



Bloomberg
Philanthropies



DATA FOR
HEALTH INITIATIVE

CRVS technical guide

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

June 2020





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

CRVS course prospectuses

These resources outline the context, training approach, course content and course objectives for the suite of CRVS trainings delivered through the Bloomberg Philanthropies Data for Health Initiative. Each course focuses on a specific CRVS intervention or concept, and is designed to support countries to strengthen their CRVS systems and data.

CRVS Fellowship reports and profiles

The CRVS Fellowship Program aims to build technical capacity in both individuals and institutions to enhance the quality, sustainability and health policy utility of CRVS systems in Fellows' home countries. Fellowship reports are written by Fellows as a component of the program, and document, in detail, the research outcomes of their Fellowship. Fellowship profiles provide a summary of Fellows' country context in relation to CRVS, an overview of the Fellowship experiences, the research topic and the projected impact of findings.

CRVS analyses and evaluations

These analytical and evaluative resources, generated through the Initiative, form a concise and accessible knowledge-base of outcomes and lessons learnt from CRVS initiatives and interventions. They report on works in progress, particularly for large or complex technical initiatives, and on specific components of projects that may be of more immediate relevance to stakeholders. These resources have a strong empirical focus, and are intended to provide evidence to assist planning and monitoring of in-country CRVS technical initiatives and other projects.

CRVS best-practice and advocacy

Generated through the Initiative, CRVS best-practice and advocacy resources are based on a combination of technical knowledge, country experiences and scientific literature. These resources are intended to stimulate debate and ideas for in-country CRVS policy, planning, and capacity building, and promote the adoption of best-practice to strengthen CRVS systems worldwide.

CRVS country reports

CRVS country reports describe the capacity-building experiences and successes of strengthening CRVS systems in partner countries. These resources describe the state of CRVS systems-improvement and lessons learnt, and provide a baseline for comparison over time and between countries.

CRVS technical guides

Specific, technical and instructive resources in the form of quick reference guides, user guides and action guides. These guides provide a succinct overview and/or instructions for the implementation or operation of a specific CRVS-related intervention or tool.

CRVS tools

Interactive and practical resources designed to influence and align CRVS processes with established international or best-practice standards. These resources, which are used extensively in the Initiative's training courses, aim to change practice and ensure countries benefit from such changes by developing critical CRVS capacity among technical officers and ministries.

Published by the University of Melbourne, Civil Registration and Vital Statistics Improvement, Bloomberg Philanthropies Data for Health Initiative

Melbourne School of Population and Global Health
Building 379
207 Bouverie Street
Carlton, VIC 3053
Australia

CRVS-info@unimelb.edu.au
www.mspgh.unimelb.edu.au/dataforhealth

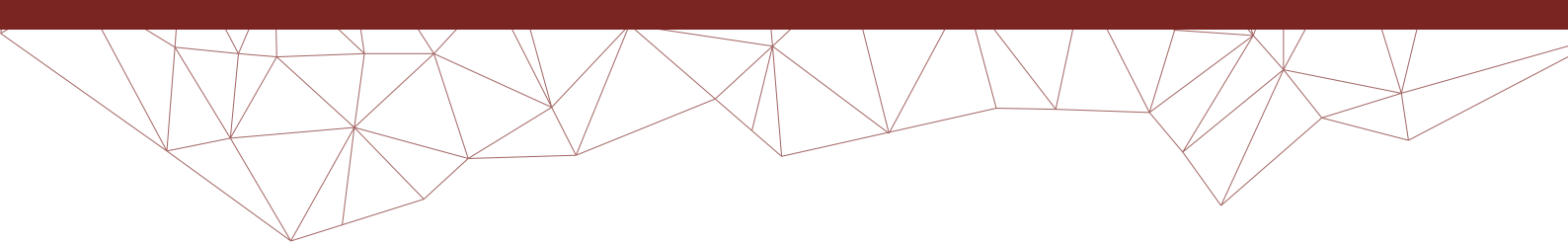
**Made possible through funding from
Bloomberg Philanthropies
www.bloomberg.org**

Acknowledgements

This CRVS technical guide was written by Dr Saman Gamage and reviewed by Dr Lene Mikkelsen, Dr Hafiz Chowdhury and Sara Hudson.

Suggested citation

Gamage, U S H. *Correctly coding deaths due to COVID-19: Guidance for manual coders*. CRVS technical guides. Melbourne, Australia: Bloomberg Philanthropies Data for Health Initiative, Civil Registration and Vital Statistics Improvement, University of Melbourne; 2020.



