HOW BEST TO CERTIFY DEATHS DUE TO SUBSTANCE USE

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Deputy State Chief Medical Examiner
https://www.tn.gov/health/section/OSCME
Purpose of Death Certificate: Not Simply to Confirm Death

- The entries for cause of death, manner of death, how injury occurred, and location of injury are analyzed and assigned ICD-10 code(s)
- These codes are the source of mortality data on local, regional, state, and federal levels and are crucial in surveillance; data are used to assign grant funds, direct prevention efforts, and identify emerging threats
Accuracy and Timeliness in Death Certification

• The death certificate must be completed before final disposition of the body; delay in completing and signing may interfere with funeral arrangements
• Significant implications in death benefits paid to families (for example, workers’ compensation claims; double indemnity payments in cases of accidental death)
• The death certificate is the source of information for regional, state, and national mortality data, which in turn is used for funding and directing research and public health efforts
### 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. Enter only one cause on a line.

<table>
<thead>
<tr>
<th>IMMEDIATE CAUSE</th>
<th>Approximate interval. Onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Final disease or condition resulting in death)</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Due to (or as a consequence of)</td>
</tr>
<tr>
<td>b.</td>
<td>Due to (or as a consequence of):</td>
</tr>
<tr>
<td>c.</td>
<td>Due to (or as a consequence of):</td>
</tr>
<tr>
<td>d.</td>
<td>Due to (or as a consequence of):</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>MANNER OF DEATH</th>
<th>WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>Yes No</td>
</tr>
<tr>
<td>Homicide</td>
<td>Yes No</td>
</tr>
<tr>
<td>Accident</td>
<td>Yes No</td>
</tr>
<tr>
<td>Pending Investigation</td>
<td>Yes No</td>
</tr>
<tr>
<td>Suicide</td>
<td>Yes No</td>
</tr>
<tr>
<td>Could not be determined</td>
<td>Yes No</td>
</tr>
</tbody>
</table>

31. DID TOBACCO USE CONTRIBUTE TO DEATH?
- Yes
- Probably
- No
- Unknown

32. IF FEMALE:
- Not pregnant within past year
- Pregnant at time of death
- Not pregnant, but pregnant within 42 days of death
- Unknown if pregnant within the past year

33. IF TRANSPORTATION INJURY, SPECIFY:
- Driver/Operator
- Passenger
- Pedestrian
- Other (Specify)

34. DATE OF INJURY (Month, Day, Year)
34a. TIME OF INJURY
34b. INJURY AT WORK? Yes No
34c. PLACE OF INJURY —at home, farm, street, factory, office, building, etc. (Specify)
34d. LOCATION OF INJURY (Street and Number, City or Town, State)
34e. DESCRIBE HOW INJURY OCCURRED
Overdose vs MVA Deaths: US, 2000-2014

Data: CDC
Interpretation of Postmortem Toxicology Can Be Challenging

• Tolerance
  ▫ With prolonged, sustained use comes tolerance
  ▫ Frequently death after hospitalization or incarceration is related to previously tolerant individual using same dose as prior to drug withdrawal

• Drug-drug interactions/synergy
• Postmortem redistribution
• Specimen type/site
Toxicology Testing/Ancillary Studies

• If case not referred to regional forensic center:
• Best specimen for postmortem toxicology testing is blood from femoral artery or vein
  ▫ Subclavian blood may also be used but runs the risk of contamination with heart blood or pleural fluid
  ▫ Many drugs undergo postmortem redistribution, which can falsely elevate levels if blood drawn from heart:
    – Diffuse from areas of high concentration (e.g., liver, stomach) to central vessels and heart
Drugs Implicated in Lethal Overdoses

- Top ten drugs, in order of frequency, involved in lethal overdoses, United States, 2014:
  - heroin
  - cocaine
  - oxycodone
  - alprazolam
  - fentanyl
  - morphine
  - methamphetamine
  - methadone
  - hydrocodone
  - diazepam

