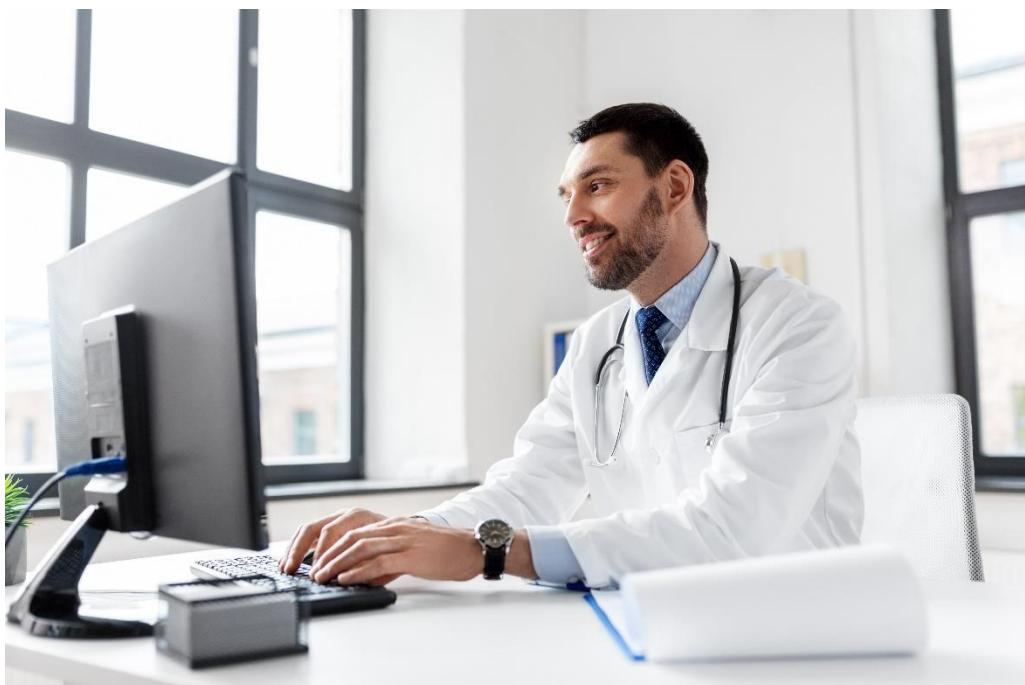


VITAL RECORDS

Electronic Vital Event Registration System (EVERS)

Physician's Handbook for Completing Medical Certification of Death



Version 1.0

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General Instructions for Completing Death Records

Death records are permanent legal records from which official copies are made. It is essential that the record be prepared accurately. Funeral directors are responsible for completing most of the demographic information on the death record with the assistance of an informant, who is usually a family member.

North Dakota law requires that the medical certification on a death record be completed and filed within 10 days of the date of death. Physicians are expected to use medical training, knowledge of medicine, available medical history, symptoms, diagnostic tests, and autopsy results, if available, to determine the cause of death. A death record may be filed with the cause of death listed as pending to meet this requirement of state law. This is especially useful when additional information, such as autopsy results or laboratory tests, are expected; however, this then obligates the physician to submit a supplemental cause of death to update the original information after the additional information becomes available.

Completing a death record involves the following guidelines:

- The medical certification of death must be completed by a physician, physician assistant, nurse practitioner, coroner, or state medical examiner.
- Use of the Electronic Vital Event Registration System or EVERS application is mandatory.
- A user's account and password for the EVERS application should not be shared with another individual.
- Physicians, physician assistants and nurse practitioners **may only** certify deaths where the manner is **Natural**. ***All other manners of death must be certified by a coroner or the state medical examiner. This would include accidents, homicides, and suicides.***
- Problems not covered in these instructions should be referred to the Vital Records Unit's Nosologist at vitalrec@nd.gov or by phone at (701) 328-4512.

Medical Certification of Death

A physician's primary responsibilities in death registration are pronouncing the death and, when he or she is the attending physician, completing the cause of death section of the death record. The medical part of the record includes:

- Date and time pronounced dead, if applicable
 - The "time of death" refers to the actual moment when a person's vital functions ceased, while the "pronounced time of death" is the time when a medical professional officially declares someone deceased, which may occur later than the actual time of death, especially if the body was discovered after death had already occurred.
 - In most cases, the pronounced and actual date and time of death will be the same.
- Actual date and time of death
- Question as to whether the case was referred to the medical examiner or coroner, for all non-natural deaths.
- Cause of death section, including the cause of death, manner of death, tobacco use, diabetes status and for females, pregnancy status.
- Injury section for cases involving injuries, which is usually for non-natural deaths.

In most cases, a physician will both pronounce death and certify the cause of death. A different physician will pronounce death only when the attending physician is unavailable to certify the cause of death at the time of death. For non-natural deaths, the state medical examiner or the county coroner is responsible for determining and reporting the cause of death.

Cause of Death

The attending physician, the medical examiner or the coroner must complete this section of the record. The cause of death section follows guidelines recommended by the World Health Organization.

The reported underlying cause determined by the certifying physician is defined as:

- a) the disease or injury that initiated the chain of morbid events leading directly to death;
or,
- b) the circumstances of the accident or violence that produced the fatal injury.

In addition to the underlying cause of death, this section provides for reporting the entire sequence of events leading to death, as well as other conditions significantly contributing to death. The section concerning the cause of death is designed to elicit the opinion of the medical certifier. Causes of death on the death record represent a medical opinion that might

vary among individual physicians. A properly completed cause of death section provides an etiologic explanation of the order, type and association of events resulting in death. The initial condition that starts the etiologic sequence is specific if it does not leave any doubt as to why it developed. For example, sepsis is not specific because several different conditions may have resulted in sepsis, whereas human immunodeficiency virus syndrome is specific.

In certifying the cause of death, any disease, abnormality, injury, or poisoning, if believed to have adversely affected the decedent, should be reported. If the use of alcohol and/or other substance, a smoking history, recent pregnancy, injury, or surgery was believed to have contributed to death, then this condition should be reported. The conditions present at the time of death may be completely unrelated – arising independently of each other – or they may be causally related to each other – that is, one condition may lead to another which in turn leads to a third condition. Death also may result from the combined effect of two or more conditions.

