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CRVS technical guide

Correctly certifying deaths due to COVID-19: guidance for physicians

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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

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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.

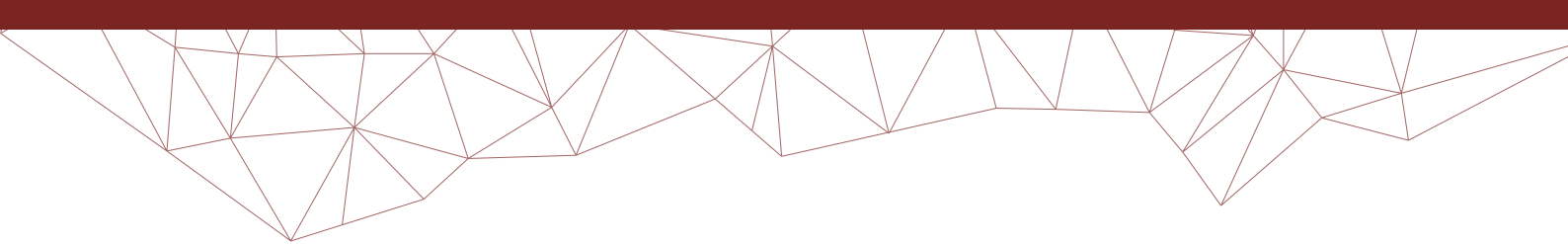
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Correctly certifying deaths due to COVID-19: guidance for physicians

This guidance document provides information for physicians on how to correctly certify deaths due to COVID-19. A video version of this text is available at: <https://crvsgateway.info/CertifyCOVID19>

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Introduction

In December 2019, an outbreak of a respiratory disease associated with a novel coronavirus was reported in the city of Wuhan, 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 disease progression in the population and assess the impact of interventions.

Cause of death certification

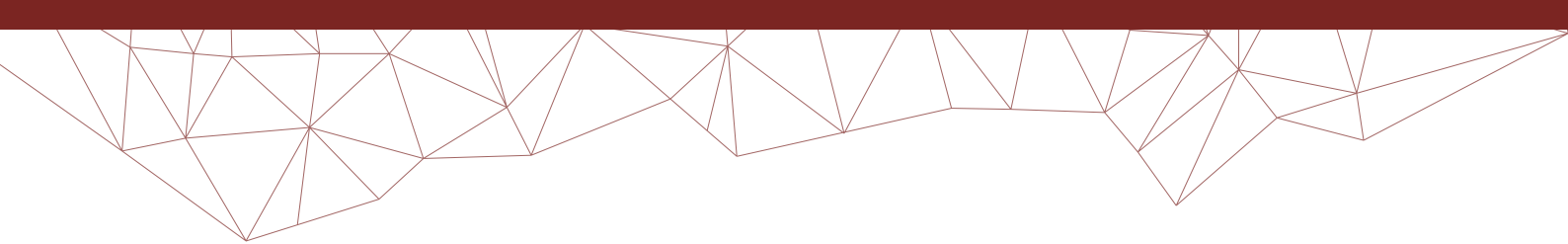
In addition to disease and intervention monitoring, cause of death information serves several purposes, including: assessing mortality risks across a population; informing health policy and planning, including the management and allocation of healthcare resources, and; reinforcing accountability and transparency for good governance.²

Certification of death is one of the first steps in obtaining an overview of the health of individuals. The diseases or conditions recorded on a death certificate represent the best medical opinion. 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.

The International Form of Medical Certificate of Cause of Death (known as the death certificate) is recommended by the WHO for certification of death in all countries. One way of looking at the death certificate is that it provides a framework for the organisation of clinical diagnoses used for public health purposes.

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>



The death certificate is divided into three sections:

1. Part 1— to record the sequence/chain of events leading to death;
2. Part 2— to record other significant conditions contributing to death, and;
3. A column to record the approximate time interval between onset of the condition and death.