Contents

Introduction	4
COVID-19 mortality coding guidelines	5
Emergency ICD codes for COVID-19.....	5
Coding COVID-19: case examples for manual coders	5
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.....	6
Case example A1	6
Case example A2	8
Case example A3	9
Case example A4	11
Category B: Instructions for manual coders who use mortality decision tables for underlying cause of death coding	13
Overview of updates to mortality decision tables for emergency ICD codes U07.1 and U07.2.....	13
Guidance for coders in the use of decision table updates	13
Case example B1	17
Case example B2.....	18
Case example B3.....	20
Case example B4.....	22



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>

1 The World Health Organization, Coronavirus disease (COVID-19) outbreak. The World Health Organization, 2020. Available at: <https://www.who.int/westernpacific/emergencies/covid-19>

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--392>



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'):³

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, both of which may be used for mortality coding as the underlying cause of death.

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.

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

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

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Respiratory failure	1 day
	b	COVID – 19 infected Pneumonia	5 days
	c	COVID – 19 Laboratory confirmed	8 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Hypertension (10 years) Diabetes mellitus type 2 (15 years)	

Coding instructions

Important reference materials:

WHO guidelines: *Emergency use ICD codes for COVID-19 disease outbreak:*

<http://www9.who.int/classifications/icd/covid19/en/>

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 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

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Respiratory failure	1 day
	b	Pneumonia	5 days
	c	Corona Virus Disease (COVID - 19) No laboratory confirmation	8 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Hypertension (10 years) Diabetes mellitus type 2 (15 years) Bronchial Asthma (10 years) -----	

Coding instructions

Important reference materials:

WHO guidelines: *Emergency use ICD codes for COVID-19 disease outbreak*:
<http://www9.who.int/classifications/icd/covid19/en/>

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):
 - ✓ 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

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Cardiac arrest	30 minutes
	b	Non ST elevated myocardial infarction	2 days
	c	Coronary arteriosclerosis	2 Years
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID - 19 laboratory confirmed (17 days), Diabetes mellitus type 2 (10 years), Smoking (30 years), Hypertension (10years), Obesity, Hypercholesterolaemia	

Coding instructions

Important reference materials:

WHO guidelines: *Emergency use ICD codes for COVID-19 disease outbreak:*

<http://www9.who.int/classifications/icd/covid19/en/>

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 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

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Respiratory failure	3 days
	b	^{Du} Pneumonia	7 days
	c	^{Du} Pregnancy complicated by COVID -19, 32 weeks pregnant	14 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			

Coding instructions

Important reference materials:

WHO guidelines: *Emergency use ICD codes for COVID-19 disease outbreak:*

<http://www9.who.int/classifications/icd/covid19/en/>

ICD-10 - 2019 online version:

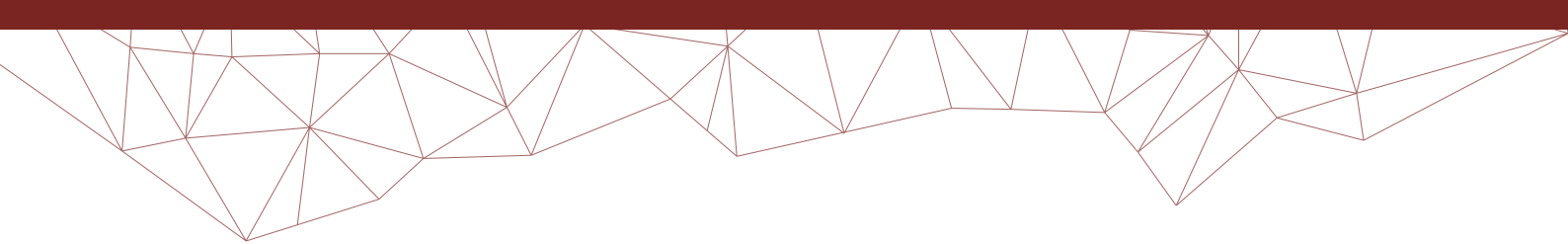
<https://icd.who.int/browse10/2019/en>

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

- 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 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)

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.

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 5**).

