Pacific CRVS
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CURRICULUM ON MEDICAL CERTIFICATION OF CAUSE OF DEATH

FOR PACIFIC ISLAND COUNTRIES AND TERRITORIES

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MINISTRY OF HEALTH
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CURRICULUM ON MEDICAL CERTIFICATION OF CAUSE OF DEATH

FOR PACIFIC ISLAND COUNTRIES AND TERRITORIES

Pacific Community, Queensland University of Technology, Australian Bureau of Statistics, New Zealand Ministry of Health, Fiji National University, Vital Strategies and World Health Organization

Noumea Cedex, New Caledonia
2021

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Australian Bureau of Statistics, New Zealand Ministry of Health, Fiji National University, Vital Strategies
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Acronyms

AIDS	acquired immunodeficiency syndrome
BAG	Brisbane Accord Group
CSF	cerebral spinal fluid
COD	cause of death
HIV	human immunodeficiency virus
ICD	International Statistical Classification of Diseases and Related Health Problems
MCCD	Medical Certificate of Cause of Death
SPC	Pacific Community
UCOD	underlying cause of death

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About this curriculum

This curriculum provides guidance on medical certification of cause of death and aims to establish mechanisms for its inclusion within a formal academic training programme in the Pacific region.

It is designed to be delivered as a module with eight learning areas and 13 hours of student contact time. Each learning area includes an assessment to evaluate the students. Regional academic training programmes are authorised to customise the learning areas in order to meet the needs of their students and to deliver the curriculum over a shorter or longer duration of time, as needed.

Country Medical Certificate of Cause of Death

This curriculum has been developed under the assumption that the international form of Medical Certificate of Cause of Death (MCCD) (or a similar version of the standard certificate, including Part 1, Part 2, and a column for the reporting time interval) is in use in the country where this curriculum will be taught. For further reference, Annex 1 provides the most up-to-date MCCD recommended by the World Health Organization.

Learning areas and objectives

This curriculum consists of eight learning areas, which can be selected individually and/or tailored to meet the needs and objectives of the regional academic training programmes that are introducing this module into their respective curricula.

Learning areas		Learning objectives
		Upon completion of the module, students should be able to perform successfully each of the tasks below.
1.	Concepts and definitions in cause of death certification	Understand important concepts and definitions in the certification of death
2.	Importance of underlying cause of death	Identify the uses of data on underlying causes of death
3.	International form of MCCD	Understand the international form of MCCD
4.	Legal and ethical issues relevant to the individual countries	Discuss the legal and ethical responsibilities of doctors in certifying deaths
5.	General instructions for completing a MCCD	Certify deaths correctly
6.	Guidelines for recording cause of death for specific conditions	Apply the guidelines related to specific underlying causes of death correctly
7.	Common errors in cause of death certification	Identify the errors committed by attending doctors during cause of death certification
8.	Understanding local mortality statistics	Describe the processes for certifying deaths and the challenges in improving cause of death statistics in their respective country

Teaching and learning methods

- Interactive lecture discussions with question-and-answer sessions (held during the theory component of the guidelines)
- Small group discussions
- Independent student work:
  - review guidelines on certifying deaths, using case scenarios.
  - practice cause of death certification, using case scenarios.
- Identification of errors committed by attending doctors during cause of death certification, using a sample of country MCCD

Student evaluation

This curriculum contains student assessments for each learning area of the training. Regional academic training programmes may choose to use all of the assessments provided or to select relevant assessments, based on their country requirements.

Course duration

The course duration consists of 13 hours of student contact time and assessments.

	Learning area	Time* (hours)	Teaching methodology
1.	Concepts and definitions in cause of death certification	0.5	Interactive presentation
2.	Importance of underlying cause of death	0.5	Interactive presentation
3.	International form of MCCD	1.0	Interactive presentation, comparing country-specific MCCD
4.	Legal and ethical issues relevant to the individual countries	0.5	Interactive presentation, oral questioning on the country situation with respect to legal and ethical issues
5.	General instructions on completing a MCCD	4.5	Interactive presentation using MCCD workbooks and answer books
6.	Guidelines for recording cause of death for specific conditions	3.0	Interactive presentation, independent student work on case scenarios in MCCD workbooks and answer books
7.	Common errors in cause of death certification	1.5	Interactive presentation, group work using a sample of country MCCD with common errors during COD certification
8.	Understanding local mortality statistics	1.5	Group work and student presentations on their respective country situations on COD certification
	Total time in hours	**13**	

**The time durations can be adjusted to the specific curriculum requirements of each regional academic training programme. The time durations listed above should be used as a guide only.*

Learning areas

1. Concepts and definitions in cause of death certification

Objective 1: *Explain the key concepts and definitions in cause of death certification*

Brief introduction to describe the three main concepts:

1. Cause of death (COD)
2. Underlying cause of death (UCOD)
3. Sequence/chain of events leading to death

Lesson plan

Time allocation: 30 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation

Topic	Expected outcome	Content
Cause of death (COD)	Students understand the definition of COD as well as its importance	The cause(s) of death recorded in the *international form of MCCD* are: *"all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence that produced any such injuries"* (Twentieth World Health Assembly, 1967).
Underlying cause of death (UCOD)	Students understand the definition of UCOD as well as its importance	The underlying cause of death is: *"the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury"* (WHO, 1994).
Sequence/ Chain of events leading to death	Students understand the sequence/chain of events leading to death	Mortality statistics are based on the underlying cause of death (i.e.the disease or injury that initiated the sequence or chain of events that directly led to death). For example, in the case of a patient dying of a Gastrointestinal haemorrhage following Perforated duodenal ulcer, Gastrointestinal haemorrhage is the immediate COD while Perforated duodenal ulcer is the UCOD. The sequence of events started with the Perforated duodenal ulcer and led to a Gastrointestinal haemorrhage and to death.

Evaluation:

1. Students define the COD.
2. Students define the UCOD.
3. Students explain the sequence/chain of events leading to death.

2. Importance of underlying cause of death

Objectives: *1. Explain the need for high-quality COD statistics*
2. Describe the purposes for which UCOD data are collected, and how they are used

This learning area explains the importance and use of COD certification. The facilitator should present this module as an interactive presentation, with time for students to ask questions. The COD statistics (based on the UCOD) provide information on what is causing premature death or contributing to reduced life expectancy in a country. The link between what individual doctors document on the MCCD, and national mortality statistics, should be highlighted in detail.

Lesson plan

Time allocation: 30 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation

Topic	Expected outcome	Content
The need for high-quality COD statistics	Students understand the need for high-quality COD statistics	Accurate and timely COD data are essential for monitoring trends and patterns in diseases, injuries and risk factors, and critically important to guide good public policy and for prevention. Medical certification of cause of death by physicians/doctors is the basis for mortality statistics in the majority of countries. It is usually assumed that hospitals accurately certify causes of death, although this is not always the case. The quality of hospital COD certification primarily depends on how accurately physicians/doctors understand the concept of the UCOD. Doctors almost always refer to the medical records to determine or confirm the underlying cause and chain of events that led to the death of a patient. Therefore, correctly documented medical records will greatly influence the accuracy of COD certification. It should be highlighted that the certifying physicians/doctors must play a major role in order to achieve this outcome. In addition to the deaths occurring in hospitals, a significant number of deaths occurs in the community – home deaths. It should be highlighted that every effort should be taken to certify these deaths accurately as well. It is common in hospitals for the intern medical officer or a junior doctor to be requested to complete the MCCD, although they may not have attended/treated the patient. Consequently, they may be the least knowledgeable to establish the COD and complete the MCCD. In such instances, the certifying doctor should seek relevant information from the doctor who attended/treated the deceased patient and may also seek help from senior colleagues or the consultant in charge of the unit.
Describe the purposes for which UCOD data are collected, and how they are used	Students understand the specific uses of UCOD data	• Statistical outputs: The accurate collection of COD data is an important step towards improved population-level health information. Countries rely heavily on hospitals and other health facilities for mortality statistics. Hospitals also benefit from improved mortality statistics as the statistics provide insight into the causes of deaths in their facility, enable them to study local case fatality rates, etc. • Evidence for health and social policy: Mortality statistics are used by health planners to plan prevention programmes in order to help reduce/prevent future premature deaths due to similar causes.

