The Importance of Proper Death Certification During the COVID-19 Pandemic

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Death certificate data are used to monitor local, regional, and national mortality trends to improve public health and public safety. Accurate death certification related to coronavirus disease 2019 (COVID-19) is vital to understand the extent and progression of the pandemic. Death certificate data can inform the public and policy makers on the progress of the COVID-19 pandemic and provide important information about who is dying, where they are from, and what were their associated medical conditions. Public health mortality data are only as good as the quality of the death certificates, but proper death certification has been a long-standing challenge in the US.[1-3] The COVID-19 pandemic has highlighted shortcomings that may compromise an accurate count of COVID-19 deaths.

COVID-19 death certificates are typically completed by treating physicians. There is a known training gap regarding proper death certification,[1,2,4] which leads to improperly completed death certificates. This affects the quality of the public health data, which in turn limits the ability to track the evolving COVID-19 pandemic. Death certificate data can be used locally to guide disease surveillance and quarantine measures and optimize medical resources. These data are transmitted to the National Center for Health Statistics (NCHS) so the US can initiate broader responses to the pandemic. If the death certificates are inaccurate, local and national responses may be adversely affected.

An example illustrates this problem. A woman in her late 70s with dementia and a history of stroke that occurred years earlier had a 3-day history of an upper respiratory tract infection with fever, dyspnea, and cough. She resided at a skilled nursing home and several residents had been diagnosed with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Her family did not want further testing or hospitalization, and the woman died several days later at the nursing home. She was not tested for SARS-CoV-2 and her cause of death was certified by the facility physician as "acute respiratory failure." When her death was reported to the medical examiner's office by the funeral director, the medical examiner reviewed the death certificate, spoke with the nursing home staff and family, and suspected the death was due to SARS-CoV-2 infection. An investigator performed a nasopharyngeal swab on the deceased woman, and laboratory testing of the swab detected SARS-CoV-2 RNA. A revised death certificate was issued with the cause of death indicated as novel coronavirus respiratory infection; dementia and remote stroke were listed as contributing conditions.

This case illustrates the shortcomings of death certificate data that lack an accurate description of the underlying medical illness and contributory conditions. The original death certificate would not have been categorized as a death due to COVID-19 and would not have offered additional public health data to aid in the understanding of the pandemic. By contrast, the revised death certificate identified the disease that set the sequence of fatal events in motion.

A US death certificate (**Figure**) typically has 4 separate lines (part I) and is divided into sections: proximate cause, immediate cause, and mechanism. The proximate (underlying) cause is defined as the etiologically specific disease that in a natural and continuous sequence, uninterrupted by an efficient intervening cause, produced the fatality and without which the death would not have occurred. This must be included for it to be a competent death certificate. The cause of death statement may include an immediate cause (eg, bronchopneumonia), but it is only required to include the proximate (underlying) cause. The contributing conditions section (part II) is for diseases that contribute to death but do not cause the disease listed in part I. For public health analysis of risk factors for deaths from COVID-19, the part II findings are essential. These become important discriminating factors, in addition to age, sex, race, and residence that are already included. A study showed that hypertension, obesity, and diabetes were common comorbidities among patients with COVID-19 who required hospitalization.[5]

The NCHS recently released guidelines for the certification of COVID-19 deaths.[6] The deaths may be considered in 2 groups: those in which the person has died from direct complications of laboratory-confirmed SARS-CoV-2 infection (such as acute respiratory distress syndrome, secondary bronchopneumonia) and those with a compelling clinical history for SARS-CoV-2 infection but were either not tested for COVID-19 or the test was negative. For the first group, the part I cause of death is COVID-19 and part II may include other medical conditions that increased the likelihood of death due to COVID-19 (eg, obesity, diabetes).

