

Coding and classification of causes of death
in accordance with the *Tenth Revision of the
International Classification of Diseases*

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The International Classification of Diseases (ICD)



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Definition

The ICD is a system of categories to which morbid entities of either external or pathological causation are assigned according to established criteria.

The ICD is developed collaboratively between the World Health Organization (WHO) and various international centers.



Dates for ICD Revisions Implemented in the United States

First Revision: 1900-1909

Second Revision: 1910-1920

Third Revision: 1921-1929

Fourth Revision: 1930-1938

Fifth Revision: 1939-1948

Sixth Revision: 1949-1957

Seventh Revision: 1958-1967

Eighth Revision: 1968-1978

Ninth Revision: 1979-1998

Tenth Revision: 1999 to present



Differences between the ICD and ICD-CM

The ICD is maintained and coordinated by WHO; ICD-CM is maintained by the United States, but coordinated with WHO

The ICD is updated every 10-20 years; ICD-CM is updated annually

The ICD-CM has greater detail than the ICD



Standardizing functions of the ICD

The ICD defines:

Death certificate form

Codes, categories and chapters

Rules for uniformly selecting the UC

Lists for presenting and tabulating mortality and morbidity statistics

Terms such as “low birth weight,” “pre-term,”
“neonatal period,” “maternal death.”



Structure of ICD-10

Volume I: main classification, list of 3-character categories, tabular list for inclusions, and 4-character subcategories; also morphology codes, tabulation lists, definitions and regulations

Volume II: coding rules and history of the ICD

Volume III: alphabetical index



Structure of ICD-10

ICD-10 is based on 3-digit categories ranging from A00-Z99

Each 3-digit category can be divided into 10 4-digit subcategories

ICD-10 contains 21 chapters

The first character of each ICD-10 code is a letter, and letters are associated with chapters.



Structure of ICD-10

- Chapters I to XVII relate to diseases and other conditions
- Chapter XVIII relates to symptoms, signs and abnormal findings
- Chapter XIX relates to injuries and other consequences of external causes
- Chapter XX relates to external causes of morbidity and mortality
- Chapter XXI is exclusive to morbidity relating to reasons for seeking medical care



Important definitions involving causes of death

Cause of death

- ◆ Underlying cause: “The disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury”
- ◆ Multiple causes: causes of death including not only the underlying cause but also immediate cause of death and all other intermediate and contributory conditions entered by the certifying physician



CAUSE OF DEATH (See instructions and examples)

32. PART I. Enter the chain of events - - diseases, injuries, or complications - - that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death)

a. _____
Due to (or as a consequence of):

b. _____
Due to (or as a consequence of):

c. _____
Due to (or as a consequence of):

d. _____

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death) **LAST**



Approximate interval:
Onset to death

Part I: Lines 1-4
Causes of death are entered sequentially starting with immediate cause and ending with the underlying cause.

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

33. WAS AN AUTOPSY PERFORMED?

Part II
Other significant conditions contributing to death

35. DID TOBACCO USE CONTRIBUTE TO DEATH?

- Yes Probably
- No Unknown

36. IF FEMALE:

- Not pregnant within past year
- Pregnant at time of death
- Not pregnant but pregnant within 42 days of death
- Not pregnant but pregnant 43 days to 1 year before death
- Unknown if pregnant within the past year

29. MANNER

- Natural
- Accident
- Suicide
- Homicide
- Could not be Determined

38. DATE OF INJURY
(Mo/Day/Yr)(Spell Month)

39. TIME OF INJURY

40. PLACE OF INJURY (e.g., Decedent's home, construction site, restaurant, wooded area)

41. INJURY AT WORK?
 Yes No

42. LOCATION OF INJURY: State:
Street & Number:

City or Town:

43. DESCRIBE HOW INJURY OCCURRED

Box 43. How injury occurred
Generally determines external cause of deaths involving injuries.

