IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF NEW YORK

William A. Jacobson, on behalf of himself and others
similarly situated,

Plaintiff,

**DECLARATION OF
EUGENE HESLIN, M.D., FAAFP**

Case No. 3:22-cv-00033(MAD)
(ML)

-against-

Mary T. Bassett, in her official capacity as Acting
Commissioner of the New York Department
of Health,

Defendant.

EUGENE HESLIN, M.D., FAAFP, declares under penalty of perjury, pursuant to 28

U.S.C. § 1746, that the following is true:

1.   I am the First Deputy Commissioner at the New York State Department of Health.

I have served in this capacity since July 13, 2017. My duties and responsibilities in this position

involve supporting the Commissioner of Health. Prior to assuming this position, I was a primary

care clinician in clinical practice for 25 years.

2.   I am a Medical Doctor and received my M.D. from University of Texas Health

Science Center in Houston.

3.   During the COVID-19 pandemic I have supported the response, initially working

with a testing site in New Rochelle, subsequently working with hospitals and alternative care

sites most recently working with the vaccination site opening at the Javits Center, providing

support for the Commissioner and for the Office of Primary Care Health Systems Management

("OPCHSM"), projects and working with supporting the Covid therapeutics.

4.   I am familiar with the facts set forth herein based upon personal knowledge, discussions with Department staff, and Department records. I have also reviewed guidance from the Centers for Disease Control & Prevention ("CDC") and studies and publications related to COVID-19 particularly studies related to the disproportionate impact and health care disparities of COVID-19 on racial and ethnic groups and minority groups.

5.   I make this affidavit in opposition to Plaintiff's Motion for a Preliminary Injunction.

BACKGROUND ON COVID

6.   The history of the COVID-19 pandemic requires no introduction. The lives of individuals around the world, including New York State, have been impacted by the virus and measures enacted to prevent its spread. The New York State Department of Health ("DOH"), since the onset of the pandemic, has vigorously applied all resources and taken all measures legally at its disposal to ensure the safety and welfare of all New Yorkers. The DOH has closely aligned state efforts with guidance and requirements released by the CDC.

7.   The outbreak of the new Omicron variant, in early December was handled no differently. The full weight of resources available to the DOH were immediately brought to bear on the issue. Testing capacity was ramped up to meet demand, engagement on vaccination and boosting efforts intensified, and the mandatory masking protocols in public spaces were extended.

8.   As Commissioner Bassett stated in her testimony on February 8, 2022, at the Joint Legislative Public Hearing on the State Fiscal Year 2022-2023 Executive Budget Proposal ("Joint Public Hearing")[1], DOH efforts have been successful in leading to a 90 percent drop in

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[1] Joint Legislative Public Hearing on 2022 Executive Budget Proposal: Topic Health/Medicaid | NY State Senate (nysenate.gov)

the state's positivity rate in the last month. The February 17, 2022 state-wide cluster dashboard

attached hereto as **Exhibit AA** identified one new cluster in state with 4 associated cases.

9.   It is my understanding that Plaintiff brought this litigation challenging specific

portions of the guidance issued by DOH entitled "COVID-19 Oral Antiviral Treatments

Authorized and Severe Shortage of Oral Antiviral and Monoclonal Antibody Treatment

Products" ("Guidance"). A copy of the Guidance is attached hereto as **Exhibit A**. This

publication is guidance and is not a "treatment policy". There is no "scoring system" and you do

not have to "get enough points" in order to receive the medication as Plaintiff asserts. It was

issued by the DOH, to health care providers and health care facilities on December 27, 2021,

concerning, among other things, the treatment and prevention of severe COVID-19 with oral

antivirals within certain categories, including those with risk factors for severe illness.

                    THE GUIDANCE AND ITS SCIENTIFIC BASIS

10.   In December of 2021, as the Omicron variant began to surge, the Food and Drug

Administration ("FDA") issued Emergency Use Authorizations for a number of drug treatments

and therapies that were found to reduce the risk of hospitalization and death in high-risk patients

when taken by the patients early after symptom onset. These include Paxlovid and Molnupiravir

two antiviral therapies and Sotrovimab a monoclonal antibody product. Shortly after their

release, supply shortages of these drug treatments and therapies began to present. *See*

https://emergency.cdc.gov/han/2021/han00461.asp, https://time.com/6139151/covid-drug-

shortages/; and https://www.forbes.com/sites/saibala/2021/12/28/theres-a-shortage-of-

monoclonal-antibody-treatments-for-covid-19-heres-how-they-work/?sh=1798a70637f7;

11.   As a result, the DOH released the December 27, 2021, Guidance to make

providers and hospitals aware of the newly authorized treatments. A copy of the Guidance is

attached hereto **Exhibit A.** Additionally, the Guidance was meant to address factors to be

considered when administering therapies amongst tranches of patients considering supply

shortages.

12.   Broadly the Guidance (1) summarizes the antiviral treatment modalities; (2)

reviews the recommended parameters for use and eligibility for antiviral treatments; (3)

discusses the clinical considerations for antiviral treatments; (4) reviews the process for referring

patients for antiviral treatment within and outside New York City to ensure equitable access; and

(5) reviews changes in the use of monoclonal antibodies.

13.   The language at issue in this litigation falls within the eligibility section of the

Guidance, which was meant to advise about health-based risk factors to consider when providing

treatment. Specifically, Plaintiff takes issue with the portion of the Guidance advising providers

and hospitals that they should consider race and ethnicity as a risk factor when making decisions

as to whether an individual meets the criteria for oral antiviral treatment:

> "Oral antiviral treatment is authorized for patients who meet all the following criteria:
> - Age 12 years and older weighing at least 40 kg (88 pounds) for Paxlovid, or 18 years and older for molnupiravir
> - Test positive for SARS-CoV-2 on a nucleic acid amplification test or antigen test; results from an FDA-authorized home-test kit should be validated through video or photo but, if not possible, patient attestation is adequate
> - Have <u>mild to moderate COVID-19 symptoms</u>
>   o Patient cannot be hospitalized due to severe or critical COVID-19
> - Able to start treatment within 5 days of symptom onset
> - Have a medical condition or other factors that increase their risk for severe illness.
>   - ***Non-white race or Hispanic/Latino ethnicity should be considered a risk factor, as longstanding systemic health and social inequities have contributed to an increased risk of severe illness and death from COVID-19"***

See **Exhibit A (emphasis added).**

14.   Both the State and City of New York coordinated on the issuance of this

Guidance, and the New York City Department of Health issued almost identical guidance in its

"2021 Health Advisory #39."[2]

15.   The language at issue tracks CDC guidance published in the "Federal Response to

COVID-19 Therapeutics Clinical Implementation Guide," *see* **Exhibit B**. Specifically, the

guidance says, "Other medical conditions or factors (for example, race or ethnicity) may also

place individual patients at high risk for progression to severe COVID-19 and authorization of

monoclonal antibody treatments "mAb" therapy is not limited to the medical conditions or

factors listed above . . .." *See* Id. at p. 50

16.   Further, a CDC Morbidity and Mortality Weekly Report analyzed treatment data

of over 800,000 patients with a positive COVID-19 test result, which showed that a larger

percentage of patients who received mAbs had high-risk medical conditions, in accordance with

current treatment guidelines. However, this study also found mAb treatments have been used

less commonly among racial and ethnic minority groups, thus amplifying the increased risk for

severe COVID-19–associated outcomes in those groups. This inclusion is one of many risk

factors to be considered, and is based on data that indicates COVID-19 mortality rates are higher

among certain demographic groups namely non-white/Hispanic communities.[3]

17.   Additional evidence supports these findings. A National Center for Health

Statistics 2020 Report: showed a disproportionate impact on life expectancy due to the COVID-

19 pandemic. From 2019 to 2020, Hispanic people experienced the greatest drop in life

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[2] *See* https://www1.nyc.gov/assets/doh/downloads/pdf/han/advisory/2021/covid-19-oral-
treatments-authorized-shortage.pdf
[3] *See* https://www.cdc.gov/mmwr/volumes/71/wr/mm7103e1.htm?s_cid=mm7103e1_w

expectancy — three years — and Black Americans saw a decrease of 2.9 years. White people experienced the smallest decline, of 1.2 years. A copy of the National Center for Health Statistics 2020 Report is attached hereto as **Exhibit C**.