Figure 5: MMDS decision table showing causal relationships for COVID-19

	A	B	C	D	E
1	ADDRESS_FROM	ADDRESS_TO	RULE	SUBADDRESS_FROM	SUBADDRESS_TO
2					
3	A040	A050	DUE	U071	U072
4	A052	A099	DUE	U071	U072
5	A240	A269	DUE	U071	U072
6	A280	A289	DUE	U071	U072
7	A310	A329	DUE	U071	U072
8	A400	A699	DUE	U071	U072
9	A740	A749	DUE	U071	U072
10	A812	A819	DUE	U071	U072
11	A870	A89	DUE	U071	U072
12	A930	A94	DUE	U071	U072
13	A968	A969	DUE	U071	U072
14	A99	B029	DUE	U071	U072
15	B07	B159	DUE	U071	U072
16	B172	B178	DUE	U071	U072
17	B188	B199	DUE	U071	U072
18	B250	B259	DUE	U071	U072
19	B270	B49	DUE	U071	U072
20	B580	B89	DUE	U071	U072
21	B99		DUE	U071	U072
22	D500	D65	DUE	U071	U072
23	D682	D999	DUE	U071	U072

Navigation: Causal relations | Obvious causes | Specificity | +

Guidance for coders in the use of decision table updates

Manual coders using decision tables can download the latest decision table updates (**Figure 6**) 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.

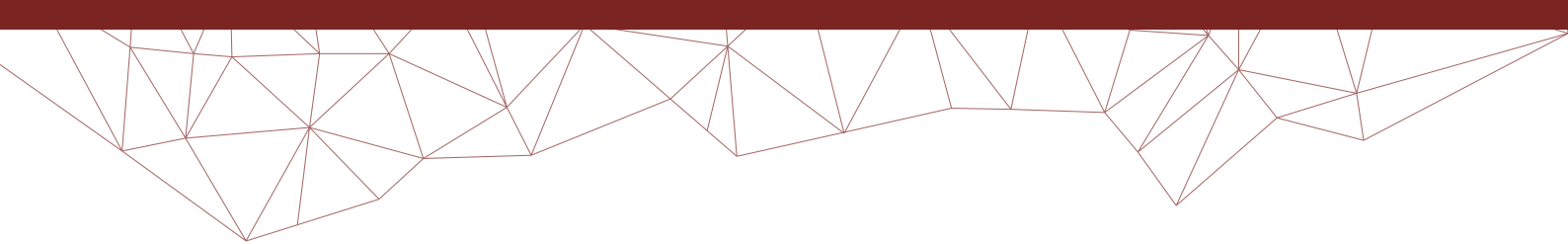


Figure 6: Column headings of decision table updates

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

Figure 7 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 7: Causal relationships excel sheet

20	B580	B89	DUE	U071	U072
21	B99		DUE	U071	U072
22	D500	D65	DUE	U071	U072
23	D682	D999	DUE	U071	U072

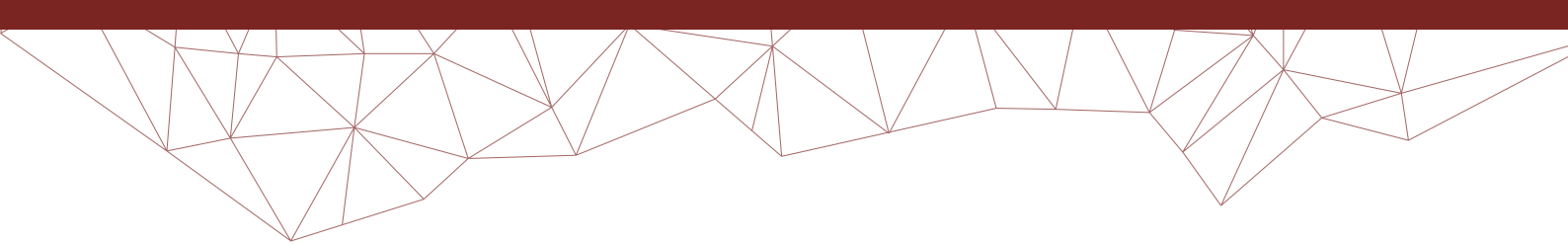
Navigation: Causal relations | Obvious causes | Specificity (+)

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 8: Step SP6 - Obvious causes excel sheet

19	G970	G979	DS	U071	U072
20	H590	H599	DS	U071	U072
21	H660		DS	U071	U072
22	H669		DS	U071	U072
23	H950	H959	DS	U071	U072
24	I409		DS	U071	U072
25	I514		DS	U071	U072
26	I970	I979	DS	U071	U072
27	J120	J168	DS	U071	U072
28	J180	J189	DS	U071	U072
29	J22		DS	U071	U072

Navigation: Causal relations | Obvious causes | Specificity (+)



