

**Burn Model System
National Data and Statistical Center**

STANDARD OPERATING PROCEDURE (SOP) #106

SOP #106	Title: Collecting Cause of Death Variables	
Approved: BMS Project Directors		Effective Date: 3/12/2015
Attachments: 1. ICD-9 Coding for Death Variables 2. Guidelines for Coding Cause of Death		Revised Date:
Forms: None		Review Date: 10/3/2025
Review Committee: BMS Project Directors		

Introduction:

The Burn Model System (BMS) Centers use an established set of rules including procedural steps for collecting cause of death during Form I or Form II data collection for the BMS National Database (NDB).

Purpose:

To institute a standard procedure for collection of cause of death data when a participant enrolled in the NDB expires.

Scope:

BMS and BMS longitudinal follow-up centers that collect follow-up data for the NDB.

Responsibilities:

BMS staff responsible for Form I and Form II data collection for the NDB (e.g., BMS researchers or clinicians, research assistants, study coordinators).

Procedures:

1. Centers enter death variables (primary cause of death, secondary cause of death, and external cause of death) to the Patient Status Form in the NDB when notified of a participant's death or when a search of an online death index (SSDI or Genealogy - at each eligible required follow-up time-point) indicates a participant's death.
 - a. Cause of death is obtained through the medical record, if applicable. Death certificates can also be requested from the vital statistics agency where the death occurred (information for vital statistics agencies can be found here: <http://www.cdc.gov/nchs/w2w.htm>).
 - b. Coding for death variables and guidelines for coding these variables is provided in the attachments, "ICD-9 Coding for Death Variables" and "Guidelines for Coding Cause of Death."
2. If cause of death is unknown, the National Death Index can be searched. NSCISC submits these identifiers to NDI in a batch search. NISCISC updates the database with the Causes from NDI. Cause of Death for participants who were not found in

the NDI search is further searched for by the center using vital statistic agencies from the state where the death occurred. If an NDI search or a vital statistics search is not possible or not successful, Cause of Death will remain coded as unknown in the NDB.

Training requirements:

Staff persons who are responsible for data collection for BMS should be familiar with these criteria. On-going training will be conducted using online training modules and data collector teleconferences.

Compliance:

All data collectors are required to comply with these guidelines.

References:

None.

History:

12/14/2020: Reviewed by Project Directors.

10/3/2025: Reviewed by Project Directors.

Review schedule:

At least every 5 years.

ICD-9 Coding for Death Variables

Use this document as a reference for coding cause of death using ICD-9-CM and E-Code Categories

For further information about E-codes, go to: <http://www.icd9data.com/2008/Volume1/E800-E999/default.htm>

Online ICD-9 Coding Manual can be found here:
<http://icd9cm.chrisendres.com/index.php?action=contents>

ICD-9-CM E-CODE CATEGORIES (abbreviated)

DESCRIPTION	ICD-9-CM E-CODE	DEFINITION
Motor Vehicle Collision;		
MV-Occupant	810-819 (.0,.1,.8,.9)	Operator or passenger of car, bus, truck, jeep, tractor, van
Motorcycle	810-819 (.2,.3)	Operator or passenger of motorcycle, moped, dirt bike
MV-Bicycle	810-819 (.6)	Motor vehicle collision with bicycle
Pedestrian	810-819 (.7)	MV collision with pedestrian
Bicycle	826 (.0,.1,.8,.9)	Bicycle collision with object or pedestrian (Non-MV)
Other Transport	800-807 820 (.0,.1,.8,.9) 821 (.0,.1,.8,.9) 822-825 (.0,.1,.8,.9) 830-839 (.0 - .9) 840-845 (.0 - .9)	Railway Snowmobile collision (off public roadway) All-terrain vehicle or other off-road vehicle collision MV non-traffic (off public roadway) Water transport vehicle Air transport
Location	849 (.0 - .9)	Place of injury occurrence
Poisonings	850-858 860-869	Poisoning by drugs Poisoning by other substances
Falls	880-888	Fall from stairs, ladder, bed; diving into water, tackles in sports
Burns	890-899 924 926	Fires, flames, smoke inhalation Hot substances including corrosive liquids, steam Radiation including infrared and ultra violet lamps
Environmental	900-909	Effects of excessive heat or cold, includes exposure and lightning
Drowning	910	Submersions
Suffocation	911-913	Inhalation, ingestion, suffocation
Foreign Body	914-915	Object in eye or other orifice
Struck By	916-918	Struck by or against object including struck by others in sports
Machinery	919	Agricultural, woodworking, manufacturing or other machinery
Cut/Pierce (unintentional)	920	Powered/unpowered hand tools, household appliances, knives
Firearms (unintentional)	921-923	Explosion of vessels, firearms, explosive material
Electricity	925	Electric shock or electrocution by wiring, power lines, appliances
Self-inflicted	950-959	Suicide and self-inflicted injury
Assault	960-969	Homicide and other-inflicted injury
Legal interventions	970-978	Legal intervention
Injury with undetermined intentionality	980-989	Undetermined if injury intentional or unintentional
War	990-999	Operations of War

