CRVS technical guide
Correctly coding deaths due to COVID-19: Guidance for manual mortality coders

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Resources available from the University of Melbourne, Bloomberg Philanthropies Data for Health Initiative

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Correctly coding deaths due to COVID-19: Guidance for manual mortality coders

This guidance document provides information for manual mortality coders to correctly code deaths due to COVID-19. More information on mortality coding is available at: https://crvsgateway.info/resources

Introduction

In December 2019, an outbreak of a respiratory disease associated with a novel coronavirus was reported in the city of Wuhan in the Hubei province, Republic of China. The virus spread worldwide, and on March 11, 2020, the World Health Organization (WHO) declared coronavirus disease 2019 (COVID–19) a pandemic.¹

Globally, countries have recognised the COVID-19 pandemic as a public health emergency. In a public health emergency, mortality surveillance is extremely important to monitor the disease progression in the population and assess the impact of interventions. In addition to disease and intervention monitoring, cause of death information serves several purposes, including: assessing mortality risks across a population; informing health policy and planning, including the management and allocation of healthcare resources, and; reinforcing accountability and transparency for good governance.²

Certification of death is one of the first steps in obtaining an overview of the health of individuals (see Box 1). A properly completed cause of death certificate provides a description of the order, type and association of events that have resulted in the death. The diagnoses reported on the certificate are coded according to the International Statistical Classification of Diseases and Related Health Problems, 10th edition (ICD-10). This coded data can then be analysed and used both nationally and internationally regardless of the language used to complete the certification.

Box 1: Certifying deaths due to COVID-19: WHO guidelines for doctors

If a patient dies following a COVID-19 infection, this must be recorded on the death certificate. Generally, patients with a COVID-19 infection die from severe respiratory distress caused by pneumonia. Pneumonia, in these cases, is caused by the coronavirus which results in the COVID-19 disease. In such cases, COVID-19 is the underlying cause of death and should be reported in the lowest used line of Part 1 of the death certificate.

The current understanding is that mortality from COVID-19 is higher among patients with co-existing chronic illnesses such as diabetes mellitus, hypertension, or chronic obstructive pulmonary disease (among others). These co-morbidities increase the risk of dying from COVID-19. Whilst COVID-19 is reported in Part 1 as the underlying cause of death, other co-morbidities that may have contributed to death should be reported in Part 2 of the death certificate.

It is also important to state whether a COVID-19 infection is laboratory confirmed or not. In situations where a COVID-19 infection is not laboratory confirmed, but clinical and epidemiological information are suggestive of the diagnosis, a probable or suspected diagnosis of COVID-19 should still be reported as the underlying cause in the death certificate.

For more information on how to correctly certify deaths due to COVID-19, see: https://crvsgateway.info/file/15072/3922


² The University of Melbourne. What are vital statistics used for, The University of Melbourne, Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, University of Melbourne, 2018. Available at: https://crvsgateway.info/What-are-vital-statistics-used-for--92
COVID-19 mortality coding guidelines

This document guides manual coders to correctly code death certificates of patients who have died from COVID-19. Guidance is provided in this document for the following categories of coders:

**Category A:** Coders in statistical offices and hospitals who code manually and do not use any tool other than ICD-10 Volumes 1, 2 and 3 for underlying cause of death coding.

**Category B:** Manual coders who use Medical Mortality Data System (MMDS) decision tables for underlying cause of death coding.

Emergency ICD codes for COVID-19

Two new emergency ICD-10 codes for COVID–19 have been designated by the WHO, assigned from Chapter XXII ('Codes for special purposes').

1. **U07.1:** COVID-19, virus identified (laboratory confirmed)
2. **U07.2:** COVID-19, virus not identified (laboratory unconfirmed). Used for:
   - Clinically-epidemiologically diagnosed COVID-19
   - Probable COVID-19
   - Suspected COVID-19

Doctors are required to properly record a COVID-19 diagnosis on the death certificate to allow coders to correctly assign one of the two codes, which may be used for mortality coding as the underlying cause of death.

An additional set of ICD categories has been introduced to document the presentation of the following:

- Conditions that occur in the context of COVID – 19
- Immunization to prevent COVID – 19
- An adverse reaction to a COVID – 19 vaccine

**U08** Personal history of COVID-19

**U08.9** Personal history of COVID-19, unspecified

Note: This optional code is used to record an earlier episode of COVID-19, confirmed or probable that influences the person’s health status, and the person no longer suffers of COVID-19. *This code should not be used for primary mortality tabulation.*

**U09** Post COVID-19 condition

**U09.9** Post COVID-19 condition, unspecified

Note: This optional code serves to allow the establishment of a link with COVID-19. This code is not to be used in cases that still are presenting COVID-19.

**U10** Multisystem inflammatory syndrome associated with COVID-19

- Kawasaki-like syndrome
- Paediatric Inflammatory Multisystem Syndrome (PIMS)
- Multisystem Inflammatory Syndrome in Children (MIS-C)

Temporal associated with COVID - 19

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3 In ICD-11, the code for a confirmed diagnosis of COVID-19 is RA01.0, and the code for a clinical diagnosis (suspected or probable) is RA01.1. ICD-11
**Excludes:** Mucocutaneous lymph node syndrome [Kawasaki] (M30.3)

**U11** Need for immunization against COVID-19

**U11.9** Need for immunization against COVID-19, unspecified

Note: This code should not be used for international comparison or for primary mortality coding. This optional code is intended to be used when a person who may or may not be sick encounters health services for the specific purpose of receiving a COVID-19 vaccine.

Prophylactic COVID-19 vaccination

Excludes: immunization not carried out (Z28.-)

**U12** COVID-19 vaccines causing adverse effects in therapeutic use

**U12.9** COVID-19 vaccines causing adverse effects in therapeutic use, unspecified

Note: This code is to be used as an external cause code (i.e. as a subcategory under Y59 Other and unspecified vaccines and biological substances). In addition to this, a code from another chapter of the classification should be used indicating the nature of the adverse effect.