Objective findings, such as laboratory tests, are an important part of medicine, but clinical realities must be considered. Tests for SARS-CoV-2 can have false-negative and false-positive results. Among some hospitalized patients, initial COVID-19 swab tests may be negative and subsequent tests may be positive. If these patients had died before the positive test, the deaths would not have been a laboratory-confirmed COVID-19 death. For instances in which a laboratory diagnosis of COVID-19 cannot be made but SARS-CoV-2 infection is suspected or likely, clinicians may use their diagnostic acumen based on the history and physical examination to certify the death as due to COVID-19 and the

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Figure. Example of a US Death Certificate

40. PART I. Enter the **chain of events**—diseases, injuries, or complications that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause of death on a line. Add additional lines if necessary.	APPROXIMATE INTERVAL ONSET TO DEATH
IMMEDIATE CAUSE (final disease or condition resulting in death) → (a) Bronchopneumonia *Due to (or as a consequence of):*	3 d
Sequentially list conditions if any, leading to the cause listed on line (a). Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death) **LAST** (b) Novel coronavirus 2019 (COVID-19) respiratory infection *Due to (or as a consequence of):*	1 wk
(c) _____ *Due to (or as a consequence of):*	
(d) _____	

41. PART II. Enter **other significant conditions contributing to death** but not resulting in the underlying cause given in PART I. **Diabetes**	42. IF FEMALE: ☐ Not pregnant within past year ☐ Not pregnant, but pregnant 43 d to 1 y before death ☐ Pregnant at the time of death ☐ Not pregnant, but pregnant within 42 d of death ☐ Unknown if pregnant within past year	43. DID TOBACCO USE CONTRIBUTE TO DEATH? ☐ Yes ☐ Probably ☒ No ☐ Unknown

44. MANNER OF DEATH (natural, homicide, accident, suicide, undetermined) (specify) **Natural**	45. DATE OF INJURY	46. TIME OF INJURY	47. PLACE OF INJURY (decedent's home, construction site, wooded area)	48. INJURY AT WORK? ☐ Yes ☒ No

There are 58 fields total in US death certificates, with only the 9 related to cause of death shown here. The key fields are cause (part I), contributing conditions (part II), manner, dates of birth and death, sex, race/ethnicity, and locations of residence and death.

recommended phrasing is "acute respiratory illness due to probable COVID-19 infection."[6]

Every death certificate needs an etiologically specific (underlying) cause of death to be useful for public health and mortality surveillance. Cardiac and respiratory arrest or failure are terminal events and need not be listed on the death certificate and certainly cannot stand alone as the cause of death. Cardiopulmonary arrest and respiratory failure are synonyms for death; listing either on the death certificate does not add to the understanding of why the person died. The key question is: What disease caused the respiratory or cardiac failure? This involves an assessment of the medical history and clinical course. The medicolegal standard for the certification of a natural death is a probability (ie, the listed reason was more likely than not to have caused death). Individuals completing the death certificate are never required to be 100% certain. Practicing forensic pathologists typically certify hundreds of deaths per year. This experience and the availability 24 hours/day and 7 days/week make medical examiner and coroner offices excellent resources for questions.

Deaths that are reportable to the medical examiner vary by jurisdiction. In general, these officials have statutory jurisdiction related to diseases that may constitute a threat to public health. Therefore, all suspected and confirmed COVID-19 deaths should be reported. In some jurisdictions, the medical examiner's office creates an electronic record and then triages the level of investigation needed for each. Autopsies are not necessary for most laboratory-confirmed COVID-19 deaths. In the above case example, the investigation resulted in laboratory testing and a revised death certificate.

Given that COVID-19 death certificates have considerable influence on local and national responses toward mitigation of disease transmission, additional effort is required by medical examiners to emphasize this to physicians and other health care professionals, nursing homes, and hospitals. This can be accomplished through collaboration with the department of public health by publishing and disseminating updated guidelines about which deaths need to be reported and what is acceptable death certificate terminology. State medical societies, hospital associations, and funeral director societies also can help distribute information. Medical examiners can publish frequently asked questions about COVID-19 and provide links to alerts from the US Centers for Disease Control and Prevention and the NCHS and educate funeral directors to report when the family or certifying physician has concerns about SARS-CoV-2 infection, but testing was not performed. These approaches serve as a reminder that the medical examiner's office has an important role in the pandemic, is available to offer guidance at any time, and that proper death certification does matter.

Death certificates serve as a valuable source of public health information that is readily available and quickly tracked and classified. The accuracy and quality of death certificate information cannot be understated. The cause of death statement must contain the underlying medical disease and any contributing comorbidities listed in part II. Well-reasoned and detailed documentation on death certificates allow local, national, and worldwide public health agencies to gather timely and accurate information to aid in the evaluation and management of the COVID-19 pandemic.

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