ICD-9-CM E-CODE CATEGORIES

ICD-9-CM E-CODE	DEFINITION
800-807	Rail
810-819	Motor Vehicle Traffic
820-825	Motor Vehicle Non-traffic
826-829	Other Road Vehicles
830-838	Water Transport
840-845	Air and Space Transport
846-848	Vehicle not elsewhere classified
849	Place of occurrence
850-858	Poisonings by drugs, medicinal/biological substances
860-869	Poisonings by other substances
870-876	Medical/surgical misadventures during procedure
878-879	Late Effects or reactions from medical/surgical procedures
880-888	Falls
890-899	Fire/flames
900-909	Natural/environmental factors
910-915	Submersion, suffocations, foreign bodies
916-928	Other accidents, struck by/against objects/persons, caught by objects/machinery, cutting/piercing instruments/objects, explosion/explosive material, firearm missile, hot/caustic/corrosive substances, electric current, radiation, over exertion/strenuous movement, other/unspec environmental/accidental causes
929	Late effects of injury
930-949	Adverse effects drugs, etc. in therapeutic use
950-959	Suicide and self inflicted injury
960-969	Homicide and purposely inflicted by other person
970-978	Legal interventions
980-989	Injury undetermined if accidental or purposely inflicted
990-999	Operations of war

Other classifications:

Vehicular-related:	800-848
Fall-related:	880-888
Violence-related:	950-978, 990-999
other:	850-879, 890-949

Other subclassifications for vehicular:

Motor Vehicle-Occupant	810-819, 822-825 (.0,.1,.8,.9)
Motorcycle	810-819, 822-825 (.2,.3)
Pedestrian	810-819, 822-825 (.7)
Bicycle	810-819, 822-825 (.6) 826

GUIDELINES FOR CODING PRIMARY CAUSE OF DEATH

- A. In general, cause of death on medical records will document the immediate cause of death followed by two or three lines under the heading "due to or as a consequence of." There will also be a line to document "other significant conditions."

As a general rule, the primary cause of death will be the cause entered alone on the lowest line of the "due to or as a consequence of" sequence unless it is unlikely that this condition gave rise to all the other conditions listed above it. *If you are uncertain about this, consult your center's medical professionals. An "Other significant condition" would be coded as a secondary cause of death unless it can be specifically linked to the causes listed above it, in which case it might be included in a combined primary cause of death.

For example, consider the following cases:

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|----|--------------------------------|----------------|-------|
| 1. | Immediate cause: | Cardiac arrest | 427.5 |
| | Due to or as a consequence of: | | |
| | Due to or as a consequence of: | | |

Unless additional information can be acquired, select cardiac arrest (427.5) because, unfortunately, it is the only option available.

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|----|--------------------------------|--------------------------|-------|
| 2. | Immediate cause: | Cardiorespiratory arrest | 427.5 |
| | Due to or as a consequence of: | Pneumonia | 486 |
| | Due to or as a consequence of: | | |
- Select pneumonia (486) since it led to the cardiorespiratory arrest.

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|----|--------------------------------|--------------------------|-------|
| 3. | Immediate cause: | Cardiorespiratory arrest | 427.5 |
| | Due to or as a consequence of: | Septicemia | 038.9 |
| | Due to or as a consequence of: | Pneumonia | 486 |

Select pneumonia (486) because it led to the other conditions. List septicemia as a secondary cause.

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|----|--------------------------------|--------------------------|-------|
| 4. | Immediate cause: | Cardiorespiratory arrest | 427.5 |
| | Due to or as a consequence of: | Arteriosclerosis | 440.9 |
| | Due to or as a consequence of: | | |

Select arteriosclerosis (440.9) since it led to the cardiorespiratory arrest.

5.	Immediate cause:	Cardiorespiratory arrest	427.5
	Due to or as a consequence of:	Septicemia	038.9
	Due to or as a consequence of:	Renal failure	586

Select septicemia (038.9) because renal failure (which would ordinarily have been chosen) cannot cause septicemia. List renal failure as a secondary cause.

6.	Immediate cause:	Arteriosclerosis	440.9
	Due to or as a consequence of:	Pneumonia	486
	Due to or as a consequence of:		

Select arteriosclerosis (440.9) because pneumonia (which would ordinarily have been chosen) cannot cause arteriosclerosis. List pneumonia as a secondary cause.

7.	Immediate cause:	Cardiac arrest	427.5
	Due to or as a consequence of:	Hemorrhage	459.0
	Due to or as a consequence of:		
	Other significant conditions:	Peptic ulcer	533.4

Unless there is specific evidence indicating the hemorrhage was not associated with the peptic ulcer, select peptic ulcer with hemorrhage (533.4) because hemorrhage (which would ordinarily have been chosen) can be linked with peptic ulcer to identify a more specific condition. The important question is whether this death is better classified as resulting from a disease of the digestive system or a disease of veins and lymphatics. Certainly, the former seems more appropriate given the available information.