Part 1 of the death certificate

Part 1 of the death certificate has four lines for reporting the sequence/chain of events leading to death, labelled 1(a), 1(b), 1(c) and 1(d). The direct cause of death is entered at Part 1(a). If the death was a consequence of another disease or condition, this underlying cause should be entered at 1(b). If there are more events leading to death, write these in order at 1(c) and 1(d).

The underlying cause of death, the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury should be reported in the lowest used line of Part 1.

Part 2 of the death certificate

Part 2 of the death certificate records all other significant or contributory diseases or conditions that were present at the time of death but did not directly lead to the underlying cause of death listed in Part 1.

Time intervals

The column on the right-hand side of the death certificate is for recording the approximate time interval between the onset of the condition/s and the date of death.

The time interval should be entered for all conditions reported on the death certificate, especially for the conditions reported in Part 1. These intervals are usually established by the physician based on available information. In some cases, the interval needs to be estimated. Time periods such as minutes, hours, days, weeks, months or years can be used.

If the time of onset is unknown or cannot be determined, write 'unknown'.

Reporting time intervals are very important, therefore, do not leave this column blank. This information is useful for coding certain diseases and provides a check on the accuracy of the reported sequence of conditions.

For an overview of how to correctly certify deaths, see the *Medical certificate of cause of death: Quick reference guide*, available at: <https://crvsgateway.info/file/12233/58>

Certifying deaths due to COVID-19

If a patient dies following a COVID-19 infection, this condition should be recorded in the death certificate. To certify COVID-19 deaths correctly, the physician will report the relevant conditions in the death certificate in a logical sequence. Generally, patients with a COVID-19 infection may die of severe respiratory distress caused by pneumonia, caused by 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 the risk of mortality from COVID-19 is higher among patients with co-existing chronic illnesses such as diabetes mellitus, hypertension, and chronic obstructive pulmonary disease, etc. 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 necessary to state whether the COVID-19 infection was 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 can be made. In such cases, COVID-19 should be reported as the underlying cause in the death certificate. As there are two distinct ICD-10 codes used for coding COVID-19 deaths - U07.1 (COVID-19, virus identified) and U07.2 (COVID-19, virus not identified) - recording this information is highly important.

Common mistakes to avoid when certifying deaths due to COVID-19

Evaluation studies have shown that medical certificates of cause of death are often of poor quality, even when the cause of death has been certified by a physician. In many countries, physicians do not get adequate opportunities to learn about death certification as part of their medical training. In addition, some hospitals lack the basic diagnostic facilities that are needed to determine accurately the cause of death.³ In general, healthcare institutions cannot achieve accurate and complete death certification if the medical records department is not functioning well. Physicians will not be able to locate supporting information, which will lead to low-quality certification.

Reporting ill-defined conditions as the underlying cause is a common mistake made by physicians (see **Figure 1**). For example, while COVID-19 patients are dying of severe respiratory distress or respiratory failure, these are not underlying causes as they can be caused by a number of other conditions. The underlying cause for COVID-19 deaths should always be reported as either *COVID-19 virus identified*, or *COVID-19 virus not identified*.

Figure 1: Example of ill-defined condition and illogical sequencing recorded on death certificate

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	COVID - 19 Laboratory confirmed	10 days
	b	Respiratory failure	1 day
	c	Due to	
	d	Due to	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			

In the example shown in **Figure 1**, respiratory failure is reported as the underlying cause in the lowest used line. Respiratory failure is an ill-defined condition and it is not acceptable as an underlying cause of death. Apart from the underlying cause being ill-defined, the sequence here is illogical.

³ Hart, J, Sorchik, R, Bo, KS, Chowdhury, H R et al. Improving medical certification of cause of death: effective strategies and approaches based on experiences from the Data for Health Initiative. BMC Medicine. 2020;18:1-11. Available from: <https://crvsgateway.info/file/14408/3774>

Incorrect sequencing of conditions in the death certificate can lead to an incorrect underlying cause of death selection (see **Figure 2**). When a clinically improbable sequence of events is recorded, it is impossible to select the correct underlying cause of death.

