



GOVERNMENT OF KERALA

Abstract

Health and Family Welfare Department - Decentralized system of death declaration at District level - Sanction accorded - Orders issued.

HEALTH AND FAMILY WELFARE (F) DEPARTMENT

G.O.(Rt)No.1262/2021/H&FWD Dated,Thiruvananthapuram, 14/06/2021

Read: Meeting on revision of methodology for declaration of COVID-19 deaths in Kerala chaired by Chief Secretary on 8th June 2021.

ORDER

The process of COVID-19 deaths reporting followed in Kerala is based on the ICMR and WHO guidelines intended for the same. As deaths due to COVID-19 are sensitive, the State needs to maintain records and carefully ascertain the cause of death.

2) Declaration of deaths due to COVID-19 on a day-to-day basis is being done based on the medical bulletins with cause of death provided by treating clinician / Institutional Medical Boards. The State unit at Directorate of Health Services compiles all the files and ensure that all necessary information regarding COVID test results is there, medical bulletin is complete and correct before declaring a death due to COVID-19.

3) Kerala state have a well-functioning Death audit committee at State level, a separate body who study every death due to a suspected communicable disease in Kerala. The process is happening for more than 10 years. It is a multidisciplinary team including expert clinicians from all specialty, public health experts and program managers. For all deaths suspected to be due to a communicable disease, every death is being audited. For all deaths suspected to be due to a communicable disease, every death is being studied. Along with detailed information report from District Surveillance Officer/ District Medical Officer, State death audit committee will reach a consensus on cause of death. The objective of the death audit is quality improvement and to see whether any deaths were preventable and suggest recommendations for preventing deaths. Such inputs have helped to

understand why deaths are happening and how could we reduce it. The Summary of COVID-19 deaths reviewed by death audit committee are published in website of Kerala Health department. Also as recommended by World Health Organization the State is performing excess death analysis with the help of vital registration system.

4) In order to further improve the death declaration, it was suggested that de-centralizing the system of declaration of deaths due to COVID-19 to district level could expedite the process of classification of deaths of persons due to / associated with COVID-19 at the time of death, through better coordination with field and hospitals for complete and correct information. Also, it was suggested to establish a web-based application where all deaths suspected to be due to COVID-19 disease could be reported by all hospitals (public and private) on a real time basis in order to cut down the delay in information transfer.

5) Government have examined the matter in detail and are pleased to approve the proposal for establishing a web-based application for reporting the deaths due to / associated with COVID-19 in a decentralized system of declaration of deaths due to / associated with COVID-19 at the district level following the guidelines below.

a. All **Deaths due to / associated with COVID-19** need to be reported in the state.

b. **‘Deaths due to COVID-19’** (where the underlying cause of death is COVID-19) and **‘Deaths associated with COVID-19’** (where the underlying cause of death is ‘NON’ COVID-19) need to be clearly differentiated by the treating clinician. The classification of Deaths due to COVID-19 shall be based on WHO medical certification, ICD mortality coding, and reporting mortality associated with COVID-19 Technical note dated 7 June 2020 (Annexure A) and Guidance for appropriate recording of COVID-19 related deaths in India by ICMR (Annexure B).

c. Persons responsible for reporting of deaths due to / associated to COVID-19 are as follows:

Place of Death	Person Responsible for reporting deaths
Death happening at hospitals	Medical Superintendent / Head of the health facility

Deaths happening at CFLTC/ CSLTC/ DCC	Medical Officer-In-Charge of CFLTC/ CSLTC /DCC
Brought dead cases reported at hospital	Medical Superintendent of the hospital / Head of the health facility
COVID related Deaths occurring at home or during transit reported to the Hospital	Medical Superintendent of the hospital / Head of the health facility

COVID related deaths at home not reported to the hospital, the family member / close relative shall report the death to the nearest Government Hospital and Medical superintendent / Medical officer in Charge to take appropriate action to report the death.

- d. All deaths due to / associated with COVID-19 need to be reported to District Medical Officer (H) within 24 hours of occurrence of deaths.
- e. All deaths due to / associated with COVID-19 need to be entered in online portal and all information transfer need to be done electronically from June 16th 2021 onwards (Annexure C)
- f. All deaths need to be reported with the following documents:
- f.1. Death Certificate (Medical Certificate of Cause of Death - MCCD) issued by the treating clinician/practitioner in proper format- **Cause of death section of Form 4/4A in annexure B : Cause of death section Form 4/4A - Guidance for appropriate recording of COVID-19 related deaths in India, National Centre for Disease Informatics and Research, Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Govt. of India** available at https://ncdirindia.org/Downloads/CoD_COVID-19_Guidance.pdf
 - f.2. A short **medical bulletin** with the following details shall also be submitted along with copy of every death certificate. (Form 4/4A)

a. Name

- b. Age
- c. Gender
- d. Address
- e. Name of LSG where patient resides
- f. Mobile number provided at the time of COVID testing
- g. **SRF ID in LDMS** (labsys) portal
- h. Date of symptom onset
- i. Date of COVID-19 Test Result
- j. Name of institution/ Hospital /Facility: of where death occurred:
- k. Date of Admission to Hospital/Facility: with IP/OP number.....
- l. Place of Death
- m. Manner of death
- n. Date of Death
- o. Time of Death
- p. Name of Hospital that the patient was referred from
- q. Co-morbidity including addictions and obesity
- r. Travel or contact and COVID vaccination history (all doses)
- s. Short Clinical History and Course in hospital including treatments provided
- t. Cause of Death as per **Cause of death section of form 4/4A**
- u. Details of the Medical officer issuing the medical bulletin

g. Medical bulletin will be generated through the Online reporting portal based on information fed by hospital/ clinician/ Medical Officer.

