**Government of Karnataka**

**Directorate of Health and Family Welfare Services, Ananda Rao Circle, Bangalore-9.**

No: DHS/DD/SSU/17/2020-21 Date: 29.07.2020

**REVISED CIRCULAR**

**Subject:** Guidelines on dead body management in the context of COVID-19 pandemic

**Reference:**
1. Direction of Hon'ble Supreme Court of India in Suo-Motu Writ petition (civil) No. 7 of 2020, dated 19.06.2020
2. Certain observations from Hon'ble High Court of Karnataka regarding guidelines of dead body management in the state, dated 27.07.2020
3. Guidelines on COVID-19 dead body management from Government of India dated 15.03.2020
4. W.H.O guidelines on Infection Prevention and Control for the safe management of a dead body in the context of COVID-19 dated 24.03.2020

*****

In view of evolving situation of COVID-19 in the state, guidelines have been issued from time to time regarding management of dead body. In Suo-Motu Writ petition (civil) No. 7 of 2020, Hon'ble Supreme Court of India has issued important directions to all states. In the background of these directions and certain observations from Hon'ble High Court of Karnataka, the following revised guidelines are issued for management of dead body in context of COVID-19 pandemic.

1. **Key Considerations**
   a. The main driver of transmission of COVID-19 is through respiratory droplets. There is unlikely to be an increased risk of COVID infection from a dead body to health workers or family members who follow standard precautions while handling dead body. Dead bodies do not transmit disease. Only the lungs of dead COVID patients, if handled during an autopsy, can be infectious.
   b. The dignity of the dead, their cultural and religious traditions, and their families should be respected and protected throughout.
   c. Hasty disposal of a dead body of COVID-19 person should be strictly avoided.
   d. District authorities/BBMP should manage every situation on a case-by-case basis, balancing the rights of the family, the need to investigate the cause of death, and the risks of exposure to infection.
   e. The safety and well-being of everyone who attends to dead bodies should be the first priority. Before attending to a dead body, people should ensure that the necessary hand hygiene and personal protective equipment (PPE) supplies are available (Annexure-1 and Annexure-2)
   f. All hospitals should maintain a register for all confirmed and suspected COVID-19 deaths occurring either in hospital or at home with details of name, age,

SRF ID, contact details, ID proof and details of death. All the documents pertaining to death and treatment shall be maintained for death audits and provided to district health authority/BBMP when required.

2. **Testing**
    a. Testing for COVID-19 should not be insisted in every case of death.
    b. Only in suspected COVID-19 deaths with history of influenza like illness (ILI) or severe acute respiratory infection (SARI) symptoms, swab shall be taken for COVID testing within 6 hours of death.

3. **Handing over the dead body in suspected COVID-19 deaths**
    a. The dead body of suspected COVID-19 death should be handed over to the family members/relatives immediately after swab collection and should not wait for laboratory results of COVID-19. Under no circumstances, there shall be any delay in handing over of the dead body to the family members/relatives.
    b. Such dead bodies as a matter of abundant precaution should be handled as per COVID-19 standard precautions. In such death cases, if the Covid test is positive, then the required contact testing, tracking, etc. should be carried out by district health authority/BBMP eventually.

4. **Standard Precautions to be followed by health care workers while handling dead bodies of COVID-19.**

    Standard infection prevention control practices should be followed at all times. These include:
    a. Hand hygiene (Annexure-3)
    b. Use of personal protective equipment (e.g., water resistant apron, gloves, masks, eyewear)
    c. Safe handling of sharps.
    d. Disinfect bag carrying dead body; instruments and devices used on the dead body
    e. Disinfect linen. Clean and disinfect surfaces and objects

5. **Training in infection prevention and control practices**
    a. All staff identified to handle dead bodies in the isolation area/ward, mortuary, ambulance and those workers in the crematorium / burial ground should be trained in the infection prevention and control practices .