18.   A study published on December 10, 2020, found that people from racial and ethnic minority groups were more likely to have increased COVID-19 disease severity upon admission to the hospital when compared with non-Hispanic white people. A copy of the December 10, 2020 study is attached here to as **Exhibit D**. Mortality data from CDC's National Vital Statistics System ("NVSS"), from February 1, 2020, to September 30, 2021, shows there have been an estimated 700,000 excess deaths in the United States. The largest percentage increase in mortality occurred among adults aged 25–44 years and among Hispanic or Latino people. A copy of the mortality data from the CDC's National Vital Statistics System from February 1, 2020, to September 30, 2021, is attached hereto as **Exhibit E**.

19.   An article in Scientific Reports illustrates that racial disparities continue to persist even after controlling for medical comorbidities. A copy of "Racial disparities in COVID-19 outcomes exist despite comparable Elixhauser comorbidity indices between Blacks, Hispanics, Native Americans, and Whites" is attached hereto as **Exhibit F**. This article finds when compared to white patients, similarly situated Black patients showed significantly higher odds of ventilator dependence and death.

20.   DOH's Commissioner Mary T. Bassett recently contributed to an article in the Journal of the American Medical Association Network Open article entitled "Variations in COVID-19 Mortality in the US by Race and Ethnicity", which found most racial and ethnic minority populations had higher age-adjusted mortality rates than non-Hispanic White populations. A copy of the article is attached hereto as **Exhibit G**.

21.   Perhaps the most convincing data point can be found in this simple chart compiled by the CDC. [4]

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

COVID-19   🔍   MENU >

Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity

Updated Feb. 1, 2022   Print

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non-Hispanic persons	Black or African American, Non-Hispanic persons	Hispanic or Latino persons
Cases[1]	1.5x	0.7x	1.0x	1.5x
Hospitalization[2]	3.2x	0.8x	2.5x	2.4x
Death[3]	2.2x	0.8x	1.7x	1.9x

Race and ethnicity are risk markers for other underlying conditions that affect health, including socioeconomic status, access to health care, and exposure to the virus related to occupation, e.g., frontline, essential, and critical infrastructure workers.

References

[1] Data Source: Data reported by state and territorial jurisdictions (accessed January 20, 2022). Numbers are ratios of age-adjusted rates standardized to the 2019 U.S. intercensal population estimate. Calculations use only the 66% of case reports that have race and ethnicity; this can result in inaccurate estimates of the relative risk among groups.

[2] Data source: COVID-NET (March 1, 2020 through January 8, 2022). Numbers are ratios of age-adjusted rates standardized to the 2020 US standard COVID-NET catchment population. Starting the week ending 12/4/2021, Maryland temporarily halted data transmission of COVID-19 associated hospitalizations, impacting COVID-NET age-adjusted and cumulative rate calculations. Hospitalization rates are likely underestimated (link ☑).

[3] Data Source: National Center for Health Statistics provisional death counts (https://data.cdc.gov/NCHS/Provisional-Death-Counts-for-Coronavirus-Disease-C/pj7m-y5uh, data through January 15, 2022). Numbers are ratios of age-adjusted rates standardized to the 2019 U.S. intercensal population estimate.

Note: Adjusting by age is important because risk of infection, hospitalization, and death is different by age, and age distribution differs by racial and ethnic group. If the effect of age is not accounted for, racial and ethnic disparities can be underestimated or overestimated.

Ⓕ 🐦 in ⊕   Last Updated Feb. 1, 2022
Content source: National Center for Immunization and Respiratory
Diseases (NCIRD), Division of Viral Diseases

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[4] https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html

22.   All of this data supports that non-white race or Hispanic/Latino ethnicity should be considered a risk factor, as longstanding systemic health and social inequities have contributed to an increased risk of severe illness and death from COVID-19.

HOW THE GUIDANCE OPERATES

23.   While the data overwhelmingly supports the fact that communities of color are at greater risk when it comes to the impact of COVID and thus the DOH's desire to level the playing field, it is also important to understand the DOH's intent as to how the guidance should operate in practice rather than in theory.

24.   The recommendation that providers and hospitals should consider race and ethnicity as a risk factor when prescribing oral antiviral treatments is in no way meant to be read as a mandate, or a restriction of COVID-19 treatments by race. The Guidance does not replace doctors' clinical judgment, and does not prevent any patient from receiving necessary treatment. Rather, the Guidance is intended to address the well documented reality that communities of color have been disproportionately impacted by the COVID-19 pandemic. This has been reiterated publicly in discussion about using these medications and I have personally, publicly spoken to this in multiple venues including: (1) a widely publicized and attended New York State New York City webinar[5]; (2) monthly calls held by the New York State Medical Society and New York State Association of County Health Officials (attended by public health directors of any county that chooses to participate) and (3) weekly regional calls with hospitals, county officials, and advocacy organizations.

25.   Despite Plaintiff's provocations, the Guidance does not, nor is it intended to, operate as a barrier to care for white people or create a racial hierarchy in the delivery of care.

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[5] See https://www.youtube.com/watch?v=jm7-BQ0RvHQ

To provide an example at the extremes, as contemplated by Plaintiff: a white person and person of color both present to a treating doctor; only one oral antiviral treatment is available; the white person has various comorbidities and is in a seriously medically compromised state; the person of color presents as asymptomatic with no comorbidities. In this situation the DOH would expect the physician, using her or his medical judgment, to prescribe the one antiviral treatment available to the white person. Please keep in mind I offer this simple explanation for the court's benefit. In reality conjecture at the extremes often oversimplifies matters. In a clinical setting, pursuant to my training and experience I would expect a practitioner should: (1) take a detailed history and conduct a physical examination, (2) understand the risks and benefits of treatment versus non treatment based upon the person presented in front of you, 3) have a discussion with the patient about risk, benefits, and alternatives especially since these medications are only approved for use pursuant to emergencies authorizations and thus have not received full FDA approval. Only then after using appropriate medical clinical judgment should a medication be prescribed. These decisions should always be based upon the physician-patient relationship and a shared decision-making process that is part and parcel to patient care. Guidance issued by the DOH is simply a suggestion to help focus the thoughts of practitioners and inform reasonable discussion.

26.   In short, the Guidance is just that -- guidance. It is not a substitute for the use of sound clinical judgment by practitioners or hospitals[6]. It merely points to one of many factors to be considered when prescribing treatment. All things being equal among patients, the Guidance

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[6] Joint Legislative Public Hearing on 2022 Executive Budget Proposal: Topic Health/Medicaid | NY State Senate (nysenate.gov) at 2 hours 13 minutes in response to a question posed by Assemblyman Colin Schmitt

is meant to allow the flexibility for health care providers to consider persons of color as being at an increased risk due to the disproportionate impact of COVID-19 on communities of color.

27.   It is also important to note, because the Guidance is not a mandate, the DOH will not take enforcement actions against practitioners or hospitals in relation to it.

NO CURRENT SHORTAGE OF MEDICATIONS

28.   It is also important to note this Guidance was issued at a time when oral antiviral treatments were anticipated to be in short supply based upon information provided by the federal government prior to their initial distribution. That is not the current situation.[7] As Commissioner Bassett testified at the Joint Public Hearing on February 8, 2022, there is currently no shortage of the medications in New York. *See* footnotes 5 and 6 above. Even though there is not currently a shortage of oral antiviral treatments, the pandemic has taught us that supply chain disruptions can happen at any time.

29.   Any individual in need of the medications has been encouraged by the DOH to reach out to their treating clinician to have the appropriate discussion about treatment options. This was publicly stated on February 15, 2022, by Governor Hochul.

CONCLUSION

30.   Nothing in the Guidance prevents the Plaintiff, or anyone similarly situated, from receiving treatment with oral antivirals in the unfortunate event that they contract COVID-19.

31.   The Guidance is based on data that shows COVID-19 mortality rates are higher among certain demographic groups, including non-white/Hispanic communities. No one in New

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[7] https://www2.erie.gov/health/index.php?q=press/erie-county-department-health-highlights-availability-covid-19-oral-antiviral-medications; http://outbreaknewstoday.com/new-york-city-announces-the-availability-of-paxlovid-covid-19-oral-treatment-50398/

York, who is otherwise qualified based on their individual risk factors, will be turned away from

life-saving treatment because of their race or any demographic identifier.