Correct administration of COVID-19 vaccine in prophylactic therapeutic use as the cause of any adverse effect. Note: This optional code serves to allow the establishment of a link with COVID-19.

The international rules and guidelines for selecting the underlying cause of death for statistical tabulation apply when COVID-19 is reported on a death certificate; however, given the intense public health requirements for data, COVID-19 is not considered as due to, or as an obvious consequence of, anything else in analogy to the coding rules applied for influenza. Furthermore, there are no provisions in the classification to link COVID-19 to other causes or modify its coding in any way.

**Coding COVID-19: case examples for manual coders**

The following cases provide examples for the correct coding of COVID-19 deaths for manual coders who fall into one of the two categories (A and B) described above.

**Category A: Instructions for coders in statistical offices and hospitals who code manually, and do not use any tool other than ICD-10 volumes 1, 2 and 3 for underlying cause of death coding**

**Case example A1**

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 1.
Figure 1: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A1

**Coding instructions**

**Important reference materials:**


ICD-10 - 2019 online version: [https://icd.who.int/browse10/2019/en](https://icd.who.int/browse10/2019/en)

**Coding procedure:**

More than one line is used in Part 1; therefore, Step SP3 (Starting point rule 3) applies.

*Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above*

- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - COVID–19 can cause pneumonia
  - COVID–19 can cause respiratory distress
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - COVID-19 is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

*Step SP6 – Obvious cause*

- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - COVID-19 is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - **COVID-19 remains as tentative starting point**

*Step SP7 – Ill-defined conditions*

- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - COVID-19 U07.1 is not listed as ill-defined
  - **COVID-19 remains as tentative starting point**
Step SP8 – Conditions unlikely to cause death

- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - COVID-19 is not listed as a condition unlikely to cause death
  - Go to Step M1 (ICD-10, Volume 2, Section 4.2.2)

Step M1 – Special instructions

- COVID-19 is now considered the tentative underlying cause.
- Check whether there are special instructions on linkages in relation to COVID-19 (ICD-10, Volume 2, Section 4.2.2):
  - There are no special instructions or linkages in relation to COVID-19
  - COVID-19 remains as tentative underlying cause

Step M2 – Specificity

- Check whether the tentative underlying cause can be specified even further by other terms:
  - COVID-19 cannot be specified further
  - COVID-19 remains as tentative underlying cause

Step M3 – Recheck Steps SP6, M1 and M2

- The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
  - The emergency ICD-10 code for laboratory confirmed COVID-19 is U07.1

Result of coding procedure for case example A1:

U07.1 is selected as the final underlying cause of death code.

Case example A2

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 2.

Figure 2: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A2

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Report disease or condition directly leading to death on line a</td>
<td>a Respiratory failure</td>
<td>1 day</td>
</tr>
<tr>
<td>Report chain of events in due order (if applicable)</td>
<td>b Pneumonia</td>
<td>5 days</td>
</tr>
<tr>
<td>State the underlying cause on the lowest used line</td>
<td>c Corona Virus Disease (COVID - 19) No laboratory confirmation</td>
<td>8 days</td>
</tr>
<tr>
<td>d Due to:</td>
<td>Hypertension (10 years) Diabetes mellitus type 2 (15 years) Bronchial Asthma (10 years)</td>
<td></td>
</tr>
</tbody>
</table>

Coding instructions

Important reference materials:

Coding procedure:
More than one line is used in Part 1; therefore, Step SP3 applies.

Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above
- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - COVID–19 can cause pneumonia
  - COVID–19 can cause respiratory failure
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - COVID-19 is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

Step SP6 – Obvious cause
- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - COVID-19 is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - COVID-19 remains as tentative starting point

Step SP7 – Ill-defined conditions
- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - COVID 19 (U07.2) is not listed – SP7 is not applied
  - COVID-19 remains as tentative starting point

Step SP8 – Conditions unlikely to cause death
- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - COVID-19 is not listed as a condition unlikely to cause death
  - Go to Step M1 (ICD-10, Volume 2, Section 4.2.2)

Step M1 – Special instructions
- COVID-19 is now considered the tentative underlying cause.
- Check whether there are special instructions on linkages in relation to COVID-19 (ICD-10, Volume 2, Section 4.2.2):
  - There are no special instructions or linkages in relation to COVID-19
  - COVID-19 remains as tentative underlying cause

Step M2 - Specificity
- Check whether the tentative underlying cause can be specified even further by other terms:
  - COVID-19 cannot be specified further
  - COVID-19 remains as tentative underlying cause

Step M3 – Recheck Steps SP6, M1 and M2
- The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
  - The emergency ICD-10 code for laboratory unconfirmed COVID-19 is U07.2

Result of coding procedure for case example A2:
U07.2 is selected as the final underlying cause of death code.
Case example A3

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 3.

Figure 3: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A3

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Cardiac arrest</td>
<td>30 minutes</td>
</tr>
<tr>
<td>b</td>
<td>Non ST elevated myocardial infarction</td>
<td>2 days</td>
</tr>
<tr>
<td>c</td>
<td>Coronary arteriosclerosis</td>
<td>2 Years</td>
</tr>
<tr>
<td>d</td>
<td>Due to:</td>
<td>COVID - 19 laboratory confirmed (17 days), Diabetes mellitus type 2 (10 years), Smoking (30 years), Hypertension (10 years), Obesity, Hypercholesterolaemia</td>
</tr>
</tbody>
</table>

Coding instructions

Important reference materials:


ICD-10 - 2019 online version: https://icd.who.int/browse10/2019/en

Coding procedure:

More than one line is used in Part 1; therefore, Step SP3 applies.

Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above

- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - Coronary arteriosclerosis can cause cardiac arrest
  - Coronary arteriosclerosis can cause Non-ST elevation myocardial infarction
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - Coronary arteriosclerosis is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

Step SP6 – Obvious cause

- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - Coronary arteriosclerosis is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - Coronary arteriosclerosis remains as tentative starting point

Step SP7 – Ill-defined conditions

- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - Coronary arteriosclerosis (I25.1) is not listed – SP7 is not applied
  - Coronary arteriosclerosis remains as tentative starting point
Step SP8 – Conditions unlikely to cause death

- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - Coronary arteriosclerosis is not listed as a condition unlikely to cause death
  - Go to Step M1 (ICD-10, Volume 2, Section 4.2.2)

Step M1 – Special instructions

- Coronary arteriosclerosis is now considered the tentative underlying cause
- Check whether there are special instructions on linkages in relation to coronary arteriosclerosis (ICD-10, Volume 2, Section 4.2.5):
  - Non-ST elevation myocardial infarction is linked to coronary arteriosclerosis; therefore, non-ST elevation myocardial infarction is preferred over coronary arteriosclerosis
  - The new tentative underlying cause of death is non-ST elevated myocardial infarction

Step M2 - Specificity

- Check whether the tentative underlying cause can be specified even further by other terms:
  - Non-ST elevation myocardial infarction cannot be specified further
  - Non-ST elevation myocardial infarction remains as tentative underlying cause

Step M3 – Recheck Steps SP6, M1 and M2

- The tentative underlying cause is not the same as the starting point selected using Steps SP1 to SP8; therefore, it is necessary to go back to Step SP6.
- Re-check Steps SP6, M1 and M2
  - Non-ST elevation myocardial infarction is not further modified
  - The ICD-10 code for non-ST elevation myocardial infarction is I21.4

Result of coding procedure for case example A3:

I21.4 is selected as the final underlying cause of death code.

Important: In case example 3, the certifier has determined that the myocardial infarction was due to the patient’s pre-existing coronary arteriosclerosis. Hypertension, obesity, smoking and hypercholesterolaemia may have contributed to it. The underlying cause of death selection in this case, therefore, is myocardial infarction.

If the certifier has determined that the myocardial infarction is due to a COVID-19 infection and subsequently records this in the lowest used line of Part 1, COVID-19 would be selected as the underlying cause of death.
Case example A4

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 4.

Figure 4: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A4

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Respiratory failure</td>
<td>3 days</td>
</tr>
<tr>
<td>b</td>
<td>Pneumonia</td>
<td>7 days</td>
</tr>
<tr>
<td>c</td>
<td>Pregnancy complicated by COVID-19, 32 weeks pregnant</td>
<td>14 days</td>
</tr>
<tr>
<td>d</td>
<td>Due to:</td>
<td></td>
</tr>
</tbody>
</table>

2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)

Coding instructions

Important reference materials:


ICD-10 - 2019 online version: [https://icd.who.int/browse10/2019/en](https://icd.who.int/browse10/2019/en)

Coding procedure:

More than one line is used in Part 1; therefore, Step SP3 applies.

Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above

- Important note: Pregnancy complicated by COVID-19 is classified as ‘other viral diseases complicating pregnancy, childbirth and the puerperium’, according to ICD-10 Chapter XV.
- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - Other viral diseases complicating pregnancy, childbirth and the puerperium’ can cause respiratory failure (diseases of the respiratory system complicating pregnancy and respiratory failure)
  - ‘Other viral diseases complicating pregnancy, childbirth and the puerperium’ can cause pneumonia (diseases of the respiratory system complicating pregnancy and pneumonia)
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - Other viral diseases complicating pregnancy, childbirth and the puerperium’ is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

Step SP6 – Obvious cause

- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - Other viral diseases complicating pregnancy, childbirth and the puerperium’ is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - Other viral diseases complicating pregnancy, childbirth and the puerperium’ remains as tentative starting point
Step SP7 – Ill-defined conditions

- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - 'Other viral diseases complicating pregnancy, childbirth and the puerperium' (O98.5) is not listed - SP7 is not applied
  - Other viral diseases complicating pregnancy, childbirth and the puerperium remains as tentative starting point

Step SP8 – Conditions unlikely to cause death

- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - 'Other viral diseases complicating pregnancy, childbirth and the puerperium' is not listed as a condition unlikely to cause death
  - Go to Step M1 (ICD-10, Volume 2, Section 4.2.2)

Step M1 – Special instructions

- 'Other viral diseases complicating pregnancy, childbirth and the puerperium' is now considered the tentative underlying cause.
- Check whether there are special instructions on linkages in relation to 'other viral diseases complicating pregnancy, childbirth and the puerperium' (ICD-10, Volume 2, Section 4.2.2):
  - There are no special instructions or linkages in relation to 'other viral diseases complicating pregnancy, childbirth and the puerperium'
  - Other viral diseases complicating pregnancy, childbirth and the puerperium remains as tentative underlying cause

Step M2 – Specificity

- Check whether the tentative underlying cause can be specified even further by other terms:
  - 'Other viral diseases complicating pregnancy, childbirth and the puerperium' cannot be specified further
  - Other viral diseases complicating pregnancy, childbirth and the puerperium remains as tentative underlying cause

Step M3 – Recheck Steps SP6, M1 and M2

- The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP8 to recheck.
  - The ICD-10 code for 'other diseases complicating pregnancy, childbirth and the puerperium' is O98.5. Additional code for COVID-19 required (see ICD-10, Volume 2, Section 4.2.8)

Result of coding procedure:

O98.5 is selected as the underlying cause of death code. Additional code U07.1 is used to retain COVID-19.
Case example A5

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 5.

Figure 5: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A5

<table>
<thead>
<tr>
<th>Frame 4: Medical data: Part 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Report disease or condition directly leading to death on line a</td>
</tr>
<tr>
<td>Cause of death</td>
</tr>
<tr>
<td>a</td>
</tr>
<tr>
<td>b</td>
</tr>
<tr>
<td>c</td>
</tr>
<tr>
<td>d</td>
</tr>
<tr>
<td>2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td>
</tr>
<tr>
<td>Diabetes mellitus type 2 (15 years)</td>
</tr>
</tbody>
</table>

Coding instructions

Important reference materials:


ICD-10 - 2019 online version: https://icd.who.int/browse10/2019/en

Coding procedure:

More than one line is used in Part 1; therefore, Step SP3 (Starting point rule 3) applies.

Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above

- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - COVID–19 can cause pneumonia
  - COVID–19 can cause Cytokine storm
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - COVID-19 is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

Step SP6 – Obvious cause

- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - COVID-19 is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - COVID-19 remains as tentative starting point

Step SP7 – Ill-defined conditions

- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - COVID-19 U07.1 is not listed as ill-defined
  - COVID-19 remains as tentative starting point
Step SP8 – Conditions unlikely to cause death

- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - COVID-19 is not listed as a condition unlikely to cause death
  - Go to Step M1 (ICD-10, Volume 2, Section 4.2.2)

Step M1 – Special instructions

- COVID-19 is now considered the tentative underlying cause.
- Check whether there are special instructions on linkages in relation to COVID-19 (ICD-10, Volume 2, Section 4.2.2):
  - There are no special instructions or linkages in relation to COVID-19
  - COVID-19 remains as tentative underlying cause

Step M2 - Specificity

- Check whether the tentative underlying cause can be specified even further by other terms:
  - Cytokine Storm reported in line 1a further specifies COVID-19
  - COVID-19 is discarded, and Cytokine storm becomes the new tentative underlying cause

Step M3 – Recheck Steps SP6, M1 and M2

- The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
  - The emergency ICD-10 code for Cytokine Storm temporally associated with COVID-19 is U10.9

Result of coding procedure for case example A1:

U10.9 is selected as the final underlying cause of death code.

Case example A6

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 6

Figure 6: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example A6

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Report disease or condition directly leading to death on line a</td>
<td>a Respiratory failure</td>
<td>3 days</td>
</tr>
<tr>
<td>b Pneumonia</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>c Lung fibrosis</td>
<td>2 Months</td>
<td></td>
</tr>
<tr>
<td>d Post Covid 19 condition</td>
<td>6 Months</td>
<td></td>
</tr>
</tbody>
</table>

| 2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition) | | |
**Coding instructions**

**Important reference materials:**
ICD-10 - 2019 online version: [https://icd.who.int/browse10/2019/en](https://icd.who.int/browse10/2019/en)

**Coding procedure:**
More than one line is used in Part 1; therefore, Step SP3 (Starting point rule 3) applies.

*Step SP3 – More than one line used in Part 1, first cause on lowest line explains all entries above*

- Identify correct sequence of conditions (ICD-10, Volume 2, Section 4.2.1):
  - Post Covid 19 condition can cause respiratory failure
  - Post Covid 19 condition can cause Pneumonia
  - Post Covid 19 condition can cause lung fibrosis
  - The first condition entered in the lowest used line of Part 1 can give rise to all the conditions entered above
  - Post COVID-19 condition is selected as the tentative starting point in accordance with Step SP3 (go to straight to Step SP6)

*Step SP6 – Obvious cause*

- Check whether tentative starting point selected in Step SP3 was obviously caused by another condition on the death certificate (ICD-10, Volume 2, section 4.2.1):
  - Post COVID-19 condition is not obviously caused by any other condition reported in Part 1 or 2 of the death certificate
  - Post COVID-19 condition remains as tentative starting point

*Step M1 - Special instruction*

- Post COVID-19 condition U09.9 is not to be used for underlying cause.
- U07.1 is selected as the underlying cause

*Step M3 – Recheck Steps SP6, M1 and M2*

- The tentative underlying cause is NOT the same as the starting point selected using Steps SP1 to SP8. However, U07.1 is not further modified

**Result of coding procedure for case example A6:**
U07.1 is selected as the final underlying cause of death code.

**Category B: Instructions for manual coders who use mortality decision tables for underlying cause of death coding**

**Overview of updates to mortality decision tables for emergency ICD codes U07.1 and U07.2**

The Iris Institute developed causal relationships for COVID-19 in the decision tables, considering that:

- Public health interest is to give priority to U07.1 and U07.2 as underlying causes of death
- The selection rules should not limit the acceptance of sequences reported by certifiers as concerning the consequences of COVID-19.

The tables have been prepared by the Iris Core Group based on current knowledge, with the acknowledgement that they could change following international advice. Iris preserves the codes of COVID-19 (U07.1 and U07.2) in the multiple cause string, so the multiple cause data can be used for the count of certificates mentioning COVID-19.
Users can check the cases where COVID-19, although mentioned, is not selected as the underlying cause of death, and can search causal relationships presented in a Microsoft Excel format (Figure 6).

**Figure 6: MMDS decision table showing causal relationships for COVID-19**

**Guidance for coders in the use of decision table updates**

Manual coders using decision tables can download the latest decision table updates (Figure 7) in Microsoft Excel format from the Iris website (see link provided above).

In the Excel updates, the span of codes within the “ADDRESS_FROM” to “ADDRESS_TO” columns indicate the range of address codes.

The “RULE” column indicates the mortality coding rule being applied. The rule “DUE” means a Table D causal relationship. The span of codes in the within the “SUBADDRESS_FROM” to “SUBADDRESS_TO” columns indicate sub address codes.

**Figure 7: Column headings of decision table updates**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ADDRESS_FROM</td>
<td>ADDRESS_TO</td>
<td>RULE</td>
<td>SUBADDRESS_FROM</td>
<td>SUBADDRESS_TO</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>A040</td>
<td>A050</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>4</td>
<td>A052</td>
<td>A099</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>5</td>
<td>A240</td>
<td>A269</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>6</td>
<td>A280</td>
<td>A289</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>7</td>
<td>A310</td>
<td>A329</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>8</td>
<td>A400</td>
<td>A699</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>9</td>
<td>A740</td>
<td>A749</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
</tbody>
</table>

Figure 8 shows the “Causal relations” sheet for Table D relationships (i.e. the codes for the conditions having DUE TO causal relationship with COVID–19 - U07.1 and U07.2).