6. **Removal of the body from the isolation ward/room**
    a. The health worker attending to the dead body should perform hand hygiene; ensure proper use of PPE (water resistant apron, goggles, N95 mask, gloves).
    b. All tubes, drains and catheters on the dead body should be removed.
    c. Any puncture holes or wounds (resulting from removal of catheter, drains, tubes, etc.) should be disinfected with 1% sodium hypochlorite solution and dressed with impermeable material. (Annexure-4)
    d. Apply caution while handling sharps such as intravenous catheters and other devices. They should be disposed into a sharps container.
    e. Plug oral, nasal orifices of the dead body to prevent leakage of body fluids.

f. If family member/s of the patient wish to view the body at the time of removal from the isolation room or area, they shall be allowed to do so observing the standard precautions like physical distancing of 1 metre/ 3 feet, wearing facemask and hand hygiene.
g. Keep both the handling and movement of the body to a bare minimum; There is no need to disinfect the body before transfer to the mortuary area.
h. Place the dead body in leak-proof plastic body bag. The exterior of the body bag can be decontaminated with 1% sodium hypochlorite solution. The body bag can be wrapped with a mortuary sheet or sheet provided by the family members.
i. The dead body shall be either handed over to the relatives or taken to mortuary.
j. All used/ soiled linen should be handled with standard precautions, put in bio-hazard bag and the outer surface of the bag disinfected with 1% sodium hypochlorite solution.
k. Used equipment should be autoclaved or decontaminated with disinfectant solutions in accordance with established infection prevention and control practices.
l. All medical waste shall be handled and disposed of in accordance with bio-medical waste management rules.
m. The health staff who handled the body shall remove personal protective equipment and perform hand hygiene.
n. Provide counselling to the family members and respect their sentiments.

**7. Handling of dead body in Mortuary**

a. Health care workers or mortuary staff preparing the body (e.g. washing the body, tidying hair, trimming nails, or shaving) should wear appropriate PPE according to standard precautions (gloves, impermeable disposable gown [or disposable gown with impermeable apron], medical mask, eye protection, etc.);
b. Dead bodies should be stored in cold chambers maintained at approximately 4°C.
c. The mortuary must be kept clean. Touch surfaces, instruments and transport trolleys should be properly disinfected with 1% sodium hypochlorite solution
d. After removing the dead body, the chamber door, handles and floor should be cleaned with 1% sodium hypochlorite solution.
e. If the family wishes only to view the body and not touch it, they may do so, using standard precautions at all times including hand hygiene. Give the family clear instructions not to touch or kiss the body.

**8. Embalming**

Embalming of dead body should not be allowed.

**9. Autopsies on COVID-19 dead bodies**

Autopsies should be avoided. If autopsy is to be performed for special reasons, the following infection prevention and control practices should be adopted:

a. The Team should be well trained in infection prevention and control practices.
b. The number of forensic experts and support staff in the autopsy room should be limited.



ONaid

c. Perform autopsies in an adequately ventilated room, i.e. natural ventilation or negative pressure rooms with at least 12 air changes per hour and controlled direction of air flow when using mechanical ventilation.
d. The Team should use full complement of PPE (coveralls, head cover, shoe cover, N 95 mask, goggles / face shield).
e. Round ended scissors should be used
f. PM40 or any other heavy duty blades with blunted points to be used to reduce prick injuries
g. Only one body cavity at a time should be dissected
h. Unfixed organs must be held firm on the table and sliced with a sponge – care should be taken to protect the hand
i. Negative pressure to be maintained in mortuary. An oscillator saw with suction extraction of the bone aerosol into a removable chamber should be used for sawing skull, otherwise a hand saw with a chain-mail glove may be used.
j. Needles should not be re-sheathed after fluid sampling – needles and syringes should be placed in a sharps bucket.
k. Reduce aerosol generation during autopsy using appropriate techniques especially while handling lung tissue.
l. After the procedure, body should be disinfected with 1% Sodium Hypochlorite and placed in a body bag, the exterior of which will again be decontaminated with 1% sodium hypochlorite solution.
m. The dead body thereafter can be handed over to the family members/ relatives.
n. Autopsy table to be disinfected as per standard protocol.

