



COVID-19

Underlying Medical Conditions Associated with Higher Risk for Severe COVID-19: Information for Healthcare Professionals

Updated Feb. 15, 2022

For the general public, see [People with Certain Medical Conditions](#) for an overview of medical conditions and resources. For information on the evidence used to update the list of underlying medical conditions, see the [Science Brief](#).

Purpose

An updated list of high-risk underlying conditions, based on what has been reported in the literature as of October 7, 2021 is provided below. The conditions are grouped by the level of evidence, with the highest level at the top. The list of underlying medical conditions is not exhaustive and will be updated as the science evolves. CDC is currently reviewing additional underlying conditions, and some of these might have sufficient evidence to be added to the list. This list should not be used to exclude people with underlying conditions from recommended preventive measures such as booster doses of vaccines or needed therapies. The process and evidence used to update the list is found in the brief of [Scientific Evidence for Conditions that Increase Risk of Severe Illness](#).

This webpage provides an **evidence-based resource for healthcare professionals** caring for patients with underlying medical conditions who are at higher risk of developing severe outcomes of COVID-19. Severe outcomes of COVID-19 are defined as hospitalization, admission to the intensive care unit (ICU), intubation or mechanical ventilation, or death.

This page summarizes data from published reports, scientific articles in press, unreviewed pre-prints, and internal data that were included in a literature review conducted by subject matter experts as of October 2021. The information reflects current evidence regarding underlying medical conditions and is intended to help healthcare professionals make informed decisions about patient care and increasing the awareness of risk among their patients.

Background

We continue to learn more about the risk factors for severe COVID-19 outcomes. Age is the strongest risk factor for severe COVID-19 outcomes. Approximately 54.1 million people aged 65 years or older reside in the United States; in 2020, this age group accounted for 81% of U.S. COVID-19 related deaths. As of February 7, 2022 ([CDC COVID Data Tracker](#)), the number of deaths in this group was more than 97 times the number of deaths in those aged 18–29.^(1, 2) In 2020, residents of long-term care facilities made up less than 1% of the U.S. population but accounted for more than 35% of all COVID-19 deaths.⁽³⁻⁷⁾ Additionally, people ages 18 years and older with certain underlying medical conditions are at increased risk for severe illness from COVID-19.⁽⁸⁾

Studies have shown that COVID-19 does not affect all population groups equally. The risk of severe COVID-19 increases as the number of underlying medical conditions increases in a person.^(9–11) People with disabilities are more likely than people without disabilities to have chronic health conditions, live in congregate settings, and face more barriers to health care.^{(12–}

¹⁴⁾ Studies have shown that some people with certain disabilities are more likely to get COVID-19 and have worse outcomes.⁽¹⁵⁻
¹⁷⁾ Some chronic medical conditions occur more frequently or at a younger age among people from racial or ethnic minority groups. Moreover, data have also shown that compared to non-Hispanic White people, people from racial and ethnic minority groups are more likely to die from COVID-19 at younger ages.⁽¹⁸⁾ Based on mortality data from CDC's National Vital Statistics System (NVSS), the total number of excess deaths in the US since February 1, 2020 through data available on February 2, 2022 is estimated at 1,006,393.⁽²⁰⁾ In 2020, the largest percentage increases in death occurred among adults aged 25–44 years and among [Hispanic or Latino people](#).⁽¹⁹⁾

Additionally, we are still learning about how conditions that affect the environments where people live, learn, and work can influence the risk for infection and severe COVID-19 outcomes. These social determinants of health include neighborhood and physical environment, housing, occupation, education, food security, access to health care, and economic stability.

Summary of Conditions with Evidence

1. **Higher risk** for severe COVID-19 outcomes is defined as an underlying medical condition or risk factor that has a published meta-analysis or systematic review or complete the [CDC systematic review process](#). The meta-analysis or systematic review demonstrates good or strong evidence, (depending on the quality of the studies in the review or meta-analysis) for an increase in risk for at least one severe COVID-19 outcome.