Topic	Expected outcome	Content
Describe the purposes for which UCOD data are collected, and how they are used (cont'd)	Students understand the specific uses of UCOD data (cont'd)	• Evidence for resource allocation decisions: Mortality statistics are used by health administrators and policy planners to determine resource allocations for health and social sectors, units, etc. • Progress towards national and global health development goals: Mortality statistics are used to measure progress towards established national and global health development/sustainable development goals. • Research purposes: Mortality statistics are used in medical and public health research.

Evaluation:

1. Students explain the uses of UCOD data.
2. Students explain the ways in which accurate COD data helps improve the health situation in each student's respective country.

3. International form of Medical Certificate of Cause of Death

Objectives: *1. Introduce the international form of MCCD*
2. Describe the structure of the international form of MCCD

The World Health Organization recommends the use of the international form of MCCD, as shown in Figure 1, for certification of deaths in all countries.

***Frame A*:** ▶ **Medical data: Part 1 and 2**				
		▶ **Cause of death**		▶ **Time interval from onset to death**
1. Report disease or condition directly leading to death on line 'a'		a		
Report chain of events in due to order (if applicable)		b	Due to:	
State the underlying cause on the lowest used line		c	Due to:	
		d	Due to:	
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				

Figure 1: Frame A of the international form of Medical Certificate of Cause of Death (WHO, 2016)

The MCCD provides a framework for the organisation of clinical diagnoses used for public health purposes. There is extensive misclassification of the UCOD in deaths reported by hospitals globally. One reason is that few doctors have been trained in MCCD certification according to the current International Statistical Classification of Diseases and Related Health Problems (ICD)[1]. Although training doctors in MCCD certification is not generally difficult, sustaining the correct certification practices over the longer term can be challenging, as there is a high turnover of junior doctors in all countries and regions necessitating continuous re-training with each new cohort of junior doctors. Medical consultants/senior doctors need to be influenced to support good certification practices to ensure that junior doctors appreciate the importance of accurate MCCD certification and help shift this trend.

UCOD data is vital in determining health policy and in ensuring appropriate resources are allocated to hospitals. It is, thus, important that medical professional organisations highlight this data in order to convince doctors of the need for improvement in reporting on UCOD.

Demographic and identification data in the local Medical Certificate of Cause of Death

For both legal and statistical purposes, correctly identifying the deceased is vital. It should be noted that, because these details vary by country, it is important for the implementing academic authority to review the current MCCD of the relevant country.

Lesson plan

Time allocation: 60 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, country-specific MCCD

[1]For further information on the ICD, see: https://www.who.int/classifications/classification-of-diseases.

Topic	Expected outcome	Content
Demographic and identification data in the country-specific MCCD	Students are familiarised with the demographic and identification data in the country-specific MCCD	Display a copy of the demographic and identification data in the current MCCD used in the target country. Discuss the importance of correctly completing all demographic and identification data items. In many countries, the MCCD is sent to the national statistics office (to facilitate the compilation of statistics) and to the civil registration organisation (for the legal registration of the event of death). Basic demographic information required by these offices generally includes: • Full name • Age/date of birth • Date of death • Place of death • Sex • Place of residence • Race/ethnicity Documenting accurate demographic and identification data of the deceased is essential for both legal and statistical purposes. For example, documenting correct demographic data (e.g. correct age and sex) facilitates the production of accurate age- and sex-specific statistics. Stress the importance of the verification of the correct details of the deceased before documentation (e.g. correct legal name, spelling, age, date of birth and usual residence). Always refer to available identity documents.

Evaluation:

1. Students give examples of situations where it is common to make errors in recording the identification data for a deceased person.
2. Students explain the role of Part 1 of the MCCD.
3. Students explain the role of Part 2 of the MCCD.
4. Students explain why it is important to record the time interval between the onset of a condition and death in the MCCD.

4. Legal and ethical issues relevant to the individual countries

***Objective 1**: Familiarise students with the legal requirements and ethical responsibilities of doctors with respect to COD certification*

The information presented in this section needs to be identified in relation to the current law of the country (e.g. who is qualified to certify a death, birth and death registration law, coronial acts, police ordinances, etc.). The students must understand that the COD laws are different for each country and that the content should be modified accordingly.

Lesson plan

Time allocation: 30 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation

Topic	Expected outcome	Content
Legal requirements in COD certification	Students understand the local legal requirements in certifying a death	A MCCD is a legal document with implications that vary by country. Therefore, it is important that the MCCD be completed accurately. The MCCD may be needed to proceed with burial or cremation of the body. The family may need it to execute the deceased person's will. In countries with a coronial system in place, an attending doctor may be required to report unnatural deaths to the coronial system for inquest/post-mortem to determine the cause and circumstances of the death. The process of notification will differ by country, and attending doctors need to be aware of the correct process of reporting. In addition, the attending doctors must be aware of the differences in the types of circumstances that should be referred to a coroner across countries. The attending doctor or the hospital will be required to report details of the death to national authorities (e.g. the ministry of health, the registrar general's office or the national statistics office). In most countries, details of the death and the circumstances of the deceased person are stored in a database and used to produce country mortality statistics.
Ethical respon sibilities	Students understand the ethical responsibilities and confidentiality issues in the COD	The attending doctor is bound to maintain confidentiality in regard to the COD. This obligation is to the family of the deceased person. The attending doctors should know that the information in the MCCD can be used for research purposes but that the identity of the deceased should not be revealed. Furthermore, they should not divulge the details of a MCCD to a third party unless they are legally required to do so, or they have obtained prior consent from the next of kin of the deceased. The attending doctors must report the correct condition when certifying deaths due to sensitive causes (e.g. HIV/AIDS, Tuberculosis, etc.). They should not concede to pressure from the relatives of the deceased and should carefully explain to them the importance and legal requirements of documenting the correct condition to them.

Evaluation questions:

1. Name the circumstances under which COD information may be disclosed to a third party by an attending doctor.
2. Describe the process of certifying deaths from unnatural causes in each student's country.

5. General instructions on completing a Medical Certificate of Cause of Death

***Objective 1**: Describe the general instructions for completing a MCCD*

It is important that medical certifiers/clinicians take note of these guidelines, as they will help mortality coders correctly identify and code the cause(s) of death. In most countries, mortality coders do not have a medical background. Therefore, even a minor misinterpretation may result in misunderstanding and selecting an incorrect UCOD. Instructions given in this section are compliant with the ICD-10 guidelines. Any local disparities in general instructions should also be taught in this section.

Lesson plan 1

Time allocation: 30 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, MCCD workbooks and answer books

Topic	Expected outcome	Content
General instructions on completing MCCD	Students should be able to follow general instructions in certifying deaths	The following are general instructions on certification. The overall accuracy of mortality statistics is greatly enhanced by complying with these instructions. Complete each item in order (following any special instructions given in the country): • All entries must be legible. • Use black or blue ink to complete the certificate. • Use block letters to complete the certificate. • Do not make alterations or erasures. If any entry needs to be altered, draw a single line across it and the certifier must initial it next to the strikeout to confirm that it was the certifier who made that change. Use of correction fluid is not allowed. • Accuracy of the name of the deceased (including the correct spelling of the legal name and place of usual residence) should be verified with the informant. • Do not use abbreviations. • Enter only one disease condition or event per line. There is one exception to this rule: When there are multiple causes in the sequence of events leading to death and not enough blank lines to record them, it may be acceptable to document multiple causes per line. However, in this case, the certifier should clearly show the sequence by writing 'due to' in between conditions documented on the same line.

Evaluation:

1. Students list common errors that are seen in MCCD.
2. Display samples of completed MCCDs for the participants and ask them to identify errors in certification of these MCCD.