To Be Completed By:
MEDICAL CERTIFIER

ICD-10 rules for selection of underlying cause of death

Selection Rules

General Principle

Rule 1

Rule 2

Rule 3

Rules for Modification of Selected Cause

Rule A: Senility and other ill-defined conditions

Rule B: Trivial conditions

Rule C: Linkage

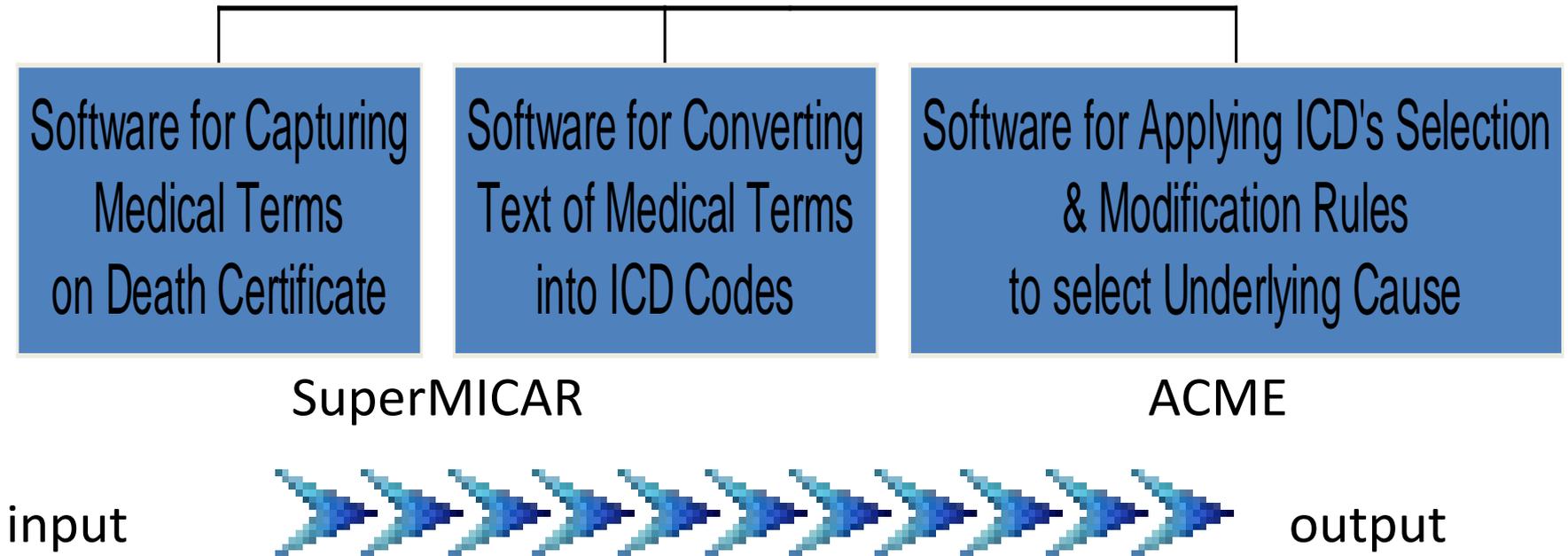
Rule D: Specificity

Rule E: Early and late stages of disease

Rule F: Sequelae



NCHS' Automated Coding System for producing underlying cause of death



The Concept of "Sequence"

The term refers to two or more conditions entered on successive lines of Part I, each condition being an acceptable cause of the one entered on the line above it. If there is more than one cause of death in a line of the certificate, it is possible to have more than one reported sequence.



General Principle

When more than one condition is entered on the certificate, select the condition entered alone in the lowest-used line of Part I only if it could have given rise to all the conditions entered above it.



Two Ways to Apply the General Principle

Immediate cause reported on Part I (a) of certificate

↑ YES

...is an acceptable cause of...

Intermediate cause reported on Part I (b) of certificate

↑ YES

...is an acceptable cause of...

Intermediate cause reported on Part I (c) of certificate

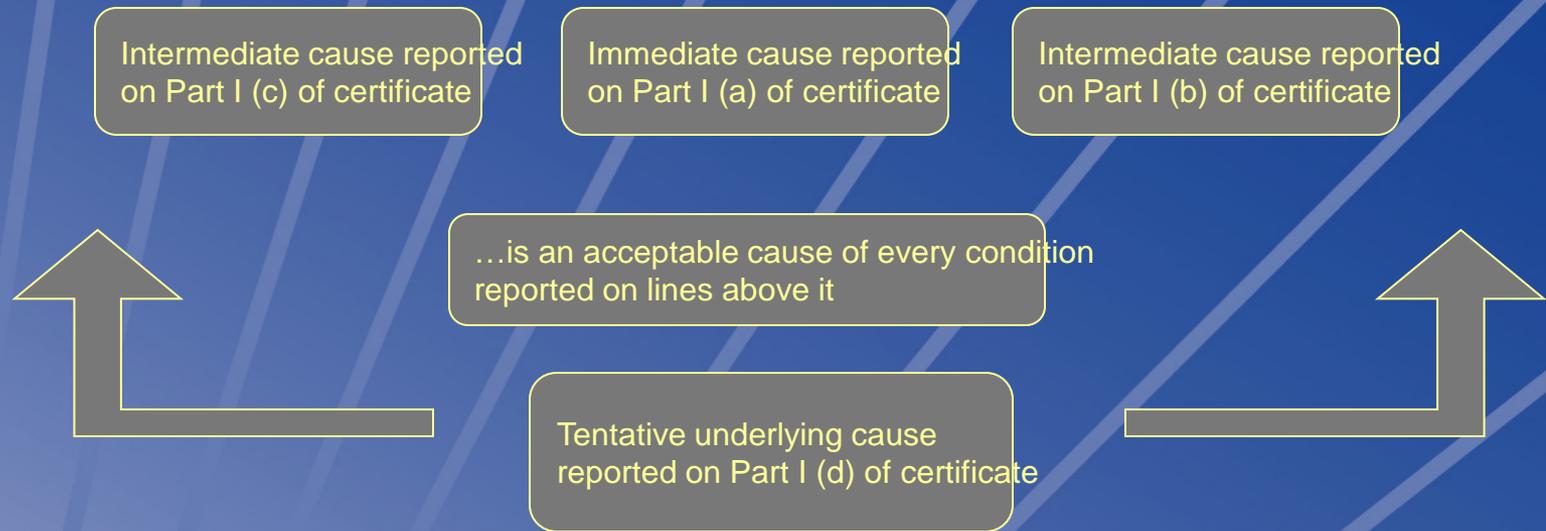
↑ YES

...is an acceptable cause of...

Tentative underlying cause reported on Part I (d) of certificate



Two Ways to Apply the General Principle



Example 1

CAUSE OF DEATH (See instructions and examples)

Approximate interval:
Onset to death

32. PART I. Enter the chain of events--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)

a. Cerebral hemorrhage

Due to (or as a consequence of):

1 month

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE

b. Nephritis

Due to (or as a consequence of):

6 months

(disease or injury that initiated the events resulting in death) LAST

c. Cirrhosis of liver

Due to (or as a consequence of):

2 years

d. _____

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I.