**10. Transportation**

a. The dead body, secured in a body bag, exterior of which is decontaminated poses no additional risk to the staff transporting the dead body.
b. The personnel handling the dead body may follow standard precautions (surgical mask, gloves, and apron).
c. The vehicle, after the transfer of the dead body to cremation/ burial staff, will be decontaminated with 1% sodium hypochlorite solution.
d. In case of inter-district or inter-state transportation of COVID-19 confirmed or suspected dead body, the hospital/medical officer should issue the death certificate in prescribed format along with test report as available. All other precautions as mentioned above shall be followed during transportation.

**11. Cleaning and disinfection of touch surfaces**

a. Novel coronavirus can remain infectious on surfaces. Therefore, cleaning and disinfecting all touch surfaces is important.
b. The mortuary must be kept clean and properly ventilated at all times.
c. Lighting must be adequate. Surfaces and instruments should be made of materials that can be easily disinfected and maintained between autopsies.
d. Instruments used during the autopsy should be cleaned and disinfected immediately after the autopsy.
e. Touch surfaces, where the body was prepared, should first be cleaned with soap and water, or a commercially prepared detergent solution.
f. After cleaning, 1% sodium hypochlorite solution or 70% ethanol should be used to clean the surfaces. Hospital-grade disinfectants may also be used.



ONPatil

g. Personnel should use appropriate PPE, including respiratory and eye protection, when preparing and using the disinfectant solutions.
h. Items classified as clinical waste must be handled and disposed of properly according to biomedical waste management guidelines

**12. At the crematorium/ burial ground**

a. The crematorium/ burial ground staff should be sensitized that handling of COVID-19 dead body needs special precautions.
b. The staff will practice standard precautions of hand hygiene, use of masks and gloves.
c. Those placing the body in the grave, on the funeral pyre, etc., should wear facemask, gloves and apron. Once the burial/cremation is complete, after removal of the gloves, they shall wash hands with soap and water.
d. Viewing of the dead body by unzipping the face end of the body bag (by the staff using standard precautions) shall be allowed, for the family members/ relatives.
e. Rituals such as reading from religious scripts, sprinkling holy water and any other last rites that does not require touching of the body shall be allowed.
f. It is a custom in the Indian tradition to bathe, hug, embrace the departed with grief and reverence which should be best avoided in view of the safety of the kith and kin of the departed.
g. The funeral/ burial staff and family members should compulsorily perform hand hygiene after cremation/ burial.
h. The ash does not pose any risk and can be collected to perform the last rites.
i. Number of persons during funeral/ last rites related gatherings should not exceed 20 persons as per unlock guidelines of Government of India and Government of Karnataka following strict physical distancing of 2 metres/6 feet at all times among persons, respiratory etiquette and hand hygiene
j. Children, older people aged more than 60 years and people with respiratory symptoms should compulsorily wear a medical mask and maintain strict physical distancing

**13. Deaths at home**

a. Any person (e.g. family member, religious leader and others) preparing the deceased (e.g. washing, cleaning or dressing body, tidying hair, trimming nails or shaving) should wear gloves to avoid contact with the body. For any activity that may involve splashing of bodily fluids, eye and mouth protection (face shield or goggles and medical mask) should be worn. Person shall wear apron or gown while preparing the dead body and dress worn by the person should be immediately removed and washed after the procedure.
b. The person preparing the dead body should not kiss the deceased. Anyone who has assisted in preparing the dead body should thoroughly wash their hands with soap and water when finished.
c. Follow principles of cultural sensitivity and ensure that family members do not touch the dead body. Bare minimum number of people should be involved in the preparations. Others may observe the preparations without touching the dead body and from a minimum distance of 1 metre/3 feet.
d. Family and friends may view the dead body after it has been prepared for burial/cremation, in accordance with customs. They should not touch or kiss the body and maintain physical distancing measures of at least 2 metre/ 6 feet

between people. They shall wash their hands thoroughly with soap and water after coming out of room/ area.

e. The belongings of the deceased person do not need to be burned or otherwise disposed of. However, they should be handled with single-use disposable gloves and cleaned with a detergent solution followed by disinfection with 1% sodium hypochlorite solution or 70% alcohol.