Dated: February 17, 2022

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EUGENE HESLIN, M.D., FAAFP

Daily Community Clusters

Report Data as of 2/16/2022

- Note on multi-county clusters: Clusters that appear across multiple counties are now reported together as the same cluster if they originated at the same source. Each county where that cluster appears, as well as its associated case/contact counts, are listed as separate rows within the cluster on the detailed cluster report. These multi-county clusters are only counted once in the overall cluster counts on the summary report page.
- A cluster is defined as 2 or more non-household laboratory-confirmed cases of SARS-CoV-2 infection among individuals with an epidemiological link (i.e., event, extended family, workplace, childcare, school, university, sports team/event, etc.).
- This dashboard is not comprehensive of all clusters, as reporting clusters into CommCare varies by county and region.

Total Clusters (Cumulative)
4,829

Total Clusters (2/16/22)
1

Total Associated Cases (Cumulative)
47,603

Total Associated Cases (2/16/22)
4

Industries with New Clusters (2/16/22)
1

Regions with New Clusters (2/16/22)
1

Daily Community Cluster Summary by Industry

Cluster Setting	Clusters	1 Day	1 Week	4 Weeks	Associated Cases	(vs. prior day)
Total	**4,829**	**+1**	**+6**	**+14**	**47,603**	**+4**
School (Pre-K-12)	781			+1	6,567	
Social Gathering/Community Gathering/..	424				3,073	
Daycare	413		+1	+2	2,860	
Other manufacturing	360			+1	3,253	
Group home for adults or children	312		+1	+3	2,865	
Retail	291				1,546	
Restaurant/Bar	280				1,769	
Unspecified Workplace	244				1,317	
College/University/Other Higher Ed	240	+1	+2	+2	7,708	+4
Government/Public Service	154				905	
Jail/Prison/Juvenile Detention Center	149			+2	5,921	
Other	145			+1	847	
Healthcare Facility	128		+1	+1	1,027	
Religious gathering	107				1,097	
Food Manufacturing	105				970	
Sporting Event	94				664	
Industrial/Warehouse	94				821	
Summer Camp	89				639	
Other care provider setting	81				736	
Geographic (i.e. locality, zip code)	45				537	
Transportation	40				209	
Arts & Entertainment	37				396	
Construction	36				183	
Gym/Fitness Class	35				222	
Mass Gathering Event	34				640	
Hair Salon/Barber and Personal Care	34				136	
Power/Utilities	31				172	
Accommodations	29				176	
Agri., Forestry, Fishing & Hunting	22				204	
Work-setting with immunocompromised..	16		+1	+1	82	
Shelter	12				61	

Daily Community Cluster Summary by Region

Region	Clusters	1 Day	1 Week	4 Weeks	Associated Cases	(vs. prior day)
Grand Total	**4,829**	**+1**	**+6**	**+14**	**47,603**	**+4**
Mid-Hudson	916	+1	+5	+9	6,722	+4
Long Island	896				8,978	
Central New York	814		+1	+1	8,501	
Southern Tier	516				5,055	
Finger Lakes	479			+1	4,915	
Capital Region	454			+2	2,980	
Mohawk Valley	345				4,016	
Western New York	284				3,225	
North Country	197			+1	3,211	

Active Cluster Spread by Cluster
Report Data as of 2/16/2022

- Note on multi-county clusters: Clusters that appear across multiple counties are now reported together as the same cluster if they originated at the same source. Each county where that cluster appears, as well as its associated case/contact counts, are listed as separate rows within the cluster on the detailed cluster report. These multi-county clusters are only counted once in the overall cluster counts on the summary report page.

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- This dashboard is not comprehensive of all clusters, as reporting clusters into CommCare varies by county and region.

Cluster Name	Cluster Type	Region of Cluster Site	County of Cluster Site	County of Residence	Case Type	Start Date	Last Updated Date	Total Cases	Total Contacts
SUNY New Paltz friends Feb.2022	College/University/Other Higher Ed	-	-	Ulster	Customer(s) (patron, student, or resident)	2/16/2022	2/16/2022	4	0
				Grand Total				4	0

NEW YORK STATE OF OPPORTUNITY. | **Department of Health**

| **KATHY HOCHUL** | **MARY T. BASSETT, M.D., M.P.H.** | **KRISTIN M. PROUD** |
| Governor | Acting Commissioner | Acting Executive Deputy Commissioner |

Date: December 27, 2021
To: Health Care Providers and Health Care Facilities
From: New York State Department of Health

**COVID-19 ORAL ANTIVIRAL TREATMENTS AUTHORIZED AND
SEVERE SHORTAGE OF ORAL ANTIVIRAL AND
MONOCLONAL ANTIBODY TREATMENT PRODUCTS**

Summary:
- Two COVID-19 oral antiviral therapies have received Emergency Use Authorization from the U.S. Food and drug Administration (FDA), Paxlovid (Pfizer) and molnupiravir (Merck).
  - Paxlovid and molnupiravir reduce the risk of hospitalization and death by 88% and 30% respectively, in patients at high-risk for severe COVID-19 when started early after symptom onset.
  - Paxlovid is the preferred product and is available for patients age 12 years and older.
  - Molnupiravir should be considered for patients age 18 years and older for whom alternative FDA- authorized COVID-19 treatment options are not accessible or clinically appropriate.
- At this time, Sotrovimab (Xevudy) is the only authorized monoclonal antibody product expected to be effective against the omicron variant of SARS-CoV-2.
  - There will be a pause on allocations of bamlanivimab and etesevimab together, etesevimab alone, and REGEN-COV beginning 1/3/2022.
- Adhere to New York State Department of Health (NYS DOH) guidance on prioritization of high-risk patients for anti-SARS-CoV-2 therapies during this time of severe resource limitations.

The announcement is to make you aware of information about available COVID-19 outpatient therapeutics, including newly authorized oral antiviral treatments.

While the availability of oral antivirals for treatment of COVID-19 is an important milestone, it comes at a time of a significant surge in cases and reduced effectiveness of existing therapeutics due to the omicron variant, which is now the predominant variant nationally and estimated by the Centers of Disease Control and Prevention (CDC) to account for over 90% of cases in New York. Supplies of oral antivirals will be extremely limited initially, and there is now only one monoclonal antibody product that is effective for treatment of infection caused by the omicron variant. While supplies remain low, adhere to the NYS DOH guidance on prioritization of anti-SARS-CoV-2 therapies for treatment and prevention of severe COVID-19 and prioritize therapies for people of any eligible age who are moderately to severely immunocompromised regardless of vaccination status or who are age 65 and older and not fully vaccinated with at least one risk factor for severe illness.

COVID-19 Oral Antiviral Treatment

The FDA authorized the first oral antiviral therapies, Paxlovid from Pfizer and molnupiravir from Merck, to treat patients with mild-to-moderate COVID-19 who are at high risk for progression to severe disease, regardless of vaccination status. The oral antivirals work by interfering with several steps in the reproductive process of SARS-CoV-2 to prevent efficient replication of the virus in host cells. The U.S. Department of Health and Human Services (HHS) provides oral antivirals at no cost to patients.

Paxlovid is the preferred product, and molnupiravir can be considered for patients age 18 years and older for whom alternative FDA-authorized COVID-19 treatment options are not accessible or clinically appropriate. Prior to initiating treatment, providers and patients should carefully consider the known and potential risks and benefits. Limited supply will require providers to prioritize treatment for patients at highest risk for severe COVID-19 until more product becomes available.

Paxlovid clinical trials among 2,246 high-risk patients showed an 88% reduction in the risk for hospitalization and death among people taking paxlovid compared to those taking placebo. Paxlovid is a combination treatment with PF-07321332 (or nirmatrelvir) and ritonavir. PF-07321332 inhibits the main protease of SARS-CoV-2 virus, the 3CL-like protease, that impedes synthesis of other non-structural proteins and ultimately inhibits viral replication. Ritonavir is a protease inhibitor (also used in HIV treatment) that acts as a pharmacokinetic enhancer of protease inhibitors.

Molnupiravir clinical trials among 1,433 high-risk patients showed a 30% reduction in the risk for hospitalization and death among people taking molnupiravir compared to those taking placebo. Molnupiravir is the pro-drug of a nucleoside analog that competes with the viral RNA polymerase and induces RNA mutations that ultimately have an antiviral effect.