***Objective 2:** Provide students with detailed instructions (including examples) on how to certify the cause of death on the WHO recommended international form of MCCD*

It is highly suggested that students be given access to available resource materials on MCCD. The following examples demonstrate how to certify deaths accurately. MCCD student workbooks and answer books can be used to supplement the hands-on experience.

Lesson plan 2

Time allocation: 240 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, case scenarios in MCCD workbooks and answer books

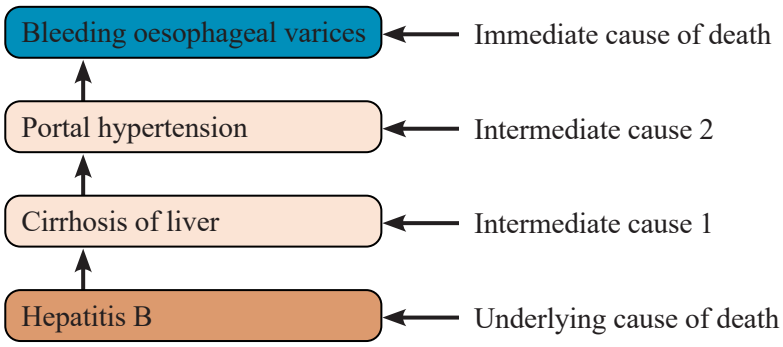
<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td rowspan="2">MCCD certification guidelines</td><td>Students understand the sequence of events leading to death, including the concept of UCOD, immediate cause of death, and intermediate cause(s) of death and contributory cause(s) of death</td><td>Refer to the following case scenarios to explain the sequence of events leading to death
Case scenario 1
A 53-year-old male was admitted to the hospital vomiting blood and was diagnosed with bleeding oesophageal varices. Investigations revealed portal hypertension. He had a history of Hepatitis B infection. Figure 2 shows the sequence of events that led to his death. It is extremely important that the UCOD be correctly determined and accurately documented. In this case, Hepatitis B was the UCOD and not bleeding oesophageal varices, which is the immediate COD. This data, together with the relevant demographic data, allows mortality rates from Hepatitis B to be calculated, and can inform a public health response to implement immunisation programmes against Hepatitis B virus to reduce deaths by this cause in the future.
 

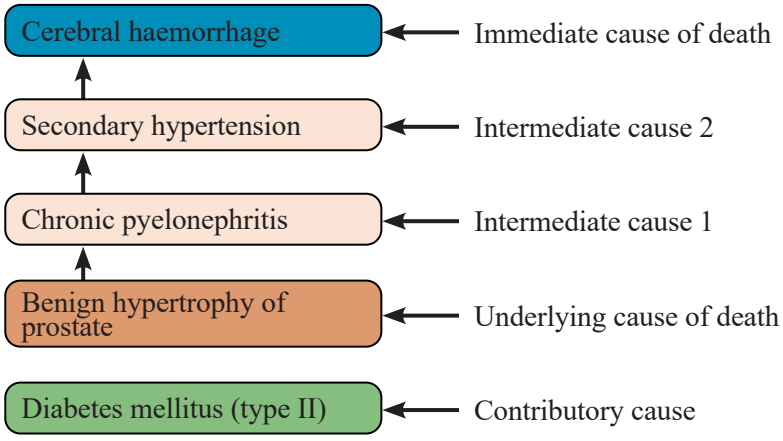
Figure 2: Case scenario 1: Sequence of events leading to death</td></tr>
<tr><td>Students understand the different case scenarios in completing Part 1 of the MCCD</td><td>Case scenario 2
A 64-year-old man dies of cerebral haemorrhage following secondary hypertension. Previously, he was diagnosed with chronic pyelonephritis due to urinary outflow obstruction as a result of long-standing benign hypertrophy of the prostate. He was also suffering from Type II Diabetes mellitus over the last 10 years.
 

Figure 3: Case scenario 2: Sequence of events leading to death
Diabetes mellitus (type II) is not included in the sequence of events leading to death. However, it would have contributed to the death and, thus, is entered in Part 2 of the MCCD. Figure 3 shows the sequence of events and contributory condition that led to his death.</td></tr>
</table>

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td rowspan="3">MCCD certification guidelines (cont'd)</td><td rowspan="3">Students understand the different case scenarios in completing Part 1 of the MCCD (cont'd)</td><td>It should be emphasised that, if the certifying doctor had additional information on this case, other probable sequence/s could also be constructed. For example, if the certifying doctor knew about the severity of the outflow obstruction and the control of diabetes mellitus, another possible sequence would be chronic pyelonephritis caused by recurrent urinary infections due to poorly controlled diabetes mellitus. The sequence will always be the best medical opinion of the certifying doctor.</td></tr>
<tr><td>Use the following example to illustrate a MCCD with only line 1(a) (the first line in Part 1) completed

Case scenario 3
A 68-year-old woman dies from acute myocardial infarction within one hour of its onset. She did not have any other illnesses. Her ECG and cardiac enzyme levels confirmed the diagnosis. Although it is uncommon to have only one event leading to death, it can happen. In these cases, COD should be reported at line 1(a) and it would also become the UCOD, shown in Figure 4.

<table>
<tr><td colspan="4">Frame A:
▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="4">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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Acute myocardial infarction</td><td>1 hour</td></tr>
<tr><td>b</td><td>Due to:</td><td></td></tr>
<tr><td>c</td><td>Due to:</td><td></td></tr>
<tr><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="2"></td></tr>
</table>
Figure 4: Case scenario 3: Sequence of events leading to death

If more evidence is available on the sequence of events leading to death, these must be reported using the lines provided at 1(b), 1(c) and 1(d).</td></tr>
<tr><td>Use the following example to illustrate the completion of a MCCD with a sequence of two events leading to death

Case scenario 4
A 54-year-old male who had been taking medication for coronary arteriosclerosis regularly over the last five years was rushed to the emergency room with a history of severe tightening chest pain, sweating and dyspnea. He collapsed in the emergency department and later died. ECG findings confirmed an acute myocardial infarction.

When there are two causes of death reported, these are written on lines 1(a) and 1(b), as shown in Figure 5. In this case, UCOD is recorded in line 1(b).

<table>
<tr><td colspan="4">Frame A:
▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="4">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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Acute myocardial infarction</td><td>Minutes</td></tr>
<tr><td>b</td><td>Due to: Coronary atherosclerosis</td><td>5 years</td></tr>
<tr><td>c</td><td>Due to:</td><td></td></tr>
<tr><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="2"></td></tr>
</table>
Figure 5: Case scenario 4: Sequence of events leading to death</td></tr>
</table>

Topic	Expected outcome	Content
MCCD certification guidelines (cont'd)	Students understand the different case scenarios in completing Part 1 of the MCCD (cont'd)	**The following example illustrates a case with a sequence of three events leading to death** **Case scenario 5** Shortly after dinner on the day prior to admission to the hospital, a 48-year-old male developed a cramping, epigastric pain, which radiated to his back, followed by nausea and vomiting. The pain was not relieved by positional changes or antacids. The pain persisted and, 24 hours after its onset, the patient sought medical attention. He had a 10-year history of chronic alcoholism and a two-year history of frequent episodes of similar epigastric pain. The patient denied diarrhea, constipation, hematemesis, or melena. The patient was admitted to the hospital with a diagnosis of an acute exacerbation of chronic pancreatitis. Radiological findings included a duodenal ileus and pancreatic calcification. Serum amylase was very high at 4,032 units per liter. The day after admission, the patient seemed to improve. However, that evening he became disoriented, restless, and hypotensive. Despite intravenous fluids and vasopressors, the patient remained hypotensive and died. Autopsy findings revealed several areas of fibrosis in the pancreas with the remaining areas showing multiple foci of acute inflammation and necrosis. Figure 6 shows a MCCD that requires three lines. These events are recorded at 1(a), 1(b) and 1(c). In this case, UCOD is recorded in the line 1(c).