Figure 2: Example of illogical/incorrect sequencing recorded on death certificate

<i>Frame A: Medical data: Part 1 and 2</i>			
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	Pneumonia	5 days
	c	COVID - 19 Laboratory confirmed	17 days
	d	Pulmonary tuberculosis	1 year
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			

In the example shown in **Figure 2**, the physician has reported pulmonary tuberculosis in the lowest line and COVID-19 in the line above. This is an incorrect or illogical sequence, because tuberculosis cannot cause COVID-19. In this case, the physician should report pulmonary tuberculosis in Part 2 of the death certificate.

Death certificates need to be completed clearly so that coders and other users can read the information provided. Illegible handwriting makes it hard, and often impossible, for coders to correctly identify the stated condition. Death certificates should always be filled out clearly so that the writing is legible to other users.

In addition to writing legibly, doctors can ensure certificates are interpretable by avoiding the use of abbreviations where possible. Abbreviations can mean different things to different people, and coders may not understand or may misinterpret the abbreviation and code the death to a non-relevant code. However, the abbreviation “COVID-19” is a standard accepted worldwide and, therefore, unambiguous.

Case example 1

A 45-year-old person who had recently travelled overseas, was admitted to the hospital with a three-day history of fever and sore throat. The nasopharyngeal swab was positive for COVID-19.

On the day of admission, the patient developed breathing difficulties and was diagnosed with pneumonia. On the fifth day of hospitalisation, the patient developed severe respiratory distress and died soon thereafter. The patient had a 15-year history of type 2 diabetes and a 10-year history of hypertension.

Figure 3: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example 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	COVID - 19 infected pneumonia	5 days
	c	Corona Virus Disease (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)	

Case example 2

A 76-year old person who reported recent contact with a COVID-19 positive individual, was admitted to the hospital with a history of fever and fatigue for eight days and breathing difficulties for five days.

The chest X-ray on admission showed evidence of bilateral pneumonia.

Facilities for laboratory testing were not available in the hospital, but a clinical diagnosis of COVID-19 was made

The patient then developed severe respiratory distress and died on the same day of admission.

The patient had a 15-year history of type 2 diabetes and 10-year history of hypertension. The patient had been a known asthmatic for the last 10 years.

Figure 4: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example 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	1 day
	b	COVID - 19 infected 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)	

Case example 3

A 60-year old male was admitted to a hospital with a five-day history of fever, sore throat and body aches. He gave a history that included two years of occasional chest discomfort, hypertension, a 30-year history of one-pack per-day cigarette smoking, and a 10-year history of insulin-dependent diabetes mellitus. He was noted to be markedly obese and to have severe hypercholesterolemia.

His nasopharyngeal swab for polymerase chain reaction (PCR) was positive upon admission. Three days after hospitalisation, his fever and sore throat subsided. On the tenth day of hospitalisation, the second PCR was negative. One day later, the patient complained of sudden tightening retrosternal chest pain associated with sweating, nausea and vomiting. ECG showed evidence of non-ST elevation anterior myocardial infarction. A cardiac catheterisation done on the next day demonstrated severe multi-vessel coronary artery stenosis. Two hours after the cardiac catheterisation, he again developed severe chest pain and went into cardiac arrest. Despite all attempts of resuscitation, the patient expired thirty minutes after the arrest.

Figure 5: Completed International Form of Medical Certificate of Cause of Death, Frame A – case example 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	Non ST elevation myocardial infarction	2 days
	b	Coronary arteriosclerosis	2 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 (test positive) (17 days)Hypertension (10 years) Diabetes mellitus type 2 (10 years) Smoking (30 years) Obesity, Hypercholesterolaemia		

COVID-19 patients may die of other diseases or accidents. In the example shown in **Figure 5**, the patient died of myocardial infarction caused by coronary arteriosclerosis. In this case, COVID-19 is not the underlying cause.

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:



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