- Top drug classifications involved in lethal overdoses, Tennessee, 2013-2016:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All Drug</td>
<td>1,166</td>
<td>1,263</td>
<td>1,451</td>
<td>1,631</td>
</tr>
<tr>
<td>Opioid</td>
<td>754</td>
<td>861</td>
<td>1,034</td>
<td>1,186</td>
</tr>
<tr>
<td>Prescription Opioids (Natural, semi-synthetic and synthetic)</td>
<td>637</td>
<td>697</td>
<td>848</td>
<td>1,009</td>
</tr>
<tr>
<td>Pain Relievers (per CDC Definition, includes methadone)</td>
<td>578</td>
<td>603</td>
<td>689</td>
<td>739</td>
</tr>
<tr>
<td>Heroin</td>
<td>63</td>
<td>147</td>
<td>205</td>
<td>260</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>53</td>
<td>69</td>
<td>169</td>
<td>294</td>
</tr>
<tr>
<td>Methadone</td>
<td>86</td>
<td>71</td>
<td>67</td>
<td>82</td>
</tr>
<tr>
<td>Benzodiazepine</td>
<td>371</td>
<td>388</td>
<td>492</td>
<td>573</td>
</tr>
<tr>
<td>Opioid and Benzodiazepine</td>
<td>340</td>
<td>352</td>
<td>447</td>
<td>522</td>
</tr>
</tbody>
</table>
Polypharmacy Involved in Roughly Half of All Drug Overdose Deaths

- All drugs which contributed to death should be listed on death certificate for accuracy in coding and monitoring trends in drug use and abuse.
List All Drugs Contributing to Death: Examples

**IMMEDIATE CAUSE**
(Immediate cause of death)

a. **ACUTE COMBINED DRUG INTOXICATION (HEROIN, DIAZEPAM)**

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

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

d. __________________________ Due to (or as a consequence of):

**IMMEDIATE CAUSE**
(Immediate cause of death)

a. **MULTIDRUG TOXICITY (TRAMADOL, COCAINE, GABAPENTIN)**

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

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

d. __________________________ Due to (or as a consequence of):
“Presumed” or “Probable”

- It is acceptable to use “presumed” or “probable” based on history, scene findings, urine drug screen, etc. when more definitive evidence is lacking and cannot be obtained:

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28 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. Enter only one cause on a line.

IMMEDIATE CAUSE
(Final disease or condition resulting in death)
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

a. PRESUMED COCAINE INTOXICATION

  Due to (or as a consequence of):

b. 

  Due to (or as a consequence of):

c. 

  Due to (or as a consequence of):

d. 