Eligibility

Oral antiviral treatment is authorized for patients who meet all the following criteria:

- Age 12 years and older weighing at least 40 kg (88 pounds) for Paxlovid, or 18 years and older for molnupiravir
- Test positive for SARS-CoV-2 on a nucleic acid amplification test or antigen test; results from an FDA-authorized home-test kit should be validated through video or photo but, if not possible, patient attestation is adequate
- Have mild to moderate COVID-19 symptoms
  - Patient cannot be hospitalized due to severe or critical COVID-19
- Able to start treatment within 5 days of symptom onset
- Have a medical condition or other factors that increase their risk for severe illness.
  - Non-white race or Hispanic/Latino ethnicity should be considered a risk factor, as longstanding systemic health and social inequities have contributed to an increased risk of severe illness and death from COVID-19

Under the authorizations, paxlovid and molnupiravir may only be prescribed for an individual patient by physicians, advanced practice registered nurses, and physician assistants that are licensed or authorized under New York State law to prescribe drugs in the therapeutic class to which paxlovid and molnupiravir belong (i.e., anti-infectives).
For Paxlovid only:

- Therapy is contraindicated for patients (1) with a history of clinically significant hypersensitivity reactions to its active ingredients or any other components of the product; (2) treating with drugs that are highly dependent on CYP3A for clearance and for which elevated concentrations are associated with serious and/or life-threatening reactions; or (3) treating with drugs that are potent CYP3A inducers where significantly reduced Paxlovid plasma concentrations may be associated with the potential for loss of virologic response and possible resistance. See list of medications in the Paxlovid Fact Sheet for Providers, Section 7.
- Therapy is not recommended for patients with severe kidney (eGFR <30 mL/min) or liver (Child-Pugh Class C) impairment. Dosage adjustments are needed for patients with moderate renal impairment. Providers should discuss with their patients with kidney or liver problems whether Paxlovid is right for them.
- Paxlovid may lead to a risk of HIV-1 developing resistance to HIV protease inhibitors in patients with uncontrolled or undiagnosed HIV-1 infection. Patients on ritonavir- or cobicistat-containing HIV or HCV regimens should continue their treatment as indicated.

For molnupiravir only:
- Molnupiravir should be prescribed for patients age 18 years and older for whom alternative COVID-19 treatment options authorized by FDA are not accessible or clinically appropriate.
- Molnupiravir is not recommended during pregnancy. Prescribing providers should assess whether a female of childbearing potential is pregnant or not. Advise individuals of childbearing potential to use effective contraception correctly and consistently for the duration of treatment and for 4 days after the last dose of molnupiravir.
- Breastfeeding is not recommended during treatment and for 4 days after the last dose of molnupiravir. A lactating individual may consider interrupting breastfeeding and pumping and discarding breast milk during this time.
- Males of reproductive potential who are sexually active with females of childbearing potential should use a reliable method of contraception correctly and consistently during treatment and for at least 3 months after the last dose.
- For more details, please refer to molnupiravir Fact Sheet for Providers.

Clinical Considerations

Treatment is most effective when given as soon as possible and no more than 5 days after symptom onset. High-risk patients who present within 6 to 10 days of symptoms onset should be referred for monoclonal antibody therapy.

The most common side effects reported during treatment and within 14 days after the last dose of molnupiravir were mild or moderate diarrhea, nausea, and dizziness. For Paxlovid, mild or moderate dysgeusia, diarrhea, hypertension, and myalgia were reported.

Oral antivirals are not authorized for pre-exposure or post-exposure prophylaxis for prevention of COVID-19. Oral antivirals should not be used for longer than 5 consecutive days.

3

Referring Patients for Oral Antivirals Outside of NYC

To ensure equitable access to oral antivirals, the New York State Department of Health has worked in partnership with local jurisdictions to identify 1-2 pharmacies within each jurisdiction (where possible). As supplies increase, additional pharmacies will be added. A list of participating pharmacies is provided in Appendix A at the end of this message.

Product is expected to ship on Tuesday 12/28/2021 and the earliest orders will be able to be filled is estimated to be Wednesday 12/29/2021. Please contact the local pharmacy to confirm availability or if your local pharmacy is Walmart, go to www.walmart.com/covidmedication to inquire about product availability at each store.

Referring Patients for Oral Antivirals in NYC

To ensure equitable access to oral antivirals, the NYC Department of Health and Mental Hygiene (Health Department) has partnered with Alto Pharmacy, a pharmacy delivery service. At this time, this is the only way NYC patients can receive oral antivirals. As supplies increase, additional pharmacies will be added.

Prescriptions placed with Alto Pharmacy will be delivered to the patient's preferred address at no cost. Once the prescription is placed, patients can schedule their delivery on the Alto mobile app, by text, or by phone with Alto pharmacists. Alto Pharmacy can offer direct support in English and Spanish and through a language line in Russian, Mandarin, Vietnamese, Arabic, and Korean. Prescriptions confirmed by 5 p.m. on weekdays or 1p.m. on weekends will be delivered the same night. For instructions on how to prescribe oral antivirals in NYC, visit nyc.gov/health/covidprovidertreatments and look for "Referring or Offering Oral Antiviral Therapy" in the "Oral Antiviral Treatment" section.

Providers who would like to automatically have molnupiravir substituted when Paxlovid is unavailable must submit two prescriptions, one for each medication, with a comment in the notes section of the molnupiravir prescription which reads "to be used in case Paxlovid prescription cannot be filled because of supplies limitation". Substituting with molnupiravir can only be done for patients meeting eligibility criteria and with no contraindications for either product.

4

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<u>Changes to Monoclonal Antibody Use</u>

At this time, Sotrovimab (Xevudy) is the only authorized monoclonal antibody therapeutic that is expected to be effective against the omicron variant of SARS-CoV-2. Supplies of Sotrovimab are extremely limited and providers should adhere to <u>NYS DOH prioritization guidance</u>.

As of <u>December 23, 2021</u>, there is a pause on further allocations of bamlanivimab and etesevimab together, etesevimab alone, and REGEN-COV beginning 1/3/2022. Bamlanivimab with etesevimab and REGEN-COV do not retain activity against omicron. NYC providers should refer to NYC's <u>Letter to Providers: Omicron and Monoclonal Antibodies.</u> Monoclonal antibody treatment can no longer be used as post-exposure prophylaxis.

Please continue to monitor our website regularly for updated guidance, including on treatment supply and prioritization: <u>COVID-19 Monoclonal Antibody (mAb) Therapeutics: Information for Providers | Department of Health (ny.gov).</u>

Appendix A: List of Participating Pharmacies outside of New York City by County

County Name	Store #	Store Name	City	Zip
Albany	417	CVS	ALBANY	12205
Albany	2702	CVS	COLONIE	12205
Albany		CENTRAL AVE PHARMACY	ALBANY	12206
Broome	1835	Walmart	VESTAL	13850
Cayuga	62	Kinney Drugs	AUBURN	13021
Cayuga	73	Kinney Drugs	MORAVIA	13118
Chautauqua	10870	Rite Aid	JAMESTOWN	14701
Chautauqua	10811	Rite Aid	DUNKIRK	14048
Chemung	10880	Rite Aid	HORSEHEADS	14845
Chemung	260	Rite Aid	ELMIRA	14901
Chenango	2120	Walmart	NORWICH	13815
Clinton		Condo Pharmacy	PLATTSBURGH	12901
Clinton		Cornerstone Drug & Gift	ROUSES POINT	12979
Columbia	242	CVS	HUDSON	12534
Cortland	7	Kinney Drugs	CORTLAND	13045
Delaware	19432	Walgreens	STAMFORD	12167
Dutchess	418	CVS	POUGHKEEPSIE	12601
Dutchess		Beekman pharmacy	POUGHQUAG	12570
Erie		Tile Pharmacy	CHEEKTOWAGA	14225
Erie		Kenmore Rx Center	KENMORE	14217
Erie		Wanakah Pharmacy	HAMBURG	14075
Erie		Larwood Pharmacy, Inc.	EAST AURORA	14052
Erie		Cy's Elma Pharmacy	ELMA	14059
Erie	3288	Walgreens	BUFFALO	14215
Essex	95	Kinney Drugs	LAKE PLACID	12946
Essex		Moriah Pharmacy	PORT HENRY	12974
Essex		Willsboro Pharmacy	WILLSBORO	12996
Franklin	10591	Walgreens	MALONE	12953
Fulton	18296	Walgreens	JOHNSTOWN	12095
Genesee	10807	Rite Aid	BATAVIA	14020
Hamilton		NATHAN LITTAUER HOSPITAL	SPECULATOR	12164
Herkimer	27	Kinney Drugs	ILION	13357
Jefferson		BOLTONS PHARMACY	WATERTOWN	13601
Jefferson	42	Kinney Drugs	ALEXANDRIA BAY	13607
Lewis	20	Kinney Drugs	LOWVILLE	13367
Livingston	5072	CVS	DANSVILLE	14437
Madison		Dougherty Pharmacy	MORRISVILLE	13408
Madison	46	Kinney Drugs	CHITTENANGO	13037

