

# Medical certification, ICD mortality coding, and reporting mortality associated with COVID-19

Technical note

7 June 2020



## Purpose

This technical note describes medical certification of cause of death and classification (International Classification of Diseases [ICD] mortality coding) of deaths related to COVID-19. The primary goal is to identify all deaths due to COVID-19 in all countries, including those not yet following WHO international norms and standards for medical certificates of cause of death and ICD mortality coding. It also addresses the related issue of estimating all deaths associated with the COVID-19 pandemic. The document is divided into three sections: identifying COVID-19 deaths; coding COVID-19 deaths; and measuring and reporting crude mortality in the context of the COVID-19 pandemic (excess mortality).

## Definition of deaths due to COVID 19

- A death **due to** COVID-19 is defined for surveillance purposes as a death resulting from a clinically compatible illness, in a probable or confirmed<sup>a</sup> COVID-19 case, unless there is a clear alternative cause of death that cannot be related to COVID disease (e.g. trauma). There should be no period of complete recovery from COVID-19 between illness and death.
- A death **due to** COVID-19 may not be attributed to another disease (e.g. cancer) and should be counted independently of pre-existing conditions that are suspected of triggering a severe course of COVID-19.
- Deaths **due to** COVID-19 are the ones that are counted in cause of death data collection (for the purposes of COVID-19 death reporting).

NOTE: Deaths **due to** COVID-19 are different from COVID-19-**related** (or COVID-19-associated) deaths. These may be deaths due to accidental or incidental causes, or natural causes when COVID-19 is not identified as the underlying cause of death according to ICD coding guidance (see Section 4.2)

## Guidance for certifying COVID-19 as a cause of death

In view of the need for accurate COVID-19 statistics, it is important to record and report deaths **due to** COVID-19 in a uniform way.

### Recording COVID-19 on the medical certificate of cause of death

COVID-19 should be recorded on the medical certificate of cause of death for ALL decedents where the disease caused, or is assumed to have caused, or contributed to death.

### Terminology

The official terminology, COVID-19,<sup>b</sup> should be used for all certification of this cause of death.

Because there are multiple coronaviruses that infect humans, it is recommended not to use “coronavirus” in place of COVID-19. This helps to reduce uncertainty in the classification or coding and to correctly monitor these deaths.

### Chain of events

Specification of the causal sequence leading to death in Part 1 of the certificate is important. For example, in cases when COVID-19 causes pneumonia and fatal respiratory distress, both pneumonia and respiratory distress should be included, along with COVID-19, in Part 1. Certifiers should include as much detail as possible based on their knowledge of the case, as from medical records or laboratory testing (e.g. “COVID-19 (test positive)”).

<sup>a</sup> Confirmation of COVID-19 infection should be based on established laboratory diagnostic criteria<sup>1</sup>

<sup>b</sup> Temporary name was 2019-nCoV acute respiratory disease<sup>2</sup>

**Example of how to certify the chain of events for deaths due to COVID-19 in Part 1 of the International Form of Medical Certificate of Cause of Death**

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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	Acute respiratory distress syndrome	2 days
		b	Due to: Pneumonia	10 days
		c	Due to: COVID-19 (test positive)	14 days
		d	Due to:	
			Underlying cause of death	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: This is a typical course with a medical certificate of cause of death that has been filled in correctly. Please remember to indicate whether the virus causing COVID-19 had been identified in the deceased.

**Comorbidities**

There is increasing evidence that people with existing chronic conditions or compromised immune systems are at higher risk of death due to COVID-19. Chronic conditions may be non-communicable diseases, such as coronary artery disease, chronic obstructive pulmonary disease (COPD), and diabetes, or chronic communicable diseases, such as HIV (see below), or disabilities. If the decedent had existing chronic conditions such as these, they should be reported in Part 2 of the medical certificate of cause of death.

**Examples of how to certify a chain of events for deaths due to COVID 19 in Part 1 of the International Form of Medical Certificate of Cause of Death, with comorbidities reported in Part 2**

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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	Acute respiratory distress syndrome	2 days
		b	Due to: Pneumonia	10 days
		c	Due to: Suspected COVID-19	12 days
		d	Due to:	
			Underlying cause of death	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Coronary artery disease [5 years], Type 2 diabetes [14 Years], Chronic obstructive pulmonary disease [8 years]		
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: This is a typical course with a medical certificate of cause of death that is filled in correctly. COVID-19 cases may have comorbidities. The comorbidities are recorded in Part 2.