  Due to (or as a consequence of):
```
Manner of Death: General Principles

- The most appropriate manner of death for drug overdose deaths is usually “Accident”; deaths due to acute drug intoxications are never “Natural”
Manner of Death: Drug-Related Deaths

• The majority of drug overdose deaths are best classified as “Accident”, as the fatal outcome is unintentional
  ▫ If the lethal drug was administered by another with the consent of the deceased, a classification of “Accident” should not preclude prosecution
  ▫ If the lethal drug was administered by another with the intent to cause harm to the decedent, the manner of death is best listed as “Homicide”
• These principles apply to an acute overdose of a given substance, not to an adverse effect of medication or to diseases caused by chronic, long-term use
Manner of Death: Accident

<table>
<thead>
<tr>
<th>PART I.</th>
<th>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. Enter only one cause on a line.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMMEDIATE CAUSE (Final disease or condition resulting in death)</td>
<td>Acute combined drug toxicity (oxycodone, butalbital, chlordiazepoxide)</td>
</tr>
<tr>
<td>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</td>
<td>Due to (or as a consequence of):</td>
</tr>
<tr>
<td>Approximate interval: Onset to death</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART II.</th>
<th>Other significant conditions contributing to death but not resulting in the underlying cause given in PART I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>29a. WAS AN AUTOPSY PERFORMED?</td>
<td>Yes</td>
</tr>
<tr>
<td>29b. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>30. MANNER OF DEATH</th>
<th>Natural</th>
<th>Homicide</th>
<th>Accident</th>
<th>Pending Investigation</th>
<th>Suicide</th>
<th>Could not be determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. DID TOBACCO USE CONTRIBUTE TO DEATH?</td>
<td>Yes</td>
<td>Probably</td>
<td>No</td>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. IF FEMALE:</td>
<td>Not pregnant within past year</td>
<td>Pregnant at time of death</td>
<td>Not pregnant, but pregnant within 42 days of death</td>
<td>Unknown if pregnant within the past year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>33. IF TRANSPORTATION INJURY, SPECIFY:</th>
<th>Driver/Operator</th>
<th>Passenger</th>
<th>Pedestrian</th>
<th>Other (Specify)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>34a. DATE OF INJURY</th>
<th>(Month, Day, Year)</th>
<th>April 3, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>34b. TIME OF INJURY</td>
<td>(Hour, Minute)</td>
<td>7:45 am</td>
</tr>
<tr>
<td>34c. INJURY AT WORK?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>34d. PLACE OF INJURY</th>
<th>(Specify)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>34f. LOCATION OF INJURY</th>
<th>(Street and Number, City or Town, State)</th>
</tr>
</thead>
</table>

123 River Road, Decatur, TN
Manner of Death: Suicide

• Classifying a death as “Suicide” requires a burden of proof greater than “more likely than not”; overdose deaths categorized as suicides should have a history of suicidal threats or ideation, or evidence of intent to cause self-harm, such as a suicide note found at the scene.
Manner of Death: Natural

Drug-related deaths should only be classified as “Natural” if they:

- Are the result of long-term use, abuse, or dependence, and no single incident can be identified as leading directly to death; OR
  - Example: cocaine-related cardiomyopathy; endocarditis due to intravenous drug abuse
- Are a known adverse effect of a drug being administered for a natural process; AND
  - Examples: amiodarone-induced pulmonary toxicity; Stevens-Johnson syndrome related to sulfonamide administration
- Toxicology testing does not show levels of drugs or alcohol sufficient to account for death
## Manner of Death: Natural

### 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. Enter only one cause on a line.

**IMMEDIATE CAUSE**
- **CIRRHOSIS**
  - Due to (or as a consequence of)

**UNDERLYING CAUSE**
- **CHRONIC ETHANOLISM**
  - Due to (or as a consequence of)

**PART II**

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

<table>