The cause of death section consists of two parts (see image below). The first part is for reporting the sequence of events leading to death, proceeding backwards from the final disease or condition resulting in death, so each condition in **Part I** should cause the condition above it. A specific cause of death should be reported in the last entry in **Part I** so there is no ambiguity about the etiology of this cause. Other significant conditions that contributed to death, but which did not lead to the underlying cause, are reported in **Part II**.

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval
Cause of Death Part II	
Other Contributing Factors	
Was an autopsy performed *	▼
Did tobacco use contribute to death?	▼
Was deceased diabetic?	▼
Manner of Death *	▼
Activity at Time of Death *	▼
Date of Surgery	▼

In addition, there are questions relating to autopsy and are the autopsy findings available, manner of death (for example, accident) and injury. The cause of death should include information provided by the pathologist if an autopsy or other type of postmortem examination is done. For deaths that have microscopic examinations pending at the time the record is filed, the cause of death should be filed as "**Pending Investigation**" within 10 days and once the pending test results are ready, a "supplemental cause of death" should be filed with the additional information as soon as possible.

NOTE: *If a physician has any questions about the procedure for doing this, he or she should contact the Nosologist in our Vital Records Unit by emailing vitalrec@nd.gov, with the subject line "Cause of Death Question" and the actual question in the text of the email.*

For statistical and research purposes, it is important that the causes of death and the underlying cause of death be reported as specifically and as precisely as possible. Careful reporting results in statistics for both underlying and multiple causes of death (i.e., all conditions mentioned on a death record) reflecting the best medical opinion.

Every cause of death statement is coded and tabulated in our statistical offices according to the latest revision of the International Classification Diseases (ICD). The Vital Records Unit is using the 10th revision, while receiving online updates periodically. When there is a problem with the reported cause of death (e.g., when a causal sequence is reported in reverse order), the rules provide a consistent way to select the most likely underlying cause. However, it is better when rules designed to compensate for poor reporting are not invoked so that the rules are confirming the physician's statement, rather than imposing assumptions about what the physician meant.

Statistically, mortality research focuses on the underlying cause of death because public health interventions seek to break the sequence of causally related medical conditions as early as possible. However, all cause information reported on death records is important and is analyzed.

In the sections that follow, detailed instructions about how to complete Parts I and II are given. A number of examples of properly completed records with case histories are provided in this section to illustrate how the cause of death should be reported as well as some ill-defined examples that will result in a query from our Nosologist for clarification.

Supplemental Cause of Death

Should additional medical information or autopsy findings become available that would change the cause or causes of death originally reported, the certifying physician should submit

a “supplemental cause of death” within EVERS to amend the original death record by immediately reporting the revised cause of death to the Vital Records Unit. Physicians should be able to search for the previously reported record, then click on “**Supplemental Cause of Death**” to update any part of the cause of death.

Instructions for Certifying Cause of Death

The section relating to cause of death consists of two parts. **Part I** is for reporting a chain of events leading directly to death, with the final disease, injury or complication directly causing death on the **Immediate Cause of Death** line and the **underlying cause** of death (the disease or injury that initiated the chain of events that led directly and inevitably to death) on the **Due to (or as a consequence of) lines**. **Part II** is for reporting all other significant diseases, conditions or injuries that contributed to death, but which did not result in the underlying cause of death given in **Part I**.

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. A condition can be listed as “probable” if it has not been definitively diagnosed.

If an organ system failure such as congestive heart failure, hepatic failure, renal failure or respiratory failure is listed as the **immediate cause of death**, always report its etiology on the **Due to** lines below, for example:

Immediate Cause of Death:	Renal failure
Due to (or as a consequence of)	Type I diabetes mellitus

When indicating a neoplasm as a cause of death, include the following: (1) primary site or that the primary site is unknown, (2) benign or malignant, (3) cell type or that the cell type is unknown, (4) grade of neoplasm, and (5) part or lobe of organ affected. for example:

Immediate Cause of Death: (should be)	Cancer (poor cause)
Immediate Cause of Death:	Lung Cancer, left upper lobe, cell type unknown (good cause)

For each fatal injury (for example, stab wound of chest), always report the trauma (for example, transection of subclavian vein) and impairment of function (for example, air embolism) that contributed to death. **This would apply to coroners and medical examiners.**

Cause-of-Death Section – Part I

Only one cause is to be entered on each line of Part I. For each cause, indicate in the space provided the approximate interval between the date of onset (not necessarily the date of diagnosis) and the date of death. For clarity, do not use parenthetical statements and/or abbreviations when reporting the cause of death. The underlying cause of death should be entered on the **lowest line used in Part I**. The underlying cause of death is the disease or injury that started the sequence of events leading directly to death or the circumstances of the accident or violence that produced the fatal injury. In the case of a violent death, the form of external violence or accident is antecedent to an injury entered, although the two events may be almost simultaneous.

Line (a) Immediate Cause

In Part I, the immediate cause of death is reported on line (a). This is the **final disease, injury or complication directly causing the death**. An immediate cause of death must always be reported on line (a). It can be the sole entry in this section if that condition is the only condition causing death.

The immediate cause does not mean the mechanism of death or terminal event (for example, cardiac arrest or respiratory arrest). The mechanism of death should not be reported as the immediate cause of death, as it is a statement not specifically related to the disease process; it merely attests to the fact of death. The mechanism of death provides no additional information on the cause of death.

Lines (b), (c) and (d) Due to (or as a Consequence of)

On line (b), report the disease, injury or complication, if any, that gave rise to the immediate cause of death reported on line (a). If this in turn resulted from a further condition, record that condition on line (c). If the condition on line (c) was caused by another condition, that condition should be reported on line (d). For as many conditions as are involved, write the full sequence, one condition per line, with the most recent condition at the top and the underlying cause of death reported on the lowest line used in Part I. If more than four lines are needed, add additional lines (writing “due to” between conditions on the same line is the same as drawing an additional line) rather than using space in Part II a to continue the sequence. The following record is an example in which an additional line was necessary.

