COVID-19 Deaths: Rapid reference guide for correct certification

Key facts

- **Definitions[1]:**
  - **Confirmed COVID-19 case:** a person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.
  - **Suspect COVID-19 case:**
    - A) a patient with acute respiratory illness AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset;
    - B) a patient with any acute respiratory illness AND having been in contact with a confirmed or probably COVID-19 case in the last 14 days prior to symptom onset;
    - C) a patient with severe acute respiratory illness AND in the absence of an alternative diagnosis that fully explains the clinical presentation.
  - **Probable COVID-19 case:**
    - A) a suspect case for whom testing for the COVID-19 virus is inconclusive;
    - B) a suspect case for whom testing could not be performed for any reason.
    - Note, often the case has clinical images or exams indicating that characteristics of COVID-19 are present including signs and symptoms.

Correct certification

- Deaths due to COVID-19 infection should be accurately recorded in the Medical Certificate of Cause of Death (MCCD).
- The certifiers (usually the attending physician) should report the relevant condition/s in the MCCD in a logical sequence of events leading to the death with the time interval from the onset of each condition.
- Standard abbreviation is "COVID-19" and is the accepted, unambiguous abbreviation used worldwide.[2]

Clinical sequence of events leading to death

- COVID-19 is the underlying cause of death (UCOD) and is reported in the lowest used line of Part 1 of the MCCD
- Risk of mortality from COVID-19 is significantly higher among patients with co-existing chronic diseases. These are important to report in Part 2 of the MCCD and may include:

[1] Global Surveillance for COVID-19 caused by human infection COVID-19 virus, Interim guidance - 20 March 2020 https://www.who.int/publications/i/item/global-surveillance-for-human-infection-with-novel-coronavirus-(2019-ncov)

[2] Other terms used by certifiers that can be coded as synonyms of COVID-19 include: COVID Positive; Coronavirus Pneumonia (unless clearly related to non-COVID-19 coronavirus); COVID-19 Infection; SARS-CoV-2 Infection; COVID-19 Coronavirus; Infection – COVID-19 (Coroner informed); Hospital Acquired Pneumonia – COVID-Positive; Corona Virus two infection (SARS-CoV-2); Coronavirus-Two Infection; Novel Coronavirus.

- Non-communicable diseases (e.g. Diabetes Mellitus, Hypertension, Coronary Artery Disease, Chronic Obstructive Pulmonary Disease, Bronchial Asthma)
- Chronic communicable diseases (e.g. HIV)
- Disabilities

- Example of typical pathway: COVID-19 (**Underlying cause of death-** leads to) ----> Pneumonia caused by COVID-19 (**Intermediate cause of death** - leads to) ----> Acute Respiratory Distress Syndrome (**Immediate cause of death -** leads to) ----> Death

Indicate if virus is laboratory confirmed or not

- For statistical purposes it is extremely important to identify whether the COVID-19 death is laboratory confirmed or not laboratory confirmed but clinically/epidemiologically diagnosed.
- As there are two different codes used, differentiating this during the certification process is critical for correct tabulation and analysis:
  - Confirmed case → ICD-10 code U07.1 (ICD-11 code RA01.0)[3]
    - Note: Virus identified or laboratory confirmed
  - Suspect or Probable case → ICD-10 code U07.2 (ICD-11 code RA01.1)[3]
    - Note: Virus not identified/laboratory not confirmed but clinically/epidemiologically diagnosed

Examples of most common errors in certifying COVID-19 deaths

UCOD ill-defined and illogically sequenced

Example 1

	Cause of death	Time interval from onset to death
a	**COVID-19 (Laboratory confirmed)**	**2 weeks**
b	Due to: **Bilateral pneumonia**	**4 days**
c	Due to: **Respiratory failure**	**hours**
d	Due to:	

UCOD ill-defined condition ✗

	Cause of death	Time interval from onset to death
a	**Bilateral pneumonia**	**4 days**
b	Due to: **COVID-19 (Laboratory confirmed)**	**2 weeks**
c	Due to:	
d	Due to:	

✓

Example 2

	Cause of death	Time interval from onset to death
a	**COVID-19 (Virus identified)**	**10 days**
b	Due to: **Bronchopneumonia**	**2 days**
c	Due to: **Respiratory arrest**	**Minutes**
d	Due to:	