33. WAS AN AUTOPSY PERFORMED?

Yes No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? Yes No



Example 1

CAUSE OF DEATH (See instructions and examples)			Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.			
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. Cerebral hemorrhage (I61.9)	Due to (or as a consequence of):	1 month
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. Nephritis (N05.9)	Due to (or as a consequence of):	6 months
	c. Cirrhosis of liver (K74.6)	Due to (or as a consequence of):	2 years
	d.		
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No	
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No	

Reported underlying cause is K74.6
 (“Other and unspecified cirrhosis of liver”)



Example 1

CAUSE OF DEATH (See instructions and examples)			Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.			
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. Cerebral hemorrhage	(I61.9)	<u>1 month</u>
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. Nephritis	(N05.9)	<u>6 months</u>
	c. Cirrhosis of liver	(K74.6)	<u>2 years</u>
	d. _____		
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No	
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No	

Tentative underlying cause is K74.6
 (“Other and unspecified cirrhosis of liver”)



Example 2

CAUSE OF DEATH (See instructions and examples)

Approximate interval:
Onset to death

32. PART I. Enter the chain of events--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)

a. Cardiac arrest with terminal hypostatic pneumonia

Due to (or as a consequence of):

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE

b. _____
Due to (or as a consequence of):

(disease or injury that initiated the events resulting in death) LAST

c. Hypertension

Due to (or as a consequence of):

d. _____

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I.

33. WAS AN AUTOPSY PERFORMED?

• Yes • No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No



Example 2

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
<p>IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)</p>	<p>a. <u>Cardiac arrest with terminal hypostatic pneumonia</u> (I46.9) (J18.2)</p> <p>Due to (or as a consequence of):</p>	_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST</p>	<p>b. _____</p> <p>Due to (or as a consequence of):</p> <p>c. <u>Hypertension</u> (I10)</p> <p>Due to (or as a consequence of):</p> <p>d. _____</p>	_____
<p>PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.</p>		<p>33. WAS AN AUTOPSY PERFORMED? • *Yes • *No</p> <p>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No</p>

Reported underlying cause is I10
 ["Essential (primary) hypertension"]



Example 2

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Cardiac arrest with terminal hypostatic pneumonia</u> (I46.9) (J18.2) Due to (or as a consequence of):	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. _____ Due to (or as a consequence of):	_____
	c. <u>Hypertension</u> (I10) Due to (or as a consequence of):	_____
	d. _____	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No

Tentative underlying cause is I10
[“Essential (primary) hypertension”]



Example 2

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Cardiac arrest with terminal hypostatic pneumonia</u> (I46.9) (J18.2) Due to (or as a consequence of):	
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. _____ Due to (or as a consequence of):	
	c. <u>Hypertension</u> (I10) Due to (or as a consequence of):	
	d. _____	
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No

Tentative underlying cause is I10
[“Essential (primary) hypertension”]



General Principle

The General Principle does not apply:

- When more than one condition has been entered on the lowest-used line of Part I
- If the single condition entered in the lowest-used line of Part I could not have given rise to all the conditions entered above it

What then...?



Selection Rules

Rule 1

“If the General Principle does not apply and there is a reported sequence terminating in the condition first entered on the certificate, select the originating cause of this sequence. If there is more than one sequence terminating in the condition mentioned first, select the originating cause of the first-mentioned sequence.”



Example 3

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Cerebral hemorrhage and hypostatic pneumonia</u>	(I61.9) (J18.2)
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. _____ Due to (or as a consequence of):	_____
	c. <u>Prostate hypertrophy and Diabetes</u>	(N40) (E14.9)
	d. _____ Due to (or as a consequence of):	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • *Yes • *No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No

Tentative underlying cause is E14.9 via Rule 1;
 General Principle not applicable;
 more than one condition entered in last-used line of Part I



Selection Rules

Rule 2

“If there is no reported sequence terminating in the condition first entered on the certificate, select this first-mentioned condition.”



Example 4

CAUSE OF DEATH (See instructions and examples)

Approximate interval:
Onset to death

32. PART I. Enter the chain of events--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)

a. Pernicious anemia and coma

Due to (or as a consequence of):

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the

b. Atherosclerosis

Due to (or as a consequence of):

UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST

c. _____
Due to (or as a consequence of):

d. _____

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I.

33. WAS AN AUTOPSY PERFORMED?

• Yes • No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No



Example 4

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Pernicious anemia and coma</u> (D51.0) (R40.2)	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. <u>Atherosclerosis</u> Due to (or as a consequence of): (I70.9)	_____
	c. _____ Due to (or as a consequence of):	_____
	d. _____ Due to (or as a consequence of):	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • *Yes • *No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No

General Principle not applicable;
single condition entered in the lowest-used line of Part I
could not have given rise to all the conditions entered above i



Example 4

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Pernicious anemia and coma</u> (D51.0) (R40.2)	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. <u>Atherosclerosis</u> Due to (or as a consequence of): (I70.9)	_____
	c. _____ Due to (or as a consequence of):	_____
	d. _____ Due to (or as a consequence of):	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • *Yes • *No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No

Rule 1 not applicable; no valid sequence terminating in the condition first entered on the certificate.