**14. Unclaimed dead body**

a. Unclaimed dead body of COVID-19 suspected or confirmed person shall be handled with due care and dignity. The hospital authority in consultation with police/ local administrative authorities shall ensure safe handling of dead body in a dignified manner by following safety precautions.

b. Due to social stigma related to COVID-19 death, the relatives may not be able to come to claim the dead body. In few cases, relatives may not be able to be present in person at the hospital as they may be in isolation or quarantine for COVID-19. Under such circumstances, after informing and taking consent from the relatives of the deceased, the dead body shall be handled by the hospital authority in consultation with police/ local administrative authorities. Final rites should be performed as per religious customs of the deceased.

**15. Appropriate recording of death**

a. ICMR guidance on appropriate recording of COVID-19 deaths in India shall be strictly adhered. (Annexure-5)
https://www.icmr.gov.in/pdf/covid/techdoc/Guidance_appropriate_recording_of_related_deaths_India.pdf

b. 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' (immediate cause) or 'b' (antecedent cause) of death certificate. 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 Medical Certification of Cause of Death (MCCD) form 4/4A. Acute respiratory failure is a mode of dying and it is prudent not to record it in line a/b/c of MCCD.

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 underlying cause of death (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 of MCCD.

d. Use ICD-10 Codes for COVID-19 provided by World Health Organization
    i. Emergency ICD-10 Code Usage conditions
        1. U07.1: COVID-19,virus identified



ONCP

2. U07.2: COVID-19, virus not identified: Clinically-epidemiologically diagnosed COVID-19, Probable COVID-19, Suspected COVID-19

e. In case of suicide by an individual who has tested positive for COVID-19, the manner of death may be captured as suicide/ pending investigation if the medical autopsy is awaited.

f. In deaths due to any other causes where COVID-19 is not confirmed or suspected, COVID-19 should not be mentioned either in cause of death or death certificate for any reasons.

District Health Officers of all districts and Chief Health Officer BBMP are hereby advised to implement the revised guidelines in letter and spirit.

**Director**

**Health and Family Welfare Services.**

Copy to,

1. District Health and Family welfare officers of all districts
2. District Surgeons of all districts
3. Director Medical Education

Copy for kind information to:

1. Chief Secretary to Government of Karnataka
2. Additional Chief Secretary to Hon'ble Chief Minister
3. Additional Chief Secretary, Health and Family welfare
4. Additional Chief Secretary, Home Department
5. Principal Secretary, Medical Education
6. Commissioner-BBMP
7. Commissioner-Health and Family Welfare Services
8. Mission Director-National Health Mission
9. Deputy Commissioners of all districts
10. CEO, ZP of all districts
11. Police Commissioner-Bengaluru
12. Additional DGP, Law and Police, Karnataka State, Bengaluru

**Annexure 1: Use of personal protective equipment (PPE) in the management of COVID-19 dead bodies**

| Procedure | Hand hygiene | Disposable gloves | Medical mask | N-95 mask | Long sleeved gown | Face shield (preferred) or anti-fog goggles | Rubber gloves | Apron |
|---|---|---|---|---|---|---|---|---|