UCOD ill-defined condition ✗

	Cause of death	Time interval from onset to death
a	**Bronchopneumonia**	**2 days**
b	Due to: **COVID-19 (Virus identified)**	**10 days**
c	Due to:	
d	Due to:	

✓

Example 3

	Cause of death	Time interval from onset to death
a	**Bilateral pneumonia**	**4 days**
b	Due to: **COVID-19 (Laboratory confirmed)**	**2 weeks**
c	Due to: **Abdominal pain**	**2 days**
d	Due to:	
ibuting led in		

UCOD ill-defined condition

	Cause of death	Time interval from onset to death
a	**Bilateral pneumonia**	**4 days**
b	Due to: **COVID-19 (Laboratory confirmed)**	**2 weeks**
c	Due to:	
d	Due to:	
ibuting led in		

Example 4

	Cause of death	Time interval from onset to death
a	**Bronchopneumonia**	**2 days**
b	Due to: **COVID-19 (Virus identified)**	**12 days**
c	Due to: **Severe headache**	**2 days**
d	Due to:	
ibuting led in		

UCOD ill-defined condition

	Cause of death	Time interval from onset to death
a	**Bronchopneumonia**	**2 days**
b	Due to: **COVID-19 (Virus identified)**	**12 days**
c	Due to:	
d	Due to:	
ibuting led in		

Incorrect sequencing of conditions

Example 1

	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 (Virus identified)**	**12 days**
d	Due to: **Insulin dependent diabetes mellites**	**10 years**
ibuting led in		

Incorrect sequencing of UCOD

	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 (Virus identified)**	**12 days**
d	Due to:	
ibuting led in	**Insulin dependent diabetes mellites (10 Years)**	

- Insulin dependent diabetes mellites is documented in the lowest used line of Part 1 of the MCCD and represents an incorrect/illogical sequence. Insulin dependent diabetes mellites is a *contributary cause* therefore must be reported it in Part 2.

Example 2

	Cause of death	Time interval from onset to death
a	**COVID-19 (Laboratory not confirmed)**	**10 days**
b	Due to: **Bronchopneumonia**	**2 days**
c	Due to:	
d	Due to:	

Incorrect sequencing of UCOD

	Cause of death	Time interval from onset to death
a	**Bronchopneumonia**	**2 days**
b	Due to: **COVID-19 (Laboratory not confirmed)**	**10 days**
c	Due to:	
d	Due to:	

- Bronchopneumonia documented in the lowest used line of Part 1 of the MCCD and represents an incorrect/illogical sequence. Instead COVID-19 (Laboratory not confirmed) must be reported in the lowest used line.

Other general errors committed during certification

- Illegible handwriting
- Making alterations or erasures
- Use of correction fluid to correct an incorrect entry
- Use of non-standard abbreviations[3]

[3] Sri Lanka handbook for medical certification ref TBA

COVID-19 CASE SCENARIOS for COD GUIDE App

Case scenarios

Case scenario 1	**68-year-old male with a 20-year history of type II diabetes mellites and a 5-year history of chronic kidney disease**
Presented to hospital	• 4 days fever, body aches and sore throat • Recent history of overseas travel
Upon examination and investigation	• Febrile and ill looking • Mild breathing difficulties • Polymerase Chain Reaction (PCR) test - positive for COVID-19
While at ward	• Moderate breathing difficulties on day 6 of admission • Chest x-ray confirmed a bilateral pneumonia • Severe respiratory distress on day 7
Transferred to ICU	• Despite aggressive treatment worsening respiratory distress • Expired on the same day

Figure 1: Completed International Form of Medical Certificate of Cause of Death, Frame A – case scenario 1

***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	**Severe acute respiratory distress syndrome**	**1 day**
		b	Due to: **COVID-19 infected pneumonia**	**10 days**
		c	Due to: **COVID-19, Laboratory confirmed**	**11 days**
		d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			**Diabetes Mellites Type II (20 Years)** **Chronic Kidney Disease (5 Years)**	

Pop up message on App: *Important to indicate whether COVID-19 has been confirmed in the deceased. COVID-19 cases may have comorbidities. These are recorded in Part 2 with time intervals in brackets.*