Example 4

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Pernicious anemia and coma</u> (D51.0) (R40.2)	_____
	Due to (or as a consequence of):	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. <u>Atherosclerosis</u> (I70.9)	_____
	Due to (or as a consequence of):	_____
	c. _____	_____
	Due to (or as a consequence of):	_____
	d. _____	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No
		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No

Tentative underlying cause is D51.0 via Rule 2: select the first-mentioned condition.



Selection Rules

Rule 3 (“direct sequel”)

“If the condition selected by the General Principle or by Rule 1 or Rule 2 is obviously a direct consequence of another reported condition, whether in Part I or Part II, select this primary condition.”



Example 5

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Cardiac arrest</u> (I46.9)	_____
	Due to (or as a consequence of):	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. <u>Gastric hemorrhage</u> (K92.2)	_____
	Due to (or as a consequence of):	_____
	c. _____	_____
	Due to (or as a consequence of):	_____
	d. _____	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • *Yes • *No
<u>Gastric ulcer</u> (K25.9)		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No

Through “direct sequel” Rule 3 a **third code K259** is selected instead of **K922** as **tentative** underlying cause because the gastric hemorrhage is a direct sequel of K25.9 as per Table E (Part 2c).



Modification Rules

Rule A (“senility and other ill-defined conditions”)

“Where the selected cause is ill-defined and a condition classified elsewhere is reported on the certificate, re-select the cause of death as if the ill-defined condition had not been reported, except to take account of that condition if it modifies the coding.”



The following are regarded as ill-defined:

- I46.9 (Cardiac arrest, unspec.);
- I95.9 (Hypotension, unspec.);
- I99 (Other and unspec. disorders of circulatory system);
- J96.0 (Acute respiratory failure);
- J96.9 (Respiratory failure, unspec.);
- P28.5 (Respiratory failure of newborn);
- R00-R94, R96-R99* (Chapter of Ill-defined & unknown causes of mortality)

* Note that R95, Sudden infant death syndrome, is not considered an “ill-defined” condition.



Example 5

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
<p>IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)</p>	<p>a. <u>Senility and hypostatic pneumonia</u> (R54) (J18.2)</p>	_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST</p>	<p>b. <u>Rheumatoid arthritis</u> (M06.9)</p>	_____
	<p>c. _____</p> <p>Due to (or as a consequence of):</p>	_____
	<p>d. _____</p> <p>Due to (or as a consequence of):</p>	_____
<p>PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.</p>		<p>33. WAS AN AUTOPSY PERFORMED? • *Yes • *No</p>
		<p>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No</p>

Senility is considered ill-defined. Reselect TUC as if R54 had not been reported.
M06.9 is selected as TUC via General Principle.
No modifications (IDDC, SENMC, SENDC) warranted.



Modification Rules

Rule B (“trivial conditions”)*

“Where the selected cause is a trivial condition unlikely to cause death, and a more serious condition (any condition except an ill-defined or another trivial condition) is reported, reselect the underlying cause as if the trivial condition had not been reported. If the death was the result of an adverse reaction to treatment of the trivial condition, select the adverse reaction.

When a trivial condition is reported as causing any other condition, the trivial condition is not discarded and Rule B **is not applicable.**”* For a list of trivial conditions, see instruction manual Part 2c, table H.



Modification Rules

Rule C (“linkage”)

“Where the selected cause is linked by a provision in the Classification or in the notes for use in underlying cause coding with one or more of the other conditions on the certificate, code the combination.

Where the linkage provision is only for the combination of one condition specified as due to another, code the combination only when the correct causal relationship is stated or can be inferred from application of the selection rules.

Where a conflict in linkages occurs, link with the condition that would have been selected if the cause initially selected had not been reported. Make any further linkage that is applicable.”



Example 6

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)	a. <u>Pneumonia and emphysema</u> (J18.9) (J43.9)	_____
	Due to (or as a consequence of):	_____
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. _____	_____
	Due to (or as a consequence of):	_____
	c. <u>Bronchitis</u> (J40)	_____
	Due to (or as a consequence of):	_____
	d. _____	_____
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.		33. WAS AN AUTOPSY PERFORMED? • Yes • No
Cerebral arteriosclerosis (I67.2)		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No

J40 is selected as TUC via General Principle. However...



Example 6

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
<p>IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)</p>	<p>a. <u>Pneumonia and emphysema</u> (J18.9) (J43.9)</p> <p>Due to (or as a consequence of):</p>	_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST</p>	<p>b. _____</p> <p>Due to (or as a consequence of):</p>	_____
	<p>c. <u>Bronchitis</u> (J40)</p> <p>Due to (or as a consequence of):</p>	_____
	<p>d. _____</p> <p>Due to (or as a consequence of):</p>	_____
<p>PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.</p> <p>Cerebral arteriosclerosis (I67.2)</p>		<p>33. WAS AN AUTOPSY PERFORMED? • Yes • No</p> <p>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • Yes • No</p>

Addressing J40 in Table E of Part 2c indicates a need to select a combined code (J44.8) as TUC because of the simultaneous presence of J40 and J43.9.

J44.8 is "Other specified chronic obstructive pulmonary disease"



Modification Rules

Rule D (“specificity”)

“Where the selected cause describes a condition in general terms and a term that provides more precise information about the site or nature of this condition is reported on the certificate, prefer the more informative term. This rule will often apply when the general term becomes an adjective, qualifying the more precise term.”