Cause of Death Part I - Chain of Events

Immediate Cause of Death ASPHYXIA BY VOMITUS	Time Interval MINTUES
Due to (or as a consequence of) CEREBELLER HEMORRAGE	Time Interval HOURS
Due to (or as a consequence of) HYPERTENSION	Time Interval ABOUT 1 YEAR
Due to (or as a consequence of) PRIMARY ALDOSTERONISM DUE TO ADRENAL ADENOMA	Time Interval 3+ YEARS / 3+ YEARS

Cause of Death Part II

Other Contributing Factors CONGESTIVE HEART FAILURE
Was an autopsy performed * No
Did tobacco use contribute to death? No
Was deceased diabetic? No
Manner of Death * Natural
Activity at Time of Death * While resting, sleeping, eating, or engaging in other vitaMac
Date of Surgery <input type="button" value=""/>

The words "DUE TO" are added between the line in Part I, apply not only to sequences with an etiological or pathological basis and usually a chronological time order, but also to sequences in which an antecedent condition is believed to have prepared the way for a subsequent cause by damage to tissues or impairment of function.

If the immediate cause of death arose as a complication of or from an error or accident in surgery or other medical procedure or treatment, it is important to report what condition was being treated, what medical procedure was performed, what the complication or error was, and what the result of the complication or error was.

Approximate Interval Between Onset and Death

Space is provided to the right of lines (a), (b), (c) and (d) for recording the interval between the presumed onset of the condition and the date of death. This should be entered for all conditions in Part I. These intervals usually are established by the physician on the basis of available information. In some cases, the interval will have to be estimated. The terms "unknown" or "approximately" may be used. General terms – such as minutes, hours, or days – are acceptable, if necessary. If the time of onset is entirely unknown, state that the interval is "unknown." **Do not leave these items blank.**

This information is useful in coding certain diseases and also provides a useful check on the accuracy of the reported sequence of conditions.

Cause-of-Death Section – Part II (Other Significant Conditions)

Cause of Death Part II	
Other Contributing Factors	<input type="text"/>
Was an autopsy performed *	<input type="text"/>
Did tobacco use contribute to death?	<input type="text"/>
Was deceased diabetic?	<input type="text"/>
Manner of Death *	<input type="text"/>
Activity at Time of Death *	<input type="text"/>
Date of Surgery	<input type="text"/> 

All other important diseases or conditions that were present at the time of death and that may have contributed to the death, but that did not lead to the underlying cause of death listed in Part I or were not reported in the chain of events in Part I, should be recorded on these lines. More than one condition can be reported per line in Part II.

Multiple conditions and sequences of conditions resulting in death are common, particularly among the elderly. When there are two or more possible sequences resulting in death, or if two conditions seem to have added together, choose and report in Part I the sequence

thought to have had the greatest impact. Other conditions or conditions from the other sequence(s) should be reported in Part II. For example, in the case of a diabetic male with chronic ischemic heart disease who dies from pneumonia, the certifying physician must choose the sequence of conditions that had the greatest impact and report this sequence in Part I. One possible sequence that the certifier might report would be pneumonia due to diabetes mellitus in Part I with chronic ischemic heart disease reported in Part II. Another possibility would be pneumonia due to the chronic ischemic heart disease entered in Part I with diabetes mellitus reported in Part II. Or the certifier might consider the pneumonia to be due to the ischemic heart disease that was due to the diabetes mellitus and report the entire sequence in Part I. Because these three different possibilities would be coded very differently, it is important for the certifying physician to decide which sequence most accurately describes the conditions causing death.

Doubt and Cause of Death

In cases of doubt, it may be necessary to use qualifying phrases in either Part I or Part II to reflect uncertainty as to which conditions led to death. In cases where the certifier is unable to establish a cause of death based upon reasonable medical certainty, he or she should enter "Unknown" in the cause of death section. However, ***this should only be entered after all efforts have been made to determine the cause of death.*** An autopsy should be performed, the cause of death, if possible.

A Note About Diabetes

The question concerning diabetes (Part II b) is a state-specific question and is on the death record at the request of the ND Department of Health and Human Service's Health Promotion & Chronic Disease Unit. This particular item is considered in determining the underlying cause of death. In order for us to consider diabetes in our coding, it must be written out in the appropriate part of the cause of death statement.

Other Items for Medical Certification

The remaining items that require the physician's certification relate to whether tobacco use by the decedent contributed to death (Part II c); whether an autopsy was performed; are the autopsy findings available; the manner of death; any injury information if death was due to trauma; and the decedent's pregnancy status..

The physician should indicate whether an autopsy was performed. If additional medical information or autopsy findings are received after the physician has certified the cause of death and he or she determines the cause to be different from what was originally entered on the death record, the original record should be amended by submitting a "supplemental cause of death within EVERs.

In most cases, the manner of death will be "Natural," and that choice should be selected from the drop-down. ***In those cases when an accident, suicide or homicide has occurred, the medical examiner or coroner must be notified. Either the medical examiner or coroner must assume jurisdiction for the death and check the appropriate manner of death and describe the injury and incident leading to death.***

Special considerations in determining manner of death

If a disease condition is attributed to a traumatic circumstance, the Manner of Death should not be marked as natural. For example:

Cause of Death Part I - Chain of Events

Immediate Cause of Death PNEUMONIA	Time Interval DAYS
Due to (or as a consequence of) FRACTURED HIP	Time Interval 2 WEEKS
Due to (or as a consequence of) FALL	Time Interval 2 WEEKS
Due to (or as a consequence of)	Time Interval

The Manner of Death is to be marked as **Accident**, and the injury section at the left of the record need to be completed.

If aspiration is due to a disease condition, Manner of Death may be marked as natural. If the cause of the aspiration is not known or is due to choking, the Manner of Death must be marked as accident, and the injury section items are to be completed.

Specific Instances in Which Injury Information Must Be Completed (Must be completed by a coroner or the state medical examiner)

Any time death is due to an "external cause," such as trauma due to accident, homicide, suicide or other trauma (Manner of Death may also be undetermined because there is no indication as to whether it was an accident, a homicide or a suicide). If a firearm was used, the type of firearm should be indicated (handgun, rifle or shotgun). In the case of a motor vehicle accident, you should indicate the type(s) of vehicle(s) and whether the deceased was the driver or passenger in his/her vehicle. If the accident was a fall, you should indicate whether it was a fall from a bed, chair, wheelchair, fall down steps, etc. There are different codes for different types of firearms, different types of motor vehicles (and driver or passenger), and falls from different levels, from a bed, involving a chair, etc.