h. A District level committee headed by District Surveillance Officer/ Adl. /Dy District Medical Officer need to evaluate the death and classify the same as deaths due to COVID-19 or other reasons within 24 hours of receipt of the bulletin following ICMR/WHO guidelines. The District Level Committee need to meet daily to review the cases to ensure quick evaluation of deaths.

i. If there are any gaps in Medical Bulletin the district committee may ask the concerned Hospitals but ensure that the death, cause of death and death declaration happens in the next 24 hours.

j. District Surveillance Officer (IDSP) / Adl./ Dy District Medical Officer (PH) through District Medical Officer (H) shall prepare line list of deaths

daily if all medical documents are submitted in the prescribed format.
This process will be facilitated in online portal.

- k. As and when the District Committee uploads the information in online portal, the copy of the Medical Bulletin shall be given to the family of the deceased.
- l. Line list of the Deaths due to COVID-19 shall be sent to State COVID-19 unit managed by PD KSACS and Director SPHL daily by 1pm. This process shall also be done electronically when online portal is fully functional.
- m. State COVID-19 Unit for death shall release the number of deaths due to COVID-19 as per reports from all DSOs through DMOs in the Online portal.
- n. For all deaths, a detailed investigation report shall be prepared by District Surveillance Officer as for all communicable diseases within 14 days of death.
- o. Process of death audit by state death audit committee shall continue, as being done for all communicable diseases.
- p. State COVID-19 unit managed by PD KSACS and Director SPHL shall review 5% of the cases to ensure that all process prescribed have been followed.

6) Excess death analysis shall be continued based on vital registration system.

(By order of the Governor)
RAJAN NAMDEV KHOBRADE
PRINCIPAL SECRETARY

To:
The State Mission Director, National Health Mission,
Thiruvananthapuram
The Managing Director, Kerala Medical Services Corporation Ltd.
The Director of Health Services Thiruvananthapuram
The Director of Medical Education Thiruvananthapuram
The Chairman, State Medical Board

The Principal Accountant General (Audit/A&E), Kerala,
Thiruvananthapuram
All District Medical Officers (Health)
Information & Public Relations (Web & New Media) Department
Stock File/ Office Copy to File F2/31/2020-HEALTH-Part (20)

Forwarded /By order
Signed by Anil Kumar.d
Date: 14-06-2021 17:20:52
Reason: **Approved**
Section Officer

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^a 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,^b 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)”).

^a Confirmation of COVID-19 infection should be based on established laboratory diagnostic criteria¹

^b Temporary name was 2019-nCoV acute respiratory disease²

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			
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 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	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			
Manner of death:			
<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			
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 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	
2 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]			
Manner of death:			
<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			
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 respiratory distress syndrome	2 days
	b	Due to: Pneumonia	10 days
	c	Due to: COVID-19	10 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Cerebral palsy [10 Years]	
Manner of death:			
<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 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			
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	2 days
	b	Due to: Pneumonia	8 days
	c	Due to: Pregnancy complicated by COVID-19	12 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			
Manner of death:			
<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	
For women, was the deceased pregnant?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Unknown
<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				
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 respiratory distress syndrome	3 days
		b	Due to: COVID-19	One week
		c	Due to:	Underlying cause of death
d	Due to:			
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		HIV disease [5 years]		
Manner of death:				
<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.

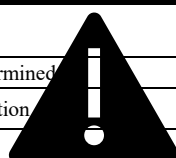
Frame A: Medical data: Part 1 and 2				
1 Report disease or condition directly leading to death on line a Report chain of events in due to order (if applicable) State the underlying cause on the lowest used line			Cause of death	Time interval from onset to death
		a	Hypovolaemic shock	1 day
		b	Due to: Aortic dissection	1 day
		c	Due to: Motor vehicle accident	2 days
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID-19		
Manner of death:				
<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			
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	Heart failure	1 day
	b	Due to: Myocardial infarction	5 days
	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	
Manner of death:			
<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	

NOT COVID-19 DEATH



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 identified³: <https://icd.who.int/browse10/2019/en#/U07.1>
- U07.2 COVID-19, virus not identified³: <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 online⁴ 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			
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 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:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Underlying cause of death	
Manner of death:			
<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			
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 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:	
2 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	
Manner of death:			
<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			
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 respiratory distress syndrome J80	2 days
	b	Due to: Pneumonia J18.9	10 days
	c	Due to: COVID-19 U07.1	10 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		Cerebral palsy [10 Years]	G80.9
Manner of death:			
<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 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			
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 Code both, O99.5 and J96.9	2 days
	b	Due to: Pneumonia Code both, O99.5 and J18.9	8 days
	c	Due to: Pregnancy complicated by COVID-19 Code both, O98.5 and U07.1	12 days
	d	Due to:	
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			
Manner of death:			
<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
For women, was the deceased pregnant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown			
<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				
1 Report disease or condition directly leading to death on line a Report chain of events in due 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:		
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				
Manner of death:				
<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