Frame A:
▶ Medical data: Part 1 and 2

		▶ Cause of death		▶ Time interval from onset to death
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		a	Acute exacerbation of chronic pancreatitis	3 days
		b	Due to: Chronic pancreatitis	2 years
		c	Due to: ChronicaAlcoholism	10 years
		d	Due to:	
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				

Figure 6: Case scenario 5: Sequence of events leading to death

The following example illustrates a case with a sequence of four events leading to death

Case scenario 6

A 36-year-old man had a previous history of duodenal ulcer for 3 years. He was admitted with symptoms of acute abdominal pain and high fever. The patient was diagnosed as having perforated duodenal ulcer and underwent emergency surgery. Five days later, the patient had high fever with chills, and his abdominal ultrasound revealed a sub-phrenic abscess. A revision exploratory laparotomy was planned. However, the patient suddenly showed signs of septic shock and died within two hours of septic shock.

This is an example of a MCCD that requires four lines. As shown in Figure 7, these events are recorded at 1(a), 1(b), 1 (c) and 1(d). The UCOD is reported in line 1(d).

Frame A:
▶ Medical data: Part 1 and 2

		▶ Cause of death		▶ Time interval from onset to death
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		a	Septic shock	2 hours
		b	Due to: Right sub-phrenic abscess	1 day
		c	Due to: Perforated duodenal ulcer	5 days
		d	Due to: Duodenal ulcer	3 years
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				

Figure 7: Case scenario 6: Sequence of events leading to death

Note: In all cases, highlight that the UCOD should be reported in the lowest used line in Part 1 of Frame A.

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td rowspan="3">MCCD certification guidelines (cont'd)</td><td rowspan="2">Students understand the different case scenarios in completing Part 1 of the MCCD (cont'd)</td><td>In rare situations, there could be a sequence of more than four event leading to death. In such a situation, multiple causes can be documented per line. However, the certifier should clearly demonstrate the sequence by writing 'due to' in between conditions documented on the same line. UCOD should not be recorded in Part 2 of the MCCD.</td></tr>
<tr><td>Part 2 of the MCCD is for recording all other significant/contributory diseases or conditions that were present at the time of death but that did not directly lead to the UCOD listed in Part 1.

Case scenario 7
A 68-year-old male was admitted to the ICU with dyspnea and moderate retrosternal pain. He had a past history of non-insulin dependent diabetes mellitus and ischeamic heart disease for eight years.

Non-insulin dependent diabetes mellitus, which is not in the sequence of events leading to death but would have contributed, should be entered in Part 2 of the MCCD, as shown in Figure 8.

<table>
<tr><td colspan="4">Frame A:
▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Acute pulmonary embolism</td><td>1 hour</td></tr>
<tr><td></td><td>b</td><td>Due to: Acute myocardial infarction</td><td>7 days</td></tr>
<tr><td></td><td>c</td><td>Due to: Chronic ischeamic heart disease</td><td>8 years</td></tr>
<tr><td></td><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="2"></td></tr>
</table>
Figure 8: Case scenario 7: Sequence of events leading to death</td></tr>
<tr><td>Students learn to document approximate interval</td><td>Introduce and explain the importance of the column to record the approximate interval between the onset of the condition and the time of death

Approximate time interval between onset and death
The column on the righthand side of Frame A of the MCCD is for recording the approximate time interval between the onset of the condition and the date of death of a person. The time interval should be entered for all conditions reported on the MCCD. Documenting the time interval, especially for the conditions reported in Part 1 is very important. These intervals are usually established by the attending physician on the basis of available information. The time interval may need to be estimated in some instances. Time periods (minutes, hours, days, weeks, months or years) can be used. If the time of onset is unknown or cannot be determined, indicate 'unknown' in the appropriate space. Emphasise to the students not to leave this column blank. This information is invaluable for coding certain diseases and provides a verification on the accuracy of the reported sequence of conditions.

Case scenario 8
A 50-year-old male was admitted to the hospital with severe anorexia, extreme pallor and generalised oedema. He had been diagnosed as having focal glomerular sclerosis 2 years ago and insulin dependent diabetes mellitus for the last 38 years with very poor control. In addition, this patient was a heavy cigarette smoker for the past 20 years. On further assessment at the hospital, a diagnosis of end-stage renal failure was made and the patient died one week following admission to the hospital. The deceased MCCD is shown in Figure 9 with properly documented time intervals.</td></tr>
</table>

Topic	Expected outcome	Content
MCCD certification guidelines (cont'd)	Students learn to document approximate interval (cont'd)	*Frame A*: ▶ **Medical data: Part 1 and 2**

		▶ Cause of death		▶ Time interval from onset to death
1. Report disease or condition directly leading to death on line "a"		a	End-stage renal failure	1 week
Report chain of events in due to order (if applicable)		b	Due to: Focal glomerular sclerosis	2 years
State the underlying cause on the lowest used line		c	Due to: Insulin dependent diabetes mellitus	38 years
		d	Due to:	
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)				

Figure 9: Case scenario 8: Sequence of events leading to death

Evaluation:

1. Small group work: Students collectively complete the blank MCCD provided in the MCCD answer books according to the case scenarios provided in the MCCD workbooks.
2. Individual work: Students individually complete the blank MCCD provided in the MCCD answer books according to the case scenarios provided in the MCCD workbooks.

6. Guidelines for recording cause of death for specific conditions

Objective 1: *Provide students with guidelines to document specific conditions in the MCCD*

Attending physicians/doctors need to provide a description of disease conditions that is as complete as possible in order to help the classification and coding process for each MCCD. Examples of common conditions that have special instructions for certifying the COD correctly are provided in this lesson.

Lesson plan

Time allocation: 180 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, case scenarios in MCCD workbooks and answer books

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td>Special instructions for certifying specific conditions</td><td>Students will learn the guidelines for documenting specific conditions</td><td>
Injuries, poisoning and external causes of death
The circumstances of death from, for example, a fall, road traffic accident, suicide or homicide, are categorised as an external cause of death. When death occurs as a consequence of injury or violence, the external cause (the circumstance of the injury) should always be listed as the UCOD. It is very important to describe the external cause in as much detail as possible. For example, 'road traffic accident' is not satisfactorily accurate; however, 'motorcycle rider in collision with a pick-up truck' is both clear and accurate. In a case of suicide, simply entering 'suicide' is insufficient; the specific method of suicide should be indicated. For example, 'suicidal death by hanging' is a clear description.

In countries where a coronial system is in place, physicians/doctors may need to inform the coroner/magistrate about deaths from causes in this category before writing a MCCD. These are usually referred to as unnatural deaths. In some instances, documentation of the relevant MCCD is carried out by forensic pathologists. The process of notification will differ between countries, and physicians/doctors need to be well aware of the correct process of reporting that is appropriate to the country in which they work.

Case scenario 9
A 21-year-old female was critically injured in an automobile accident and died from a fractured skull causing cerebral contusion soon after being brought to the hospital. Police records indicated that she was the driver in a two-car collision that occurred at 3 am at the corner of Edward Street and Queens Street. The decedent crossed the center line and struck an oncoming car head on. Autopsy showed injuries and toxicology results indicated a very high blood alcohol level.

The deceased MCCD is shown in Figure 10 with an external cause: 'driver injured in collision of two motor cars on a street' properly documented as the UCOD. In addition, if the MCCD includes a manner of death section, the certifying doctor must tick the accident box. Furthermore, if a coronial system is in place in the country, the attending doctor must refer this case to the coroner and should not certify the death.

Frame A:
▶ Medical data: Part 1 and 2
<table>
<tr><td rowspan="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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Cerebral contusion</td><td>Minutes</td></tr>
<tr><td></td><td>b</td><td>Due to: Fractured skull</td><td>Minutes</td></tr>
<tr><td></td><td>c</td><td>Due to: Driver injured in collision of two motor cars on a street</td><td>Minutes</td></tr>
<tr><td></td><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="2">Acute alcohol intoxication (hours)</td></tr>
</table>
Figure 10: Case scenario 9: Sequence of events leading to death
</td></tr>
</table>

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td rowspan="3">Special instructions for certifying specific conditions (cont'd)</td><td rowspan="3">Students will learn the guidelines for documenting specific conditions (cont'd)</td><td>Diabetes mellitus
The guidelines related to documenting COD when the patient has diabetes is complex. Diabetes mellitus can be the UCOD, or a risk factor for another UCOD. As a general rule, if the patient dies from a complication of diabetes mellitus (e.g. diabetes nephropathy), document diabetes mellitus (type I or II) as the UCOD. (Please refer to case scenario 8 for further information.) If a patient dies from stroke or acute myocardial infarction, document diabetes in Part 2 as a risk factor (other significant/contributory condition). (Please refer to case scenario 7 for further information.)</td></tr>
<tr><td>Hypertension
It is important to state whether hypertension was essential/primary or secondary to some other disease condition (e.g. chronic pyelonephritis). Essential or primary hypertension is a contributory cause of death in many instances rather than UCOD.