**Figure 8: Causal relationships excel sheet**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>B580</td>
<td>B69</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>21</td>
<td>B99</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>D500</td>
<td>D65</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>23</td>
<td>D692</td>
<td>D69</td>
<td>DUE</td>
<td>U071</td>
<td>U072</td>
</tr>
</tbody>
</table>

The “Obvious causes” sheet (Figure 8) contains the codes for the conditions obviously caused by U07.1 and U07.2. These relationships indicate the mortality coding rule SP6 (Table E acronym DS).
Figure 9: Step SP6 - Obvious causes excel sheet

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>G970</td>
<td>G979</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>20</td>
<td>H590</td>
<td>H599</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>21</td>
<td>H660</td>
<td></td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>22</td>
<td>H669</td>
<td></td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>23</td>
<td>H850</td>
<td>H959</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>24</td>
<td>J409</td>
<td></td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>25</td>
<td>J514</td>
<td></td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>26</td>
<td>J970</td>
<td>J979</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>27</td>
<td>J120</td>
<td>J168</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
<tr>
<td>28</td>
<td>J180</td>
<td>J189</td>
<td>DS</td>
<td>U071</td>
<td>U072</td>
</tr>
</tbody>
</table>

The Excel sheet “Specificity” (Figure 10) contains the codes for the conditions that are considered to be less specific and better described in more precise terms by the codes COVID–19 U07.1 or U07.2.

Figure 10: Step M2 - Specificity excel sheet

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ADDRESS_FROM</td>
<td>ADDRESS_TO</td>
<td></td>
<td>RULE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SMP</td>
<td>U071</td>
<td></td>
<td>U072</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SMP</td>
<td>U071</td>
<td></td>
<td>U072</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SMP</td>
<td>U071</td>
<td></td>
<td>U072</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SMP</td>
<td>U071</td>
<td></td>
<td>U072</td>
<td></td>
</tr>
</tbody>
</table>

Update – Decision Tables for emergency codes (U08.9, U09.9, U10.9, U11.9, U12.9)

The responsible committee of the WHO Family of International Classifications (WHO -FIC) Network concluded that the ICD-10 emergency codes U08.9, U09.9, U10.9, U11.9 and U12.9 are assigned to “COVID-19” cases.

The third and fourth update in relation to the COVID-19 includes these new titles of the new emergency codes:

- U08.9 Personal history of COVID-19, unspecified
- U09.9 Post COVID-19 condition, unspecified
- U10.9 Multisystem inflammatory syndrome associated with COVID-19, unspecified
- U11.9 Need for immunization against COVID-19, unspecified
- U12.9 COVID-19 vaccines causing adverse effects in therapeutic use, unspecified

The Iris Institute developed the following causal relations, taking the new codes into account:

- Code for personal history: U08.9 should not interact with mortality coding as other Z codes. This code will not be taken into account for the unicausal selection.
- Code for post COVID-19 condition: U09.9 should be used only in multiple cause coding; it should have the same due to than U07.1-U07.2, as well as for the direct sequel rules (DS). Once the code is selected as underlying cause (not to be used for underlying cause coding), it should be converted into U07.1.
- Code for multisystem inflammatory syndrome: U10.9 should have the same rules as COVID-19. If U07.1 or U07.2 are selected as temporary underlying cause and if there is mention of multisystem inflammatory syndrome, U10.9 should be considered as more specific than U07.1 and U07.2.
- Code for need of immunization against COVID-19: U11.9 should not interact with mortality coding as other Z codes. This code will not be taken into account for the unicausal selection.
Update – Decision Tables for emergency codes (U08.9, U09.9, U10.9, U11.9, U12.9)

The responsible committee of the WHO Family of International Classifications (WHO-FIC) Network concluded that the ICD-10 emergency codes U08.9, U09.9, U10.9, U11.9 and U12.9 are assigned to “COVID-19” cases.

The third and fourth update in relation to the COVID-19 includes these new titles of the new emergency codes:

- U08.9 Personal history of COVID-19, unspecified
- U09.9 Post COVID-19 condition, unspecified
- U10.9 Multisystem inflammatory syndrome associated with COVID-19, unspecified
- U11.9 Need for immunization against COVID-19, unspecified
- U12.9 COVID-19 vaccines causing adverse effects in therapeutic use, unspecified

The Iris Institute developed the following causal relations, taking the new codes into account:

- Code for personal history: U08.9 should not interact with mortality coding as other Z codes. This code will not be taken into account for the unicausal selection.
- Code for post COVID-19 condition: U09.9 should be used only in multiple cause coding; it should have the same due to than U07.1-U07.2, as well as for the direct sequel rules (DS). Once the code is selected as underlying cause (not to be used for underlying cause coding), it should be converted into U07.1.
- Code for multisystem inflammatory syndrome: U10.9 should have the same rules as COVID-19. If U07.1 or U07.2 are selected as temporary underlying cause and if there is mention of multisystem inflammatory syndrome, U10.9 should be considered as more specific than U07.1 and U07.2.
- Code for need of immunization against COVID-19: U11.9 should not interact with mortality coding as other Z codes. This code will not be taken into account for the unicausal selection.
- Code for COVID-19 vaccines causing adverse effects in therapeutic use: U12.9 should be used as an external cause code (i.e. as a subcategory under Y59 Other and unspecified vaccines and biological substances). In addition to this, a code from another chapter of the classification should be used indicating the nature of the adverse effect.

The tables have been prepared by the Iris Core Group based on the current knowledge and after discussion in the Mortality Reference Group (MRG).

Moreover, all codes for COVID-19 are kept in the multiple cause string and can be used for analyzing cases where COVID-19 is mentioned, but not selected as UC. There is also the possibility to implement a reject for these cases via the “Dictionary” and/or the ”NonConsistentIcdCodes” (NCIC) table.

For more information about COVID-19, please visit the WHO website:

- [https://www.who.int/health-topics/coronavirus#tab=tab_1](https://www.who.int/health-topics/coronavirus#tab=tab_1)

Manual coders can use Microsoft Excel decision table updates to check the causal relationships with U07.1 and U07.2 COVID-19 emergency codes. Updates are available for both Tables D and E. MMDS table updates can be downloaded from the URL provided above.