Completing the Certifier Section

A *pronouncing physician* is a physician who determines that the decedent is legally dead but was not in charge of the patient's care for the illness or condition that resulted in death. The *attending physician* is usually responsible for completing the cause of death section of the record. The attending physician is usually in a better position than any other individual to make a judgment as to which of the conditions led directly to death and to state the antecedent conditions, if any, that gave rise to this cause.

Examples of Incomplete or Ill-Defined Cause-of-Death Certifications

Example No. 1

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
CARDIORESPIRATORY ARREST	30 MINUTES
Due to (or as a consequence of)	Time Interval
END OF LIFE CARE/COMFORT CARE MEASURES	6 WEEKS
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval

In this example, end of life care/comfort care measures is not a cause of death. What was the cause of the cardiorespiratory arrest? Typically, you need to work backwards from the immediate cause of death to explain the complete picture of what led to the decedent's death.

Example No. 2

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
CARDIAC ARREST SECONDARY TO PULSELESS ELECTRICAL ACTIVITY	MORE THAN 1 DAY
Due to (or as a consequence of)	Time Interval
ACUTE HYPOXIC RESPIRATORY FAILURE REQUIRING MECHANICAL VENTILATION	MORE THAN 1 DAY
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval

In this example, all are ill-defined causes. Ventilation and no pulse are not causes of death

Examples of Incomplete or Ill-Defined Cause-of-Death Certifications (Cont'd)

Example No. 3

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
ADULT FAILURE TO THRIVE	WEEKS
Due to (or as a consequence of)	Time Interval
STAGE IV MALIGNANT MELANOMA	6 WEEKS
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval

In this example, you must state the primary site of the melanoma or cancer, if known. Otherwise state "unknown primary".

Example No. 4

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
DEMENTIA	YEARS
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval

In this example, you must state the type of dementia, if known. (Alzheimer's, Vascular, Multi Infarct, etc.) Otherwise state "Dementia NOS".

Example No. 5

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
FAILURE TO THRIVE	3 WEEKS
Due to (or as a consequence of)	Time Interval
NATURAL CAUSES	2 MONTHS
Due to (or as a consequence of)	Time Interval
OLD AGE	2 YEARS
Due to (or as a consequence of)	Time Interval

In this example, natural causes is a manner of death, not a cause of death. Old age is also not a cause of death. List the diseases and underlying conditions that may have contributed to the death.

Examples of Well-Defined Cause-of-Death Certifications

The following case histories and copies of medical portions of a death record illustrate proper completion of death records and may be of some help.

Case History No. 1

Shortly after dinner on the day prior to admission to the hospital, this 48-year-old male developed a cramping, epigastric pain, which radiated to his back, followed by nausea and vomiting. The pain was not relieved by positional changes or antacids. The pain persisted, and 24 hours after its onset, the patient sought medical attention. He had a 10-year history of excessive alcohol consumption and a two-year history of frequent episodes of similar epigastric pain. The patient denied diarrhea, constipation, hematemesis or melena. The patient was admitted to the hospital with a diagnosis of an acute exacerbation of chronic pancreatitis. Radiological findings included a duodenal ileus and pancreatic calcification. Serum amylase was 4,032 units per liter. The day after admission, the patient seemed to improve. However, that evening he became disoriented, restless and hypotensive. Despite intravenous fluids and vasopressors, the patient remained hypotensive and died. Autopsy findings revealed many areas of fibrosis in the pancreas, with the remaining areas showing multiple foci of acute inflammation and necrosis.

Cause of Death Part I - Chain of Events

Immediate Cause of Death ACUTE EXACERBATION OF CHRONIC PANCREATITIS	Time Interval 3 DAYS
Due to (or as a consequence of) CHRONIC PANCREATITIS	Time Interval 2 YEARS
Due to (or as a consequence of) CHRONIC ALCOHOLISM	Time Interval 10 YEARS
Due to (or as a consequence of) _____	Time Interval _____

Notes on Case #1 death certification:

Duodenal ileus and pancreatic calcification are nonspecific processes, and neither could be listed as an underlying cause of death.

Case History No. 2

A 68-year-old male was admitted to the hospital with progressive right lower quadrant pain of several weeks' duration. The patient had lost about 40 pounds, with progressive weakness and malaise. On physical examination, the patient had an enlarged liver span that was four finger breadths below the right costal margin. Rectal examination was normal, and stool was negative for occult blood. Routine laboratory studies were within normal limits. A chest X-ray and barium enema were negative. His EKG showed a right bundle branch block. A CT scan showed numerous masses within both lobes of the liver. A needle biopsy of the liver was diagnostic of moderately differentiated hepatocellular carcinoma, and the patient was started on chemotherapy. Three months after the diagnosis, the patient developed sharp diminution of liver function, as well as a deep venous thrombosis of his left thigh, and he was admitted to the hospital. On his third day, the patient developed a pulmonary embolism and died 30 minutes later.

Cause of Death Part I - Chain of Events

Immediate Cause of Death PULMONARY EMBOLISM	Time Interval 30 MINUTES
Due to (or as a consequence of) DEEP VENOUS THROMBOSIS IF LEFT THIGH	Time Interval 3 DAYS
Due to (or as a consequence of) ACUTE HEPATIC FAILURE	Time Interval 3 DAYS
Due to (or as a consequence of) MODERATELY DIFFERENTIATED HEPATOCELLULAR CARCINOMA	Time Interval 4 MONTHS

Case History No. 3

This 75-year-old male was admitted to the hospital complaining of severe chest pain. He had a 10-year history of arteriosclerotic heart disease, with EKG findings of myocardial ischemia and several episodes of congestive heart failure controlled by digitalis preparations and diuretics. Five months before his admission, the patient was found to be anemic, with a hematocrit of 17 and to have occult blood in the stool. A barium enema revealed a large polypoid mass in the cecum diagnosed as carcinoma by biopsy.

Because of the patient's cardiac status, he was not considered to be a surgical candidate. Instead, he was treated with a five-week course of radiation therapy and periodic packed red cell transfusions. He completed this course three months before this hospital admission. On this admission, the EKG was diagnostic of an acute anterior wall myocardial infarction. He expired two days later.