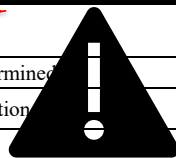
Note: The certifier should have added the HIV disease as a comorbidity in Part 2 of the medical certificate of cause of death; however, the selection rules of ICD allow for identification of COVID-19 as underlying cause of death. COVID-19 is reported in a sequence starting with a terminal condition (Acute 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				
1 Report disease or condition directly leading to death on line a Report chain of events in due 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:		
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID-19 U07.1		
Manner of death:				
<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

Note: Code all entries in Part 1 and 2, and, in this example, select motor vehicle accident (V89.2) 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, motor vehicle accident (V89.2), can cause all the conditions traumatic aortic dissection (S25.0) and traumatic hypovolemic shock (T79.4)—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			
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	Heart failure 150.9	1 day
	b	Due to: Myocardial infarction 121.9	5 days
	c	Due to: Underlying cause of death	
d	Due to:		
2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)		COVID-19	U07.1
Manner of death:			
<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	

NOT COVID-19 DEATH



Note: The physician has determined and recoded that the myocardial infarction this person died of was not caused by COVID-19. Code all entries in Part 1 and 2, and, in this example, select acute myocardial infarction (I21.9) 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, myocardial infarction (I21.9), can cause the condition, heart failure (I50.9), mentioned on the line above. [See ICD-10 2016 and later, Volume 2, Section 4.2.1].

WHO's requirements for Member States to report weekly number of COVID-19 deaths from their civil registration and vital statistics systems

Rationale

WHO has been the lead agency in gathering cause-of-death statistics from its Member States' civil registration and vital statistics (CRVS) systems yearly since the early 1950s. This function is becoming even more crucial as the during the global pandemic of COVID-19, in which the availability of timely, accurate, and complete data is essential to understand the true impact of the disease on mortality. Well-functioning CRVS systems produce cause-of-death statistics that are compiled from individual medical certificates of cause of death that follow WHO international norms and standards in ICD mortality coding. This enables COVID-19 mortality to be measured in a comparable manner.

During the current pandemic, deaths in health facilities are often the first to be counted, leaving out deaths in the community, elderly care facilities, etc., thus distorting the real impact.

Obtaining timely, accurate, and complete weekly mortality statistics will help show the impact of COVID-19 on overall mortality across countries, as well as the sex and age breakdown of mortality, and may identify possible under-reporting of COVID-19 deaths. Additionally, this will help monitor the impact of interventions. The reporting of certified deaths through the present system will enable more precise information on a subset (certified deaths) of all COVID-19 deaths, which will complement comprehensive weekly global surveillance for COVID-19 deaths already in place, as found in WHO's global surveillance guidance.⁵

Phase I

To ensure measurement of the indirect mortality impacts of COVID-19 and to include countries not yet following WHO international norms and standards in medical certificates of cause of death and ICD mortality coding, Member States are asked to submit:

- Total deaths aggregated by week of occurrence, sex, and age group according to a standard file layout. These data should ideally come from the CRVS system, namely, via established mortality notification systems in both facilities and communities;
- COVID-19 deaths aggregated by week of occurrence, sex, and age group, according to a standard file layout. These data should be compiled from the individual medical certificates of cause of death by the authorized national authorities.

List of data variables and metadata to be submitted to WHO

Variable	Description
Week	Week in which deaths occur
Sex	Sex of the deceased
Age	Age of the deceased by age-group
Cause of death	<ul style="list-style-type: none"> – Total deaths from all causes combined (natural and non-natural) – COVID-19 is mentioned anywhere on the death certificates (Parts 1 and 2) – COVID-19 is the underlying cause of death

Metadata

Variable	Rationale
Source of data	Countries may rely on several sources of data. This collection relies mainly on data from CRVS systems
Average length of time from occurrence of death to inclusion in statistics	Will help in understanding backlogs and expectations of revised and updated figures
Estimated completeness of total mortality data from all causes combined for the most recent week as submitted to WHO	Incomplete data need to be interpreted with caution and revised accordingly
Estimated completeness of COVID-19-specific mortality data for the most recent week as submitted to WHO	Incomplete data need to be interpreted with caution and revised accordingly
Proportion of deaths certified electronically	Another measure of timeliness, an electronic system for medical certification enables the information on death and causes of death to be shared with authorities with no or reduced delay.
Place(s) of occurrence of death	Deaths occur in health facilities, in care homes, and at home, as well in other places such as prisons or retention centres. Knowing which data are included in the data file will help in understanding data completeness.
Population(s) covered	Countries may have different policies around inclusion of non-citizen residents, deaths of citizens or residents abroad, or deaths of temporary visitors that occur within the country in their data. It is also important to know the denominator (catchment population), by age and sex, to which the mortality data refer.

