

Key Findings

- Among 1,279 death certificates listing COVID-19 in 2020, 94.6% of death certificates had a co-occurring diagnosis that was a plausible chain-of-event condition (e.g., pneumonia), a significant contributing condition (e.g., hypertension), or both.
- Fewer than 60 death certificates (4.6%) listed only COVID-19 with no other medical conditions.
- Ten (0.8%) of death certificates which listed COVID-19 had co-occurring diagnosis codes that could not be plausibly categorized as either a chain-of-event or significant contributing condition.

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Death Certificate—Based ICD-10 Diagnosis Codes for COVID-19 Mortality Surveillance, Montana Occurrences, 2020

Introduction

Approximately 1,300 deaths during 2020 were attributed to COVID-19 on death certificates filed in Montana. Concerns have been raised that some deaths may be inappropriately attributed to COVID-19.¹ To determine whether COVID-19 deaths have been overestimated, the International of Classification of Diseases, Tenth Revision (ICD-10) diagnosis codes were examined using official Montana death certificates. This report describes ICD-10 codes for COVID-19 by age, sex, race, and place of death reported on the death certificate.

Methods

Data used in this report come from the Montana death certificates collected by the Montana Office of Vital Records for COVID-19-associated deaths occurring in Montana regardless of residency (Montana and non-Montana residents). Death certificates analyzed included only those processed using standard CDC protocols to convert all written text and diagnoses to ICD-10 codes.² COVID-19 deaths were ascertained using the ICD-10 code U07.1 listed in Part I (the section for reporting chain of events leading to directly to death, the immediate cause of death, and the underlying cause of death) or Part II (the section for reporting all other significant conditions that contributed to the death) of the death certificate for deaths occurring during 2020. The following methods were adapted from an analysis of COVID-19 death certificate coding published by the Centers for Disease Control and Prevention (CDC) in March 2021.³

First, the location of ICD-10 diagnoses in relation to the COVID-19 diagnosis was used to categorize the co-occurring diagnoses as being in the chain of events that directly caused the death (chain-of-event conditions) or a significant condition contributing to death (significant contributing conditions).

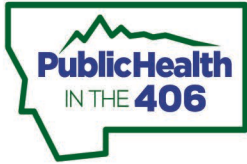
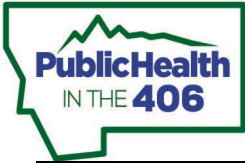


Table 2. Highest-frequency International Classification of Diseases, Tenth Revision (ICD-10) codes listed in death certificates with COVID-19 in Part I of death certificate and at least one diagnosis other than COVID-19, Montana Occurrences, 2020.

	Number	Percent
Condition ICD-10 coded Certificates	1,113	100.0
Conditions listed as chain-of-event conditions (ICD-10 code)		
Pneumonia, unspecified (J18.9)	668	60.0
Acute respiratory failure (J96.0)	372	33.4
Respiratory failure, unspecified (J96.9)	233	20.9
Sepsis, unspecified (A41.9)	80	7.2
Adult respiratory distress syndrome (J80)	75	6.7
Asphyxia (R09.0)	63	5.7
Cardiac arrest, unspecified (I46.9)	57	5.1
Respiratory arrest (R09.2)	22	2.0
Conditions listed as significant contributing conditions (ICD-10 code)		
Essential (primary) hypertension (I10)	238	21.4
Chronic obstructive pulmonary disease, unspecified (J44.9)	180	16.2
Tobacco use (F17.9)	177	15.9
Unspecified dementia (F03)	140	12.6
Unspecified diabetes mellitus without complication (E14.9)	118	10.6
Atherosclerotic heart disease (I25.1)	116	10.4
Type 2 Diabetes mellitus without complication (E11.9)	115	10.3
Atrial fibrillation and flutter (I48)	102	9.2
Congestive heart failure (I50.0)	69	6.2
Hyperlipidemia, unspecified (E78.5)	65	5.8
Chronic kidney disease, unspecified (N18.9)	56	5.0
Other specified disorders of the kidney and ureter (N28.8)	45	4.0
Alzheimer disease, unspecified (G30.9)	44	4.0
Obesity, unspecified (E66.9)	43	3.9
Stroke, not specified as hemorrhage or infarction (I64)	37	3.3
Acute renal failure, unspecified (N17.9)	36	3.2
Heart failure, unspecified (I50.9)	26	2.3
Morbid obesity (E66.8)	25	2.2
Chronic kidney disease stage 3 (N18.3)	23	2.1
Chronic kidney disease stage 5 (N18.5)	22	2.0
Conditions listed and not identified as known chain-of-event conditions or significant contributing conditions (ICD-10 code)		
Sleep Apnea (G47.3)	34	3.1
Other specified general symptoms and signs (R68.8)	30	2.7
Hypothyroidism, unspecified (E03.9)	28	2.5
Other lack of expected normal physiological development (R62.8)	23	2.1



- ¹ Weinberger DM, Chen J, Cohen T, et al. 2020. Estimation of excess deaths associated with the COVID-19 pandemic in the United States, March to May 2020. *JAMA Intern Med* 180:1336–44.
- ² National Center for Health Statistics. 2017. Section I: instructions for classifying the underlying cause-of-death, 2017. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics.
- ³ Gundlapalli, AV, et al. 2020. Death Certificate–Based ICD-10 Diagnosis Codes for COVID-19 Mortality Surveillance — United States, January–December 2020. *MMWR* 70;14: 523-527.
- ⁴ CDC. COVID-19: people with certain medical conditions. Atlanta, GA: US Department of Health and Human Services, CDC; 2021. Accessed April 12, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>
- ⁵ Kim L, Garg S, O’Halloran A, et al. 2020. Risk factors for intensive care unit admission and in-hospital mortality among hospitalized adults identified through the U.S. coronavirus disease 2019 (COVID-19)-Associated Hospitalization Surveillance Network (COVID-NET). *Clin Infect*.
- ⁶ Ko JY, Danielson ML, Town M, et al. 2020. Risk factors for coronavirus disease 2019 (COVID-19)-associated hospitalization: COVID-19-Associated Hospitalization Surveillance Network and Behavioral Risk Factor Surveillance System. *Clin Infect Dis*.
- ⁷ Richardson S, Hirsch JS, Narasimhan M, et al. 2020. Northwell COVID-19 Research Consortium. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. *JAMA* 323:2052–9.
- ⁸ Centers for Disease Control and Prevention, National Center for Health Statistics. *Physician’s Handbook on Medical Certification of Death* (2003 ed.). 2004. Hyattsville, Maryland: US Department of Health and Human Services.
- ⁹ CDC. Coronavirus Disease 2019 (COVID-19) FAQs. Accessed April 16, 2021. <https://www.cdc.gov/nchs/covid19/faq.htm>