<thead>
<tr>
<th>30. MANNER OF DEATH</th>
<th>31. DID TOBACCO USE CONTRIBUTE TO DEATH?</th>
<th>32. IF FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>Yes □   Probably □   No □   Unknown □</td>
<td>Not pregnant within past year □</td>
</tr>
<tr>
<td>Homicide</td>
<td></td>
<td>Pregnant at time of death □</td>
</tr>
<tr>
<td>Accident</td>
<td></td>
<td>Not pregnant, but pregnant within 42 days of death □</td>
</tr>
<tr>
<td>Pending Investigation</td>
<td></td>
<td>Not pregnant, but pregnant 43 days to 1 year before death □</td>
</tr>
<tr>
<td>Suicide</td>
<td></td>
<td>Unknown if pregnant within the past year □</td>
</tr>
<tr>
<td>Could not be determined</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DATE OF INJURY**
- (Month, Day, Year)

**TIME OF INJURY**
- (Specify)

**INJURY AT WORK?**
- Yes □   No □

**PLACE OF INJURY**
- at home, farm, street, factory, office, building, etc. (Specify)

**LOCATION OF INJURY**
- (Street and Number, City or Town, State)
How Injury Occurred: Examples

• If the route of administration is known, include this information on the death certificate:
  ▫ Inhaled cocaine
  ▫ Injected fentanyl
  ▫ Took morphine pills
  ▫ Inhaled crushed oxycodone tablets

• If the route of administration is not clear, broader language should be used:
  ▫ Used heroin
  ▫ Oxymorphone toxicity
  ▫ Diazepam and tramadol overdose
How Injury Occurred

- “Use”, “abuse”, and “dependence” will be coded differently

34e. DESCRIBE HOW INJURY OCCURRED
Used cocaine

34e. DESCRIBE HOW INJURY OCCURRED
Acute and chronic heroin abuse

34e. DESCRIBE HOW INJURY OCCURRED
Benzodiazepine dependence
ICD-10 Code will Incorporate Specific Drugs and Intent

28 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. Enter only one cause on a line.

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

a. Acute combined drug toxicity (oxycodone, oxymorphone, temazepam)  
   Due to (or as a consequence of):
   
   b.  
   Due to (or as a consequence of):
   
   c.  
   Due to (or as a consequence of):
   
   d.  

Approximate interval: Onset to death

29a WAS AN AUTOPSY PERFORMED?  
 méthène  

29b WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?  

30. MANNER OF DEATH  
   □ Natural  
   □ Homicide  
   □ Accident  
   □ Pending Investigation  
   □ Suicide  
   □ Could not be determined

31. DID TOBACCO USE CONTRIBUTE TO DEATH?  
   □ Yes  
   □ No  
   □ Probably  
   □ Unknown

32. 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

33. IF TRANSPORTATION INJURY, SPECIFY:  
   □ Driver/Operator  
   □ Passenger  
   □ Bicyclist  
   □ Pedestrian  
   □ Other (Specify)

34a. DATE OF INJURY  
   (Month, Day, Year)  
   December 4, 2018

34b. TIME OF INJURY  
   4:58 pm

34c. INJURY AT WORK?  
   □ Yes  
   □ No

34d. PLACE OF INJURY  
   (Specify)  
   Farm

34e. DESCRIBE HOW INJURY OCCURRED  
   Crushed and inhaled pills

34f. LOCATION OF INJURY  
   (Street and Number, City or Town, State)  
   123 Maple Street, Union City, TN
Scenario 1

- 35 year old found dead at home
- Multiple pill and whisky bottles present
- Toxicology testing:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Result</th>
<th>Units</th>
<th>Matrix Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>56</td>
<td>mg/dL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Blood Alcohol Concentration (BAC)</td>
<td>0.056</td>
<td>g/100 mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Diazepam</td>
<td>60</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Nordiazepam</td>
<td>150</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Oxycodone - Free</td>
<td>340</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Oxymorphone - Free</td>
<td>28</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
</tbody>
</table>

- What is cause of death? What is the manner of death? How did the injury occur?
# Scenario 1: Death Certificate

## PART I
28. **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. Enter only one cause on a line.

**IMMEDIATE CAUSE**
(Initial disease or condition leading to the death)
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

| a. Acute intoxication (ethanol, diazepam, oxycodone, oxymorphone) |
| --- | --- |
| Due to (or as a consequence of): |