County Name	Store #	Store Name	City	Zip
Monroe	5123	CVS	BROCKPORT	14420
Monroe	831	CVS	WEBSTER	14580
Monroe	10512	Walgreens	ROCHESTER	14621
Montgomery	25	Kinney Drugs	ST. JOHNSVILLE	13452
Nassau	997	CVS	GLEN COVE	11542
Nassau	2028	CVS	HEMPSTEAD	11550
Nassau	1084	CVS	FREEPORT	11520
Niagara	10817	Rite Aid	LOCKPORT	14094
Niagara	3600	Rite Aid	NIAGARA FALLS	14301
Oneida	639	Rite Aid	UTICA	13502
Oneida	610	Rite Aid	ROME	13440
Oneida		Bassett Medical Center OP Pharmacy	COOPERSTOWN	13326
Onondaga	43	Kinney Drugs	BALDWINSVILLE	13027
Onondaga	79	Kinney Drugs	LIVERPOOL	13088
Onondaga	108	Kinney Drugs	SYRACUSE	13206
Onondaga	64	Kinney Drugs	EAST SYRACUSE	13057
Ontario	10846	Rite Aid	GENEVA	14456
Ontario	10842	Rite Aid	CANANDAIGUA	14564
Orange	10688	CVS	NEWBURGH	12550
Orange	2908	CVS	MONROE	10950
Oswego		Wayne Drug- Oswego	OSWEGO	13126
Otsego	2262	Walmart	ONEONTA	13820
Putnam		COMMUNITY PHARMACY INC	BREWSTER	10509
Putnam	5054	CVS	CARMEL	15012
Rensselaer	906	CVS	TROY	12182
Rensselaer	2137	CVS	WYNANTSKILL	12198
Rockland	2205	CVS	SPRING VALLEY	10977
Saratoga	10384	Walgreens	WILTON	12866
Saratoga	5046	CVS	CLIFTON PARK	12065
Schenectady	2340	CVS	SCHENECTADY	12304
Schenectady	5385	CVS	SCOTIA	12302
Schoharie	7326	CVS	COBLESKILL	12043
Schuyler	3221	Walmart	WATKINS GLEN	14891
Seneca	65	Kinney Drugs	SENECA FALLS	13148
St. Lawrence	1	Kinney Drugs	GOUVERNEUR	13642
St. Lawrence		The Medicine Place-KimRos Inc.	OGDENSBURG	13669
St. Lawrence		Adk Pharmacy COVID-19	STAR LAKE	13690
Steuben	2326	Walmart	HORNELL	14830
Steuben	2992	Walmart	PAINTED POST	14810

County Name	Store #	Store Name	City	Zip
Suffolk	3099	CVS	BAY SHORE	11706
Suffolk	6026	CVS	RIVERHEAD	11901
Suffolk	1271	CVS	ROCKY POINT	11778
Suffolk	2961	CVS	HUNTINGTON STATION	11746
Sullivan		Rock Hill Healthmart Pharmacy	ROCK HILL	12775
Sullivan		K & K Pharmacy	LIBERTY	12754
Tompkins	80	Kinney Drugs	ITHACA	14850
Ulster	8945	CVS	KINGSTON	12401
Ulster	323	CVS	SAUGERTIES	12477
Warren	419	CVS	QUEENSBURY	12804
Washington	2685	CVS	HUDSON FALLS	12839
Wayne	66	Kinney Drugs	LYONS	14489
Westchester	5048	CVS	PEEKSKILL	10566
Westchester	5350	CVS	PORT CHESTER	10573
Westchester	4539	CVS	YONKERS	10701
Wyoming		Sinclair Pharmacy	WARSAW	14569
Yates	442	Rite Aid	PENN YAN	14527

Federal Response to COVID-19: Therapeutics
Clinical Implementation Guide

Outpatient administration guide for healthcare providers

12/29/2021

Table of Contents

1. Introduction to COVID-19 Outpatient Therapeutics & Product Selection

Summary of COVID-19 Preventative Agents & Therapeutics

No Illness	Exposed Per CDC Close Contact Criteria	Mild to Moderate Symptoms	Hospital Admission			ICU Admission

Baseline health status, no infection	Not hospitalized, no limitations	Not hospitalized, with limitations	Hosp. no act. medical problems	Hospitalized, not on oxygen	Hospitalized, on oxygen	Hospitalized, high flow oxygen/ non-invasive ventilation	Hospitalized, mechanical ventilation/ ECMO

Remdesivir

COVID-19 VACCINES

Monoclonal Antibodies for PrEP
- Tixagevimab + cilgavimab (AZ)

Monoclonal Antibodies for PEP
- Casirivimab + Imdevimab (RGN)**
- Bamlanivimab + Etesevimab (Lilly)**

Oral Antivirals
- Paxlovid (Pfizer)
- Molnupiravir (Merck)

Monoclonal Antibodies for treatment
- Sotrovimab (GSK/Vir)
- Bamlanivimab + Etesevimab[1] (Lilly)**
- Casirivimab + Imdevimab (RGN)**

Tocilizumab

Dexamethasone

Baricitinib

**Not expected to be active against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Tools to Assist in COVID-19 Outpatient Therapeutic Selection

As variant prevalence changes and new therapeutics become available, there are tools and resources available to assist in clinical decision-making for prescribers.

- Clinical Decision Aid: A pathway for decision-making including outpatient parenteral and oral therapeutics

- [Side-by-Side Overview of Outpatient Therapeutics](https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/Side-by-Side-Overview-of-mAbs-Treatment.aspx)
(https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/Side-by-Side-Overview-of-mAbs-Treatment.aspx)

- [NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant](https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron) (https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron)

- [The COVID-19 Treatment Guidelines Panel's Interim Statement on Patient Prioritization for Outpatient Anti-SARS-CoV-2 Therapies or Preventive Strategies When There Are Logistical or Supply Constraints](https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-patient-prioritization-for-outpatient-therapies/) (https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-patient-prioritization-for-outpatient-therapies/)

- [The COVID-19 Treatment Guidelines Panel's Statement on Potential Drug-Drug Interactions Between Ritonavir-Boosted Nirmatrelvir (Paxlovid) and Concomitant Medications](https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-paxlovid-drug-drug-interactions/) (https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-paxlovid-drug-drug-interactions/)

Adult or pediatric (age 12 and older and weight 40kg or greater) with mild to moderate COVID-19 & high risk for progression to severe disease

+

Is Patient:
- Hospitalized for COVID-19 **OR**
- Requiring O_2 **OR** an increase in baseline home O_2 due to COVID-19

No → **Symptom onset within the past 5-7 days?**

Yes →

No ↓

Symptom onset within the past 10 days?

Yes →

No ↓

Yes →

Does patient have severe renal impairment (eGFR <30mL/min) OR severed hepatic impairment (child-pugh class C)

Yes ↓

Consider the following (symptoms within 10 days)[1]:
sotrovimab 500 mg IV (sotrovimab EUA)

No →

Consider One of the following therapeutics, if available[1,2]:

Paxlovid within **5 days of symptom onset**

eGFR 60 mL/min or greater: 300mg nirmatrelvir taken with 100mg ritonavir twice daily for 5 days

eGFR >30-<60: 150mg nirmatrelvir taken together with 100mg ritonavir twice daily for 5 days; evaluate concomitant use of CYP3A inducers and medications with high dependency on CYP3A for clearance as these may be contraindicated per Paxlovid EUA

OR

sotrovimab 500 mg IV within **ASAP 10 days of symptom onset** (sotrovimab EUA)

OR

Remdesivir 200mg IV x 1 dose on day 1, 100mg IV x1 on days 2-3 begun ASAP and within **7 days of symptom onset[1]**

If none of the above therapeutics are available for patient treatment within 5 days of symptom onset and patient **is age 18 or greater**

No → **Possibility of pregnancy, if applicable, is ruled out?**

Yes ↓

Consider molnupiravir
- Authorized only in patients ages 18 and older
- Within 5 days of symptom onset
- Molnupiravir 800mg by mouth every 12h for 5 days
- Prescribers must review and comply with the mandatory requirements outlined in the molnupiravir EUA