Case scenario 2

Case scenario 2	**59-year-old lady with a 13-year history of Hypertension, Bronchial Asthma 10 years and Carcinoma of Breast for the last 6 months**
Presented to hospital	• Loss of taste for 2 days and • Difficulty in breathing for 1 day • Was on self-quarantine due to an exposure to a COVID-19 positive person
Upon examination and investigation	• Moderate breathing difficulties • Fever, muscle pain and body aches • Chest x-ray confirmed a bilateral pneumonia • Nasopharyngeal swab for a PCR test was sent to a remote laboratory since laboratory testing is not available • A clinical diagnosis of COVID-19 was made pending PCR test results • Oxygen measure in blood is low (65%) by oximetry

While at ward	• Severe breathing difficulties on day 2 of admission • Confirmed as having Severe Acute Respiratory Distress Syndrome • Lack of response to aggressive supportive therapy • Respiratory arrest on the same day • PCR test results not received

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

***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	**Severe acute respiratory distress syndrome**	**Hours**
		b	Due to: **COVID-19 infected pneumonia**	**2 days**
		c	Due to: **COVID-19, Probable case (PCR test collected)**	**4 days**
		d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			**Hypertension (13 years), Bronchial Asthma (10 years)** **Carcinoma of left breast (6 months)**	

Pop up message on App: *It is important to indicate if COVID-19 has not been laboratory confirmed but clinically or epidemiologically diagnosed in the deceased as well as any relevant co-morbidities in Part 2. If the virus is not identified it is good practice to state that this is a "Probable Case" and if PCR test was collected but results not received this can also be noted in Part 2 or in Part 1c. This will help coders to search for lab results in the future for greater precision.*

Case scenario 3

Case scenario 3	**65-year-old female with a 15-year history of non-insulin-dependent diabetes mellitus, hypercholesterolemia and ischemic heart disease for last 5-years**
Presented to hospital	• 5-day history of fever, sore throat and a dry cough • Retrosternal chest pain of 6-hours
Upon examination and investigation	• ECG showed myocardial ischemia • PCR test on a nasopharyngeal swab was positive for COVID-19 virus • Mild breathing difficulties
While at ward	• Fever, sore throat and cough subsided on day 4 of admission • Second PCR test negative for COVID-19 on hospital day 9 • Sudden severe tightening retrosternal chest pain associated with sweating, nausea and vomiting on day 10 morning • ECG – acute left anterior myocardial infarction • Urgent transfer to Coronary Care Unit (CCU)
While at CCU	• Cardiac condition further aggravated • Goes into cardiac arrest in next 2 hours • All attempts of resuscitation were unsuccessful and died in minutes

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

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	**Acute myocardial infarction (left anterior)**	**2 hours**
		b	Due to: **Ischemic Heart Disease**	**5 years**
		c	Due to:	
		d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			**COVID-19 (Virus identified) (15 days)** **Non-insulin dependent diabetes mellitus; Hypercholesterolemia (15 years)**	

Pop up message on App: *The patient died of an acute myocardial infarction following long term ischemic heart disease. Here, COVID-19 is* ***not*** *the underlying cause but may have contributed for the death and therefore is reported in Part 2 of the MCCD. It is also recommended to report all other contributary causes.*

Case scenario 4

Case scenario 4	**A 36-year-old man was brought to the hospital**
Presented to hospital	• 6-day history of fever, abdominal pain, anorexia, nausea and a dry cough • He also complained of shortness of breath for the last 3-days
Upon examination and investigation	• Intense pain over the lower right quadrant of the abdomen and febrile (Temperature 41.2° C) • Mild breathing difficulties
While at ward	• Worsening abdominal pain and breathing difficulties • WBC – high neutrophil count (76%) • Abdominal ultrasound – compatible with acute appendicitis • Chest x-ray – compatible with right sided pneumonia • PCR test positive for COVID-19 • Patient was prepared for emergency surgery to remove his appendix • Unfortunately, he developed a perforated appendix and peritoneal contamination • Though he was subjected for surgery his condition deteriorated and died due to septicaemia

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	**Septicaemia**	**1 Hour**
		b	Due to: **Peritonitis**	**3 Hours**
		c	Due to: **Perforated appendix**	**3 Hours**
		d	Due to: **Acute appendicitis**	**6 Days**
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			**COVID-19 (Lab confirmed) (6 days)** **Right sided pneumonia (3 days)**	

Pop up message on App: *The patient died of septicemia due to acute appendicitis despite having pneumonia. PCR test was positive however at this point COVID-19 can only be recorded in Part 2 as there is no clearly established relationship between COVID-19 and acute appendicitis.*