Cause of Death Part I - Chain of Events	
Immediate Cause of Death	Time Interval
ACUTE MYOCARDIAL INFARCTION	2 DAYS
Due to (or as a consequence of)	Time Interval
ARTERIOSCLEROTIC HEART DISEASE	10 YEARS
Due to (or as a consequence of)	Time Interval
Due to (or as a consequence of)	Time Interval
Cause of Death Part II	
Other Contributing Factors	
CARCINOMA OF CECUM, CONGESTIVE HEART FAILURE	
Was an autopsy performed *	
No	▼
Did tobacco use contribute to death?	
No	▼
Was deceased diabetic?	
No	▼
Manner of Death *	
Natural	▼
Activity at Time of Death *	
During unspecified activity	▼
Date of Surgery	<input type="button" value="Calendar"/>

Notes on Case #3 death certification:

Acute myocardial infarction, listed in Part I as the immediate cause of death, is a direct consequence of arteriosclerotic heart disease, the underlying cause listed is the Due To on line two..

Carcinoma of cecum is listed in Part II because it caused anemia and weakened the patient, but it did not cause arteriosclerotic heart disease. The congestive heart failure is also listed in Part II because it also weakened the patient. Although it was caused by the arteriosclerotic heart disease, it was not part of the causal sequence leading to the acute myocardial infarction.

Case History No. 4

A 68-year-old female was admitted to the ICU with dyspnea and moderate retrosternal pain of four hours duration, which did not respond to nitroglycerin. There was a past history of obesity, non-insulin-dependent diabetes mellitus, hypertension and episodes of non-exertional chest pain, diagnosed as angina pectoris, for eight years. Over the first 72 hours, she developed a significant elevation of the MB isoenzyme of creatine phosphokinase, confirming an acute myocardial infarction. A Type II second degree AV block developed, and a temporary pacemaker was put in place. She subsequently developed dyspnea with fluid retention and cardiomegaly on chest radiograph. She improved with diuretics. On the seventh hospital day, during ambulation, she suddenly developed chest pain and increased dyspnea. An acute pulmonary embolism was suspected, and intravenous heparin was started. The diagnosis of pulmonary embolism was confirmed by a ventilation/perfusion scan, as well as arterial blood gas measurements. One hour later, she became unresponsive, and resuscitation efforts were unsuccessful.

Cause of Death Part I - Chain of Events

Immediate Cause of Death PULMONARY EMBOLISM	Time Interval 1 HOUR
Due to (or as a consequence of) ACUTE MYOCARDIAL INFARCTION	Time Interval 7 DAYS
Due to (or as a consequence of) CHRONIC ISCHEMIC HEART DISEASE	Time Interval 8 YEARS
Due to (or as a consequence of)	Time Interval

Cause of Death Part II

Other Contributing Factors NON-INSULIN DEPENDENT DIABETES MELLITUS, OBESITY, HYPERTENSION, CONGESTIVE HEART FAILURE
Was an autopsy performed * No
Did tobacco use contribute to death? Yes
Was deceased diabetic? Yes
Manner of Death * Natural
Activity at Time of Death * During unspecified activity
Date of Surgery [calendar icon]

Notes on Case #4 death certification:

In this case, non-insulin-dependent diabetes mellitus, obesity, hypertension, and congestive heart failure would all be considered factors that contributed to death. However, they would not be in the direct causal sequence of Part I, so they would be placed in Part II.

Case History No. 5

A 78-year-old female with a temperature of 102.6° F was admitted to the hospital from a nursing home. She first became a resident of the nursing home two years earlier following a cerebrovascular accident that left her with a residual left hemiparesis. Over the next year, she became increasingly dependent on others to help with her activities of daily living, eventually requiring an in-dwelling bladder catheter six months before the current admission. For the three days prior to admission, she was noted to have lost her appetite and to have become increasingly withdrawn.

On admission to the hospital, her leukocyte count was 19,700, she had pyuria, and gram-negative rods were seen on a gram stain of urine. Ampicillin and gentamicin were administered intravenously. On the third hospital day, admission blood cultures turned positive for *Pseudomonas aeruginosa*, which was resistant to ampicillin and gentamicin. Antibiotic therapy was changed to ticarcillin clavulanate, to which the organism was sensitive. Despite the antibiotics and intravenous fluid support, the patient's fever persisted. On the fourth hospital day, she became hypotensive and died.

This case illustrates that additional lines may be added to Part I.

Cause of Death Part I - Chain of Events	
Immediate Cause of Death PSEUDOMONAS AERUGINOSA SEPSIS	Time Interval 1 DAY
Due to (or as a consequence of) PSEUDOMONAS AERUGINOSA URINARY TRACT INFECTION	Time Interval 4 DAYS
Due to (or as a consequence of) IN-DWELLING BLADDER CATHETER	Time Interval 6 MONTHS
Due to (or as a consequence of) LEFT HEMIPARESIS DUE TO OLD CEREBROVASCULAR ACCIDENT	Time Interval 2 YEARS / 2 YEARS

Case History No. 6

A 34-year-old male was admitted to the hospital with severe shortness of breath. He had a nine-month history of unintentional weight loss, night sweats and diarrhea. The patient had no history of any medical condition that would cause immunodeficiency. An Elisa test and confirmatory Western Blot test for human immunodeficiency virus (HIV) were positive. T-lymphocyte tests indicated a low T helper-suppressor ratio. A lung biopsy was positive for pneumocystis carinii pneumonia (PCP), indicating a diagnosis of acquired immunodeficiency syndrome (AIDS).

The patient's pneumonia responded to pentamidine therapy, and the patient was discharged. The patient had two additional admissions for PCP. Seventeen months after the patient was first discovered to be HIV positive, he again developed PCP but did not respond to therapy. He died two weeks later.

Cause of Death Part I - Chain of Events

Immediate Cause of Death	Time Interval
PNEUMOCYSTIS CARINII PNEUMONIA	2 WEEKS
Due to (or as a consequence of)	Time Interval
ACQUIRED IMMUNODEFICIENCY SYNDROME	17 MONTHS
Due to (or as a consequence of)	Time Interval
HIV INFECTION	17 MONTHS
Due to (or as a consequence of)	Time Interval

Notes on Case #6 death certification:

By definition, AIDS is due to HIV infection; even though it may seem redundant to specify HIV infection in the causal sequence, it is desirable to do so. HIV infection and AIDS are not synonymous, and there is a variable clinical course between the time of HIV infection and onset of AIDS.