Modification Rules

Rule E (“early and late stages of disease”)

“Where the selected cause is an early stage of a disease and a more advanced stage of the same disease is reported on the certificate, code to the more advanced stage.

This rule does not apply to a ‘chronic’ form reported as due to an ‘acute’ form unless the classification gives special instructions to that effect.”



Modification Rules

Rule F (“sequela”)

“Where the selected cause is an early form of a condition for which the Classification provides a separate ‘Sequela of ...’ category, and there is evidence that death occurred from residual effects of this condition rather than from those of its active phase, code to the appropriate ‘Sequela of ...’ category.”



“Sequela of...” categories

B90.- Sequela of tuberculosis

B91 Sequela of poliomyelitis

B92 Sequela of leprosy

B94.- Sequela of other and unspecified infectious and parasitic diseases

E64.- Sequela of malnutrition and other nutritional deficiencies

E68 Sequela of hyperalimentation

G09 Sequela of inflammatory diseases of central nervous system

I69.- Sequela of cerebrovascular disease

O97 Death from sequela of direct obstetric causes

Y85 - Y89 Sequela of external causes



Example 7

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
<p>IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)</p>	<p>a. <u>Fractured spine</u> (T08) ?</p> <p>Due to (or as a consequence of):</p>	_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST</p>	<p>b. <u>Passenger in auto accident, 18 mos. ago</u> (V49) ?</p> <p>Due to (or as a consequence of):</p>	_____
	<p>c. _____</p> <p>Due to (or as a consequence of):</p>	_____
	<p>d. _____</p>	_____
<p>PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.</p>		<p>33. WAS AN AUTOPSY PERFORMED? • *Yes • *No</p>
		<p>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No</p>

These are likely ICD codes for these conditions.
However...



Example 7

CAUSE OF DEATH (See instructions and examples)		Approximate interval: Onset to death
<p>32. PART I. Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>		
<p>IMMEDIATE CAUSE (Final disease or condition -----> resulting in death)</p>	<p>a. <u>Fractured spine (T91.1)</u></p> <p>Due to (or as a consequence of):</p>	_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST</p>	<p>b. <u>Passenger in auto accident, 18 mos. ago (Y85.0)</u></p> <p>Due to (or as a consequence of):</p>	_____
	<p>c. _____</p> <p>Due to (or as a consequence of):</p>	_____
	<p>d. _____</p>	_____
<p>PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I.</p>		<p>33. WAS AN AUTOPSY PERFORMED? • *Yes • *No</p>
		<p>34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? • *Yes • *No</p>

Presence of mention of injury having occurred long time ago gives rise to sequela codes. As usual, TUC goes to the external cause of the injury (Y85.0)

– not the injury code itself



Integration of supplemental items in coding process



Other items that may be used

- Injury details
- Manner of death

- Pregnancy status
- Tobacco use

35. DID TOBACCO USE CONTRIBUTE TO DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> Probably <input type="checkbox"/> No <input type="checkbox"/> Unknown		36. IF FEMALE: <input type="checkbox"/> Not pregnant within past year <input type="checkbox"/> Pregnant at time of death <input type="checkbox"/> Not pregnant, but pregnant within 42 days of death <input type="checkbox"/> Not pregnant, but pregnant 43 days to 1 year before death <input type="checkbox"/> Unknown if pregnant within the past year		COMPLETE THE CAUSE OF DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> No 37. MANNER OF DEATH <input type="checkbox"/> Natural <input type="checkbox"/> Homicide <input type="checkbox"/> Accident <input type="checkbox"/> Pending Investigation <input type="checkbox"/> Suicide <input type="checkbox"/> Could not be determined	
38. DATE OF INJURY (Mo/Day/Yr) (Spell Month)	39. TIME OF INJURY	40. PLACE OF INJURY (e.g., Decedent's home; construction site; restaurant; wooded area)		41. INJURY AT WORK? <input type="checkbox"/> Yes <input type="checkbox"/> No	
42. LOCATION OF INJURY: State: _____ City or Town: _____ Street & Number: _____ Apartment No.: _____ Zip Code: _____					
43. DESCRIBE HOW INJURY OCCURRED:				44. IF TRANSPORTATION INJURY, SPECIFY: <input type="checkbox"/> Driver/Operator <input type="checkbox"/> Passenger <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other (Specify)	



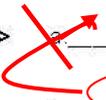
Example 8

CAUSE OF DEATH (See instructions and examples)

Approximate interval:
Onset to death

32. **PART I.** Enter the chain of events--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death) →



a. **Subdural hematoma**

(S06.5)

Due to (or as a consequence of):

b. **CVA**

(I64)

Due to (or as a consequence of):

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death) **LAST**

b.

c.

d.

Due to (or as a consequence of):

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I

33. WAS AN AUTOPSY PERFORMED?

Yes No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? Yes No

35. DID TOBACCO USE CONTRIBUTE TO DEATH?

Yes Probably

No Unknown

36. IF FEMALE:

Not pregnant within past year

Pregnant at time of death

Not pregnant, but pregnant within 42 days of death

Not pregnant, but pregnant 43 days to 1 year before death

Unknown if pregnant

37. MANNER OF DEATH

Natural Homicide

Accident Pending Investigation

Suicide Could not be determined

38. DATE OF INJURY (Mo/Day/Yr) (Spell Month)

39. TIME OF INJURY

40. PLACE OF INJURY

42. LOCATION OF INJURY: State:

Street & Number:

43. DESCRIBE HOW INJURY OCCURRED:

Fell while walking (W18)

Tentative underlying cause is S06.5 "Traumatic subdural hemorrhage" by Rule 2. The only information on an accidental cause of a hematoma is in the injury description. W18 "Other fall on same level" is assigned and selected as the underlying cause.