 Coders are also able to obtain printable PDF versions of completed decision tables (TABA – Causal relationships and TABB – Modifications) through the decision table browser of Iris Version 5.8 ([Figures 10 and 11](#)). These tables are updated with U07, U08, U09, U10, U11, and U12 COVID-19 ICD-10 codes.
Figure 11: PDF Decision tables TABA (Causal relationships) available through Iris

```
--- I972 ---
A000  -  U079  ---
U099  -  U109  ---
U129  -  Y835  ---
Y836  -  Y839  ---
Y840  -  Y882  ---
Y883  -  Y98  ---
--- I978 ---
A000  -  U079  ---
U099  -  U109  ---
U129  -  Y98  ---
--- I979 ---
A000  -  I979  ---
I99  -  U079  ---
U099  -  U109  ---
U129  -  Y96  ---
--- I980 ---
1980  ---
U070  -  U072  ---
U099  -  U109  ---
U129  ---
--- J100-J118 ---
J09  -  J118  ---
U071  -  U072  ---
U099  -  U109  ---
--- J120-J157 ---
A000  -  R002  ---
R008  -  R961  ---
R98  -  U079  ---
U099  -  U109  ---
--- J158 ---
U129  ---
--- J171 ---
D890  -  D899  ---
J171  ---
--- J172 ---
D45  -  D469  ---
D70  ---
--- J173 ---
D45  -  D469  ---
D70  ---
```

Figure 12: PDF decision tables TABB (Modifications) available through Iris

```
--- A009 ---
SMP  A000  -  A001  ---
--- A010-A013 ---
DSC  B200  -  B207  ---
DS  B201  ---
DSC  B202  -  B206  B207  ---
DS  B207  ---
DSC  B208  B207  ---
DSC  B209  B201  ---
DSC  B210  -  B222  B227  ---
DS  B227  ---
DSC  B230  -  B232  B227  ---
DSC  B238  -  B24  B201  ---
--- A014 ---
SMP  A010  -  A013  ---
DSC  B200  -  B207  ---
DS  B201  ---
DSC  B202  -  B206  B207  ---
DS  B207  ---
DSC  B208  B207  ---
DSC  B209  B201  ---
DSC  B210  -  B222  B227  ---
DS  B227  ---
DSC  B230  -  B232  B227  ---
```
Case example B1

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 13.

Figure 13: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Respiratory failure</td>
<td></td>
<td>1 day</td>
</tr>
<tr>
<td>b. COVID – 19 infected Pneumonia</td>
<td></td>
<td>5 days</td>
</tr>
<tr>
<td>c. COVID – 19 Laboratory confirmed</td>
<td></td>
<td>8 days</td>
</tr>
<tr>
<td>d. DNR to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Other significant conditions</td>
<td>Hypertension (10 years)</td>
<td></td>
</tr>
<tr>
<td>contributing to death (time intervals can be included in brackets after the condition)</td>
<td>Diabetes mellitus type 2 (15 years)</td>
<td></td>
</tr>
</tbody>
</table>

Result of coding procedure:

Final underlying cause of death: U07.1 COVID–19 virus identified (laboratory confirmed).

Table 1: Results, case example B1

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>J96.9</td>
<td>U07.1</td>
<td>SP3</td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>J12.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1c</td>
<td>U07.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PART II</td>
<td>I10</td>
<td>E11.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FUCOD U07.1 COVID-19 virus identified

Notes and comments on selection of underlying cause of death:

First, code all the conditions recorded in the death certificate (see Table 1). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---J969---, (---J960-J969---): U07.1 (R98 – U079) is listed
- Look up Table D Address ---J12.8---, (---J120-J157---): U07.1 (R98 – U079) is listed
  ✓ U07.1 selected as tentative starting point (go straight to Step SP6)

Step SP6 – Obvious cause

- Look up Table E Address ---U071---
  ✓ Obvious cause is not applied
  ✓ COVID-19 remains as tentative starting point
Step SP7 – Ill-defined conditions

■ Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  ✓ COVID-19 U07.1 is not listed as ill-defined
  ✓ COVID-19 remains as tentative starting point

Step SP8 – Conditions unlikely to cause death

■ Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  ✓ COVID-19 is not listed as a condition unlikely to cause death
  ✓ Go to Step M1

Steps M1 (Special instructions) and M2 (Specificity)

■ Look up Table E Address ---U071---
  ✓ No modifications required

Step M3 – Recheck Steps SP6, M1 and M2

✓ The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
✓ U07.1 is selected as final underlying cause of death

Case example B2

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 14.

Figure 14: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B2

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Respiratory failure</td>
<td>1 day</td>
</tr>
<tr>
<td>2</td>
<td>Pneumonia</td>
<td>5 days</td>
</tr>
<tr>
<td>3</td>
<td>Corona Virus Disease (COVID - 19) No laboratory confirmation</td>
<td>8 days</td>
</tr>
<tr>
<td>4</td>
<td>Hypertension (10 years) Diabetes mellitus type 2 (15 years) Bronchial Asthma (10 years)</td>
<td></td>
</tr>
</tbody>
</table>

Result of coding procedure:

Final underlying cause of death: U07.2 COVID-19 virus not identified (laboratory unconfirmed).
Table 2: Results, case example B2

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>J96.9</td>
<td>U072</td>
<td>SP3</td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>J12.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1c</td>
<td>U07.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PART II</td>
<td>I10</td>
<td>E11.9</td>
<td>J459</td>
<td></td>
</tr>
</tbody>
</table>

FUCOD U07.2 COVID-19 virus identified

Notes and comments on selection of underlying cause of death:
First, code all the conditions recorded in the death certificate (see Table 2). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---J969---, (---J960-J969---): U07.1 (R98 – U079) is listed
- Look up Table D Address ---J12.8---, (---J120-J157---): U07.1 (R98- U079) is listed
  ✓ U07.2 selected as tentative starting point (go straight to Step SP6)

Step SP6 – Obvious cause
- Look up Table E Address ---U072---
  ✓ Obvious cause is not applied
  ✓ COVID-19 remains as tentative starting point

Step SP7 – Ill-defined conditions
- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  ✓ COVID-19 U07.2 is not listed as ill-defined
  ✓ COVID-19 remains as tentative starting point

Step SP8 – Conditions unlikely to cause death
- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  ✓ COVID-19 is not listed as a condition unlikely to cause death
  Go to Step M1

Steps M1 (Special instructions) and M2 (Specificity)
- Look up Table E Address ---U072---
  ✓ No modifications required

Step M3 – Recheck Steps SP6, M1 and M2
  ✓ The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
  ✓ U07.2 is selected as final underlying cause of death
Case example B3

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 15.