- Cancer
- Cerebrovascular disease
- Chronic kidney disease*
- Chronic lung diseases limited to:
 - Interstitial lung disease
 - Pulmonary embolism
 - Pulmonary hypertension
 - Bronchiectasis
 - COPD (chronic obstructive pulmonary disease)
- Chronic liver diseases limited to:
 - Cirrhosis
 - Non-alcoholic fatty liver disease
 - Alcoholic liver disease
 - Autoimmune hepatitis
- Cystic fibrosis
- Diabetes mellitus, type 1 and type 2*
- Disabilities
 - Attention-Deficit/Hyperactivity Disorder (ADHD)
 - Cerebral Palsy
 - Congenital Malformations (Birth Defects)
 - Limitations with self-care or activities of daily living
 - Intellectual and Developmental Disabilities
 - Learning Disabilities
 - Spinal Cord Injuries
 - (For the list of all conditions that were part of the review, [see the module below](#))
- Heart conditions (such as heart failure, coronary artery disease, or cardiomyopathies)
- HIV (human immunodeficiency virus)
- Mental health disorders limited to:
 - Mood disorders, including depression
 - Schizophrenia spectrum disorders
- Neurologic conditions limited to dementia

- Obesity (BMI ≥ 30 kg/m²)*
- Primary Immunodeficiencies
- Pregnancy and recent pregnancy
- Physical inactivity
- Smoking, current and former
- Solid organ or hematopoietic cell transplantation
- Tuberculosis
- Use of corticosteroids or other immunosuppressive medications

[See List of All Disabilities from CDC's Systematic Review Process](#)



- Attention-Deficit/Hyperactivity Disorder (ADHD)
- Autism
- Cerebral Palsy
- Charcot Foot
- Chromosomal Disorders
- Chromosome 17 and 19 Deletion
- Chromosome 18q Deletion
- Cognitive Impairment
- Congenital Hydrocephalus
- Congenital Malformations
- Deafness/Hearing Loss
- Disability Indicated by Barthel Index
- Down Syndrome
- Fahr's Syndrome
- Fragile X Syndrome
- Gaucher Disease
- Hand and Foot Disorders
- Learning disabilities
- Leber's Hereditary Optic Neuropathy (LHON) or Autosomal Dominant Optic Atrophy (ADOA)
- Leigh Syndrome
- Limitations with self-care or activities of daily living
- Maternal Inherited Diabetes and Deafness (MIDD)
- Mitochondrial Encephalopathy, Lactic Acidosis, and Stroke-Like Episodes (MELAS) and Risk Markers
- Mobility Disability
- Movement Disorders
- Multiple Disability (referred to in research papers as "bedridden disability")
- Multisystem Disease
- Myoclonic Epilepsy with Ragged Red Fibers (MERRF)
- Myotonic Dystrophy
- Neurodevelopmental Disorders
- Neuromuscular Disorders
- Neuromyelitis Optica Spectrum Disorder (NMOSD)
- Neuropathy, Ataxia, and Retinitis Pigmentosa (NARP)
- Perinatal Spastic Hemiparesis

- Primary Mitochondrial Myopathy (PMM)
- Progressive Supranuclear Palsy
- Senior-Loken Syndrome
- Severe and complex disability (referred to in research papers as “polyhandicap disability”)
- Spina Bifida and Other Nervous System Anomalies
- Spinal Cord Injury
- Tourette Syndrome
- Traumatic Brain Injury
- Visual Impairment/Blindness
- Wheelchair Use

2. **Suggestive higher risk** for severe COVID-19 outcomes is defined as an underlying medical condition or risk factor that neither has a published meta-analysis or systematic review nor completed the [CDC systematic review process](#). The evidence is supported by mostly cohort, case-control, or cross-sectional studies. (Systematic reviews are available for some conditions for children with underlying conditions.)

- Children with certain underlying conditions
- Overweight (BMI ≥ 25 kg/m², but < 30 kg/m²)
- Sickle cell disease
- Substance use disorders
- Thalassemia

3. **Mixed evidence** is defined as an underlying medical condition or risk factor that has a published meta-analysis or systematic review or completing the [CDC systematic review process](#). The meta-analysis or systematic review is inconclusive, either because the aggregated data on the association between an underlying condition and severe COVID-19 outcomes are inconsistent in direction or there are insufficient data (or limited) on the association between an underlying conditions and severe COVID-19 outcomes.

