WHO medical certificate of cause of death (parts I and II) •Concept of underlying cause of death •Importance of best medical opinion •Appropriate exercises in death certification
1.Certification rules for specific causes of death	•External causes of death e.g. suicides, drowning, alcohol related deaths, drug overdose; poisoning •Guidelines for reporting peri-natal deaths •Certifying deaths from cancers, diabetes, asthma,
1.Legal/ethical issues	•Legal requirements regarding death certification •General privacy and confidentiality principles •Professional ethics
1.Uses of data on causes of death	•Clinical education •Medical and epidemiological research •Statistical outputs for health situation and trend analysis •Health program evaluation and planning

Structure of ICD

- First version in 1893, currently tenth version ICD-10

- 22 chapters arranged as follows:
  - Epidemic diseases
  - Constitutional or general diseases
  - Local diseases arranged by system
  - Developmental diseases
  - Injuries
- Alpha numeric codes – e.g. A15.0 – Resp TB, sp +ve
- Individual deaths coded to three / four character codes

Rules for ICD Coding

- Recommends primary tabulations based on underlying causes
- Rules for selection of underlying causes
  - General Principle
  - Selection rules 1 – 3
  - Modification rules A - F

Modification rules - some examples

- **Senility** (Senility & bronchopneumonia = bronchopneumonia)
- **Ill-defined** (Cough & haematemesis = haematemesis)
- **Trivial conditions**
- **Linkage** (RBBB & Chagas = Chagas with heart involvement, B57.2)
- **Specificity** (Cerebral infarct & stroke = cerebral infarct)
- **Early & late stages** (Tertiary syphilis & primary syphilis = tertiary)
- **Sequelae** (Bronchopneumonia & curvature of spine & childhood rickets = sequelae of rickets, E64.3)

Conclusion

- Compilation and publication of cause of death statistics is complex, and prone to error at different levels

- However, “The scientific purist, who will wait for medical statistics to be nosologically exact, is no wiser than Horace’s rustic, waiting for the river to flow away” (Major Greenwood)