Frame A: Medical data: Part 1 and 2			
<b>1</b> 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  <div style="border: 1px solid black; padding: 2px; display: inline-block;">Underlying cause of death</div>		Cause of death	Time interval from onset to death
	a	Acute respiratory distress syndrome	2 days
	b	Due to: Pneumonia	10 days
	c	Due to: COVID-19	10 days
	d	Due to:	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Cerebral palsy [10 Years]	
<b>Manner of death:</b>			
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault	
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention	
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War	
		<input type="checkbox"/> Could not be determined	
		<input type="checkbox"/> Pending investigation	
		<input type="checkbox"/> Unknown	

Note: This is a typical course with a certificate that has been filled in correctly. COVID-19 cases may have comorbidities. The comorbidities are recorded in Part 2


### Other examples

#### COVID-19 and maternal mortality:

Frame A: Medical data: Part 1 and 2			
<b>1</b> 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  <div style="border: 1px solid black; padding: 2px; display: inline-block;">Underlying cause of death</div>		Cause of death	Time interval from onset to death
	a	Respiratory failure	2 days
	b	Due to: Pneumonia	8 days
	c	Due to: Pregnancy complicated by COVID-19	12 days
	d	Due to:	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			
<b>Manner of death:</b>			
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault	
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention	
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War	
		<input type="checkbox"/> Could not be determined	
		<input type="checkbox"/> Pending investigation	
		<input type="checkbox"/> Unknown	
<b>For women, was the deceased pregnant?</b>			
<input checked="" type="checkbox"/> At time of death		<input type="checkbox"/> Within 42 days before the death	
<input type="checkbox"/> Between 43 days up to 1 year before death		<input type="checkbox"/> Unknown	
Did the pregnancy contribute to the death?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Unknown	


Note: This is a typical course with a certificate that is filled in correctly. In case of a pregnancy, puerperium or birth leading to death in conjunction with COVID-19, please record the sequence of events as usual, and remember to enter the additional detail for pregnancies in frame B of the certificate of cause of death.

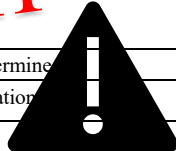
**COVID-19 and HIV:**

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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	Acute respiratory distress syndrome	3 days
		b	Due to: COVID-19	One week
		c	Due to:	Underlying cause of death
d	Due to:			
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		HIV disease [5 years]		
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown




Note: This is a typical course with a certificate that is filled in correctly. The certifier has identified HIV disease as contributing to the death and recorded it in Part 2.

The examples below show recording of cases where death may have been influenced by **COVID-19**, but death was caused by another disease or an accident.

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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	Hypovolaemic shock	1 day
		b	Due to: Aortic dissection	1 day
		c	Due to: Motor vehicle accident	2 days
	d	Due to:	Underlying cause of death	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID-19		
<b>Manner of death:</b>				
<input type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input checked="" type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

**NOT COVID-19 DEATH** 

Note: Persons with COVID-19 may die of other diseases or accidents. Such cases are not deaths due to COVID-19 and should not be certified as such. If it is thought that COVID-19 aggravated the consequences of the accident, COVID-19 may be reported in Part 2. Please remember to indicate the manner of death and record in Part 1 the exact kind of an incident or other external cause.

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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	Heart failure	1 day
		b	Due to: Myocardial infarction	5 days
		c	Due to:	
		d	Due to:	
			Underlying cause of death	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			COVID-19	
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: The clinical illness and sequence of events leading to death may indicate that even in the presence of COVID-19 a person dies due to other conditions, as in the example above. Such cases are not deaths due to COVID-19 and should not be certified as such. The eventual presence of COVID-19 may then be recorded in part 2 of the certificate, in case it might have influenced the course of the condition leading to death.

### Guidance for coding COVID-19 for mortality



This section addresses the specialized coding community. It provides information about the ICD 10 codes for COVID-19 and includes mortality classification (coding) instructions for statistical tabulation in the context of COVID-19.