Figure 15: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B3

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Report disease or condition directly leading to death on line a</td>
</tr>
<tr>
<td>Report chain of events in due order (if applicable)</td>
</tr>
<tr>
<td>State the underlying cause on the lowest used line</td>
</tr>
<tr>
<td>2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td>
</tr>
</tbody>
</table>

**Result of coding procedure:**
Final underlying cause of death: I21.4 non-ST elevation myocardial infarction.

**Table 3: Results, case example B3**

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>I469</td>
<td>I25.1</td>
<td>SP3</td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>I214</td>
<td>I214</td>
<td>M1</td>
<td>LMP</td>
</tr>
<tr>
<td>Line 1c</td>
<td>I251</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PART II</td>
<td>U071, E119</td>
<td>I10, F171</td>
<td>E669, E780</td>
<td></td>
</tr>
<tr>
<td>FUCOD</td>
<td>I21.4 non-ST elevated myocardial infarction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes and comments on selection of underlying cause of death:**
First, code all the conditions recorded in the death certificate (see Table 2). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---I469---, (---I440 - I509---): I25.1 (H000 – L599) is listed
- Look up Table D Address ---I214---, (---I210 - I214---): 125.1 (I10 – 1359) is listed
  - Coronary arteriosclerosis (I25.1) selected as tentative starting point (go straight to Step SP6)

**Step SP6 – Obvious cause**
- Look up Table E Address ---I251---
  - Obvious cause is not applied
  - Coronary arteriosclerosis remains as tentative starting point

**Step SP7 – Ill-defined conditions**
- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
Coronary arteriosclerosis (I25.1) is not listed as ill-defined

Coronary arteriosclerosis remains as tentative starting point

**Step SP8 – Conditions unlikely to cause death**

- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - Coronary arteriosclerosis is not listed as a condition unlikely to cause death
  - Go to Step M1

**Steps M1 (Special instructions) and M2 (Specificity)**

- Look up Table E Address —I251—, (—I250 - I256—): I21.4 (I210 – I229) is listed. Table E acronym LMP, Step M1
  - Non-ST elevation myocardial infarction is linked to coronary arteriosclerosis; therefore, non-ST elevation myocardial infarction is preferred over coronary arteriosclerosis
  - The new tentative underlying cause of death is non-ST elevated myocardial infarction (I21.4)

**Step M2 (Specificity)**

- I21.4 is not modified further

**Step M3 – Recheck Steps SP6, M1 and M2**

- Non-ST elevation myocardial infarction is not further modified
- I21.4 selected as final underlying cause of death

**Important:** In case example B3, the certifier has determined that the myocardial infarction was due to the patient’s pre-existing coronary arteriosclerosis. Hypertension, obesity, smoking and hypercholesterolaemia may have contributed to it. The underlying cause of death selection in this case, therefore, is myocardial infarction.

If the certifier has determined that a myocardial infarction is due to a COVID-19 infection and subsequently records this in the lowest used line of Part 1, COVID-19 would be selected as the underlying cause of death. Updated decision tables supports a DUE TO relationship between codes in the range I20.0 – I24.9 with U07.1 – U07.2.

**Case example B4**

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in **Figure 15**.

**Figure 15: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B4**

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
<th>Cause of death</th>
<th>Time interval from onset to death</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Respiratory failure</td>
<td>3 days</td>
<td></td>
</tr>
<tr>
<td>b Pneumonia</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>c Pregnancy complicated by COVID-19, 32 weeks pregnant</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>d Due to:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Result of coding procedure:
Final underlying cause of death: O98.5 ‘Other viral diseases complicating pregnancy, childbirth and the puerperium’. Add corresponding code U07.1 to retain COVID-19.

Table 4: Results case example B4

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>O99.5</td>
<td>J96.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>O99.5</td>
<td>J12.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1c</td>
<td>O98.5</td>
<td>U07.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| PART II | FUCOD | O98.5 Other viral diseases complicating pregnancy, childbirth and the puerperium Use the additional code U07.1 to retain COVID - 19 |

Notes and comments on selection of underlying cause of death:
First, code all the conditions recorded in the death certificate (see Table 4). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---O99.5---, (---O995 - O997---), O98.5 (O00.0 – O99.8) is listed
- Look up Table D Address ---J96.9---, (---J960 - J969 ---), O98.5 (G948 – R002) is listed
- Look up Table D Address ---J12.8---, (---J120 - J168---), O98.5 (G948 – R002) is listed
  ✓ O98.5 selected as tentative starting point (go straight to Step SP6)

Step SP6 – Obvious cause
- Look up Table E Address ---O98.5---
  ✓ Obvious cause is not applied
  ✓ O98.5 remains as tentative starting point

Step SP7 – Ill-defined conditions
- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  ✓ O98.5 is not listed as ill-defined
  ✓ Coronary arteriosclerosis remains as tentative starting point

Step SP8 – Conditions unlikely to cause death
- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  ✓ O98.5 is not listed as a condition unlikely to cause death
  ✓ Go to Step M1

Steps M1 (Special instructions) and M2 (Specificity)
- No modifications required

Step M3 – Recheck Steps SP6, M1 and M2
- The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.
✓ The ICD-10 code for ‘other diseases complicating pregnancy, childbirth and the puerperium’ is O98.5. Additional code for COVID-19 required (see ICD-10, Volume 2, Section 4.2.8)

✓ O98.5 is selected as final underlying cause of death. Additional code U07.1 is used to retain COVID-19.

