



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

Updated June 15, 2022

For the general public: [People with Certain Medical Conditions](#) provides an overview of medical conditions and resources.

 **Science Brief:** [Scientific Evidence for Conditions Associated with Higher Risk for Severe COVID-19](#)

Purpose

An updated list of high-risk underlying conditions, based on what has been reported in the literature as of January 1, 2022 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](#) and [CDC's Systematic Review Process](#).

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. Although age is the strongest risk factor for severe COVID-19 outcomes, patients with certain underlying medical conditions are also at higher risk. The more underlying conditions a person has, the higher the risk for severe COVID-19 outcomes.⁽⁹⁻¹¹⁾

In addition, studies have shown that COVID-19 does not affect all population groups equally. Two important factors are age and race and ethnicity.

Age

Age remains 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 May 23, 2022 ([CDC COVID Data Tracker](#)), the proportion of deaths in this group was more than 42 times than those aged 30-39 years. ^(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⁾

Race & Ethnicity

The COVID-19 pandemic has highlighted [racial, ethnic, and socioeconomic disparities](#) in COVID-19 illnesses, hospitalizations, and deaths. ⁽²²⁻²⁴⁾ Some racial and ethnic minority groups are also more likely to face multiple barriers to accessing health care including lack of insurance, transportation, child care, or ability to take time off from work.

Estimates of COVID-19 deaths in the U.S. show that people from racial and ethnic minority groups are dying from COVID-19 disproportionately, and studies have identified racial and ethnic differences in at-home COVID-19 test use, vaccination coverage, and access to outpatient therapeutics. ⁽²⁵⁻²⁷⁾ Data have shown that compared to non-Hispanic White people, people from [racial and ethnic minority groups](#) are more likely to be infected with SARS-CoV-2 (the virus that causes COVID-19). Once infected, people from racial and ethnic minority groups are more likely to be hospitalized, be admitted to the ICU, and die from COVID-19 at younger ages. ⁽¹⁸⁾

We are still learning about how the environments where [people live, learn, and work](#) can influence the risk for infection and severe COVID-19 outcomes.

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.

- Asthma
- 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 or ≥ 95 th percentile in children)*‡
- 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 Complete List of 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.)

- 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
- Bronchopulmonary dysplasia
- Hepatitis B
- Hepatitis C
- Hypertension*

Footnotes:

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

‡ underlying conditions for which there is evidence in pediatric patients.

Actions Healthcare Professionals Can Take

- Support approved and authorized COVID-19 vaccines (primary series and all boosters) which are safe and effective. Check out [Interim Clinical Considerations for Use of COVID-19 Vaccines](#) as well as [Stay Up to Date with your Vaccines](#) and [Locations for COVID-19 vaccination for patients](#)

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- Consider therapies, such as [antivirals and monoclonal antibodies](#), when treating patients with worsening symptoms or with mild to moderate illness and risk factors for severe illness. These therapeutics have been shown to significantly decrease the risk of hospitalization and death, and outcomes are improved if therapeutics are started within the first days of illness.
- 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.
- Check out [additional information for your patients](#).

Considerations For Patients Within Racial and Ethnical Minority Groups

- Ask patients about their concerns about vaccines and therapy. Consider using an evidence-based and culturally sensitive approach, such as [motivational interviewing](#). Try to provide trusted sources of information and other resources.
- Encourage testing, as well as [early therapeutics](#) [↗](#), for patients who are eligible.
- Facilitate access to culturally and linguistically appropriate resources.
- Reduce barriers to accessing current and emerging outpatient treatments.