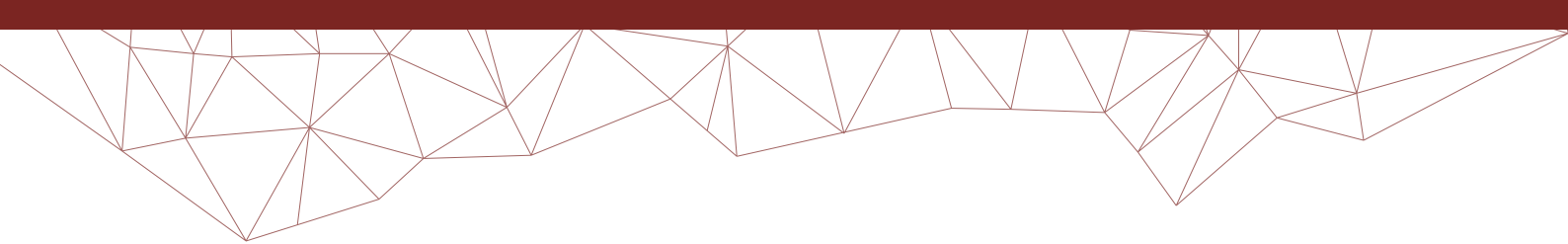
The Excel sheet “Specificity” (Figure 9) contains the codes for the conditions that are considered to be less specific and better described in more precise terms by the codes COVID-19 U07.1 or U07.2.

Figure 9: Step M2 - Specificity excel sheet

	A	B	C	D	E
1	ADDRESS_FROM	ADDRESS_TO	RULE	SUBADDRESS_FROM	SUBADDRESS_TO
2					
3	B342		SMP	U071	U072
4	B349		SMP	U071	U072
5	J110	J118	SMP	U071	U072
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

Navigation tabs: Causal relations | Obvious causes | **Specificity** | +

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 5.7 (**Figures 10** and **11**). These tables are updated with U07.1 and U07.2 COVID-19 ICD-10 codes.

Figure 10: PDF Decision tables TABA (Causal relationships) available through Iris

```

TABA - specV2020SR30

--- I958-I959 ---
A000 - A969
A980 - E281
E283 - G232
G238 - G834
G836 - G942
G948 - Q999
R02
R090 - R098
R54
R58 - R5800
R75
S000 - Y98

--- I970-I978 ---
A000 - Y98

--- I979 ---
A000 - I979
I99 - Y98

--- J120-J168 ---
A000 - E281
E283 - G942
G948 - R002
R008 - R961
R98 - Y98

--- J170 ---
D45 - D469
D70
D800 - D849
D890 - D899
J170
M300 - M319
T451
U070 - U072

--- J171 ---
D45 - D469
D70
D800 - D849

--- J178 ---
CONTINUED
U070 - U072

--- J180-J22 ---
A000 - E281
E283 - G942
G948 - R002
R008 - R961
R98 - Y98

--- J300-J304 ---
A429
A439
E840 - E849
E859
J300 - J304
T780 - T789
T885 - T887
U070 - U072

```

Figure 11: PDF decision tables TABB (Modifications) available through Iris

```

TABB - specV2020SR30

--- B161 ---
CONTINUED
LMC M K729 B160
LDC K740 - K742 B180
LDC K744 - K746 B180

--- B162 ---
LDC K721 - K7210 B181
LDC K740 - K742 B181
LDC K744 - K746 B181

--- B169 ---
SMP B160 - B162
LDC K721 - K7210 B181
LMC M K729 B162
LDC K740 - K742 B181
LDC K744 - K746 B181

--- B170 ---
LDC K721 - K7210 B180

--- B178 ---
CONTINUED
LDC K721 - K7210 B188
LDC K740 - K742 B188
LDC K744 - K746 B188

--- B179 ---
SMP B150 - B178
LDC K721 - K7210 B189
LDC K740 - K742 B189
LDC K744 - K746 B189

--- B181 ---
SMP B180

--- B188 ---
DSC B200 - B202 B207
DS B203
DSC B204 - B206 B207
DC B207

```


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 12**.

Figure 12: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B1

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Respiratory failure	1 day
	b	COVID – 19 infected Pneumonia	5 days
	c	COVID – 19 Laboratory confirmed	8 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Hypertension (10 years) Diabetes mellitus type 2 (15 years)	

Result of coding procedure:

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

Table 1: Results, case example B1

PART I	ICD CODES			TUCOD	RULE	TABLE E ACRONYM
Line 1a	J96.9			U07.1	SP3	
Line 1b	J12.8					
Line 1c	U07.1					
Line 1d						
PART II	I10	E11.9				
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**).