8.	Immediate cause:	Pernicious anemia	281.0
	Due to or as a consequence of:	Cerebral hemorrhage	431
	Due to or as a consequence of:	Arteriosclerosis	440.9

Select pernicious anemia (281.0). Although arteriosclerosis can cause a cerebral hemorrhage, it cannot cause pernicious anemia. Cerebral hemorrhage also cannot cause pernicious anemia. Therefore, with no apparent causal sequence leading directly to the immediate cause of death, the immediate cause is selected as the primary cause of death. The others should be listed as secondary causes.

- B. In general, ill-defined conditions should not be selected as the primary cause of death unless no alternative exists. *(For exception – see H.)

For example:

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|----|--------------------------------|-----------------------|-------|
| 1. | Immediate cause: | Myocardial infarction | 410.9 |
| | Due to or as a consequence of: | Tachycardia | 785.0 |
| | Due to or as a consequence of: | | |

Select myocardial infarction (410.9) because tachycardia (which would ordinarily have been chosen) is considered a "symptom or ill-defined condition."

Tachycardia can be listed as a secondary cause of death.

- C. In general, trivial conditions should be ignored. If death is the result of an adverse reaction to treatment for a trivial condition (such as renal failure resulting from taking aspirin for recurrent migraines), then code the adverse reaction as the primary cause of death. If the trivial condition is not reported as the cause of a more serious complication and a more serious unrelated condition is reported, then code the more serious condition as the primary cause of death.

For example:

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|----|--------------------------------|---------------------------|-------|
| 1. | Immediate cause: | Congenital anomaly of eye | 743.9 |
| | Due to or as a consequence of: | Congenital heart disease | 746.9 |
| | Due to or as a consequence of: | | |

Select congenital heart disease (746.9) even though it cannot cause a congenital anomaly of the eye because the latter is considered a trivial condition unlikely by itself to cause death.

- D. When the normal selection process results in choosing a condition which is described only in general terms and a related cause is also reported which provides more precise information about the system or nature of the chosen condition, reselect the more informative cause as the primary cause of death.

For example:

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|----|--------------------------------|--------------------------|-------|
| 1. | Immediate cause: | Cerebral thrombosis | 434.0 |
| | Due to or as a consequence of: | Cerebrovascular accident | 436 |
| | Due to or as a consequence of: | | |

Select cerebral thrombosis (434.0) because it is more informative and precise than cerebrovascular accident (which would ordinarily have been chosen).

Cerebrovascular accident can be listed as a secondary cause.

2.	Immediate cause:	Pyelonephritis	590.8
	Due to or as a consequence of:	Kidney stone	592.0
	Due to or as a consequence of:	Renal disease	593.9

Select kidney stone (592.0). Both kidney stone and pyelonephritis are more specific than renal disease, but kidney stone would have been selected if renal disease had not been listed on the certificate. Therefore, it is preferred over pyelonephritis, which can be listed as a secondary cause of death along with renal disease.

- E. It is important to consider the interval between onset and death for each condition specified on the death certificate. Acute conditions that occurred a protracted time prior to death probably will not be the primary cause of death.

For example:

Immediate cause:	Congestive heart failure (3 mo)	428.0
Due to or as a consequence of:	Pneumonia (1year)	486
Due to or as a consequence of:		

Select congestive heart failure (428.0) because the episode of pneumonia occurred a long time before the patient died as well as long before the symptomatic heart disease began.

- F. The use of E codes is very important because it is the only way to distinguish accidents, suicides and homicides from each other as well as from natural causes of death. *If an injury or poisoning code is reported (800-999), it should always also have an E-code (E800-E999) with it. If an E code is appropriate, it will always be treated as the primary cause of death.
- G. When the medical record does not provide adequate information code the cause of death as unknown.
- *H. For a death due to seizure or seizure disorder, use the seizure code 780.39 as opposed to the epilepsy codes 345.90 & 345.91. Someone who dies of Post-Traumatic Seizures should be coded as cause death due to seizure.
- *I. When the death certificate reports the cause of death due to cancer/neoplasm, if a site of the cancer is given (e.g., lung cancer) assume this to be the primary site, if not otherwise specified.

- *J. If the death certificate lists several “Other significant conditions” or “Secondary causes”, try to select from a different diagnosis grouping, for your secondary code, to provide more information upon analysis.”

For example:

1.	Immediate Cause:	Adult Respiratory Distress Syndrome	518.4
	Due to or as a consequence of:	Streptococcal Pneumonia	481
	Other significant conditions:	Pseudomonas Sepsis	038.43
		Acute Glomerulonephritis	584.9

Select Streptococcal Pneumonia (481) because it led to the other conditions. List the acute Glomerulonephritis as your secondary code as it provides a different diagnosis grouping.

Adapted from the Traumatic Brain Injury Model System and the Spinal Cord Injury Model System