- Alpha 1 antitrypsin deficiency
- Asthma
- Bronchopulmonary dysplasia
- Hepatitis B
- Hepatitis C
- Hypertension*

Footnote: * indicates underlying conditions for which there is evidence for pregnant and non-pregnant people

Actions Healthcare Professionals Can Take

- Approved and authorized COVID-19 vaccines (primary series and booster) are safe and effective. Check out [Interim Clinical Considerations for Use of COVID-19 Vaccines](#) and [Stay Up to Date with your Vaccines](#).
- Check out [additional information for your patients](#), including a link to your state, local, tribal, or territorial health department’s website on eligibility for and [locations for COVID-19 vaccination](#).
- Encourage patients to keep appointments for routine care and adhere to treatment regimens.
- Consider use of telehealth in coordination with community-based organizations, family members, or other providers, when appropriate, although some patients may not have knowledge of or access to appropriate technology or internet service.
- Encourage patients with underlying medical conditions, who are able to, to continue practicing [preventive measures, such as wearing a well-fitted mask and physical distancing](#), and to avoid infection with the virus that causes COVID-19. This becomes even more important with increasing age and number and severity of underlying conditions.
- Carefully consider potential additional risks of COVID-19 illness for patients who are members of racial and ethnic minority groups, and how to facilitate access to culturally and linguistically appropriate resources. These patients are often younger when they develop chronic medical conditions, might be at higher risk of having more than one

underlying medical condition, and at higher risk for acquisition of COVID-19. Studies have shown that people in ethnic and racial minority groups are dying from COVID-19 at younger ages.

Key Findings from One Large Cross-Sectional Study

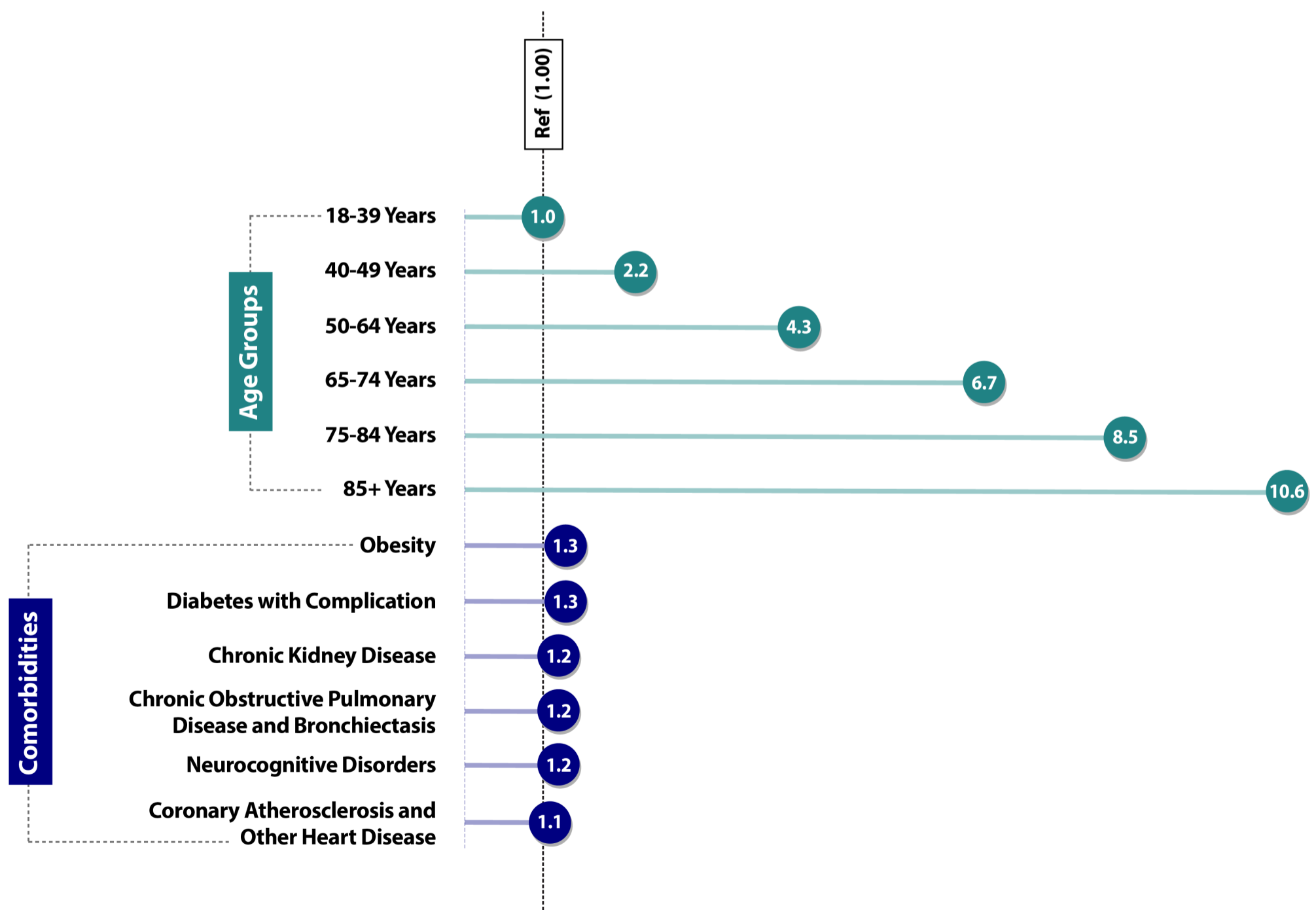
Underlying Medical Conditions and Severe Illness Among 540,667 Adults Hospitalized With COVID-19, March 2020–March 2021