Phase II

WHO will be approaching Member States to submit anonymized individual-level death records where COVID-19 is mentioned.

Goals

- Allow investigation of comorbidities with COVID-19
- Perform equity analyses or analyses of within-country disparities based on geography, ethnicity, profession, or other factors relevant to the determination of COVID-19 control policies

Reporting requirements

In addition to the variables reported in Phase I, the following variables would be also needed at the individual level:

- Date of death (day and month and year)
- Place of death (health facilities, care homes, home, prisons, retention centres, etc)
- Was COVID-19 test performed? If yes, was it confirmed positive?
- Place of usual residence by 1st and 2nd geographic area
- Profession
- Ethnicity
- Pregnancy status
- Multiple causes of death (all causes mentioned on Parts 1 and 2 of the death certificates)

Data safeguards

WHO has a formal and comprehensive policy for securely managing all databases and information sources hosted by the Organization. The policy includes information security, technical and physical data security, data access and retention procedures, and confidentiality arrangements in the context of public health emergencies. Accordingly, WHO will establish measures to safeguard confidential information about the deceased and prevent misuse of the information.^c

Analysis of total mortality**Excess mortality**

Excess mortality, measuring the increase in mortality rates that is attributable to the excess risk imposed by a specific disease or crisis condition, can be used to assess the impact of COVID-19 on mortality overall and to assess the impact of interventions. In-depth statistical analyses with more data variables than are currently available, including the essential ones outlined in this WHO guideline, will be required to more accurately quantify the excess mortality attributed to COVID-19 pandemic.

Nevertheless, as a crude measure, one can compare the observed death rates by age and sex during the period of the COVID-19 pandemic in 2020 with the projected deaths rates adjusted for any abnormal events (e.g. armed conflicts, natural disaster) based on reported data or reliable estimates for the same period in previous years, by age, sex, and cause of deaths where possible.

This would provide a general picture of the mortality impact of the COVID-19 pandemic. One example of monitoring excess mortality related to pandemics and other public health threats is the EUROMOMO project.⁷ However, a number of factors need to be considered when interpreting such estimates, including the relative timeliness, completeness, and accuracy of death reporting for non-COVID-19 death in 2020 and the most recent years, other non-COVID-19 causes that contribute to the excess mortality in 2020 over and above any projected levels, and potential decrease in mortality from other causes affected indirectly by COVID-19 (e.g. decline in deaths from road traffic injuries due to physical distancing measures).

Analysis of COVID-19 related deaths**Age-standardized rates**

Apart from differential mortality risks, the variation in mortality levels across different locations is also a function of varying population age structures. For comparisons between countries and regions with different population age structures, age-standardized rates for cases and deaths will be used in place of crude rates. When Member States or the WHO Secretariat calculate age-standardized rates, the WHO world standard population⁸ should be used as weights to derive the weighted sum of age-specific rates.

(WHO world standard population : <https://apps.who.int/healthinfo/statistics/mortality/whodpms/definitions/pop.htm>.)

Case fatality rates and infection fatality rates

Case fatality rate (CFR), the proportion of deaths from a certain disease among all people diagnosed with the disease over a certain period of time, can be used as a measure to evaluate the severity of the disease and the effectiveness of treatments. An alternative measure is the infection fatality rate (IFR), which differs from CFR by using all infections as the denominator to additionally account for all asymptomatic and undiagnosed infections. Because older adults with pre-existing health conditions are potentially at higher risk of dying from COVID-19, it is recommended to examine the estimated CFR and IFR by age and/or by the health condition of patients where possible to gain a better understanding of the interaction of COVID-19 with age and other pre-existing diseases. For the numerator, a distinction should be made between deaths caused directly by COVID-19 and deaths related to COVID-19. If data permit, CFR and IFR for direct COVID-19 deaths should be separately calculated. Otherwise, the inclusion of deaths related to COVID-19 in the numerator should be clearly documented to ensure comparability. The calculation should take into account the lag between the occurrence of the infections and the associated deaths in a specific location, as the failure to do so will cause artificially lower or higher CFR and IFR estimates depending on the stage of the epidemic progression. As the COVID-19 pandemic is still evolving and many countries continue to build up the capacity and expand the population coverage for testing and reporting, it is likely the true numbers of COVID-19 cases are under-reported to varying degrees in different countries and over time, leading to artificially higher estimates of CFR compared with IFR. This bias needs to be considered when interpreting the estimated CFR and IFR.

^c The Policy Statement on Data Sharing by the World Health Organization in the Context of Public Health Emergencies has been published.⁶ Eurostat collects anonymized individual-level death record but has put in place an EU regulation to safeguard the data. PAHO started such a similar project some years ago but due to resource-constraints was unable to continue the project. WHO HQ is considering implementing such a project within the expansion of its Mortality Database in 2021.