Case example B5

Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 16.

Figure 16:

<table>
<thead>
<tr>
<th>Step SP6 – Obvious cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look up Table E Address ---O98.5---</td>
</tr>
<tr>
<td>✓ Obvious cause is not applied</td>
</tr>
<tr>
<td>✓ O98.5 remains as tentative starting point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step SP7 – Ill-defined conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):</td>
</tr>
<tr>
<td>✓ O98.5 is not listed as ill-defined</td>
</tr>
<tr>
<td>✓ O98.5 remains as tentative starting point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step SP8 – Conditions unlikely to cause death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):</td>
</tr>
<tr>
<td>✓ O98.5 is not listed as a condition unlikely to cause death</td>
</tr>
<tr>
<td>✓ Go to Step M1</td>
</tr>
</tbody>
</table>

Steps M1 (Special instructions) and M2 (Specificity)

✓ No modifications required

Step M3 – Recheck Steps SP6, M1 and M2

✓ The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8. Therefore, there is no need to go back to Step SP6 to recheck.

✓ The ICD-10 code for ‘other diseases complicating pregnancy, childbirth and the puerperium’ is O98.5. Additional code for COVID-19 required (see ICD-10, Volume 2, Section 4.2.8)

✓ O98.5 is selected as final underlying cause of death. Additional code U07.1 is used to retain COVID-19.

Result of coding procedure:

Final underlying cause of death.

Table 5: Results case example B5

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>U10.9</td>
<td>U07.1</td>
<td>SP3</td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>J12.8</td>
<td>U10.9</td>
<td>M2</td>
<td>SMP</td>
</tr>
<tr>
<td>Line 1c</td>
<td>U07.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PART II</td>
<td>I10</td>
<td>E11.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUCOD</td>
<td>U10.9</td>
<td></td>
<td></td>
<td>Multisystem inflammatory syndrome, cytokine storm</td>
</tr>
</tbody>
</table>

Notes and comments on selection of underlying cause of death:

First, code all the conditions recorded in the death certificate (see Table 5). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---U10.9---. ---U09.9-U10.9---: U07.1 (U071-U072) is listed
- Look up Table D Address ---J12.8---. ---J120-J157---: U07.1 (R98 – U079) is listed
  - ✓ U07.1 selected as tentative starting point (go straight to Step SP6)
Step SP6 – Obvious cause
- Look up Table E Address ---U071---: address code is not found
  - Obvious cause is not applied
  - **COVID-19 remains as tentative starting point**

Step SP7 – Ill-defined conditions
- Check whether the selected tentative starting point is listed in the table of ill-defined conditions (ICD-10, Volume 2, Annex 7.3):
  - COVID-19 U07.1 is not listed as ill-defined
  - **COVID-19 remains as tentative starting point**

Step SP8 – Conditions unlikely to cause death
- Check whether tentative starting point is listed in the table of conditions unlikely to cause death (ICD-10, Volume 2, Annex 7.4):
  - COVID-19 is not listed as a condition unlikely to cause death
  - Go to Step M1

Steps M1 (Special instructions) and M2 (Specificity)
- Look up Table E Address ---U071---, U109 is listed SMP

Step M3 – Recheck Steps SP6, M1 and M2
- The tentative underlying cause is NOT the same as the starting point selected using Steps SP1 to SP8. However, U10.9 Cytokine storm is listed as due to U07.1 COVID-19; therefore, there is no need to go back to Step SP6 to recheck.
- **U10.9 is selected as final underlying cause of death**

Case example B6
Coding instructions for this case are based on the example completed International Form of Medical Certificate of Cause of Death, Frame A shown in Figure 17.

Figure 17:

<table>
<thead>
<tr>
<th>Frame A: Medical data: Part 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Cause of death</td>
</tr>
<tr>
<td>a</td>
</tr>
<tr>
<td>b</td>
</tr>
<tr>
<td>c</td>
</tr>
<tr>
<td>d</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
Table 6: Results case example B6

<table>
<thead>
<tr>
<th>PART I</th>
<th>ICD CODES</th>
<th>TUCOD</th>
<th>RULE</th>
<th>TABLE E ACRONYM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1a</td>
<td>J96.9</td>
<td>U09.9</td>
<td>SP3</td>
<td></td>
</tr>
<tr>
<td>Line 1b</td>
<td>J18.9</td>
<td>U07.1</td>
<td>Special instruction</td>
<td></td>
</tr>
<tr>
<td>Line 1c</td>
<td>J84.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 1d</td>
<td>U09.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PART II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUCOD</td>
<td>U07.1 COVID-19 virus identified</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes and comments on selection of underlying cause of death:

First, code all the conditions recorded in the death certificate (see Table 6). As more than one line is used in Part 1, Step SP3 is applied

- Look up Table D Address ---J96.9---, (---J96.0 – J96.9---): U09.9 (U099-U109) is listed
- Look up Table D Address ---J18.9---, (---J180-J22---): U09.9 (U099 – U109) is listed
- Look up Table D Address ---J84.1---, (---J841---): U09.9 (U099 – U109) is listed

✔ U09.9 selected as tentative starting point (go straight to Step SP6)

Step SP6 – Obvious cause

- Look up Table E Address ---U09.9---
  ✔ Obvious cause is not applied
  ✔ U09.9 remains as tentative starting point

Step M3 – Recheck Steps SP6, M1 and M2

✔ The tentative underlying cause is the same as the starting point selected using Steps SP1 to SP8.

Step M1 - Special instruction:

✔ U09.9 is not to be used for underlying cause
✔ U07.1 is selected as final underlying cause of death

Step M3 – Recheck Steps SP6, M1 and M2

✔ U07.1 is selected as final underlying cause of death
The program partners on this initiative include: The University of Melbourne, Australia; CDC Foundation, USA; Vital Strategies, USA; Johns Hopkins Bloomberg School of Public Health, USA; World Health Organization, Switzerland.

Civil Registration and Vital Statistics partners:

For more information contact:
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