Case scenario 10
A 40-year-old female was rushed to the emergency room with a sudden loss of consciousness. A diagnosis of haemorrhagic stroke was made. The patient could not be revived and died 30 minutes after admission to the emergency room. Her medical history revealed that she had recurrent urinary tract infections for the last 10 years. She was also diagnosed with chronic pyelonephritis for the past eight years and hypertension for the last five years.

Figure 11 illustrates the sequence of events that led to death specifying the type of hypertension as secondary.

Frame A:
▶ Medical data: Part 1 and 2
<table>
<tr><td rowspan="2"></td><td rowspan="2"></td><td colspan="2">▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td rowspan="4">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</td><td rowspan="4">↩
↩
↩</td><td>a</td><td>Cerebral haemorrhage</td><td>30 Minutes</td></tr>
<tr><td>b</td><td>Due to: Secondary hypertension</td><td>5 years</td></tr>
<tr><td>c</td><td>Due to: Chronic pyelonephritis</td><td>8 years</td></tr>
<tr><td>d</td><td>Due to: Recurrent urinary tract infection</td><td>10 years</td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="3"></td></tr>
</table>
Figure 11: Case scenario 10: Sequence of events leading to death</td></tr>
<tr><td>Infectious and parasitic diseases
If the infectious/causative agent is known, it should be noted on the certificate. If the infectious/causative agent is unknown, write 'cause unknown'. It is important to include the specific site or organ of the infection (e.g. meninges, urinary bladder, lungs, appendix, liver, etc.), if known.

Case scenario 11
A 49-year-old female was admitted to the hospital with a history of fever, disorientation and drowsiness for the last two days. Focal neurological findings were identified on physical examination and a provisional diagnosis of meningitis was made. A diagnostic lumber puncture was performed for CSF examination. Staphylococcus aureus organism was isolated from CSF and the provisional diagnosis was confirmed as Staphylococcus aureus meningitis. Despite intravenous antibiotic administration, her condition worsened and, on day three of admission, blood cultures were also positive for Staphylococcus aureus and the patient died on day four of admission due to septic shock. She was diagnosed with type II diabetes for the last 10 years.</td></tr>
</table>

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td>Special instructions for certifying specific conditions cCont'd)</td><td>Students will learn the guidelines for documenting specific conditions (cont'd)</td><td>
The causative agent, Staphylococcus aureus, and the site of infection, meninges, both are correctly documented in the MCCD shown in Figure 12.
<table>
<tr><td colspan="4">Frame A: ▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="4">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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Septic shock</td><td>1 day</td></tr>
<tr><td>b</td><td>Due to: Staphylococcus aureus sepsis</td><td>4 days</td></tr>
<tr><td>c</td><td>Due to: Staphylococcus aureus meningitis</td><td>6 days</td></tr>
<tr><td>2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="3">Type II diabetes mellitus (10 years)</td></tr>
</table>
Figure 12: Case scenario 11: Sequence of events leading to death

Neoplasms (tumours)

When reporting deaths as a result of a neoplasm, certifiers should provide detailed information about the tumour. This should include: site of the neoplasm; whether benign or malignant (i.e. behaviour of the neoplasm); whether primary or secondary (if known); and histological type (if known). The site of the primary neoplasm should be mentioned even if the primary neoplasm had been removed long before death. If the primary site of a secondary neoplasm is known, it must also be stated. If the primary site of a secondary neoplasm is unknown, it should be stated in the MCCD as 'primary unknown'.

Case scenario 12

A 54 year-old female was admitted to the hospital for palliative care due to secondary adenocarcinoma of the liver. The secondary growth occurred one year prior to admission due to the primary adenocarcinoma of the left lung diagnosed three years before that. The patient died one week following admission to the hospital.

The sites of the neoplasm (lung and liver), behaviour type (carcinoma meaning malignant), histological type (adenocarcinoma), and whether primary or secondary (primary lung, secondary liver) are correctly documented in the MCCD shown in Figure 13.
<table>
<tr><td colspan="4">Frame A:
▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="4">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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Secondary adenocarcinoma of liver</td><td>1 year</td></tr>
<tr><td>b</td><td>Due to: Primary adenocarcinoma of left lung</td><td>3 years</td></tr>
<tr><td>c</td><td>Due to:</td><td></td></tr>
<tr><td>2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="3"></td></tr>
</table>
Figure 13: Case scenario 12: Sequence of events leading to death

Surgical procedures

If death is a consequence of a surgical procedure, the procedure name should include the condition for which it was performed (e.g. appendectomy for acute appendicitis). In addition, if the MCCD includes a manner of death section, the certifying doctor must tick the surgery box as well.
</td></tr>
</table>

<table>
<tr><th>Topic</th><th>Expected outcome</th><th>Content</th></tr>
<tr><td>Special instructions for certifying specific conditions (cont'd)</td><td>Students learn the guidelines for documenting specific conditions cCont'd)</td><td>
Pregnancy and reporting maternal deaths
If a woman dies during pregnancy or within 42 days of the termination of a pregnancy, the fact that the woman was pregnant should be indicated on the MCCD. It should be reported even if the immediate COD is not related to the pregnancy or to childbirth. For example, the entry could read 'pregnant, period of gestation 18 weeks' and may be reported in part 2 of the MCCD. If the MCCD includes a pregnancy box, it should be marked to indicate that the woman was pregnant or was within 42 days of delivery when the death occurred.

Case scenario 13
A 24-year-old female, pregnant for 4 months, was admitted to the hospital with sudden onset of hemiplegia. Her history revealed that she had suffered from rheumatic fever at the age of 10 years, and a diagnosis of mitral stenosis was made. A MRI scan of the brain also identified a cerebral embolus and, on her second day in the hospital, the patient died.

The fact that the deceased was pregnant at the time of death is correctly stated in the MCCD shown in Figure 14.
<table>
<tr><td colspan="4">Frame A:
▶ Medical data: Part 1 and 2</td></tr>
<tr><td rowspan="4">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</td><td></td><td>▶ Cause of death</td><td>▶ Time interval from onset to death</td></tr>
<tr><td>a</td><td>Cerebral embolism</td><td>2 days</td></tr>
<tr><td>b</td><td>Due to: Mitral stenosis</td><td>10 years</td></tr>
<tr><td>c</td><td>Due to: Rheumatic fever (inactive)</td><td>14 years</td></tr>
<tr><td></td><td>d</td><td>Due to:</td><td></td></tr>
<tr><td colspan="2">2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)</td><td colspan="2">Pregnancy (4 months)</td></tr>
</table>
Figure 14: Case scenario 13: Sequence of events leading to death

Certifying perinatal deaths
Perinatal period extends from 22 completed weeks of gestation (when the fetal weight is normally 500 grams) to seven completed days after birth. However, this definition may vary in countries based on the chances of viability of the fetus when it is born, and the certifier must adhere to the local definition and act accordingly. The WHO recommends using the same MCCD format to certify perinatal deaths and record additional information (e.g. birthweight, gestation, age of mother, etc.). In the certification of perinatal COD, both fetal and maternal factors are considered. The following case study is an example for certification of a perinatal death.

Case scenario 14
A 39-year-old grand multipara with gestational diabetes mellitus was admitted to the hospital with dribbling at 30 weeks gestation. She was diagnosed as having premature rupture of the membranes. Two days later, she delivered a baby girl weighing 1.8 kilograms. On examination, the baby was found to be premature and was short of breath. The diagnosis of neonatal respiratory distress syndrome was made. The baby was put on incubator care. Despite all efforts, the baby died six hours following birth.