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

Key Findings from One Large Cross-Sectional Study

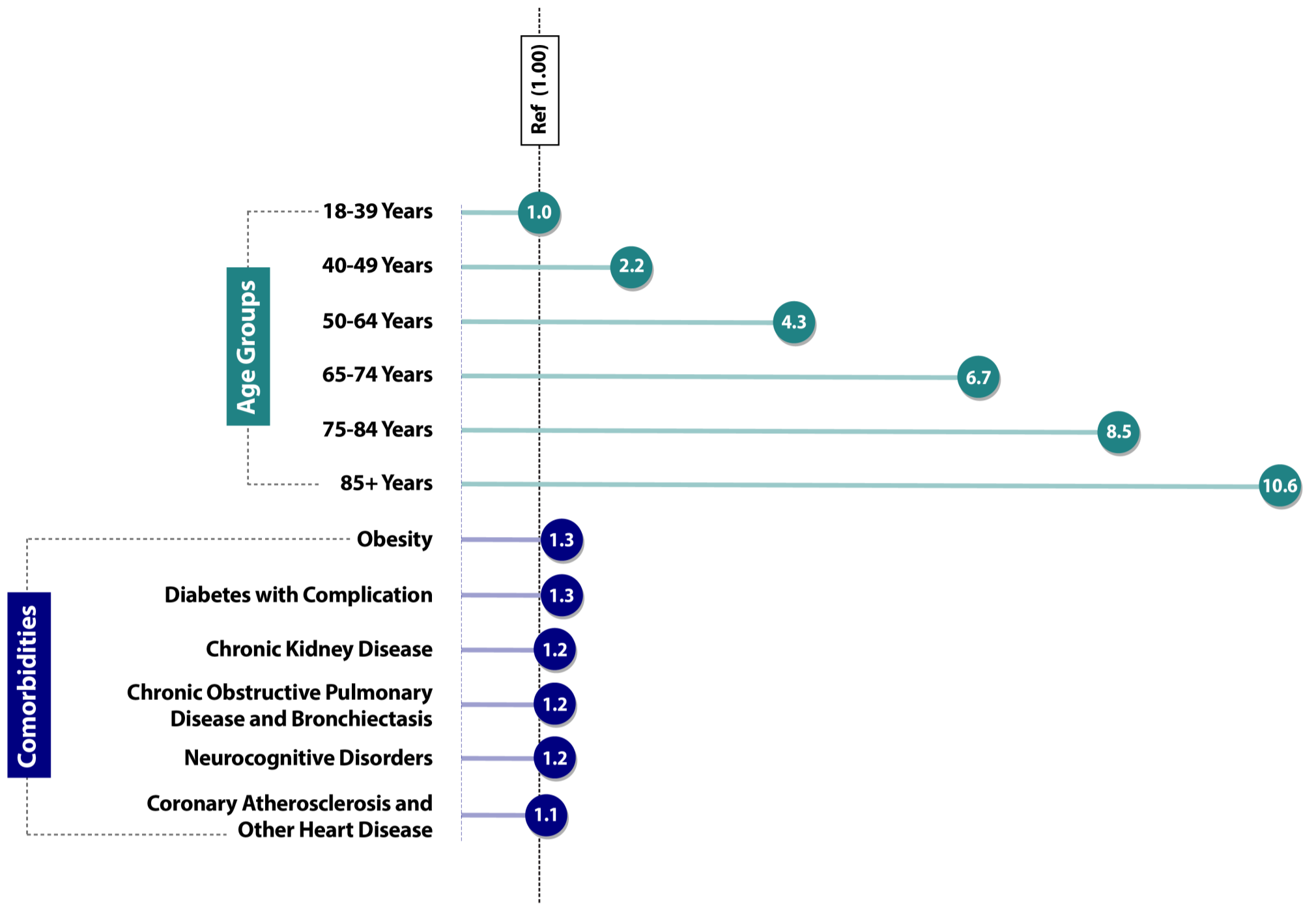
Underlying Medical Conditions and Severe Illness Among 540,667 Adults Hospitalized With COVID-19, March 2020–March 2021

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 was also associated with severe COVID-19 illness.
- Obesity, diabetes with complications, and anxiety and fear-related disorders had the strongest association with death.
- The number of frequent underlying medical conditions increased with age.⁽²¹⁾