Pregnancy status

Ideal processing situation:

- Cause-of-death statement would include information about role of pregnancy and timing between pregnancy and death, so separate question would not be used in coding
- Separate pregnancy question would allow calculation of deaths of pregnant or recently pregnant women and assist surveillance programs



Pregnancy status

Processing reality:

- Pregnancy question is frequently used in tandem with cause-of-death statement
- Same general guidelines used for separate questions as before: Information in question taken into consideration when coding



Example 9

Female, 28 years old

CAUSE OF DEATH (See instructions and examples)

Approximate interval:
Onset to death

32. **PART I.** Enter the chain of events--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death) →

a. →

CVA

(O96)

Due to (or as a consequence of):

b.

Hypertension

(O96)

Due to (or as a consequence of):

c.

Pregnancy

Due to (or as a consequence of):

d.

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death) **LAST**

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I

33. WAS AN AUTOPSY PERFORMED?

Yes No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? Yes No

35. DID TOBACCO USE CONTRIBUTE TO DEATH?

Yes Probably

No Unknown

36. IF FEMALE:

Not pregnant within past year

Pregnant at time of death

Not pregnant, but pregnant within 42 days of death

Not pregnant, but pregnant 43 days to 1 year before death

Unknown if pregnant within the past year

37. MANNER OF DEATH

Natural Homicide

Accident Pending Investigation

Suicide Could not be determined

Tentative underlying cause is O96 ("Death from any obstetric cause occurring more than 42 days but less than one year after delivery") by general principle. No further modification is applicable.



Example 10

Female, 24 years old

CAUSE OF DEATH (See instructions and examples)			Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> --diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.			
IMMEDIATE CAUSE (Final disease or condition resulting in death) →	a. CVA	(O99.4)	
	Due to (or as a consequence of):		
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	b. Hypertension	(O16)	
	Due to (or as a consequence of):		
	c. Pregnancy		
	Due to (or as a consequence of):		
	d.		
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I			33. WAS AN AUTOPSY PERFORMED? <input type="checkbox"/> Yes <input type="checkbox"/> No
			34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> No
35. DID TOBACCO USE CONTRIBUTE TO DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> Probably <input type="checkbox"/> No <input type="checkbox"/> Unknown	36. IF FEMALE: <input type="checkbox"/> Not pregnant within past year <input type="checkbox"/> Pregnant at time of death <input checked="" type="checkbox"/> Not pregnant, but pregnant within 42 days of death <input type="checkbox"/> Not pregnant, but pregnant 43 days to 1 year before death <input type="checkbox"/> Unknown if pregnant within the past year	37. MANNER OF DEATH <input type="checkbox"/> Natural <input type="checkbox"/> Homicide <input type="checkbox"/> Accident <input type="checkbox"/> Pending Investigation <input type="checkbox"/> Suicide <input type="checkbox"/> Could not be determined	

Tentative underlying cause is O16 (“Unspecified maternal hypertension”) by general principle. No further modification is applicable.



Tabulation Lists



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Background

- One of the purposes of the ICD is to provide standard lists for presenting mortality data
- WHO recommends four special tabulation lists for underlying cause of death data
- The United States has created its own tabulation lists; however, the NCHS lists can be used to recreate the WHO tabulation lists



Instruction manual part 9

- Instruction Manual Part 9, ICD-10 Cause-of-Death Lists for Tabulating Mortality Statistics
- NCHS started to use this manual in 1999
- Describes 12 tabulation lists (updated for 2011)

http://www.cdc.gov/nchs/nvss/instruction_manuals.htm



Browser navigation bar showing address: http://www.cdc.gov/nchs/data/dvs/Part9InstructionManual2011.pdf, search engine: Google, and various navigation icons.

**TABLE B. LIST OF 113 SELECTED CAUSES OF DEATH and ENTEROCOLITIS
DUE TO CLOSTRIDIUM DIFFICILE – Con.**

Number	Cause of death
49	Acute rheumatic fever and chronic rheumatic heart diseases.....I00-I09
50	Hypertensive heart disease.....I11
51	Hypertensive heart and renal disease.....I13
	Ischemic heart diseases.....I20-I25
52	Acute myocardial infarction.....I21-I22
53	Other acute ischemic heart diseases.....I24
	Other forms of chronic ischemic heart disease.....I20,I25
54	Atherosclerotic cardiovascular disease, so described.....I25.0
55	All other forms of chronic ischemic heart disease.....I20,I25.1-I25.9
	Other heart diseases.....I26-I51
56	Acute and subacute endocarditis.....I33
57	Diseases of pericardium and acute myocarditis.....I30-I31,I40
58	Heart failure.....I50
59	All other forms of heart disease.....I26-I28,I34-I38,I42-I49,I51
60#	Essential hypertension and hypertensive renal disease.....I10,I12,I15
61#	Cerebrovascular diseases.....I60-I69
62#	Atherosclerosis.....I70
	Other diseases of circulatory system.....I71-I78
63#	Aortic aneurysm and dissection.....I71
64	Other diseases of arteries, arterioles and capillaries.....I72-I78
65	Other disorders of circulatory system.....I80-I99
#	Influenza and pneumonia.....J09-J18
66	Influenza.....J09-J11
67	Pneumonia.....J12-J18
	Other acute lower respiratory infections.....J20-J22,U04
68#	Acute bronchitis and bronchiolitis.....J20-J21
69	Other and unspecified acute lower respiratory infections.....J22,U04
#	Chronic lower respiratory diseases.....J40-J47