In this example, the diseases/conditions in the infant are neonatal respiratory distress syndrome, prematurity and low birth weight; and the maternal diseases/conditions affecting the fetus or infant are premature rupture of membranes, pre-term labour, gestational diabetes mellitus and grand multi-parity.
</td></tr>
</table>

Topic	Expected outcome	Content
Special instructions for certifying specific conditions (cont'd)	Students learn the guidelines for documenting specific conditions (cont'd)	The sequence of events leading to death are neonatal respiratory distress syndrome due to prematurity resulting from pre-term labour caused by the premature rupture of membranes. Gestational diabetes mellitus, grand multi-parity (maternal conditions affecting the fetus/infant), low birth weight (1.8 kilograms) and the period of gestation are considered contributory and reported in part 2 of the MCCD, as shown in Figure 15.

Frame A:
▶ Medical data: Part 1 and 2

		▶ Cause of death		▶ Time interval from onset to death
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		a	Neonatal respiratory distress syndrome	6 hours
		b	Due to: Prematurity	6 hours
		c	Due to: Preterm labour	6 hours
		d	Due to: Premature rupture of membranes	2 days
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			Gestational diabetes mellitus (months), grand multi-parity (years) Low birth weight-1.8kg (6 hours), Gestation (30 weeks)	

Figure 15: Case scenario 14: Sequence of events leading to death

Ill-defined conditions

Entering ill-defined conditions on the MCCD is counterproductive to public health programmes. These conditions do not provide any information for decision-makers to guide them in designing preventive health programmes. Organ failure (e.g. cardiac or respiratory failure) is not acceptable as an UCOD. Therefore, it is extremely important to record the disease or condition causing the organ failure as the UCOD in order to contribute to the design of relevant preventive health programmes and, in turn, to benefit public health. Examples of UCOD leading to cardiac or respiratory failure are shown in Figure 16.

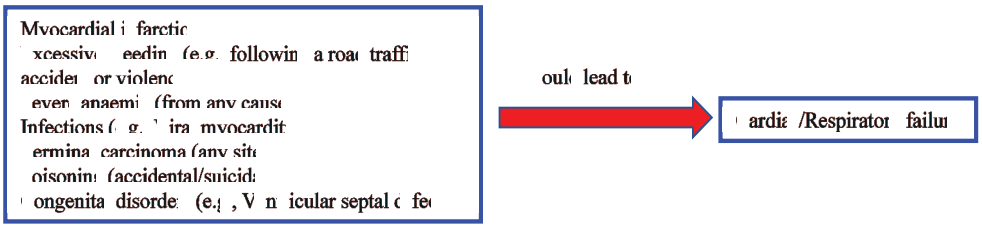


Figure 16: Examples of underlying causes of death that could lead to cardiac/respiratory failure

Sepsis is another ill-defined term that is commonly used in the certification of COD. It must be emphasised that the term 'sepsis' should be avoided as an UCOD. The certifiers must document the source of the infection that led to sepsis as the UCOD. However, if the cause of sepsis is genuinely unknown even after investigation, the certifiers must record 'source unknown' along with sepsis. Examples of UCOD leading to sepsis are shown in Figure 17.

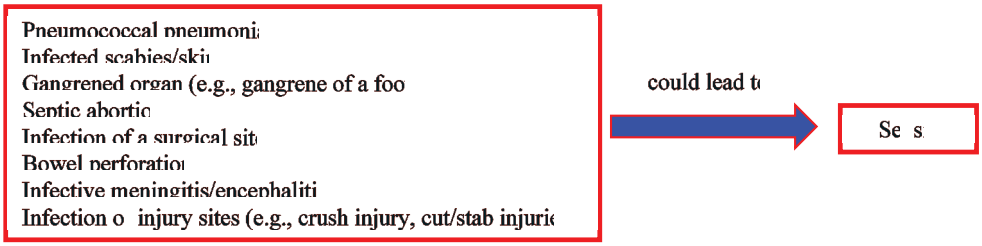


Figure 17: Examples of underlying causes of death that could lead to sepsis

Topic	Expected outcome	Content
Special instructions for certifying specific conditions (cont'd)	Students learn the guidelines for documenting specific conditions (cont'd)	Symptoms and signs (e.g. chest pain, backache, abdominal pain, cough, fever) are also considered ill-defined conditions. Doctors should not report modes of dying as cause(s) of death on the MCCD. This includes: 'cardiac arrest'; 'respiratory arrest'; 'cardiopulmonary arrest'; or 'brain death'. In reporting a death of an older person, the terms, 'senility', 'old age' or 'natural causes', should also be avoided, and the attending doctor must enter a specific cause. Where there is insufficient information to be certain of the COD, it is acceptable for the attending doctor to mention 'unknown cause of death'. However, this COD should be reserved for exceptional circumstances where the certifiers could not arrive at a valid COD. In countries where a coronial system is in place, attending physicians/doctors may need to inform the coroner/magistrate about deaths from causes in this category before writing a MCCD.

Evaluation:

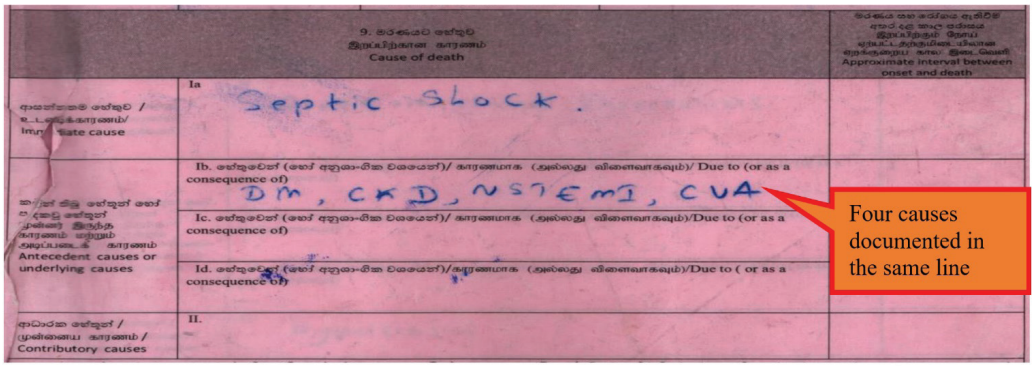
1. Individual/Small group work: Students complete the blank MCCD provided in MCCD workbooks according to the case scenarios provided in them.

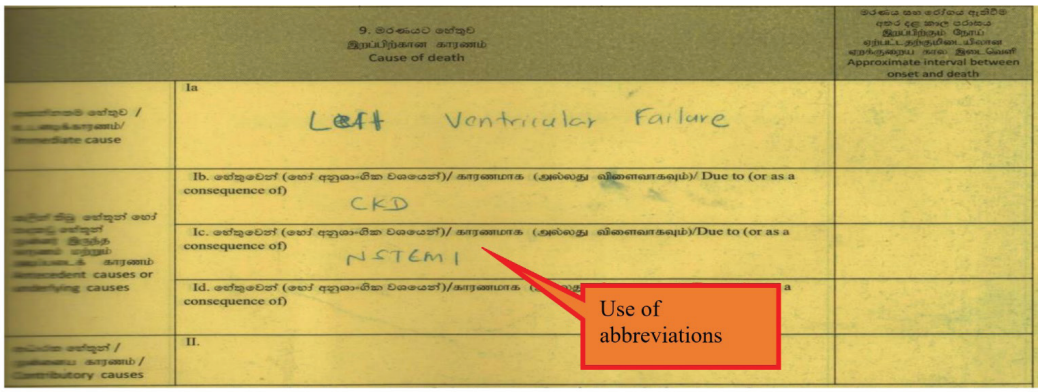
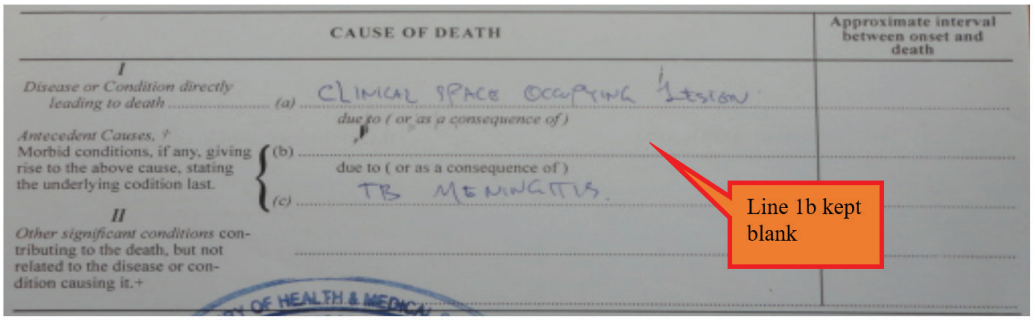
7. Common errors in cause of death certification