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Annex: Additional WHO cause of death certification links

How to fill in a medical certificate of cause of death: Interactive Self Learning Tool (WHO)

<https://apps.who.int/classifications/apps/icd/icd10training/ICD-10%20Death%20Certificate/html/index.html>

Cause of Death on the Death Certificate: Quick Reference Guide (Section 7.1.2)

https://icd.who.int/browse10/Content/statichtml/ICD10Volume2_en_2016.pdf

International form of medical certificate of cause of death (Section 7.1.1)

https://icd.who.int/browse10/Content/statichtml/ICD10Volume2_en_2016.pdf

Examples of terms used by certifiers of cause of death to describe COVID-19 and that can be coded as synonyms of COVID-19:

- COVID Positive
- Coronavirus Pneumonia (unless clearly related to a non-COVID-19 coronavirus)
- COVID-19 Infection
- SARS-Cov-2 Infection (Coronavirus Two Infection)
- COVID-19 Coronavirus
- Infection – COVID-19 (Coroner Informed)
- Hospital Acquired Pneumonia - COVID-Positive
- Corona Virus two infection (SARS-Cov-2)
- Corona Virus Pneumonia (COVID-19)
- Coronavirus-Two Infection
- Novel coronavirus

WHO continues to monitor the situation closely for any changes that may affect this technical note. Should any factors change, WHO will issue a further update. Otherwise, this technical note will expire 2 years after the date of publication

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WHO reference number: [WHO/2019-nCoV/Mortality_Reporting/2020.1](https://www.who.int/publications/m/item/WHO/2019-nCoV/Mortality_Reporting/2020.1)

Guidance for appropriate recording of COVID-19 related deaths in India



Impacting NCD Public Health Actions and Policies
Collaborate Innovate Inspire

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1. Introduction

1.1 What is Cause of Death?

The cause of death (COD) is defined as “all those diseases, morbid conditions or abnormalities, injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries.”(1)

1.2 How to record Cause of Death?

Medical Certificate of Cause of Death (MCCD) is the certificate issued by the attending medical practitioner who had treated the person during admission in a medical institution or in the last illness (prior to death) while taking treatment from a physician outside of a medical institution. Medical certification of cause of death is the process of recording and reporting death using standard Form 4 (institutional deaths) and Form 4A (non-institutional deaths) as per the rules of the Registration of Births and Death Act, 1969. The MCCD form contains Part 1 to record the immediate and antecedent causes, and Part 2 to record the significant conditions that contributed to the death but were not part of the sequence of events leading to death.

Image 1: Cause of Death section of Form 4/4A

<u>CAUSE OF DEATH</u>		Interval between onset and death approx
I Immediate cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc	a) <div style="text-align: center;">due to (or as a consequence of)</div>
Antecedent cause Morbid conditions, if any, giving rise to the above cause stating underlying conditions last.	b) <div style="text-align: center;">due to (or as a consequence of)</div>
II Other significant conditions contributing to the death but not related to the disease or condition causing it	c)

1.3 What is Underlying COD?

Death often results from the combined effect of two or more independent or related conditions, that is, one condition may lead to another, which in turn leads to a third condition and so on. Where there is a sequence, the disease or injury which initiated the sequence of events, called the **underlying cause of death** is recorded and reported. It is:

- (a) The disease or injury which initiated the train of morbid events leading directly to death;
- Or
- (b) The circumstances of the accident or violence which produced the fatal injury.

All the morbid conditions or injuries consequent to the underlying cause relating to death are termed as antecedent and immediate cause.

The medical part of the certificate consists of two parts-

I. Sequence of events leading to death -

First line is the immediate cause of death – the condition / disease that directly led to death / that preceded death.

The cause of death antecedent to immediate cause should be entered in line (b), and a cause further antecedent to this should be entered in line (c).

Underlying cause of death is on the lowest line of part I – It is the disease or condition that started the sequence of events between normal health to immediate cause of death. Conditions if any, as a consequence thereof will be entered above it in ascending causal order of sequence.

How many cause of death can be entered in Part I?

Only one cause is to be entered on each line of Part I. There may be many morbid events that happened, but the sequence of events that caused death should be sorted out, and one cause should be written on each line of Part 1 so that there is a **logical sequence of events leading to death**.

What if there is only one condition?

The disease, injury or complication that immediately preceded death can be the only entry in the MCCD FORM if only one condition is present at death.

What if there is only one condition antecedent to the immediate cause?

The condition antecedent to the immediate cause should be entered in line (b). Line (c) should be kept blank.

How to record time interval from onset of disease to death?

The time interval between the presumed onset of the condition, not the diagnosis, and death should be reported. It is acceptable to approximate the intervals or use general terms, such as hours, days, weeks, or years.

II. Other significant conditions that contributed to the death

All other diseases or conditions believed to have unfavourably influenced the course of the disease leading to death, but were not related to the disease or condition directly causing death.

What should be entered in Part II - Other significant conditions?