| b. |
| c. |
| d. |

---

29a. WAS AN AUTOPSY PERFORMED? [X] Yes [ ] No
29b. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? [X] Yes [ ] No

## PART II
30. **MANNER OF DEATH**

- Natural
- Homicide
- Accident
- Pending Investigation
- Suicide
- Could not be determined

31. **DID TOBACCO USE CONTRIBUTE TO DEATH?**

- [ ] Yes
- [X] No
- [ ] Probably

32. **IF FEMALE:**

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

33. **IF TRANSPORTATION INJURY, SPECIFY:**

- [ ] Driver/Operator
- Passenger
- Pedestrian
- Other (Specify)

34a. **DATE OF INJURY** (Month, Day, Year)

- November 5, 2018

34b. **TIME OF INJURY**

- 9:21 am

34c. **INJURY AT WORK?**

- [ ] Yes [X] No

34d. **PLACE OF INJURY**

- Residence

34e. **DESCRIPTION OF INJURY OCCURRED**

- Took pills and drank alcohol

34f. **LOCATION OF INJURY** (Street and Number, City or Town, State)

- 123 Elm Street, Celina, TN
Scenario 2

- 29 year old with history of polysubstance abuse found dead at home with a needle and syringe and burnt spoon nearby
- Initial toxicology:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Result</th>
<th>Units</th>
<th>Matrix Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine - Free</td>
<td>10</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Morphine - Free</td>
<td>170</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
</tbody>
</table>
Scenario 2, continued

- Additional toxicology testing performed on vitreous humor

<table>
<thead>
<tr>
<th>Compound</th>
<th>Result</th>
<th>Units</th>
<th>Matrix Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine - Free</td>
<td>10</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Morphine - Free</td>
<td>170</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>6-MAM - Free</td>
<td>15</td>
<td>ng/mL</td>
<td>Vitreous Fluid</td>
</tr>
</tbody>
</table>

- Heroin is rapidly metabolized to 6-monoacetylmorphine (6-MAM) and morphine; codeine is a frequent contaminant of illicit heroin
- 6-MAM is pathognomonic for heroin use and is more easily detected in urine and vitreous humor than in blood
- What is cause of death? What is the manner of death? How did the injury occur?
# Scenario 2: Death Certificate

28. **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. Enter only one cause on a line.

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

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

- **HEROIN OVERDOSE**
  - Due to (or as a consequence of):

<table>
<thead>
<tr>
<th>Part II. Other significant conditions contributing to death but not resulting in the underlying cause given in PART I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate interval:</td>
</tr>
<tr>
<td>Onset to death</td>
</tr>
</tbody>
</table>

29a. **WAS AN AUTOPSY PERFORMED?**  [X] Yes  [ ] No

29b. **WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH?**  [X] Yes  [ ] No

30. **MANNER OF DEATH**
- Natural
- Homicide
- Accident
- Pending Investigation
- Suicide
- Could not be determined

31. **DID TOBACCO USE CONTRIBUTE TO DEATH?**
- [X] Yes
- [ ] Probably
- [ ] No
- [ ] Unknown

32. **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

33. **IF TRANSPORTATION INJURY, SPECIFY:**
- [ ] Driver/Operator
- [ ] Passenger
- [ ] Pedestrian
- [ ] Other (Specify) ________

34. **DATE OF INJURY** (Month, Day, Year)
- March 23, 2018

34b. **TIME OF INJURY**
- 3:20 am

34c. **INJURY AT WORK?**
- [X] Yes
- [ ] No

34d. **PLACE OF INJURY**
- at home, farm, street, factory, office, building, etc.
- (Specify) RESIDENCE

34e. **DESCRIBE HOW INJURY OCCURRED**
- INJECTED HEROIN

34f. **LOCATION OF INJURY** (Street and Number, City or Town, State)
- 123 MAIN STREET GALLATIN TN
Scenario 3

- Otherwise healthy 17 year-old found unresponsive; friends reported that they were “partying” and heard decedent snoring loudly
- Emergency department urine drug screen positive for opiates and benzodiazepines
- Pronounced brain dead after 8-day ICU stay; admission blood specimens was discarded without further testing
- What is cause of death? What is the manner of death? How did the injury occur?
Scenario 3: Death Certificate

<table>
<thead>
<tr>