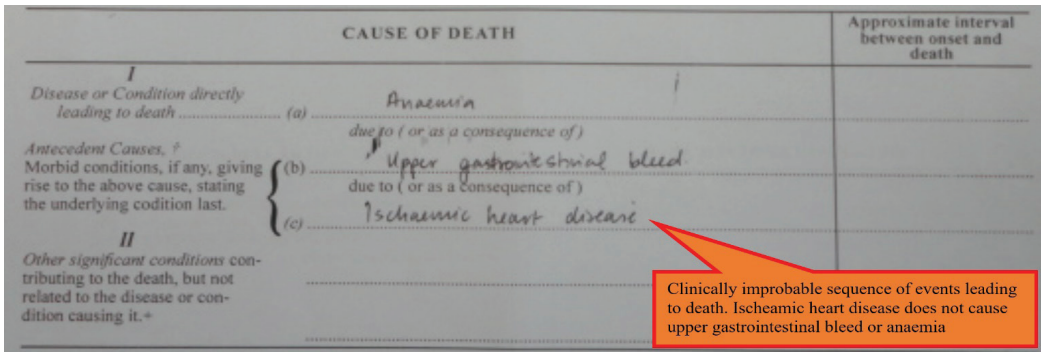
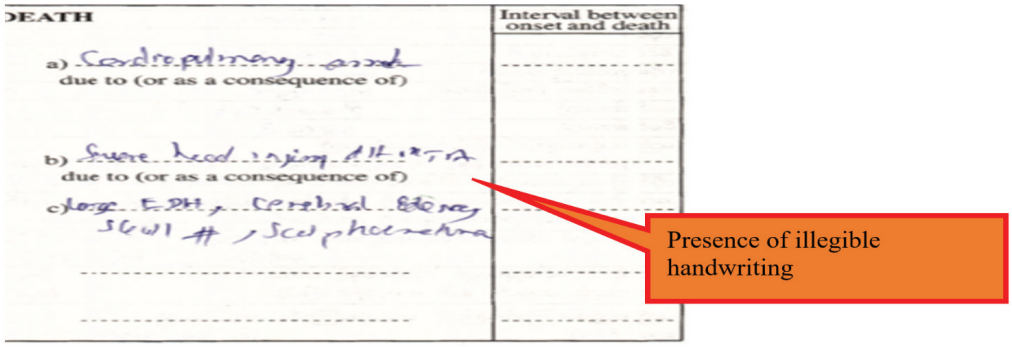
***Objective 1**: Understand and identify the common errors made by attending doctors in cause of death certification*

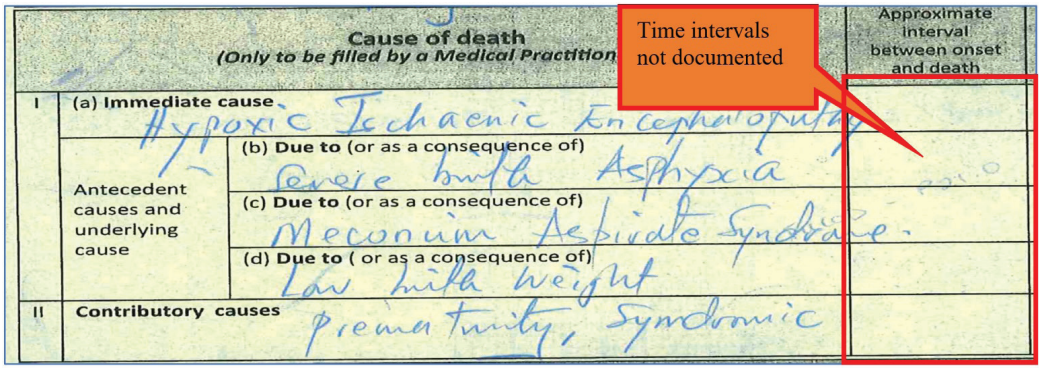
Lesson plan

Time allocation: 90 minutes
Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, sample of local MCCD with common errors

Topic	Expected outcome	Content
Errors in COD certification	Students identify common errors in COD certification	Examples of errors in COD certification are provided in this section, using actual MCCDs from several countries. However, it is recommended that a sample of MCCDs be collected from the local country in order to draw on errors specific to the local context. The following errors are identified as the most commonly occurring errors in COD certification: • Documenting multiple causes per line • Use of abbreviations • Keeping blank lines within the sequence of events • Incorrect sequencing of the causes of death • Illegibility • Ill-defined condition entered as the UCOD • Lack of specificity around causes (e.g. no sites for cancers, no organism for infections, etc.) • Time intervals left blank
	Students are able to identify MCCD that contain more than one COD per line	**Documenting multiple causes per line** Only one COD should be documented per line in a MCCD according to the guidelines provided by WHO. If the attending doctor documents more than one COD on a single line in the MCCD, it becomes difficult for the ICD mortality coders to find the sequence of events leading to death and select the UCOD. One exception to this rule is when there are multiple causes in the sequence leading to death and not enough blank lines to record them. When a certifier encounters this situation, multiple causes can be documented per line. However, in this case, the certifier should clearly show the sequence by writing 'due to' between conditions documented on the same line. Figure 18 shows a MCCD that contain four COD on the same line (line 1b). You may also note the erroneous use of abbreviations, incorrect sequencing of causes of death and a blank column where time intervals should be recorded in this MCCD.  *Figure 18: MCCD with multiple causes documented on the same line*

Topic	Expected outcome	Content
Errors in COD certification (cont'd)	Students are able to identify the MCCD that contain abbreviations	**Use of abbreviations** The use of abbreviations during COD certification should be avoided. Abbreviations could have different meanings to different people, especially to mortality coders. The chances of mortality coders misinterpreting the abbreviation and coding the COD to a non-relevant code is high. This would lead to an incorrect UCOD. Figure 19 shows a MCCD where the attending doctors have used abbreviations when documenting causes of death. Note also the incorrect sequencing of events leading to death and the non-recording of the time intervals between the onset of the condition and death.  *Figure 19: Use of abbreviations in documenting causes of death in a MCCD*
	Students are able to identify MCCD with blank lines within the sequence of events	**Presence of blank lines within the sequence of events** The certifying doctors must use consecutive lines in Part 1 of the MCCD, starting at line 1(a), when completing the MCCD. The UCOD must be documented in the lowest used line in Part 1. Certifiers should not leave blank lines within the sequence/chain of events leading to death. They should understand that the MCCD is a legal document and that they should not leave any space that could be easily altered or modified in a completed MCCD. Figure 20 shows a MCCD where the attending doctors have erroneously left a blank line within the sequence of events. Note also the column to record the time interval is erroneously left blank in this MCCD.  *Figure 20: MCCD with blank lines within the sequence of events*
	Students are able to identify incorrect or clinically improbable sequences/ chain of events leading to death documented in the MCCD	**Incorrect sequencing of causes of death** The students should be reminded that mortality statistics are based on the UCOD, which is the disease or injury that initiated the chain/sequence of events that led directly to death. For example, if a person dies due to excessive bleeding from a ruptured spleen following a road traffic accident, splenic haemorrhage is the immediate COD while the road traffic accident is the UCOD. Documenting the immediate COD as the UCOD is the most frequently observed error. The attending doctors should be urged to identify the chain/sequence of events leading to death and document them correctly in the MCCD. It should be emphasised that, when a clinically improbable chain/ sequence of events is documented, it becomes extremely difficult to select the correct UCOD.