Treatment of symptoms, Management per NIH & CDC Guidelines

Limited use of bamlanivimab/etesevimab and REGEN-COV as they are not expected to be active against the Omicron variant[1]

[1]Refer to the NIH COVID-19 Treatment Guidelines Panel's Statement on the Use of Anti-SARS-CoV-2 Monoclonal Antibodies or Remdesivir for the Treatment of Covid-19 in Nonhospitalized patients when Omicron is the Predominant Circulating Variant; Remdesivir is only approved for hospitalized individuals with COVID-19. Outpatient treatment is based on information from the literature (Dec 22, 2021 Early Remdesivir to Prevent Progression to Severe Covid-19 in Outpatients; DOI: 10.1056/NEJMoa2116846)
[2] COVID-19 convalescent plasma with high titers of anti-SARS-CoV-2 antibodies is authorized for the treatment of COVID-19 in patients with immunosuppressive disease in either the outpatient or inpatient setting (COVID-19 Convalescent Plasma EUA)

mAb Susceptibility to CDC Variants of Concern

➢ Information on variants of concern updated in **Section 15 of FDA fact sheets** for monoclonal antibodies

➢ bamlanivimab/etesevimab and REGEN-COV <u>are not</u> expected to be active against the Omicron variant[1]; sotrovimab <u>is</u> expected to retain activity against omicron

➢ The CDC monitors and publishes <u>variant information</u> on the CDC Covid Data Tracker https://covid.cdc.gov/covid-data-tracker/#variant-proportions

➢ Recommendations for Providers:

    ➢ If Delta still represents a significant proportion of infections locally and other options are not available, eligible patients offered bamlanivimab/ etesevimab or REGEN-COV must be informed these therapeutics are likely ineffective if infected with Omicron.

Fact Sheet for Health Care Providers Emergency Use Authorization of Bamlanivimab and Etesevimab (https://www.fda.gov/media/145802/download)
Fact Sheet for Health Care Providers Emergency Use Authorization for EVUSHELD (https://www.fda.gov/media/154701/download)
Fact Sheet for Health Care Providers Emergency Use Authorization of REGEN-COVTM (casirivimab and imdevimab) (https://www.fda.gov/media/145611/download)
Fact Sheet for Health Care Providers Emergency Use Authorization of Sotrovimab (https://www.fda.gov/media/149534/download)
[1] NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant (https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron)

NIH COVID-19 monoclonal antibody guidelines when there are logistical constraints

➢ The NIH COVID-19 Treatment Guidelines Panel recommends using anti-SARS-CoV-2 monoclonal antibodies for the treatment of mild to moderate COVID-19 and for post-exposure prophylaxis (PEP) of SARS-CoV-2 infection in individuals who are at high risk for progression to severe COVID-19, as outlined in the FDA Emergency Use Authorizations (EUAs). See the individual EUAs for details.

➢ Logistical constraints (e.g., limited space, not enough staff who can administer therapy) can make it difficult to administer these agents to all eligible patients. In situations where it is necessary to triage eligible patients, the Panel suggests:

- **Prioritizing the treatment of COVID-19 over PEP of SARS-CoV-2 infection.**

- **Prioritizing the following groups over vaccinated individuals who are expected to have mounted an adequate immune response**:

  - Unvaccinated or incompletely vaccinated individuals who are at high risk of progressing to severe COVID-19

  - Vaccinated individuals who are not expected to mount an adequate immune response (e.g., immunocompromised individuals).

➢ **Providers should use their clinical judgment** when prioritizing treatments in a specific situation. When there are no logistical constraints for administering therapy, these considerations **should not** limit the provision of anti-SARS-CoV-2 monoclonal antibodies.

2.   Overview of Emergency Use Authorizations

The Role of Emergency Use Authorization (EUA) in COVID-19 Therapeutics

Q: What is an emergency use authorization and how is it being used to respond to COVID-19

A: In certain types of emergencies, the FDA can issue an <u>emergency use authorization, or EUA</u>, to provide more timely access to critical medical products (including medicines and tests) that may help during the emergency when there are no adequate, approved, and available alternative options.

The EUA process is different than FDA approval, clearance, or licensing because the EUA standard may permit authorization based on significantly less data than would be required for approval, clearance, or licensing by the FDA. This enables the FDA to authorize the emergency use of medical products that meet the criterial within weeks rather than months to years.

EUAs are in effect until the emergency declaration ends but can be revised or revoked as we evaluate the needs during the emergency and new data on the product's safety and effectiveness, or as products meet the criteria to become approved, cleared, or licensed by the FDA.

About Emergency Use Autorizations (EUAs)
https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#abouteuas

Monoclonal Antibody Indications and Routes of Administration

Monoclonal Antibody	PRE-EXPOSURE PROPHYLAXIS (PREP) for eligible individuals	POST-EXPOSURE PROPHYLAXIS (PEP) for individuals who are not fully vaccinated or immunocompromised, with high risk of progression to severe disease	TREATMENT of Mild to Moderate COVID-19 Infection within 10 days of symptom onset in patient with high risk of progression to severe disease
bamlanivimab and etesevimab[1] (Eli Lilly) **	N/A	**Dose:** bamlanivimab 700mg and etesevimab 1400mg **Route:** Intravenous **Post-administration observation:** 60 minutes *Weight-based pediatric (< 40kg) dosing*[1] **	**Dose:** bamlanivimab 700mg and etesevimab 1400mg **Route:** Intravenous **Post-administration observation**: 60 minutes *Weight-based pediatric (< 40kg) dosing*[1] **
casirivimab and imdevimab[2] (REGEN-COV) **	N/A	**Dose:** casirivimab 600mg and imdevimab 600mg **Route:** Intravenous is preferred route, however subcutaneous injection may be utilized in situations where there would be a delay in intravenous administration **Post-administration monitoring:** 60 minutes **	**Dose:** casirivimab 600mg and imdevimab 600mg **Route:** Intravenous or subcutaneous **Post-administration monitoring:** 60 minutes **
sotrovimab[3] (Glaxo Smith Kline)	N/A	N/A	**Dose:** sotrovimab 500mg **Route:** Intravenous **Post-administration monitoring:** 60 minutes
tixagevimab and cilgavimab[4] (AstraZeneca)	**Dose:** tixagevimab 150mg and cilgavimab 150mg **Route:** Intramuscular **Post-administration monitoring:** 60 min	N/A	N/A

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant
https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Refer to product Emergency Use Authorizations for detail on indications and administration

[1] Fact Sheet for Health Care Providers Emergency Use Authorization of Bamlanivimab and Etesevimab (https://www.fda.gov/media/145802/download)
[2] Fact Sheet for Health Care Providers Emergency Use Authorization of REGEN-COVTM (casirivimab and imdevimab) (https://www.fda.gov/media/145611/download)
[3] Fact Sheet for Health Care Providers Emergency Use Authorization of Sotrovimab (https://www.fda.gov/media/149534/download)
[4] Fact Sheet for Health Care Providers Emergency Use Authorization for Evusheld (tixagevimab co-packaged with cilgavimab (https://www.fda.gov/media/154701/download)

Oral Antiviral Indications and Dosing

Antiviral Agent	PRE-EXPOSURE PROPHYLAXIS (PREP) for eligible individuals	POST-EXPOSURE PROPHYLAXIS (PEP) for individuals who are not fully vaccinated or immunocompromised, with high risk of progression to severe disease	TREATMENT of Mild to Moderate within 5 days of symptom onset in patients with high risk or progression to severe disease
Paxlovid (Pfizer)	N/A	N/A	**Dose:** **eGFR ≥60 ml/min:** 300mg nirmatrelvir (#2 150mg tablets) with 100mg ritonavir (#1 100mg tablet) ORALLY twice daily for 5 days **eGFR ≥30 to <60 mL:** 150mg nirmatrelvir (#1 150mg tablet) with 100mg ritonavir (#1 100mg tablet) ORALLY twice daily for 5 days **Severe renal impairment (eGFR <30 mL/min):** NOT Recommended **Severe hepatic impairment (Child-Pugh Class C):** NOT recommended
Molnupiravir (Merck)	N/A	N/A	**Dose:** 800mg molnupiravir (#4 200mg tablets) ORALLY twice daily for 5 days (No renal or hepatic dosing restrictions)

Outpatient Therapeutics
Provider and Patient EUA Fact Sheets

- Each product under EUA also has an FDA fact sheet for providers and one for patients and caregivers