This [study](#) used data from the Premier Healthcare Database, which represents approximately 20% of all inpatient admissions in the United States since 2000. This cross-sectional study of 540,667 adults hospitalized with COVID-19 included both inpatients and hospital-based outpatients with laboratory-diagnosed COVID-19 from March 1, 2020, through March 31, 2021. The database included reports from 592 acute care hospitals in the United States. The study was designed to examine risk factors associated with severe outcomes of COVID-19 including admission to an ICU or stepdown unit, invasive mechanical ventilation, and death.

Main Findings:

- Certain underlying medical conditions increased risk for severe COVID-19 illness in adults.
- Having multiple conditions also increased risk.
- Obesity, diabetes with complications, and anxiety and fear-related disorders had the strongest association with death.
- The risk associated with a condition increased with age.

COVID-19 Death Risk Ratio (RR) for Select Age Groups and Comorbid Conditions

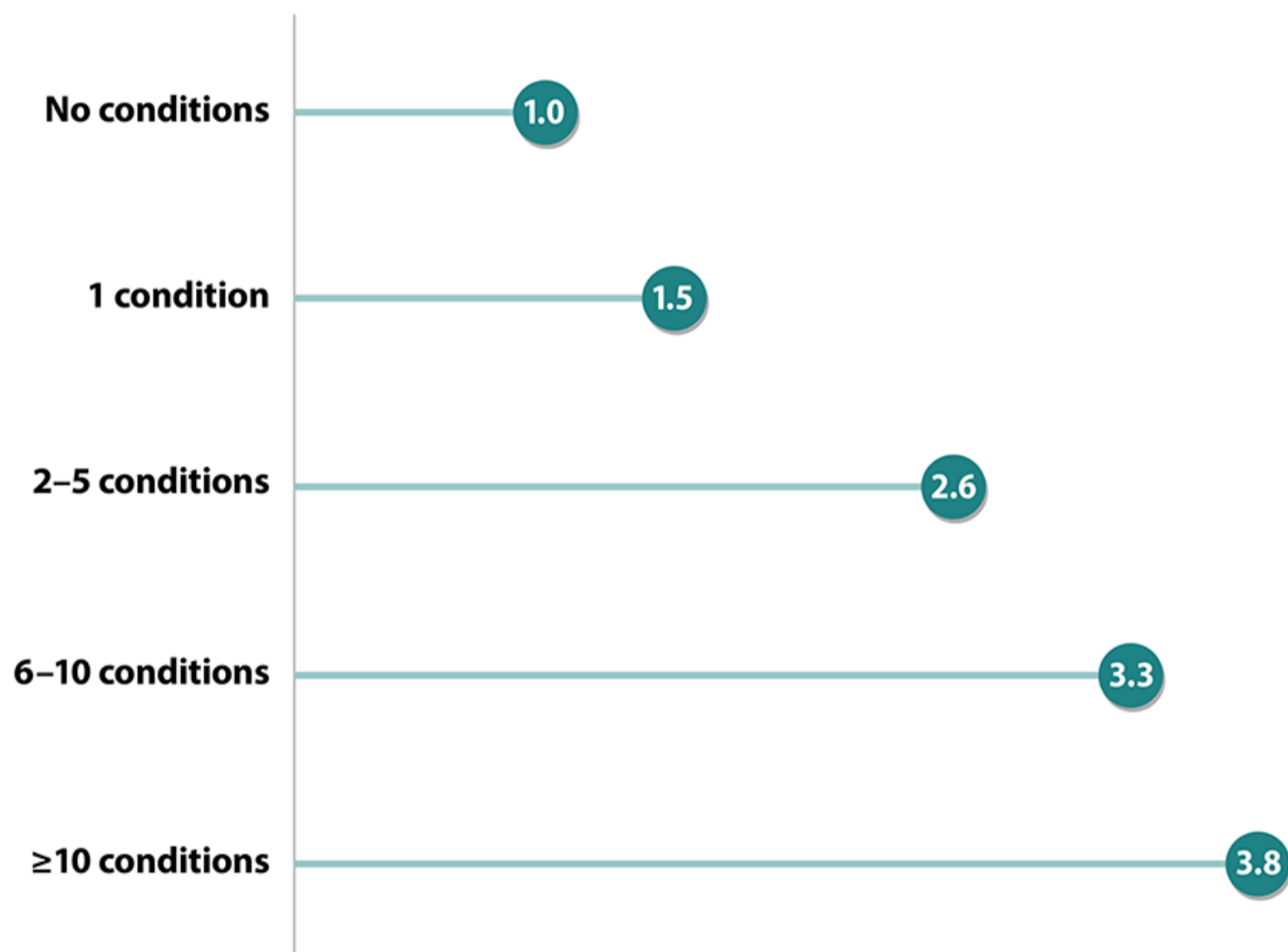


[View Larger](#)

Adapted from Sources:

- Kompaniyets L, Pennington AF, Goodman AB, Rosenblum HG, Belay B, Ko JY, et al. Underlying Medical Conditions and Severe Illness Among 540,667 Adults Hospitalized With COVID-19, March 2020–March 2021. To learn more, visit the *Preventing Chronic Disease* article: https://www.cdc.gov/pcd/issues/2021/21_0123.htm