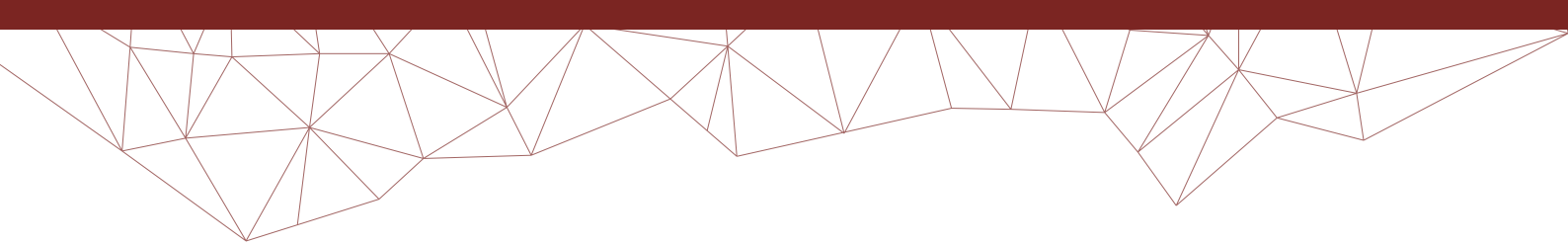
As more than one line is used in Part 1, *Step SP3* is applied

- Look up Table D Address ---J969---, (---J960-J969---): U07.1 (R98 – Y98) is listed
- Look up Table D Address ---J12.8---, (---J120-J168---): U07.1 (R98 – Y98) is listed

✓ **U07.1 selected as tentative starting point (go straight to Step SP6)**

Step SP6 – Obvious cause

- Look up Table E Address ---U071--- 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)

- ✓ 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 13**.

Figure 13: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B2

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Respiratory failure	1 day
	b	Pneumonia	5 days
	c	Corona Virus Disease (COVID - 19) No laboratory confirmation	8 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Hypertension (10 years) Diabetes mellitus type 2 (15 years) Bronchial Asthma (10 years) -----	

Result of coding procedure:

Final underlying cause of death: U07.2 COVID-19 virus not identified (laboratory unconfirmed).

Table 2: Results, case example B2

PART I	ICD CODES				TUCOD	RULE	TABLE E ACRONYM
Line 1a	J96.9				U072	SP3	
Line 1b	J12.8						
Line 1c	U072						
Line 1d							
PART II	I10	E119	J459				
FUCOD	U07.2 COVID-19 virus not 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 – Y98) is listed
- Look up Table D Address ---J12.8---, (---J120-J168---): U07.1 (R98- Y98) is listed
 - ✓ **U07.2 selected as tentative starting point (go straight to Step SP6)**

Step SP6 – Obvious cause

- Look up Table E Address ---U072--- U072: 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 U07.2 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)

- ✓ 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 14**.

Figure 14: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example B3

Frame A: Medical data: Part 1 and 2			
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line		Cause of death	Time interval from onset to death
	a	Cardiac arrest	30 minutes
	b	Non ST elevated myocardial infarction	2 days
	c	Coronary arteriosclerosis	2 Years
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID - 19 laboratory confirmed (17 days), Diabetes mellitus type 2 (10 years), Smoking (30 years), Hypertension (10years), Obesity, Hypercholesterolaemia	

Result of coding procedure:

Final underlying cause of death: I21.4 non-ST elevation myocardial infarction.

Table 3: Results, case example B3

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

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**

Step M1 (Special instructions)

- 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

- 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
 - ✓ **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

Frame A: Medical data: Part 1 and 2				
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line			Cause of death	Time interval from onset to death
	a		Respiratory failure	3 days
	b	Due to	Pneumonia	7 days
	c	Due to	Pregnancy complicated by COVID -19, 32 weeks pregnant	14 days
	d	Due to:		
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				

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

PART I	ICD CODES			TUCOD	RULE	TABLE E ACRONYM
Line 1a	O99.5	J96.9				
Line 1b	O99.5	J12.8				
Line 1c	O98.5	U07.1				
Line 1d						
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
 - ✓ **O98.5 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**

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:

CRVS-info@unimelb.edu.au
crvsgateway.info

CRICOS Provider Code: 00116K

Version: 0620-01

Copyright

© Copyright University of Melbourne June 2020.

The University of Melbourne owns the copyright in this publication, and no part of it may be reproduced without their permission.

Disclaimer

The University of Melbourne has used its best endeavours to ensure that the material contained in this publication was correct at the time of printing. The University gives no warranty and accepts no responsibility for the accuracy or completeness of information and the University reserves the right to make changes without notice at any time in its absolute discretion.

Intellectual property

For further information refer to: unimelb.edu.au/governance/statutes