<th>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. Enter only one cause on a line.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMMEDIATE CAUSE (Final disease or condition resulting in death)</td>
</tr>
<tr>
<td>a. PROBABLE OPIATE AND BENZODIAZEPINE TOXICITY Due to (or as a consequence of)</td>
</tr>
<tr>
<td>b.</td>
</tr>
<tr>
<td>c. Due to (or as a consequence of):</td>
</tr>
<tr>
<td>d. Due to (or as a consequence of):</td>
</tr>
<tr>
<td>APPROXIMATE INTERVAL Onset to death</td>
</tr>
<tr>
<td>PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in PART I.</td>
</tr>
<tr>
<td>29a. WAS AN AUTOPSY PERFORMED? Yes No</td>
</tr>
<tr>
<td>29b. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? Yes No</td>
</tr>
<tr>
<td>MANNER OF DEATH</td>
</tr>
<tr>
<td>Natural</td>
</tr>
<tr>
<td>Accident</td>
</tr>
<tr>
<td>Suicide</td>
</tr>
<tr>
<td>DID TOBACCO USE CONTRIBUTE TO DEATH? Yes Probably No Unknown</td>
</tr>
<tr>
<td>IF FEMALE</td>
</tr>
<tr>
<td>Not pregnant within past year</td>
</tr>
<tr>
<td>Pregnant at time of death</td>
</tr>
<tr>
<td>Not pregnant, but pregnant 43 days to 1 year before death</td>
</tr>
<tr>
<td>Unknown if pregnant within the past year</td>
</tr>
<tr>
<td>TRANSPORTATION INJURY, SPECIFY:</td>
</tr>
<tr>
<td>Driver/Operator</td>
</tr>
<tr>
<td>Passenger</td>
</tr>
<tr>
<td>Pedestrian</td>
</tr>
<tr>
<td>Other (Specify)</td>
</tr>
<tr>
<td>DATE OF INJURY (Month, Day, Year) June 3, 2018</td>
</tr>
<tr>
<td>TIME OF INJURY 3:35 pm</td>
</tr>
<tr>
<td>INJURY AT WORK? Yes No</td>
</tr>
<tr>
<td>PLACE OF INJURY — at home, farm, street, factory, office, building, etc. RESIDENCE 123 OAK AVENUE, SPARTA, TN</td>
</tr>
<tr>
<td>DESCRIBE HOW INJURY OCCURRED USED DRUGS</td>
</tr>
</tbody>
</table>
Scenario 4

- 27 year old former heroin user found dead in hotel
- Autopsy reveals multiple vegetations on tricuspid valve leaflets; blood culture positive for *Staphylococcus aureus*
- Toxicology testing negative
- What is cause of death? What is the manner of death? How did the injury occur?
Scenario 4: Death Certificate

By definition, there is no injury in natural deaths; leave injury details blank
Scenario 5

- 27 year old former heroin user found dead in hotel
- Autopsy reveals multiple vegetations on tricuspid valve leaflets; blood culture positive for *Staphylococcus aureus*
- Toxicology:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Result</th>
<th>Units</th>
<th>Matrix Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>163</td>
<td>mg/dL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Blood Alcohol Concentration (BAC)</td>
<td>0.163</td>
<td>g/100 mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Morphine - Free</td>
<td>100</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>7-Amino Clonazepam</td>
<td>11</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>29</td>
<td>ng/mL</td>
<td>Femoral Blood</td>
</tr>
<tr>
<td>Ethanol</td>
<td>170</td>
<td>mg/dL</td>
<td>Vitreous Fluid</td>
</tr>
<tr>
<td>Morphine - Free</td>
<td>16</td>
<td>ng/mL</td>
<td>Vitreous Fluid</td>
</tr>
<tr>
<td>6-MAM - Free</td>
<td>45</td>
<td>ng/mL</td>
<td>Vitreous Fluid</td>
</tr>
</tbody>
</table>

- What is cause of death? What is the manner of death? How did the injury occur?
### Scenario 5: Death Certificate

- Death cannot be classified as “Natural” due to presence of significant levels of heroin, ethanol, alprazolam, and active metabolite of clonazepam

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**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. Enter only one cause on a line.

1. **IMMEDIATE CAUSE** (Final disease or condition resulting in death)
   - **a.** Acute multidrug intoxication (heroin, ethanol, alprazolam, clonazepam)
     - Due to (or as a consequence of):

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

- **Infective endocarditis (Staphylococcus aureus) due to chronic IV drug abuse**

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**MANNER OF DEATH**
- Natural
- Homicide
- Accident
- Pending Investigation
- Suicide
- Could not be determined

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**DATE OF INJURY**
- April 3, 2018

**TIME OF INJURY**
- 7:45 am

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**LOCATION OF INJURY**
- 123 Main Street, Celina TN
References

THANK YOU