Any disease, abnormality, injury or late effects of poisoning, believed to have adversely affected the deceased should be reported such as chronic conditions, and also information such as:

<ul style="list-style-type: none">• Chronic Bronchitis /COPD/Asthma/ Tuberculosis• Cancer –Primary / Metastatic cancer / On cancer directed treatment /Old cancer - cured or treated• Cardiovascular disease- Hypertension / IHD/Coronary Heart Disease / heart failure• Stroke / Neurological conditions like epilepsy, Parkinson’s disease, dementia, Alzheimer’s disease• Rheumatoid arthritis / Immune related conditions	<ul style="list-style-type: none">• Use of alcohol and/or other substances.• Tobacco use (smoking / smokeless)• Recent pregnancy, if believed to have contributed to the death.• Environmental factors-exposure to toxic fumes, history of working in specific industry, professional exposure to toxins, specific animals• Late effects of injury, including head injury sequelae• Any iatrogenic underlying cause• Surgical information, if applicable
---	--

1.4 Public health significance of Cause of Death data

Stating the sequence of morbid conditions in order, allows selection of the cause of death that is considered as “underlying” cause. It is the underlying cause of death that is coded with ICD -10 codes and is counted for statistical purposes.

Robust cause of death information in a population is useful for understanding disease burden estimations, and explains trends in the health of populations. It is useful for evaluation and planning of health services and programmes. Good cause of mortality statistics also aids in identifying research questions of public health significance.

2 COVID-19

2.1 COVID-19 pandemic and need for cause of death

COVID-19 is the infectious disease caused by the most recently discovered coronavirus (SARS- CoV- 2) from Wuhan, China, in December 2019. The COVID-19 disease outbreak was declared a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 by the World Health Organization, and later on 11 March 2020 as a Global Pandemic. During such situations, mortality surveillance becomes a very important public health tool to assess the impact of the viral infection.

2.2 COVID-19 as Underlying Cause of Death (UCOD)

COVID-19 is reported to cause pneumonia / acute respiratory distress syndrome (ARDS) / cardiac injury / disseminated intravascular coagulation and so on. These may lead to death and may be recorded in line ‘a’ or ‘b’. It is likely that COVID-19 is the underlying cause of death (UCOD) that lead to ARDS or Pneumonia in most of the deaths due to COVID-19 (test positive and symptoms positive). In these cases COVID-19 must be captured in the last line / lowest line of Part 1 of MCCD form 4/4 A. Acute respiratory failure is a mode of dying and it is prudent not to record it in line a/b/c.

Patients may present with other pre-existing comorbid conditions such as chronic obstructive pulmonary disease (COPD) or asthma, chronic bronchitis, ischemic heart disease, cancer and diabetes mellitus. These conditions increase the risk of developing respiratory infections, and may lead to complications and severe disease in a COVID-19 positive individual. These conditions are not considered as UCOD as they have directly not caused death due to COVID-19. Also a patient may have many co-morbid conditions, but only those that have contributed to death should be recorded in Part 2.

2.3 ICD-10 Codes for COVID-19 provided by World Health Organization

Emergency ICD-10 Code	Usage conditions
U07.1	COVID-19,virus identified
U07.2	COVID-19, virus not identified, Clinically-epidemiologically diagnosed COVID-19 Probable COVID-19 Suspected COVID-19

2.4 Public health significance of recording cause of death in COVID-19 pandemic

COVID-19 is a new disease and is a pandemic affecting all communities and countries. It's clinical presentation ranges from mild to severe, and fatality depends on the severity of the illness, associated co-morbid conditions and age of patients. Patterns of disease and patterns of death can come from only standardised recording of clinical disease history and cause of death, and therefore epidemiological surveillance of disease and death are important. Robust data is needed from every district and state in India to measure the public health impact of COVID 19 and to plan for timely health interventions and protect communities. At the same time, other health conditions affecting populations need to be also monitored so that the health system is prepared for responding to the needs of the population.

3 Completing Medical Certification of Cause of Death (MCCD) in COVID-19

3.1 Mortality coding of COVID-19 with ICD-10 codes

The ICD-10 codes presently recommended by WHO for mortality coding are:

Test	Symptoms of COVID-19	Diagnosis	Code
+ve	None	Confirmed COVID-19	U07.1
+ve	Present	Confirmed COVID-19 documented as UCOD	U07.1
+ve	Present with comorbid conditions like heart disease, asthma, COPD, Type 2 diabetes	Confirmed COVID-19 documented as UCOD	U07.1
Test Negative	Present	Clinically –Epidemiologically diagnosed COVID -19	U07.2
Test awaited	Present	Suspected COVID-19	
Test inconclusive	Present	Probable COVID-19	

3.2 Examples of underlying cause of death in COVID-19

Some examples are provided to help physicians' record cause of death in COVID-19

Example 1 : 40 year old male diagnosed with COVID-19			
CAUSE OF DEATH			
Part I		Interval between onset and death approx	For statistical use
Immediate Cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc	a) Respiratory acidosis	2 days	

Antecedent cause Morbid conditions, if any, giving rise to the above cause stating underlying conditions last.	b) Acute respiratory distress syndrome (ARDS) c) COVID-19	3 days 7 days	U07.1
Part II Other significant conditions contributing to the death but not related to the disease or condition causing it.		