#### New ICD-10 codes for COVID-19

- U07.1 COVID-19, virus identified<sup>3</sup>: <https://icd.who.int/browse10/2019/en#/U07.1>
- U07.2 COVID-19, virus not identified<sup>3</sup>: <https://icd.who.int/browse10/2019/en#/U07.2>
- Clinically or epidemiologically diagnosed COVID-19
  - Probable COVID-19
  - Suspected COVID-19

Details of the updates to ICD-10 are available online<sup>4</sup> at: <https://www.who.int/classifications/icd/icd10updates/en/>.

#### ICD-10 cause of death coding of COVID-19

Though “COVID-19” is the standard recommended terminology, certifiers may use a range of terms to describe COVID-19 as a cause of death. A list of potential terms can be found in the annex of this document.

Although both categories, U07.1 (COVID-19, virus identified) and U07.2 (COVID-19, virus not identified) are suitable for cause of death coding, it is recognized that in many countries detail as to the laboratory confirmation of COVID-19 will NOT be reported on the death certificate. In the absence of this detail, it is recommended, for mortality purposes only, to code COVID-19 provisionally to U07.1 unless it is stated as “probable” or “suspected”.

The international rules and guidance for selecting the underlying cause of death for statistical tabulation apply when COVID-19 is reported on a death certificate. But, 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 and emerging diseases reportable to WHO). Further, there is no provision in the classification to link COVID-19 to other causes or modify its coding in any way.

With reference to section 4.2.3 of volume 2 of ICD-10, the purpose of mortality classification (coding) is to produce the most useful cause of death statistics possible. Thus, whether a sequence is listed as ‘rejected’ or ‘accepted’ may reflect interests of importance for public health rather than what is acceptable from a purely medical point of view. Therefore, always apply these instructions, whether they can be considered medically correct or not. Individual countries should not correct what is assumed to be an error, since changes at the national level will lead to data that are less comparable to data from other countries, and thus less useful for analysis.

A manual plausibility check is recommended for certificates where COVID-19 is reported, in particular for certificates where COVID-19 was reported but not selected as the underlying cause of death for statistical tabulation.

### Chain of events

*Example of how to code this chain of events and select the underlying cause of death for deaths due to COVID 19 in Part 1 of the International Form of Medical Certificate of Cause of Death*

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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		Acute respiratory distress syndrome J80	2 days
	b	Due to:	Pneumonia J18.9	10 days
	c	Due to:	COVID-19 (test positive) U07.1	14 days
	d	Due to:		
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Underlying cause of death		
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: Select COVID-19 as underlying cause of death. Step SP3 applies as causes have been reported on more than one line in Part 1 and the condition reported first on the lowest used line (COVID-19) can cause all the conditions, pneumonia (J18.9) and acute respiratory distress syndrome (J80)—mentioned on the lines above. [See ICD-10 2016 and later, Volume 2, Section 4.2.1].

### Comorbidities

*Examples of how to code this chain of events on the International Form of Medical Certificate of Cause of Death, and select the underlying cause of death for deaths due to COVID 19 in Part 1, with comorbidities reported in Part 2*

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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		Acute respiratory distress syndrome J80	2 days
	b	Due to:	Pneumonia J18.9	10 days
	c	Due to:	Suspected COVID-19 U07.2	12 days
	d	Due to:		
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Coronary artery disease [5 years], Type 2 diabetes [14 Years], Chronic obstructive pulmonary disease [8 years] I25.1, E11.9, J44.9		
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: Code all entries in Part 1 and 2, and, in this example, select COVID-19, specified as suspected (the case is explicitly stated as not having been confirmed) as underlying cause of death. Step SP3 applies as causes have been reported on more than one line in Part 1 and the condition reported first on the lowest used line (COVID-19) can cause all the conditions—pneumonia (J18.9) and acute respiratory distress syndrome (J80)—mentioned on the lines above. [See ICD-10 2016 and later, Volume 2, Section 4.2.1].