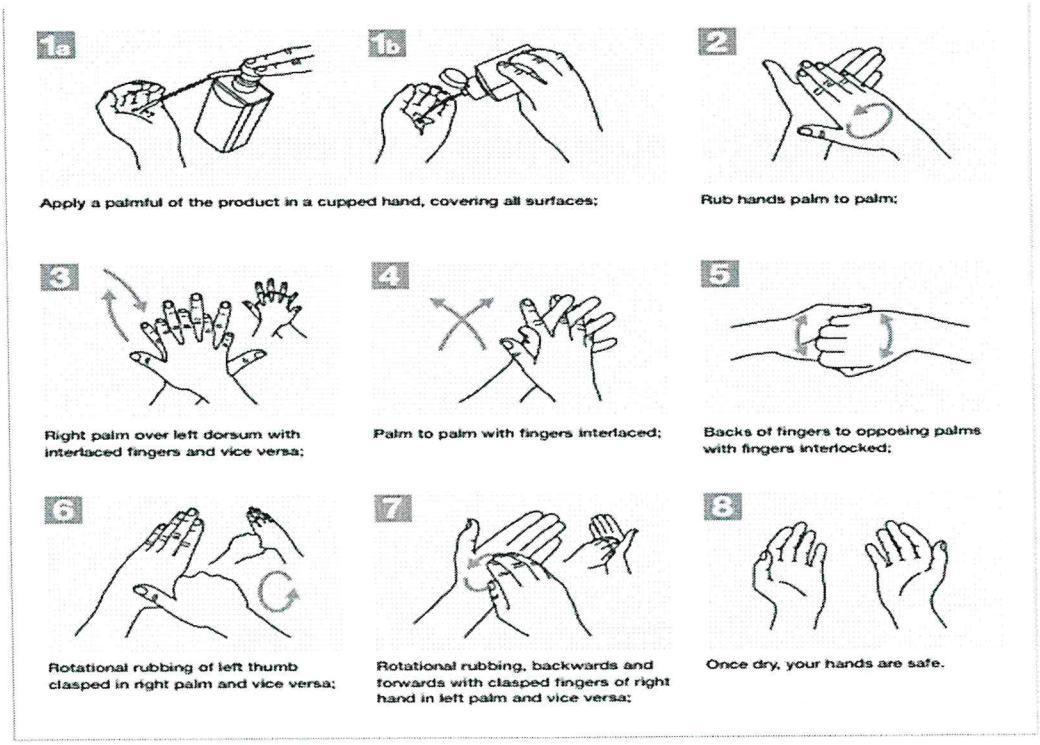
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Packing and transport of the body | Yes | Yes | Yes | | Yes | | | Yes |
| Mortuary care | Yes | Yes | Yes | | Yes | Yes | | Yes |
| Autopsy | Yes | Yes | | Yes | Yes | Yes | Yes | Yes |
| Religious Observation-care of body by family members | Yes | Yes | Yes | | Yes or apron | | | Yes |

**Annexure 2: Supplies in management of dead bodies of COVID-19**

| Description | Details |
|---|---|
| Hand hygiene | • Alcohol-based hand rub<br>• Running water<br>• Soap<br>• Disposable towel for hand drying (paper or tissue) |
| Personal protective equipment | • Gloves (single use, heavy duty gloves)<br>• Boots<br>• Waterproof plastic apron<br>• Long sleeve gowns<br>• Anti-fog googles<br>• Face shield<br>• Medical mask<br>• N95 or similar level respirator (for aerosol-generating procedures only) |
| Waste management and environmental cleaning | • Disposal bag for bio-hazardous waste<br>• Soap and water, or detergent<br>• Disinfectant for surfaces – 1% sodium hypochlorite solution or 70% ethanol, or hospital-grade disinfectant. |

Original

## Annexure 3 : Steps of Hand Hygiene




## Annexure 4: Guidelines for Preparation of 1% sodium hypochlorite solution and Lysol

| Product | Available chlorine | 1percent |
|---|---|---|
| Sodium hypochlorite – liquid bleach | 3.5% | 1-part bleach to 2.5 parts water |
| Sodium hypochlorite - liquid | 5% | 1-part bleach to 4 parts water |
| NaDCC (sodium dichloroisocyanurate) powder | 60% | 17 grams to 1-liter water |
| NaDCC (1.5 g/ tablet) - tablets | 60% | 11 tablets to 1-liter water |
| Chloramine - powder | 25% | 80 g to 1-liter water |
| Bleaching powder | 70% | 70 g to 1-liter water |
| Lysol for disinfection<br>Lysol IP (50% Cresol and 50% Liquid soap) | | 2.5% Lysol (1 litre of Lysol in 19 litres of water) |
| Any other | As per manufacturer's Instructions | |

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

ICMR INDIAN COUNCIL OF MEDICAL RESEARCH | NCDIR NATIONAL CENTRE FOR DISEASE INFORMATICS AND RESEARCH

Impacting NCD Public Health Actions and Policies
Collaborate Innovate Inspire

**Correspondence to:**

Director
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)
NirmalBhawan-ICMR Complex (II Floor), Poojanahalli
Kannamangala Post, Bengaluru – 562 110 (India)