  - bamlanivimab and etesevimab

    - [Bamlanivimab and etesevimab provider fact sheet](#): https://www.fda.gov/media/145802/download
    - [Bamlanivimab and etesevimab Patient fact sheet](#): https://www.fda.gov/media/145803/download
    - [Bamlanivimab and etesevimab Patient fact sheet (Spanish)](#): http://pi.lilly.com/eua/span/bam-and-ete-eua-factsheet-patient-span.pdf

  - casirivimab and imdevimab (REGEN-COV)

    - [Casirivimab and imdevimab Provider fact sheet](#): https://www.fda.gov/media/145611/download
    - [Casirivimab and imdevimab Patient fact sheet](#): https://www.fda.gov/media/145612/download
    - [Casirivimab and imdevimab Patient fact sheet (Spanish)](#): https://www.regeneron.com/downloads/treatment-covid19-eua-fact-sheet-patient-spanish.pdf

  - sotrovimab

    - [Sotrovimab Provider fact sheet](#): https://www.fda.gov/media/149534/download
    - [Sotrovimab Patient fact sheet](#): https://www.fda.gov/media/149533/download
    - [Sotrovimab Patient fact sheet (Spanish)](#): https://www.sotrovimab.com/content/dam/cf-pharma/hcp-sotrovimab-phase2/en_US/sotrovimab-eua-fact-sheet-for-patients-in-spanish.pdf

  - tixagevimab and cilgavimab (Evusheld)

    - [Tixagevimab and cilgavimab Provider fact sheet](#): https://www.fda.gov/media/154701/download
    - [Tixagevimab and cilgavimab Patient fact sheet](#): https://www.fda.gov/media/154702/download

Outpatient Therapeutics
Provider and Patient EUA Fact Sheets

- Each product under EUA also has an FDA fact sheet for providers and one for patients and caregivers

  ▪ Paxlovid

    ➢ Paxlovid provider fact sheet: https://www.fda.gov/media/155050/download

    ➢ Paxlovid patient fact sheet: https://www.fda.gov/media/155051/download

    ➢ Paxlovid patient fact sheet (Spanish): https://www.fda.gov/media/155075/download

  ▪ Molnupiravir

    ➢ Molnupiravir provider fact sheet: https://www.fda.gov/media/155054/download

    ➢ Molnupiravir patient fact sheet: https://www.fda.gov/media/155055/download

    ➢ Molnupiravir patient fact sheet (Spanish): https://www.fda.gov/media/155115/download

3. Overview of Outpatient Therapeutic Distribution Process

Principles for USG allocation and distribution

1 Maximize use of existing infrastructure within USG, as well as manufacturer and distributor channels

2 Allocations must ensure both *temporal* and *geographic* equity

3 USG to allocate to state and territorial health departments based on:
- Confirmed Hospitalizations (7- Day Incident)
- Confirmed Cases (7- Day Incident)

4 States/Territories responsible for distribution to administration sites

5 Sites required to report product utilization

6 Manufacturer tracks pharmacovigilance and follows mandatory reporting guidance

Reporting Requirements

For bam/ete, sotrovimab, REGEN-COV

For Evusheld, Paxlovid, molnupiravir

Long Term Care / Skilled Nursing Facilities

NHSN

Hospitals / Hospital Pharmacies

HHSProtect/TeleTracking/
Health Departments

Non-hospital Facilities

HHS TeleTracking
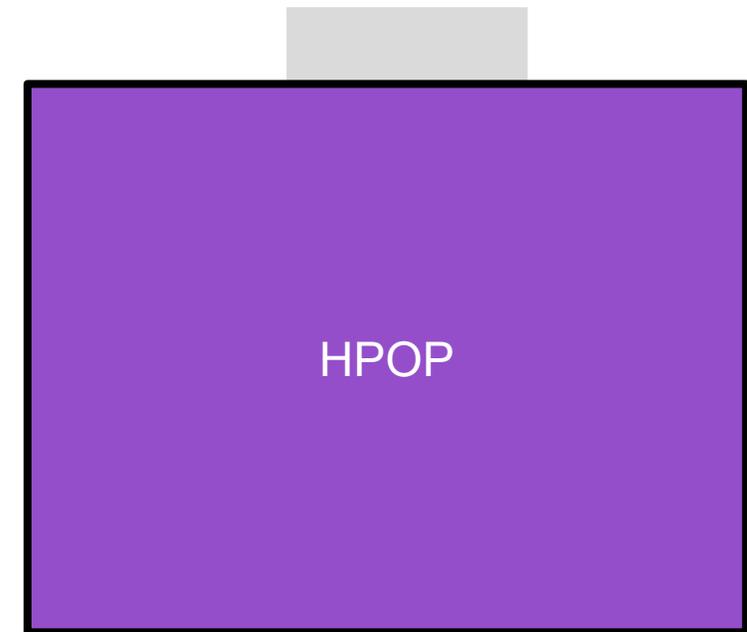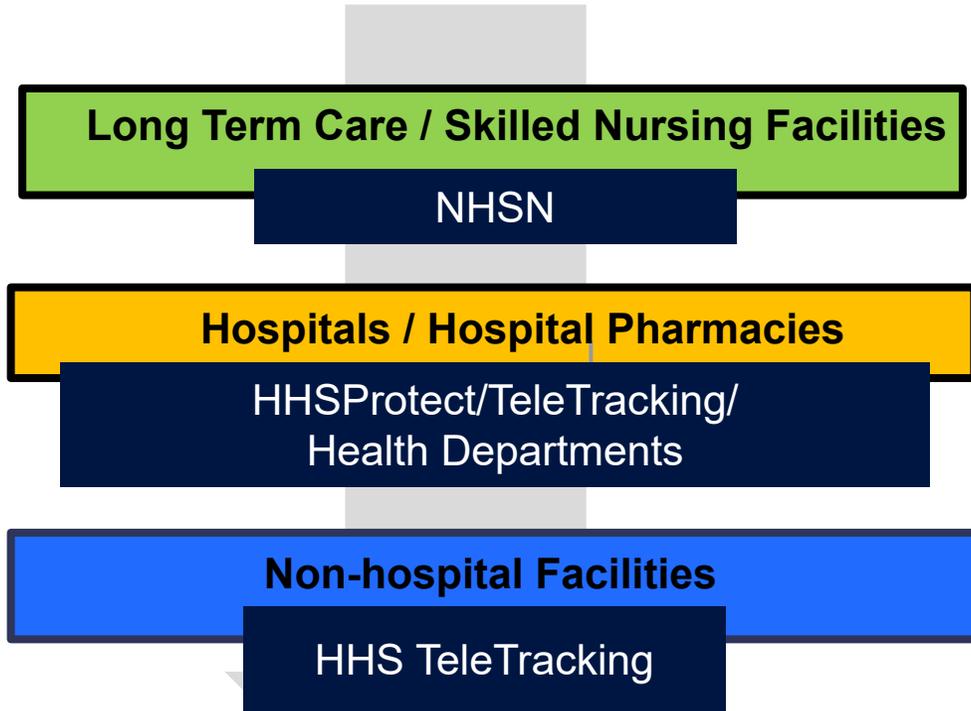
**Reporting required
by 11:59 pm each Wednesday**

HPOP

**Reporting required
by 11:59 pm daily**

Sites administering/dispensing USG-purchased COVID-19 therapeutics must provide information on product utilization and stock on hand

4. Monoclonal Antibody Administration

4. Monoclonal Antibody Administration:
Site and Patient Logistics

Monoclonal Antibody Administration Can Occur Across a Wide Variety of Models

Hospital

- Hospital-based infusion centers
- Emergency departments
- Urgent care/Obs units/Fast track areas
- Converted space within hospital for COVID infusion
- Alternate care sites

Ambulatory center

- Infusion centers
- Urgent care clinics
- Dialysis centers
- Alternate care sites

Nursing homes

- Skilled nursing facilities
- Long-term care facilities

Mobile sites

- Bus/trailer
- Other mobile sites

Home

- At patient's home

Sample Staffing Models for Monoclonal Antibody Administration

Examples of staff plans *(recommended positions may vary depending on the State's scope of practice for Paramedics as it related to Subcutaneous and or Intravenous administration of medications or mAbs)*

- 8-10 bed mAb infusion/observation site

  - 1 physician / advanced practitioner (present or available via telemedicine)

  - 2 Nurses

  - 1 Nurse or Paramedic

  - 2 Paramedics

  - 1 flex position – administrative/ logistics/ runner

- Single station or mobile visit Subcutaneous administration site

  - 1 physician / advanced practitioner (present or available via telemedicine)