Example 2 : 60 year old male, father of COVID-19 patient and a known diabetes individual presented with Influenza like illness (ILI) and died, test for COVID-19 not available			
CAUSE OF DEATH			
Part I		Interval between onset and death approx	For statistical use
Immediate Cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc	a) Acute respiratory distress syndrome (ARDS)	1 day	
Antecedent cause Morbid conditions, if any, giving rise to the above cause stating underlying conditions last.	b) Influenza like illness c) COVID-19 suspect	4 days 4 days	U07.2
Part II Other significant conditions contributing to the death but not related to the disease or condition causing it.	Diabetes 	15 years	

Example 3 : 50 year old female completed chemotherapy for Breast cancer admitted with breathlessness and developed shock and died			
CAUSE OF DEATH			
Part I		Interval between onset and death approx	For statistical use
Immediate Cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc	a) Disseminated Intravascular Coagulation (DIC)	2 days	

Antecedent cause Morbid conditions, if any, giving rise to the above cause stating underlying conditions last.	b) Pneumonia c) COVID-19	5 days 5 days	U07.1
Part II Other significant conditions contributing to the death but not related to the disease or condition causing it.	Breast Cancer	6 months	

Example 4 76 year old male with Ischemic heart disease developed fever and breathlessness two days ago, and was admitted and died in 24 hours, first test was inconclusive

CAUSE OF DEATH			
Part I		Interval between onset and death approx	For statistical use
Immediate Cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc	a) Acute cardiac injury	1 day	
Antecedent cause Morbid conditions, if any, giving rise to the above cause stating underlying conditions last.	b) Probable COVID-19	2 days	U07.2
Part II Other significant conditions contributing to the death but not related to the disease or condition causing it.	Ischemic heart disease		

3.3 What to avoid as Cause of Death?

- Avoid Mode of Dying as Cause of Death – Mode of dying merely tells you that death has occurred and is not specifically related to the disease process.

Mode of dying		
Respiratory Arrest	Emaciation	Vasovagal attack
Asphyxia	Exhaustion	Cardiac arrest
Asthenia	Heart Failure	Heart attack
Brain failure	Hepatic/Liver failure	Hepatic failure
Cachexia	Hepatorenal failure	Liver Failure
Cardiac Arrest/Heart Attack	Kidney failure/Renal failure	Cardio respiratory failure
		Multiorgan/System failure

Cardio Respiratory Arrest Coma Debility	Respiratory arrest/Failure Shock Syncope Uraemia Vagal inhibition	Respiratory Failure Cardio Pulmonary failure
---	---	---

- Avoid abbreviations and short forms like ARDS, COPD, SARI.

Incorrect	Correct
ARDS	Acute respiratory distress syndrome
COPD	Chronic obstructive pulmonary disease
SARS	Severe Acute Respiratory illness
CRF	CRF could be Cardio respiratory failure or Chronic Renal failure
MI	Myocardial Infarction / Mitral Incompetence
AD	Acute Diarrhoea / Alzheimer`s Dementia
MS	Mitral Stenosis / Multiple Sclerosis
RTI	Respiratory Tract Infection / Reproductive Tract Infection

- Though COVID-19 (Corona virus disease -19) is an abbreviation, it has been specified by the WHO and is an acceptable term to be used as UCOD.

- Avoid vague terms or ambiguity –

Sometimes it is difficult to provide a simple description of cause of death when there are no medical records or a doctor is seeing the patient in a critical condition for the first time or the doctor is not the treating physician.

Incorrect	Correct
Irrelevant talking and feverishness	Delirium due to fever
Very poor nourishment	Severe Malnutrition
Less healthy at birth	Low birth weight / Congenital Anomaly

- Avoid short forms / incomplete description –

Incorrect	Correct
Ca Br	Cancer Breast / Cancer Brain
Ac. Infarct	Acute Myocardial Infarction / Acute Cerebral Infarction
Sev Mal	Severe Malaria / Severe Malnutrition

- Avoid symptoms / signs

Incorrect	Correct
Jaundice	Hepatitis
Fever	Infection
Chest pain	Angina

- Avoid terms such as senescence, old age, senility, infirmity, and advanced age.

These terms cannot be the immediate cause of death. There may be 1 or 2 conditions that have been due to old age and thus the etiological sequence should be specified. If old age was a contributory factor, it should be entered in Part II.

Part I	Incorrect	Correct
la	Bed ridden	Aspiration Pneumonia
lb	Old Age	Stroke
lc	Hypertension	
Part II		
I		Old Age
		Hypertension

3.4 Other considerations in recording MCCD for COVID -19

- i. Provide specific medical terms as cause of death. COVID-19 is a 'viral infection' and presentations include 'influenza like illness' (ILI) or "Severe acute respiratory illness (SARI). These are not specific and can be used in the sequence of the events and the specific virus / bacteria / agent that caused the disease should be recorded as UCOD, for example COVID-19.
- ii. Record the logical sequence of events in Part 1. There may be many medical conditions in a person. Based on the most logical events that caused death, only these conditions are mentioned in Part 1 of the MCCD form.
- iii. **Manner of death:** It refers to the circumstances under which death has occurred.
 - Manner of death due to COVID-19 infection will mostly be 'natural', as it is the disease that led to the death.
 - In case of suicide by an individual tested +ve for COVID-19, the manner of death may be captured as suicide / pending investigation if the medical autopsy is awaited.
- iv. **Place of death:** Most of the deaths due to COVID-19 occur in a hospital and in such cases the place of death should be captured as 'Hospital'. In case an individual is discharged from hospital and the death occurs in his/her residence, the place of death must be captured as 'House'.