Telephone: 080-22176300
Email: ncdir@ncdirindia.org
Website: www.ncdirindia.org

# Table of Contents

## 1. Introduction

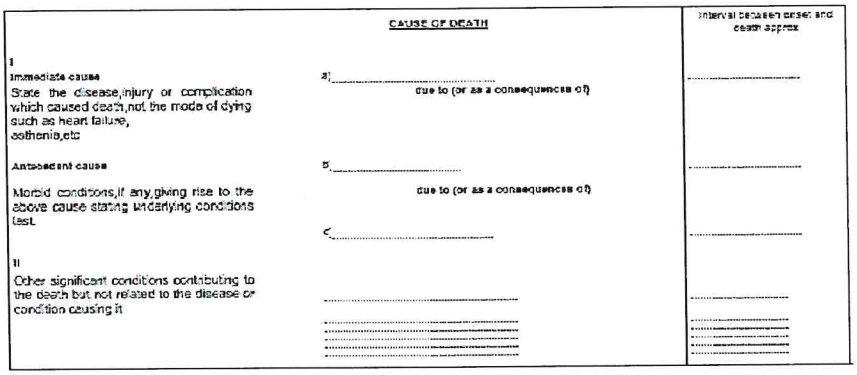
### 1.1 What is Cause of Death?

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



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

### 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:

| | |
|---|---|
| • Chronic Bronchitis /COPD/Asthma/ Tuberculosis<br>• Cancer –Primary / Metastatic cancer / On cancer directed treatment /Old cancer - cured or treated<br>• Cardiovascular disease- Hypertension / IHD/Coronary Heart Disease / heart failure<br>• Stroke / Neurological conditions like epilepsy, Parkinson's disease, dementia, Alzheimer's disease<br>• Rheumatoid arthritis / Immune related conditions | • Use of alcohol and/or other substances.<br>• Tobacco use (smoking / smokeless)<br>• Recent pregnancy, if believed to have contributed to the death.<br>• Environmental factors-exposure to toxic fumes, history of working in specific industry, professional exposure to toxins, specific animals<br>• Late effects of injury, including head injury sequelae<br>• Any iatrogenic underlying cause<br>• 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,<br>Clinically-epidemiologically diagnosed COVID-19<br>Probable COVID-19<br>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**<br>Morbid conditions, if any, giving rise to the above cause stating underlying conditions last. | b) Acute respiratory distress syndrome (ARDS)<br>c) COVID-19 | 3 days<br>7 days | **U07.1** |
| Part II<br>Other significant conditions contributing to the death but not related to the disease or condition causing it. | .....<br>.....<br>..... | | |

| **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**<br>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**<br>Morbid conditions, if any, giving rise to the above cause stating underlying conditions last. | b) Influenza like illness<br>c) COVID-19 suspect | 4 days<br>4 days | **U07.2** |
| Part II<br>Other significant conditions contributing to the death but not related to the disease or condition causing it. | Diabetes<br>.....<br>..... | 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**<br>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**<br>Morbid conditions, if any, giving rise to the above cause stating underlying conditions last. | b) Pneumonia<br>c) COVID-19 | 5 days<br>5 days | **U07.1** |
| Part II<br>Other significant conditions contributing to the death but not related to the disease or condition causing it. | Breast Cancer<br>.....<br>..... | 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**<br>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**<br>Morbid conditions, if any, giving rise to the above cause stating underlying conditions last. | b) Probable COVID-19 | 2 days | **U07.2** |
| Part II<br>Other significant conditions contributing to the death but not related to the disease or condition causing it. | Ischemic heart disease<br>.....<br>.....<br>..... | | |

**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<br>Coma<br>Debility | Respiratory arrest/Failure<br>Shock<br>Syncope<br>Uraemia<br>Vagal inhibition | Respiratory Failure<br>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 |
|---|---|---|
| Ia | Bed ridden | Aspiration Pneumonia |
| Ib | Old Age | Stroke |
| Ic | 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.