Multiple Causes of Death



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A Word on Multiple Causes of Death

Valuable supplement to underlying cause data

By using only the underlying cause of death,
valuable information is lost

In the United States, about 75% of death
certificates have more than one condition listed,
with the average about 3 conditions

An underused resource



Multiple Causes of Death, cont.

The U.S. developed an automated system that captures this additional information and produces analyzable output based on it

Began with 1968 data

ACME: Automated Classification of Medical Entities
(underlying cause output)

**TRANSAX: Translation of Axes (multiple cause
output)**



Multiple Causes of Death, cont.

Two types of related multiple-cause outputs:

- ◆ Entity axis
- ◆ Record axis

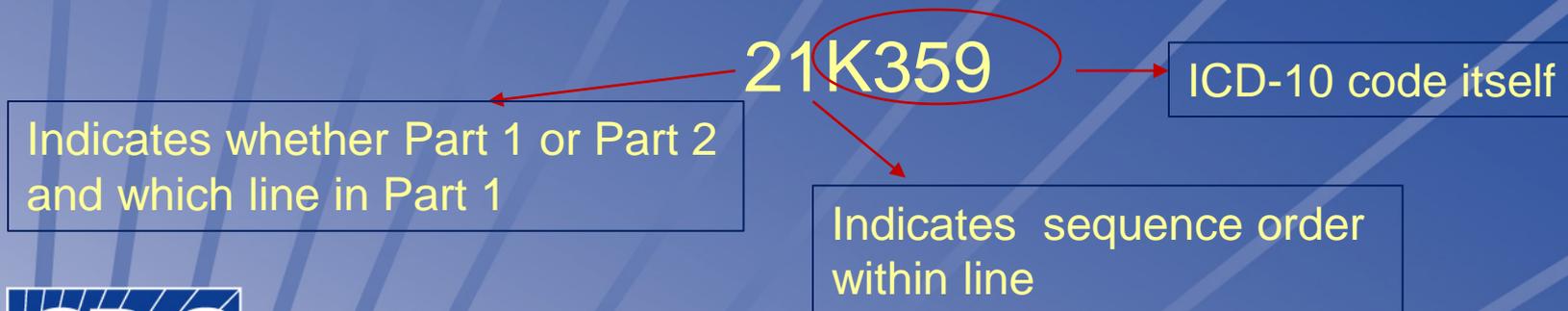


Multiple Causes of Death

Entity Axis

- ◆ Closer to what is actually entered by certifier
- ◆ Includes the placement of the condition on the death certificate

Anatomy of an entity axis code



Multiple Causes of Death

Record Axis

- ◆ A transformation of the entity axis
- ◆ More useful for analysis and tabulation
- ◆ Redundant conditions are deleted
- ◆ Certain conditions are combined



Multiple Causes of Death

Analytic uses include:

- ◆ The only source of “nature of injury” information

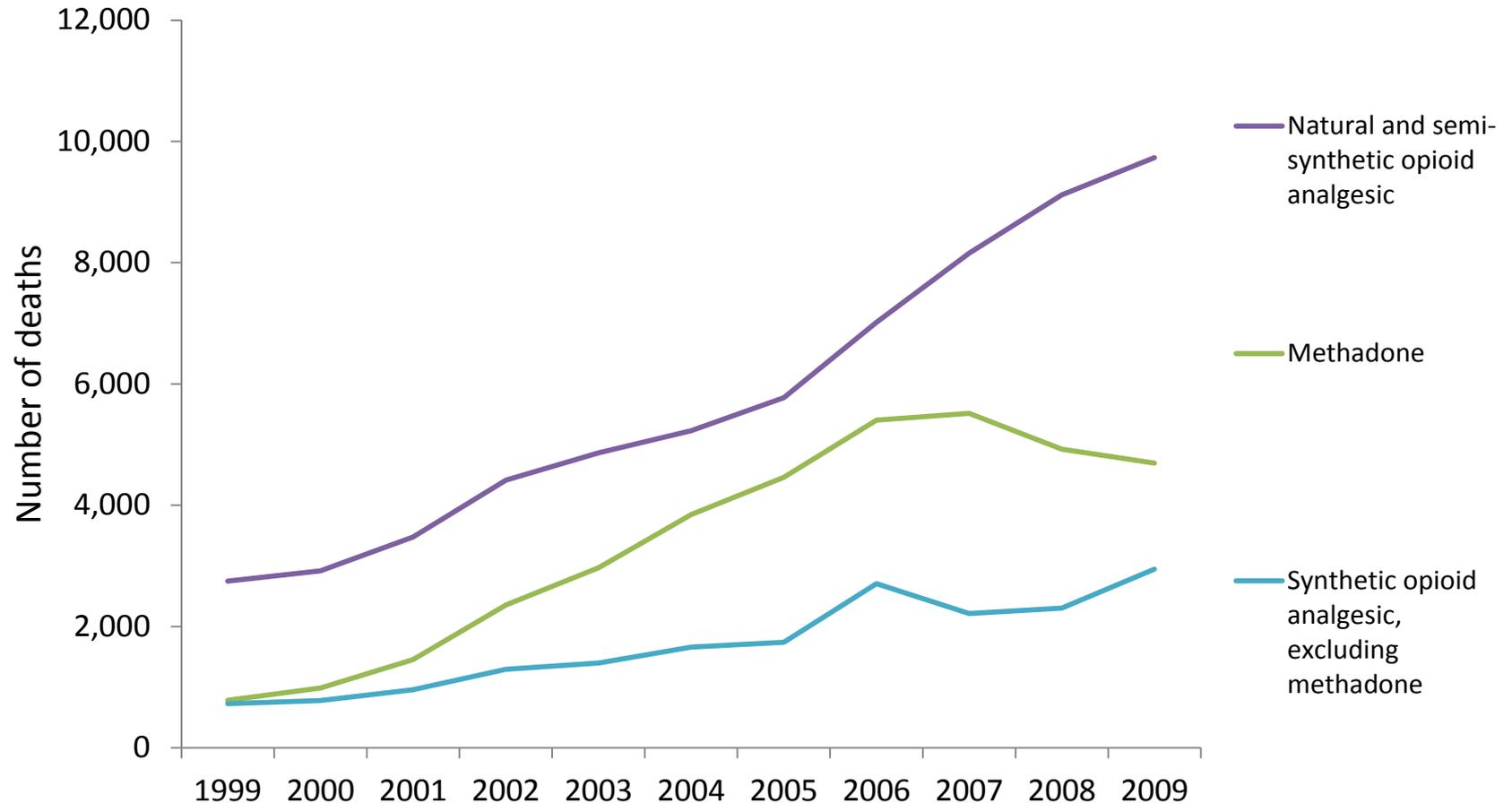
According to WHO conventions, we tabulate the death according to the external cause rather than the nature of the injury