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

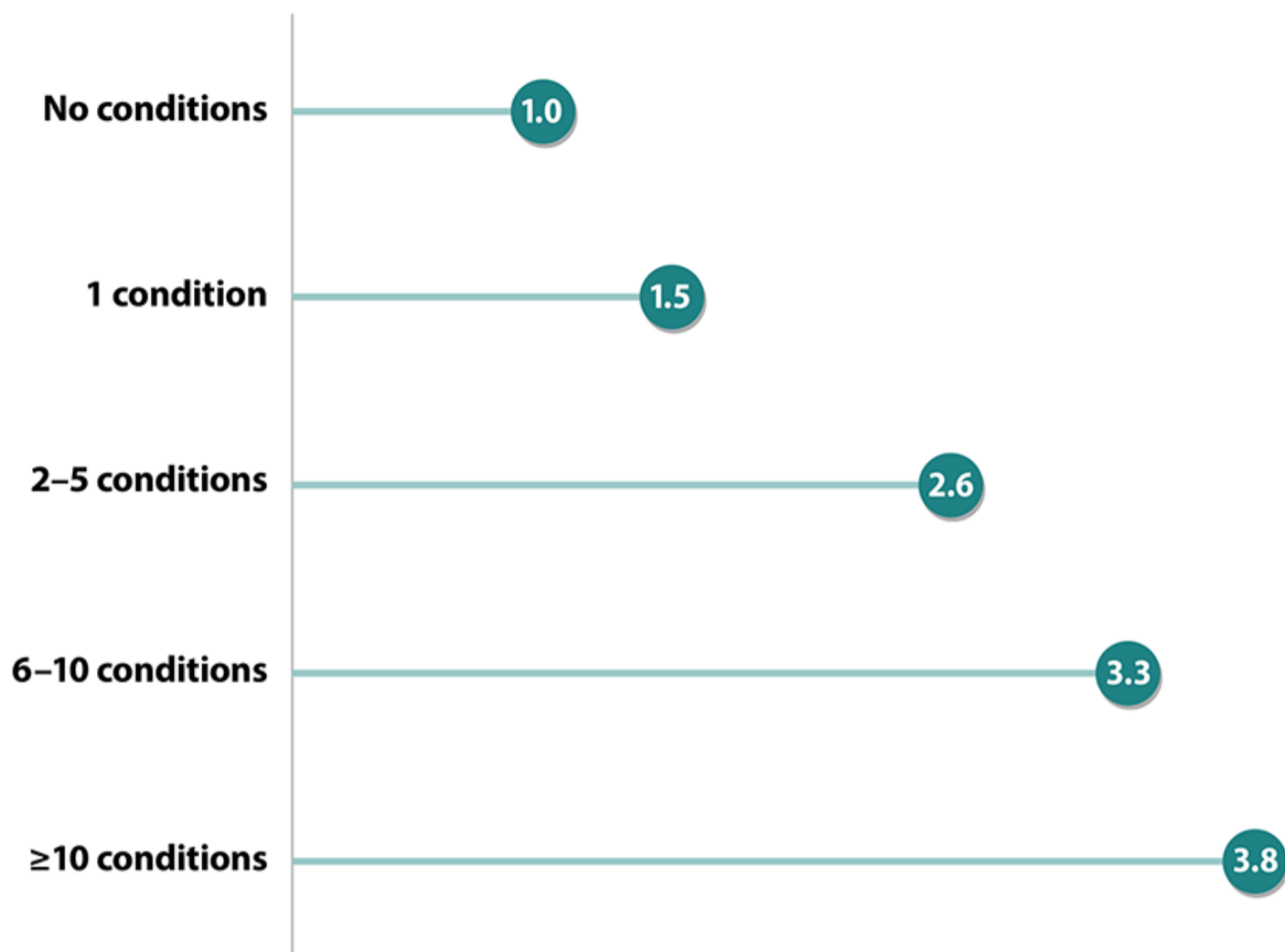


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Adapted from Sources:

- 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



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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

- [COVID-19 Treatment Guidelines: What's New](#) [↗](#)
- [HHS CombatCovid](#) [↗](#)
- [Clinical Care Considerations: Clinical Course](#)
- [COVID-19 Treatment in Outpatients](#)
- [COVID Data Tracker](#)
- [COVID-19 Vaccination Clinical & Professional Resources](#)
- [Demographic Trends of COVID-19 Cases and Deaths in the U.S. by Race and Ethnicity](#)
- [Health Equity: Promoting Fair Access to Health](#)
- [How Do I Find a COVID-19 Vaccine](#)

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