Case History No. 7

A 75-year-old male had a 10-year history of chronic bronchitis associated with smoking two packs of cigarettes a day for more than 40 years. When seen by his physician about two years prior to his terminal episode, he had a moderately reduced FEV₁ and FVC with no response to bronchodilators. During his last year, he required corticosteroids to prevent wheezing and coughing at night; however, he was unable to reduce his smoking to less than one pack of cigarettes per day. When seen three months prior to his terminal episode, he had significantly reduced FEV₁ and FVC with no response to bronchodilators. He awoke one evening complaining to his wife about coughing and worsening shortness of breath. He was taken to the emergency room, where he was found to have an acute exacerbation of obstructive airway disease. He was admitted to the hospital. At the patient's request, no mechanical ventilation was employed, and he died 12 hours later in respiratory arrest.

Cause of Death Part I - Chain of Events

Immediate Cause of Death ACUTE EXACERBATION OF OBSTRUCTIVE AIRWAY DISEASE	Time Interval 12 HOURS
Due to (or as a consequence of) CHRONIC BRONCHITIS	Time Interval 10 YEARS
Due to (or as a consequence of) _____	Time Interval _____
Due to (or as a consequence of) _____	Time Interval _____

Cause of Death Part II

Other Contributing Factors CIGARETTE SMOKING
Was an autopsy performed * No
Did tobacco use contribute to death? Yes
Was deceased diabetic? No
Manner of Death * Natural
Activity at Time of Death * While resting, sleeping, eating, or engaging in other vitaMac
Date of Surgery _____

Notes on Case #7 death certification:

In this case, respiratory arrest is considered a mechanism of death, and it would not be listed as the immediate cause of death.

Case History No. 8

A 75-year-old female had a 15-year history of non-insulin-dependent diabetes mellitus, a 13-year history of mild hypertension treated with thiazide diuretics and an uncomplicated myocardial infarction six years prior to the present illness. She was found disoriented in her apartment and brought to the hospital. On admission, she was noted to be unresponsive, without focal neurologic signs, and severely dehydrated with a blood pressure of 90/60. Initial laboratory tests disclosed severe hyperglycemia, hyperosmolarity, azotemia, and mild ketosis with acidosis. A diagnosis of hyperosmolar nonketotic coma was made.

The patient was vigorously treated with fluids, electrolytes, insulin and broad-spectrum antibiotics, although no source for infection was documented. Within 72 hours, the patient's hyperosmolar, hyperglycemic state was resolved. However, she remained anuric with progressive azotemia. Attempts at renal dialysis were unsuccessful, and the patient died on the eighth hospital day in severe renal failure.

Cause of Death Part I - Chain of Events

Immediate Cause of Death	Time Interval
ACUTE RENAL FAILURE	5 DAYS
Due to (or as a consequence of)	Time Interval
HYPEROSMOLAR NONKETOTIC COMA	8 DAYS
Due to (or as a consequence of)	Time Interval
DIABETES MELLITUS, NON-INSULIN DEPENDENT	15 YEARS
Due to (or as a consequence of)	Time Interval

Cause of Death Part II

Other Contributing Factors
HYPERTENSION, PREVIOUS MYOCARDIAL INFARCTION
Was an autopsy performed *
No
Did tobacco use contribute to death?
No
Was deceased diabetic?
Yes
Manner of Death *
Natural
Activity at Time of Death *
While resting, sleeping, eating, or engaging in other vitaMac
Date of Surgery
<input type="button" value="Calendar"/>

Notes on Case #8 death certification:

In this case, hypertension and a previous myocardial infarction would both be considered factors that contributed to the death. However, they would not be in the direct causal sequence of Part I, so they would be placed in Part II.

Case History No. 9

This 53-year-old male was admitted to the hospital following two days of intermittent midepigastric and left-sided chest pain. The pain radiated to his left arm and was accompanied by nausea and vomiting. He gave a history that included two years of occasional chest discomfort, a near syncopal episode six months prior, hypertension, a 30-year history of one pack per day cigarette smoking, congenital blindness and insulin-dependent diabetes mellitus. He was noted to be markedly obese and to have severe hypercholesterolemia.

At the time of admission, his enzyme studies were normal, but the EKG suggested myocardial ischemia. Two days later, he experienced an episode of severe chest pain that did not respond to nitroglycerin and was accompanied by ST-segment elevation. A cardiac catheterization demonstrated severe multivessel coronary artery stenosis. He underwent quadruple coronary artery bypass surgery. Shortly after being taken off the cardiopulmonary bypass machine, he went into cardiac arrest. As resuscitation was being attempted by open cardiac massage, a rupture developed in his left ventricular wall that resulted in rapid exsanguination and death.

Cause of Death Part I - Chain of Events

Immediate Cause of Death RUPTURE OF LEFT VENTRICLE	Time Interval MINUTES
Due to (or as a consequence of) MYOCARDIAL INFARCTION	Time Interval 2 DAYS
Due to (or as a consequence of) CORONARY ARTERIOSCLEROSIS	Time Interval 2 YEARS
Due to (or as a consequence of)	Time Interval

Cause of Death Part II

Other Contributing Factors HYPERTENSION, CORONARY BYPASS SURGERY, DIABETES MELLITUS, HYPERCHOLESTEROLEMIA
Was an autopsy performed * Yes
Are autopsy findings available? Yes
Did tobacco use contribute to death? Yes
Was deceased diabetic? Yes
Manner of Death * Natural
Activity at Time of Death * While resting, sleeping, eating, or engaging in other vitaMac
Date of Surgery 07/28/2002

Notes on Case #9 death certification:

In this case, insulin-dependent diabetes mellitus, cigarette smoking, hypertension and hypercholesterolemia would all be considered factors that contributed to the death. However, they would not be in the direct causal sequence of Part I, so they would be placed in Part II. The surgery probably played a role in death but did not cause the coronary artery disease, so it is also listed in Part II.