Mechanism and intent of death (Based on the <i>International Classification of Diseases, Tenth Revision, 1992</i>)	Total injury deaths	Total mentions of injury	Fracture	Dislocation	Internal organ injury	Open wound	Amputation	Blood vessel	Superficial and contusion
All injury (*U01–*U03,V01–Y36, Y85–Y87,Y89) ³	161,269	247,195	20,665	528	26,254	42,295	177	2,475	688
Unintentional (V01–X59, Y85–Y86)	106,742	163,997	19,564	507	19,868	1,899	141	1,466	591
Suicide (*U03,X60–X84, Y87.0) ³	31,655	45,181	555	8	2,664	21,214	24	206	22
Homicide (*U01–*U02, X85–Y09, Y87.1) ³	17,638	29,877	418	9	3,266	18,482	8	771	58
Undetermined (Y10–Y34, Y87.2,Y89.9)	4,830	7,523	128	4	379	305	4	14	17
Legal intervention/ war (Y35–Y36,Y89(.0,.1))	404	617	–	–	77	395	–	18	–



Number of drug poisoning deaths involving opioid analgesics by opioid analgesic category: United States, 1999--2009



NOTES: Opioid analgesic categories are not mutually exclusive. Deaths involving more than one opioid analgesic category shown in this figure are counted multiple times. Natural and semi-synthetic opioid analgesics include morphine, oxycodone and hydrocodone; and synthetic opioid analgesics include fentanyl.

SOURCE: CDC/NCHS, National Vital Statistics System; and Warner M, Chen LH, Makuc DM, Anderson RN, Miniño AM. *Drug poisoning deaths in the United States, 1980–2008*. NCHS data brief, no 81. Hyattsville, MD: National Center for Health Statistics. 2011. <http://www.cdc.gov/nchs/data/databriefs/db81.htm>

Multiple Causes of Death

Analytic uses include:

- ◆ Associations among conditions contributing to death



TABLE 9

*Ratio of actual to expected number of pairs of causes of death for specified causes by sex, United States, 1979
(based on the National Center for Health Statistics "List of 72 Selected Causes of Death." Expected number of
deaths determined under assumption of independence)*

Cause of death (underlying or secondary)	Both sexes	Male	Female
Chronic liver disease and cirrhosis, with			
Anemias	1.51	1.53	1.64
Chronic ischemic heart disease	0.35	0.39	0.30
Pneumonia	0.90	0.96	0.79
Nephritis, nephrotic syndrome, and nephrosis	1.69	1.71	1.66
Pneumonia, with			
Malignant neoplasms of digestive organs	0.60	0.69	0.50
Malignant neoplasms of respiratory system	1.07	1.13	0.80
Chronic ischemic heart disease	0.74	0.70	0.71
Chronic liver disease with cirrhosis	0.90	0.92	0.79
Chronic obstructive pulmonary diseases and al- lied conditions	1.68	1.72	1.55
Diabetes mellitus, with			
Malignant neoplasms of digestive organs	0.52	0.57	0.18
Acute myocardial infarction	1.54	1.53	1.63
Chronic ischemic heart disease	1.62	1.71	1.53
Atherosclerosis	1.63	1.89	1.39
Nephritis, nephrotic syndrome, and nephrosis	1.67	1.61	1.66



Multiple Causes of Death

Analytic uses include:

- ◆ Studies of the nature and quality of medical certification
- ◆ To see how often the medical certifier correctly completes the death certificate



Thank you

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