Frame A: Medical data: Part 1 and 2			
<b>1</b> 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	Acute respiratory distress syndrome <b>J80</b>	2 days
	b	Due to: Pneumonia <b>J18.9</b>	10 days
	c	Due to: COVID-19 <b>U07.1</b>	10 days
	d	Due to:	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Cerebral palsy [10 Years] <b>G80.9</b>	
<b>Manner of death:</b>			
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault	
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention	
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War	
		<input type="checkbox"/> Could not be determined	
		<input type="checkbox"/> Pending investigation	
		<input type="checkbox"/> Unknown	

Note: Code all entries in Part 1 and 2, and, in this example, select COVID-19 as underlying cause of death (the case has probably tested positive). Step SP3 applies as causes have been reported on more than one line in Part 1 and the condition reported first on the lowest used line (COVID-19) can cause both of the conditions—pneumonia (J18.9) and acute respiratory distress syndrome (J80)—mentioned on the lines above. [See ICD-10 2016 and later, Volume 2, Section 4.2.1]

#### Other examples

Frame A: Medical data: Part 1 and 2			
<b>1</b> 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 <b>Code both, O99.5 and J96.9</b>	2 days
	b	Due to: Pneumonia <b>Code both, O99.5 and J18.9</b>	8 days
	c	Due to: Pregnancy complicated by COVID-19 <b>Code both, O98.5 and U07.1</b>	12 days
	d	Due to:	
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			
<b>Manner of death:</b>			
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault	
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention	
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War	
		<input type="checkbox"/> Could not be determined	
		<input type="checkbox"/> Pending investigation	
		<input type="checkbox"/> Unknown	
<b>For women, was the deceased pregnant?</b>			
<input checked="" type="checkbox"/> At time of death		<input type="checkbox"/> Within 42 days before the death	
<input type="checkbox"/> Between 43 days up to 1 year before death		<input type="checkbox"/> Unknown	
Did the pregnancy contribute to the death?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Unknown	

Note: Code all entries in Part 1 and 2, and, in this example, select other viral diseases complicating pregnancy, childbirth, and the puerperium (O98.5) as underlying cause of death. Step SP3 applies as causes have been reported on more than one line in Part 1 and the condition reported first on the lowest used line (other viral diseases complicating pregnancy, childbirth and the puerperium) can cause both of the conditions—pneumonia (O99.5 and J18.9) and acute respiratory distress syndrome (O99.5 and J80)—mentioned on the lines above. [See ICD-10 2016 and later, Volume 2, Section 4.2.1]. Use additional code to retain COVID-19. [See ICD-10 2016 and later, Volume 2, Section 4.2.8 Special instructions on maternal mortality (Step M4)].



Examples of **incorrect** certification

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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		Acute respiratory distress syndrome J80	3 days
	b	Due to:	COVID-19 U07.1	One week
	c	Due to:	HIV disease B24	5 years
	d	Due to:		
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				
<b>Manner of death:</b>				
<input checked="" type="checkbox"/> Disease		<input type="checkbox"/> Assault		<input type="checkbox"/> Could not be determined
<input type="checkbox"/> Accident		<input type="checkbox"/> Legal intervention		<input type="checkbox"/> Pending investigation
<input type="checkbox"/> Intentional self harm		<input type="checkbox"/> War		<input type="checkbox"/> Unknown

Note: The certifier should have added the HIV disease as a comorbidity in Part 2 of the medical certificate of cause of death; however, the selection rules of ICD allow for identification of COVID-19 as underlying cause of death. COVID-19 is reported in a sequence starting with a terminal condition (Acute respiratory distress syndrome due to COVID-19). Mortality coding rule step SP4 applies as causes have been reported on more than one line in Part 1 and the condition reported first on the lowest used line (HIV disease) cannot cause all the conditions. [See ICD-10 2016 and later, Volume 2, Section 4.2.1].

Frame A: Medical data: Part 1 and 2				
<b>1</b> 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		Hypovolaemic shock T79.4	1 day
	b	Due to:	Aortic dissection S25.0	1 day
	c	Due to:	Motor vehicle accident V89.2	2 days
	d	Due to:		
<b>2</b> Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			COVID-19 U07.1	
<b>Manner of death:</b>				

预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_24554](https://www.yunbaogao.cn/report/index/report?reportId=5_24554)