Case History No. 10

A 30-year-old mother, with a history of gestational hypertension, reported to the emergency room at 36-weeks gestation with complaints of abdominal cramping and light vaginal bleeding during the past 12 hours. At time of first assessment, fetal heart tones were detected. The uterus was tense, irritable and tender. The mother was hypotensive with tachycardia. A presumptive diagnosis of abruption placenta was made, and an emergency cesarean section was performed under general anesthesia. The baby was a fetal death (stillborn). The mother continued to bleed from her uterus and phlebotomy sites and went into profound shock secondary to disseminated intravascular coagulation. Despite administration of blood and clotting factors, intravascular pressure could not be maintained, and the mother died on the operating table. Maternal autopsy confirmed the clinic diagnosis.

A death record would be completed for the mother, and a fetal death record must be completed for the baby. The fetal death record must be completed if the mother's gestation is 20 weeks or higher.

Cause of Death Part I - Chain of Events

Immediate Cause of Death HEMORRHAGIC SHOCK	Time Interval MINUTES
Due to (or as a consequence of) DISSEMINATED INTRAVASCULAR COAGULOPATHY	Time Interval HOUR
Due to (or as a consequence of) ABRUPTIO PLACENTA	Time Interval 13 HOURS
Due to (or as a consequence of)	Time Interval

Cause of Death Part II

Other Contributing Factors GESTATIONAL HYPERTENSION, 36 WEEKS INTO PREGNANCY
Was an autopsy performed * Yes
Are autopsy findings available? Yes
Did tobacco use contribute to death? No
Was deceased diabetic? No
Manner of Death * Natural
Activity at Time of Death * While engaging in other specified activities
Other Activity at Time of Death * ATTEMPTING TO DELIVER A BABY
Date of Surgery <input type="button" value="Calendar"/>

Notes on Case #10 death certification:

In this case, gestational hypertension would be considered a factor that contributed to the death. However, it would not be in the direct causal sequence of Part I, so it would be placed in Part II. A fetal death record should be started by the hospital where the delivery occurred.

Common Problems in Death Certification

There are often several acceptable ways of writing a cause-of-death statement. Optimally, a certifier will be able to provide a simple description of the process leading to death that is etiologically clear and be confident that this is the correct sequence of cause. Realistically, however, description of the process is sometimes difficult because the certifier is **not certain**.

In this case, the certifier should think through the causes about which he or she is confident and what possible etiologies could have resulted in these conditions. The certifier should select the causes that are suspected to have been involved and use words such as "probable" or "presumed" to indicate that the description provided is not completely certain. If the initiating condition reported on the death record could have arisen from a pre-existing condition but the certifier cannot determine the etiology, he or she should state that the etiology is unknown, undetermined or unspecified, so it is clear that the certifier did not have enough information to provide even a qualified etiology. **Reporting a cause of death as unknown should be a last resort.**

The **elderly decedent** should have a clear and distinct etiological sequence for cause of death, if possible. Terms such as senescence, infirmity, old age and advanced age have little value for public health or medical research. Age is recorded elsewhere on the record. When a number of conditions resulted in death, the physician should choose the single sequence that, in his or her opinion, best describes the process leading to death. Other pertinent conditions should be placed in Part II. "Multiple system failure" or "Multi organ failure" could be included in Part II, but the systems need to be specified to ensure that the information is captured. If, after careful consideration, the physician cannot determine a sequence that ends in death, the medical examiner or coroner should be consulted about conducting an investigation or providing assistance in completing the cause of death.

The **infant decedent** should have a clear and distinct etiological sequence for cause of death, if possible. "Prematurity" should not be entered without explaining the etiology of prematurity. Maternal conditions may have initiated or affected the sequence that resulted in infant death, and such maternal causes should be reported in addition to the infant causes on the infant's death record (e.g., hyaline membrane disease **due to** prematurity, 28 weeks **due to** placental abruption **due to** blunt trauma to mother's abdomen).

When **sudden infant death syndrome** (SIDS) is suspected, a complete investigation should be conducted, typically by a medical examiner or coroner. If the infant is younger than 1 year of age, the cause of death is determined after scene investigation, review of clinical history, and a complete autopsy. The death **may** then be reported as SIDS; however, what may seem to be a death attributable to SIDS also can be due to disease or injury, which will change the cause of death.

At some point, most certifiers will find themselves in a circumstance in which they are unable to provide a simple description of the process of death. In this situation, the certifier should try to provide a clear sequence, qualify the causes about which he or she is uncertain, and be able to explain the certification chosen.

When processes such as the following are reported, additional information about the etiology should be reported:

Abscess	Congestive heart failure	Multiorgan failure
Abdominal hemorrhage	Convulsions	Multisystem organ failure
Adhesions	Decubiti	
Adult respiratory distress syndrome	Dehydration	Myocardial infarction
Acute myocardial infarction	Dementia (when not otherwise specified)	Necrotizing soft tissue infection
	Diarrhea	Old age
Altered mental state	Disseminated intra vascular coagulopathy	Open (or closed) head injury
Anemia	Dysrhythmia	Pancytopenia
Anoxia; anoxic encephalopathy	End stage liver disease	Paralysis
Arrhythmia	End stage renal disease	Perforated gallbladder
Ascites	Epidural hematoma	Peritonitis
Aspiration	Exsanguination	Pleural effusions
Atrial fibrillation	Failure to thrive	Pneumonia
Bacteremia	Fracture	Pulmonary arrest
Bedridden	Gangrene	Pulmonary edema
Biliary obstruction	Gastrointestinal hemorrhage	Pulmonary embolism
Bowel obstruction		Pulmonary insufficiency
Brain injury	Head injury	Renal failure
Brain stem herniation	Heart failure	Respiratory arrest
Bronchopneumonia	Hemothorax	Seizures
Carcinogenesis	Hepatic failure	Sepsis
Carcinomatosis	Hepatitis	Septic shock
Cardiac arrest	Hepatorenal syndrome	Shock
Cardiac dysrhythmia	Hyperglycemia	Starvation
Cardiomyopathy	Hyperkalemia	Subdural hematoma
Cardiopulmonary arrest	Hypovolemic shock	Subarachnoid hemorrhage
Cellulitis	Hyponatremia	
Cerebral edema	Hypotension	Sudden death
Cerebrovascular accident	Immunosuppression	Thrombocytopenia
	Increased intracranial pressure	Uncal herniation
Cerebellar tonsillar herniation	Intracranial hemorrhage	Urinary tract infection
Chronic bedridden state	Malnutrition	Ventricular fibrillation
Cirrhosis	Metabolic encephalopathy	Ventricular tachycardia
Coagulopathy		Volume depletion
Compression fracture		

If the certifier is unable to determine the etiology of a process such as those shown above, the process must be qualified as being of an unknown, undetermined, probable, presumed, or unspecified etiology so it is clear that a distinct etiology was not inadvertently or carelessly omitted.