- Pennington AF, Kompaniyets L, Summers AD, Danielson ML, Goodman AB, Chevinsky JR, Preston LE, Schieber LZ, Namulanda G, Courtney J, Strosnider HM, Boehmer TB, Mac Kenzie WR, Baggs J, Gundlapalli AV, Risk of Clinical Severity by Age and Race/Ethnicity Among Adults Hospitalized for COVID-19—United States, March–September 2020, *Open Forum Infectious Diseases*, Volume 8, Issue 2, February 2021. To learn more, visit: <https://doi.org/10.1093/ofid/ofaa638> [↗](#)

COVID-19 Death Risk Ratio (RR) Increases as the Number of Comorbid Conditions Increases




[View Larger](#)

Source: Kompaniyets L, Pennington AF, Goodman AB, Rosenblum HG, Belay B, Ko JY, et al. Underlying Medical Conditions and Severe Illness Among 540,667 Adults Hospitalized With COVID-19, March 2020–March 2021. To learn more, visit the *Preventing Chronic Disease* article: https://www.cdc.gov/pcd/issues/2021/21_0123.htm

More Information

CDC strongly encourages healthcare professionals, patients and their advocates, and health system administrators to regularly consult the [COVID-19 Treatment Guidelines](#) [↗](#) by the National Institutes of Health (NIH).

Information about enrolling in clinical trials related specifically to COVID-19 can be found at hhs.gov , and includes opportunities for people with and without COVID-19.

Visit CDC's [COVID Data Tracker](#) for current data.

Visit CDC's [COVID-19 Vaccination Clinical & Professional Resources](#) for vaccine information and resources.

Visit CDC's [Demographic Trends of COVID-19 Cases and Deaths in the U.S.](#) for COVID-19 hospitalization and death data by race/ethnicity.

Visit CDC's [Health Equity](#) page for health equity considerations for racial and ethnic minority groups.

Please [contact your state, tribal, local, or territorial health department](#) for more information on COVID-19 vaccination in your area.

References

[See All References](#) 