4. Use of ICMR-NCDIR e-Mortality (e-Mor) software for recording cause of death

The ICMR-NCDIR e-Mortality (e-Mor) software application aids in recording and reporting cause of deaths as per national standards of death reporting laid down by the Office of Registrar General of India (ORGI) under its Civil Registration System (CRS). This software can be implemented by hospitals and district local registrar offices in a district (to record deaths occurring in residence). Institutions should register with ICMR-NCDIR or State authority for provision of authorized login credentials. This will allow access to the software with its technical training on MCCD), ICD-10 coding for cause of death and use of software for recording and reporting deaths. The application data entry form is designed to record all details of Form 2 (Death Report) and Form 4 / 4A (MCCD Forms).

NCDIR e-Mor software features include:

- a. Record details of death of all institution and non-institution based deaths with guide to prevent errors in cause of death
- b. Guide in recording the sequence of death events and underlying cause of death

- c. Guide in ICD-10 coding as per the National list of the ORGI and codes for COVID-19 announced by the World Health Organization.
- d. Quality check modules to reduce errors in recording like date check, missing field check and search and export features
- e. Exporting data to maintain mortality register of the institutional deaths and generate statistical tables for data analytics to establish mortality audit systems in hospitals.
- f. On completion of accurate data entry, Form 2 and Form 4 can be printed, signed by appropriate authority for further submission to the Local Registrar for Death registration under CRS.
- g. District Registrar and Chief Registrar Office at the state level can monitor data coverage, MCCD coverage, and generate statistical tables on leading causes of death district and state wise.

Role of NCDIR: NCDIR e-Mor software is accessible online through dedicated secure webserver that hosts the software and shall support the online data transmission and standard data encryption. Offline access to the software may also be facilitated.

As coordinating unit, NCDIR team shall provide technical resources in implementation and monitoring of data quality. As per the NCDIR policy of data processing and disclosure, all necessary safeguards for data confidentiality and data security will be maintained. NCDIR shall develop data analytics for reporting all-cause mortality statistics and deaths related to COVID-19 as per guidelines. NCDIR will assist state/UT governments in strengthening MCCD through technical assistance.

5. Additional Guides

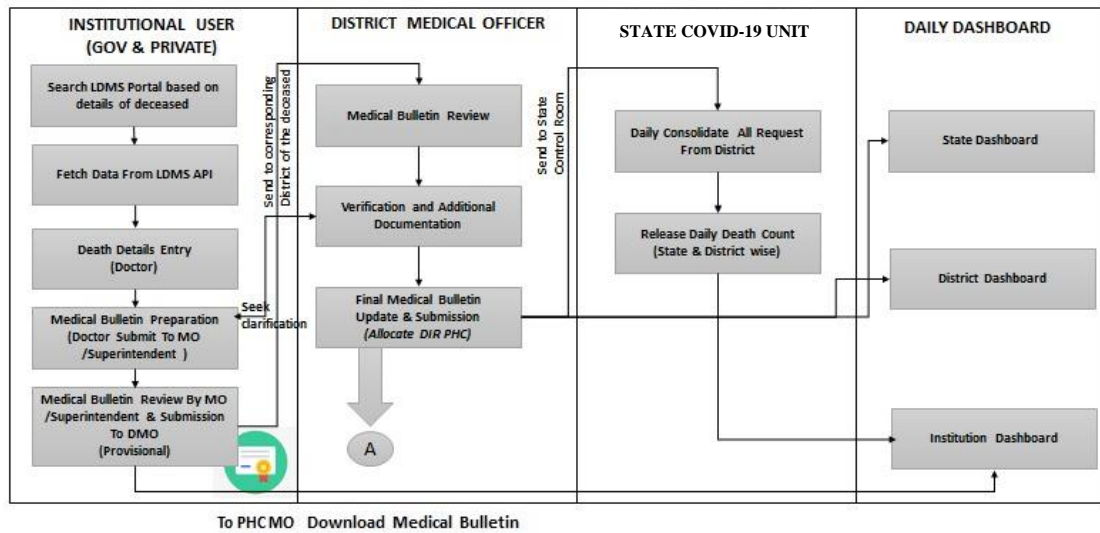
1. ICMR-NCDIR e-Mor : <http://ncdirindia.org/e-mor/>

[This software is available free of cost for use by any hospital/health facility/private practitioner/administrative unit concerned with recording cause of death]

2. World Health Organization. COVID-19 coding in ICD-10. Available from: <https://www.who.int/classifications/icd/COVID-19-coding-icd10.pdf?ua=1>
3. National Center for Health Statistics. Guidance for certifying deaths due to COVID–19. Hyattsville, MD. 2020.
4. Physicians Manual on Medical Certification of Cause of Death by ORGI, India.

Annexure-C

Medical Bulletin Process Flow



DIR Process Flow