The following conditions and types of death might seem to be specific or natural. However, when the medical history is examined further, it may be found to be complications of an injury or poisoning (possibly occurring long ago). Such cases should be reported to the medical examiner or coroner.

Asphyxia	Fall	Seizure disorder
Bolus	Fracture	Sepsis
Choking	Hip fracture	Subarachnoid hemorrhage
Drug or alcohol overdose or alcohol abuse	Hyperthermia	Subdural hematoma
	Hypothermia	Surgery
Epidural hematoma	Open reduction of fracture	Thermal burns or chemical burns
Exsanguination	Pulmonary embolism	

Completing Other Items on a Death Certificate

Date and Time of Death Pronounced

This is used to identify the date the decedent was legally pronounced dead. This information is helpful in cases where the body of a person who has been dead for some time is found, and the death is pronounced by the medical examiner or coroner.

Enter the exact two-digit month, two-digit day, and four-digit year that the decedent was pronounced dead.

Enter the time as the current military time (24-hour clock). A death that occurred at 0000 or midnight belongs to the state of a new day. One minute after midnight is entered as 0001 of the next day. If the exact time of death is unknown, the person pronouncing death should approximate the time.

This pronounced information is to be completed even when the information is the same for the actual or presumed date and time of death.

Pronouncing Physician

A pronouncing physician is the person who determines that the decedent is legally dead, but they are not the person in charge of the patient's care for the illness or condition that resulted in death. This physician certifies to the fact and time of death so the body can be released to the funeral practitioner when the attending physician is not available.

Actual or Presumed Date and Time of Death

Enter the exact two-digit month, two-digit day, and four-digit year that the death occurred.

Enter the time as the current military time (24-hour clock). A death that occurred at 0000 or midnight belongs to the state of a new day. One minute after midnight is entered as 0001 of the next day. If the exact time of death is unknown, the person who certifies the death should approximate the time.

Attending Physician - Certifier

The certifier is the physician who determines cause, manner and actual date and time of death of the decedent. If the attending physician is available to complete these items, the pronouncing physician and pronounced date and time should not be completed.

Manner of Death

There are six choices for manner of death that can be selected by the certifying physician. These selections are:

- 1) Natural
- 2) Accident
- 3) Suicide
- 4) Homicide
- 5) Pending Investigation
- 6) Could Not Be Determined

If the physician is not a coroner or a medical examiner, the only available manner of death will be **Natural**. These are typically deaths not due to external causes, like falls, accidents, or injuries.

All other manners of death must either be assigned to a county coroner or the state medical examiner's office. The medical examiner or coroner will certify deaths due to external causes, including those due to **Accident, Homicide, or Suicide**.

Pending Investigation should be selected when the manner of death cannot be determined to be accident, homicide, or suicide within the statutory ten (10) day time limit for submitting the cause of death. Pending Investigation can be changed by submitting a Supplemental Cause of Death once the laboratory results or anything other testing or evidence becomes available to determine the actual manner of death.

Could Not Be Determined should **ONLY** selected when it is impossible to determine the manner of death.

Accidents or Injuries

The accident and injury items must be completed where injury or poisoning caused or contributed to the death. **All deaths resulting from injury or poisoning must be reported to the medical examiner or county coroner, who must certify the cause of death.**

Date and Time of Injury

Enter the exact two-digit month, two-digit day, and four-digit year that the injury occurred.

Enter the time as the current military time (24-hour clock). An injury that occurred at 0000 or midnight belongs to the state of a new day. One minute after midnight is entered as 0001 of the next day. If the exact time of injury is unknown, the person who certifies the death should approximate the time of injury.

Place of Injury

Enter the general type of place (I.E. a restaurant, a vacant lot, a baseball field, a construction site, an office building, or decedent's home) where the injury occurred. DO NOT enter the firm or organization names, for example "restaurant," not "McDonald's".

Injury at Work

Complete this item if anything other than natural disease is mentioned in Part I or Part II of the medical certification, including homicides, suicides, and accidents, or if anything other than "Natural" is selected for manner of death.

This includes all motor vehicle deaths. The item must be completed for decedents aged 14 years and over and may be completed for those under age 14 years, if warranted. Select "Yes" if the injury occurred at work. Otherwise, select "No." An injury may occur at work regardless of whether the injury occurred in the course of the decedent's "usual" occupation.

Examples of injury at work:

- Injury while working or in vocational training on job premises.
- Injury while on break or at lunch or in parking lot on job premises.
- Injury while working for pay or compensation, including at home.
- Injury while working as a volunteer law enforcement official or firefighter.
- Injury while traveling on business, including to or from business contacts.

Examples of injury not at work:

- Injury while engaged in personal recreational activity on job premises
- Injury while a visitor (not on official work business) to job premises
- Homemaker working at homemaking activities
- Student in school
- Working for self for no profit (mowing yard, repairing own roof, hobby)
- Commuting to or from work

Location of Injury

Enter the complete address where the injury took place, including the ZIP code. Complete as many of the items as known.

Describe How Injury Occurred

Enter, in narrative form, a brief but specific and clear description of how the injury occurred. Explain the circumstances or cause of the injury, such as "fell off ladder while painting house," "driver of car ran off roadway," or "passenger in car in car–truck collision."

Specify type of gun (handgun, hunting rifle) or type of vehicle (car, bulldozer, train) when relevant to the circumstances. Indicate if more than one vehicle was involved and, if so, the type of vehicle the decedent was in. For motor vehicle accidents, indicate whether the decedent was a driver, passenger, or pedestrian.

If known, indicate what activity the decedent was engaged in when the injury occurred (playing a sport, working for income, hanging out at a bar).

If Transportation Injury, Specify

Specify the role of the decedent (for example, driver, passenger) in the transportation accident. "Driver/Operator" and "Passenger" should also be designated for modes other than motor vehicles, including bicycles. "Other" applies to people using other modes of transportation, such as watercraft, aircraft, or animal, and people who are on the outside of vehicles (for example, surfers), but are not passengers or drivers.