Topic	Expected outcome	Content
Errors in COD certification (cont'd)	Students are able to identify incorrect or clinically improbable sequences/ chain of events leading to death documented in the MCCD (cont'd)	Figure 21 shows a MCCD where certifying doctors have recorded a clinically improbable chain/sequence of events leading to death. Note also that the column to record the time interval is erroneously left blank in this MCCD.  *Figure 21: MCCD with a clinically improbable chain/sequence of events*
	Students are able to identify MCCD with illegible handwriting in COD certification	**Illegibility** An entry in a MCCD is considered illegible if it is not legible at a glance with an adequate light source without the help of another person. The attending doctors must complete the MCCD in a legible manner so that coders and other users can read the information provided in it. However, some doctors have illegible handwriting and this makes it difficult for coders to identify the stated condition correctly. Figure 22 shows a MCCD with illegible handwriting of a certifying doctor. Note also that the column to record the time interval is erroneously left blank in this MCCD.  *Figure 22: MCCD with illegible handwriting of the certifying doctor*
	Students are able to identify ill-defined conditions entered as UCOD in MCCD	**Ill-defined condition entered as the UCOD** Documenting ill-defined conditions in MCCD is counterproductive to public health and results in the omission of information needed for decision-makers to guide them in designing preventive health programmes. Ill-defined conditions are usually coded to unusable codes, which belong to four main types: 1. Impossible underlying causes, including signs and symptoms 2. Intermediate causes 3. Modes of dying (i.e. respiratory, cardiac or cardiorespiratory arrest) 4. Unspecified causes within a larger mortality category (i.e. unspecified accident, ill-defined site of injury or cancer). Organ failure (e.g. kidney or liver failure) is not acceptable as an UCOD. The disease or condition causing the organ failure must be entered as the UCOD. Similarly, the term 'sepsis' should not be used as an UCOD but, instead, as the source of the infection (e.g. pneumococcal pneumonia or infective meningitis) should be identified whenever possible. These are known as ill-defined conditions and should be avoided.

Topic	Expected outcome	Content
Errors in COD certification (cont'd)	Students are able to identify the MCCD where the time interval is not documented	**Time intervals left blank** The column on the righthand side of Part 1 of the MCCD is for recording the approximate time interval between the onset of the condition and the date of death. The time interval should be entered for all conditions reported on the MCCD, especially for the conditions reported in Part 1. For conditions listed in Part 2, the time interval can be written in brackets after the condition (e.g. alcohol abuse [20 years]). These time intervals are usually established by the attending doctor on the basis of available information in the medical records. In some instances, the time interval will have to be estimated by the attending doctor. Time periods (minutes, hours, days, weeks, months or years) can be used. If the time of onset is unknown or cannot be determined due to the absence of further information, it can be documented as 'unknown'. Time intervals are extremely important for correctly coding certain diseases. They also provide a check on the accuracy of the reported sequence of conditions. Therefore, doctors should be encouraged to complete the time intervals accurately. Figure 23 shows a MCCD where the attending doctors have not documented time intervals.  *Figure 23: MCCD where time intervals are not documented*

Evaluation:

1. Individual/Small group work: Students identify the errors committed by certifying doctors on a sample of completed MCCDs.

8. Understanding local mortality statistics

***Objective 1**: Enhance student knowledge of the challenges in improving the cause of death certification in the country*

During this module, students should be encouraged to present available information on their own countries. After gaining knowledge on the importance of UCOD, students should have a strong understanding of the importance and uses of mortality statistics. Participating students should be asked to explore the current challenges in improving the COD information in their own countries. This activity should be planned as a small group activity. The facilitators must provide students with guidance on where such information is available (e.g. country annual health bulletins, local hospital websites, national statistical office webpages, etc.).

Lesson plan

Time allocation: 90 minutes
Teaching/Learning method: The questions outlined below could be provided to the students to help guide this small group activity.

1. What is the latest year for which COD data is available in your country?
2. Use of International Classification of Diseases (ICD) in coding COD in the MCCD: At present, does your country use the ICD to code COD information? If yes, what version of the ICD is used (version ICD-10, ICD-11 any other modified version, mortality coding rules, standard mortality coding rules or ICD SMoL [start-up mortality list] rules)? Who is responsible for coding MCCD in your country? Where are the certificates completed by doctors sent for coding? Who is responsible for producing national mortality statistics in your country? Are your country's COD statistics reported to the WHO?
3. List major challenges that attending doctors face during the certification of CODs.
4. Who certifies the unnatural deaths, 'dead on arrival', deaths occurring outside hospitals, etc. in your own country?

Teaching/Learning method: Interactive presentation
Resources: PowerPoint presentation, flip chart presentations by student groups, country-specific MCCD formats

Evaluation:

1. Students conduct a brief PowerPoint/flip chart presentation to the class in groups.

References

United Nations Economic and Social Commission for Asia and the Pacific 2007. Core curriculum for certifiers of underlying cause of death. Available at: http://getinthepicture.org/resource/core-curriculum-certifiers-underlying-cause-death (accessed 15 March 2021).

SPC (Pacific Community) 2018. Regional Medical Death Certification Workshop Report. Tonga. Available at: https://sdd.spc.int/events/2018/12/sub-regional-training-medical-certification-causes-death.

World Health Organization 2016. International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Volume 2, Instruction manual, Section 4.1.2 and annex 7.1. Geneva, Switzerland.

Annex

International form of medical certificate of cause of death (WHO 2016 version)

Administrative Data (can be further specified by country)																
Sex	☐ Female								☐ Male	☐ Unknown						
Date of birth	D	D	M	M	Y	Y	Y	Y	Date of death	D	D	M	M	Y	Y	Y	Y

***Frame A*:** **▶ Medical data: Part 1 and 2**			
		▶ Cause of death	▶ Time interval from onset to death
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	a		
	b	Due to:	
	c	Due to:	
	d	Due to:	
2. Other significant conditions contributing to death (time intervals can be included in brackets after the condition)			

***Frame B*:** **▶ Other medical data**										
Was **surgery** performed within the last 4 weeks?	☐ Yes	☐ No	☐ Unknown							
If yes, please specify date of surgery	D	D	M	M	Y	Y	Y	Y		
If yes, please specify reason for surgery (disease or condition)										
Was an autopsy requested?	☐ Yes	☐ No	☐ Unknown							
If yes were the findings used in the certification?	☐ Yes	☐ No	☐ Unknown							
▶ Manner of death:										
Disease	Assault									
Accident	Legal intervention									
Intentional self harm	War									
If external cause or poisoning:	Date of injury	D	D	M	M	Y	Y	Y	Y	
Please describe how external cause occurred (If poisoning please specify poisoning agent)										
▶ Place of occurrence of the external cause:										
☐ At home	☐ Residential institution	☐ School, other institution, public administrative area	☐ Sports and athletics area							
☐ Street and highway	☐ Trade and service area	☐ Industrial and construction area	☐ Farm							
☐ Other place (please specify):			☐ Unknown							
▶ Fetal or infant Death										
Multiple pregnancy	☐ Yes	☐ No	☐ Unknown							
Stillborn?	☐ Yes	☐ No	☐ Unknown							
If death within 24h specify number of hours survived	Birth weight (in grams)									
Number of completed weeks of pregnancy	Age of mother (years)									
If death was perinatal, please state conditions of mother that affected the fetus and newborn										
▶ For women, was the deceased pregnant?	☐ Yes	☐ No	☐ Unknown							
☐ At time of death	☐ Within 42 days before the death									
☐ Between 43 days up to 1 year before death	☐ Unknown									
☐ Did the pregnancy contribute to the death?	☐ Yes	☐ No	☐ Unknown							

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