1. Ahmad FB, Cisewski JA, Miniño A, Anderson RN. Provisional Mortality Data — United States, 2020. *MMWR Morb Mortal Wkly Rep* 2021;70:519–522. DOI: <http://dx.doi.org/10.15585/mmwr.mm7014e1>. 
2. COVID Data Tracker. Centers for Disease Control and Prevention. <https://covid.cdc.gov/covid-data-tracker/#demographics>
3. Abrams HR, Loomer L, Gandhi A, Grabowski DC. Characteristics of U.S. Nursing Homes with COVID-19 Cases. *J Am Geriatr Soc*. 2020 Aug;68(8):1653-1656. doi: 10.1111/jgs.16661. Epub 2020 Jul 7. PMID: 32484912; PMCID: PMC7300642. 
4. Grabowski DC, Mor V. Nursing Home Care in Crisis in the Wake of COVID-19. *Journal of the American Medical Association* 2020. doi:10.1001/jama.2020.8524 
5. Brown KA, Jones A, Daneman N, et al. Association between nursing home crowding and COVID-19 infection and mortality in Ontario, Canada. *Journal of the American Medical Association, Internal Medicine* 2020. doi:10.1001/jamainternmed.2020.6466 
6. Sarah HY, See I, Kent AG, et al. Characterization of COVID-19 in assisted living facilities—39 states, October 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69(46): 1730. doi: 10.15585/mmwr.mm6946a3
7. Fisman DN, Bogoch I, Lapointe-Shaw L, McCready J, Tuite AR. Risk factors associated with mortality among residents with coronavirus disease 2019 (COVID-19) in long-term care facilities in Ontario, Canada. *Journal of the American Medical Association* 2020; 3(7): e2015957-e. doi:10.1001/jamanetworkopen.2020.15957 
8. Harrison, S. L., Fazio-Eynullayeva, E., Lane, D. A., Underhill, P., & Lip, G. (2020). Comorbidities associated with mortality in 31,461 adults with COVID-19 in the United States: A federated electronic medical record analysis. *PLoS medicine*, 17(9), e1003321. doi: 10.1371/journal.pmed.1003321 
9. De Giorgi, F. Fabbian, S. Greco, et al. Prediction of in-hospital mortality of patients with SARS-CoV-2 infection by comorbidity indexes: an Italian internal medicine single center study *Eur Rev Med Pharmacol Sci*. 2020, 24(19), 10258-10266. doi: 10.26355/eurrev_202010_23250pdf 
10. Lenin Dominguez-Ramirez, Francisco Rodriguez-Perez, Francisca Sosa-Jurado, Gerardo Santos-Lopez, Paulina Cortes-Hernandez The role of metabolic comorbidity in COVID-19 mortality of middle-aged adults. The case of Mexico medRxiv 2020.12.15.20244160; doi: 10.1101/2020.12.15.20244160 
11. Rosenthal, N et al. Risk Factors Associated With In-Hospital Mortality in a US National Sample of Patients With COVID-19. *JAMA Network Open*.2020;3(12):e2029058. doi:10.1001/jamanetworkopen.2020.29058 
12. Dixon-Ibarra A, Horner-Johnson W. Disability status as an antecedent to chronic conditions: National Health Interview Survey, 2006-2012. *Prev Chronic Dis*. 2014 Jan 30;11:130251. doi: 10.5888/pcd11.130251 

13. Landes SD, Turk MA, Formica MK, McDonald KE, Stevens JD. COVID-19 outcomes among people with intellectual and developmental disability living in residential group homes in New York State. *Disabil Health J*. 2020 Oct;13(4):100969. doi: 10.1016/j.dhjo.2020.100969 [↗](#)
14. Okoro CA, Hollis ND, Cyrus AC, Griffin-Blake S. Prevalence of Disabilities and Health Care Access by Disability Status and Type Among Adults — United States, 2016. *MMWR Morb Mortal Wkly Rep* 2018;67:882–887. doi: 10.15585/mmwr.mm6732a3
15. Gleason J, Ross W, Fossi A, Blonsky H, Tobias J, Stephens M. The devastating impact of Covid-19 on individuals with intellectual disabilities in the United States. *NEJM Catalyst Innovations in Care Delivery*. 2021 Mar 5;2(2). [↗](#)
16. Turk MA, Landes SD, Formica MK, Goss KD. Intellectual and developmental disability and COVID-19 case-fatality trends: TriNetX analysis. *Disability and Health Journal*. 2020 Jul 1;13(3):100942 [↗](#)
17. Makary M, West Health Institute. Risk Factors for COVID-19 Mortality among Privately Insured Patients: A Claims Data Analysis. FAIR Health White Paper. November 2020. [📄](#) [↗](#)
18. Health Disparities: Race and Hispanic Origin. Provisional Death Counts for Coronavirus Disease 2019. Centers for Disease Control and Prevention. Updated February 9, 2022. https://www.cdc.gov/nchs/nvss/vsrr/covid19/health_disparities.htm
19. Rossen LM, Branum AM, Ahmad FB, Sutton P, Anderson RN. Excess Deaths Associated with COVID-19, by Age and Race and Ethnicity — United States, January 26–October 3, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:1522–1527.
20. National Center for Health Statistics. Excess Deaths Associated with COVID-19. Centers for Disease Control and Prevention. Updated February 9, 2022. https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

Last Updated Feb. 15, 2022