  - 1 Nurse / Paramedic per single mobile visit or single station

Average patient (door to door) visit can range from 80-120 minutes

Site Preparation

- Collect administration site location(s), address, and points of contact
  - For mobile or deployed teams, identify the point of contact at the administration site and make contact
  - Site will need dedicated space for isolation of COVID-19 patients[1]
  - Rededication of existing clinical space is permitted under the CMS Hospital Without Walls Initiative

- Ensure a patient scheduling and referral process is in place

- Identify and understand which therapeutics will be administered

- Determine who is responsible for ordering the monoclonal antibody administration
  - Referring provider
  - On-site or telemedicine provider
  - Standing order

- Brief administration team with site objectives

- Team training
  - Site workflow
  - Monoclonal administration
  - Managing adverse reactions with rescue medications on site as applicable

[1] *Select recommendations for outpatient setting, for more information reference CDC guidelines*
https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html

4. Monoclonal Antibody Administration: *Patient Pathways to Monoclonal Administration*

Pathway to Monoclonals: Patient with Confirmed COVID-19 Infection

4

- Treatment likely most beneficial to patients if given **early in symptom progression**
- EUA requires administration of **treatment as soon as possible after** confirmed positive test result and within **10 days of symptom onset**
- Strong **partnership and communication** between patients and HCP to get right treatment to right patients at right time
- Fast testing turnaround needed, to efficiently **identify positive tests** and **schedule for treatment**

Example of timeline which would fulfill EUA requirements
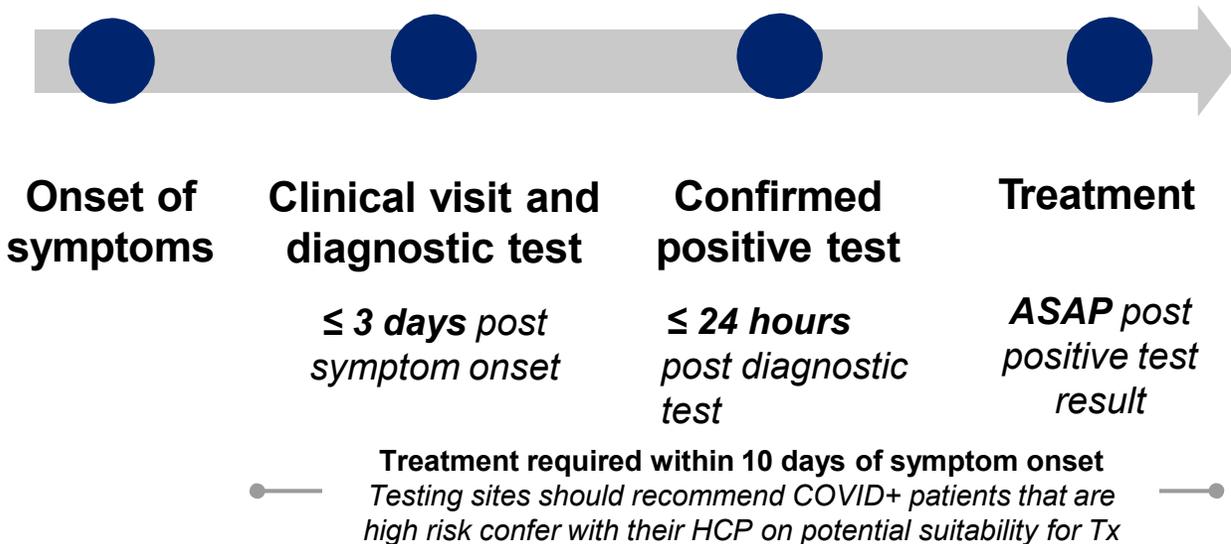
Onset of symptoms

Clinical visit and diagnostic test
≤ 3 days post symptom onset

Confirmed positive test
≤ 24 hours post diagnostic test

Treatment
ASAP post positive test result

Treatment required within 10 days of symptom onset
Testing sites should recommend COVID+ patients that are high risk confer with their HCP on potential suitability for Tx

Please reference EUA factsheet for specific treatment guidelines including recommended treatment window

Early administration of treatment needs fast testing turn-around and patient scheduling

Planning required for "Test and treat" or "Test and refer" models

Patient Flow for Outpatient mAbs Product
Scenario 1: Confirmed positive patient referred for treatment

Pre-treatment	Treatment	Post-treatment

Confirm documentation of COVID-19 infection via either
- Participant-provided lab report
- Medical record lab report
- Direct communication from a provider or laboratory

Discuss treatment with patient
- Ensure patient meets treatment requirements and understands risks

Schedule the patient to come in for treatment ASAP
- Provide guidance on site visit protocols to patients
- Provide patient education on what to expect with administration

Pre-treatment steps should be completed via telemedicine as possible (~30 mins)

Pre-book time for administration space and follow clear protocol for coming onsite
- Ensure operationally ready to receive and treat the patient
- Use CDC recommended practices to minimize exposure to others

Provide treatment to patient
- Infusion duration up to ~1 hr[1] with an additional 1 hr of observation post infusion (checks during infusion and observation)
- Infusion pumps or gravity-based infusion acceptable
- Subcutaneous administration if appropriate per EUA[2]

Ensure preparation for administration reactions as unlikely but possible side effect
- Infusion rate may be reduced based on patient circumstances
- Ensure emergency action plan in place; ability to activate EMS if necessary, a requirement for administration under EUA

Discharge patient immediately following monitoring completion
- Follow clear protocol to minimize risk of exposure to others

Post-treatment care encouraged to be via telemedicine as possible
- Normal follow-up care, no special data tracking requirements

1. Contingent on product dilution, reference EUA fact sheet for dilution and infusion timing
2. Reference EUA for route of administration

Patient Flow for Outpatient mAbs Product
Scenario 2 and 3: Patient arrives for testing at site with unknown diagnosis

Same process as Scenario 1

| Pre-treatment | Treatment | Post-treatment |

Direct patient to typical testing process for site (onsite or offsite)
- Quick response testing needed for early diagnosis to enable early treatment

Assuming patient discharged to await test results, once patient confirmed positive outreach on treatment (~30 mins) :
- Discuss treatment with patient
  - Ensure patient meets treatment requirements and understands risks
  - Provide guidance on administration and site visit protocols to patients
- Schedule the patient to come in for treatment ASAP
- Pre-treatment discussion and scheduling should be via telemedicine as possible

In case of point-of-care rapid testing, consider same-day administration. Needs
- Isolated location for patient to wait
- Availability of treatment space and staff

Pre-book time for administration space and follow clear protocol for coming onsite
- Ensure operationally ready to receive and treat the patient
- Use CDC recommended practices to minimize exposure to others

Provide treatment to patient
- Infusion duration up to ~1 hr[1] with an additional 1 hr of observation post infusion (checks during infusion and observation)
- Infusion pumps or gravity-based infusion acceptable
- Subcutaneous administration if appropriate per EUA[2]

Ensure preparation for administration reactions as unlikely but possible side effect
- Infusion rate may be reduced based on patient circumstances
- Ensure emergency action plan in place; ability to activate EMS if necessary, a requirement for administration under EUA

Discharge patient immediately following monitoring completion
- Follow clear protocol to minimize risk of exposure to others

Post-treatment care encouraged to be via telemedicine as possible
- Normal follow-up care, no special data tracking requirements

1. Contingent on product dilution, reference EUA fact sheet for dilution and infusion timing
2. Reference EUA for route of administration

4

Patient Flow for Post-Exposure Prophylaxis

| Pre-treatment | Treatment | Post-treatment |

Confirm eligibility for PEP
- Patient meets CDC high risk exposure criteria[1]
- Patient is not fully vaccinated or immunocompromised[2]

Discuss treatment with patient
- Ensure patient meets treatment requirements and understands risks

Schedule the patient to come in for treatment ASAP
- Provide guidance on site visit protocols to patients
- Provide patient education on what to expect with administration

Pre-book time for administration space and follow clear protocol for coming onsite
- Ensure operationally ready to receive and treat the patient
- Use CDC recommended practices to minimize exposure to others

Provide treatment to patient
- Infusion duration up to ~1 hr[1] with an additional 1 hr of observation post infusion (checks during infusion and observation)
- Infusion pumps or gravity-based infusion acceptable
- Subcutaneous administration if appropriate per EUA[2]

Ensure preparation for administration reactions as unlikely but possible side effect
- Infusion rate may be reduced based on patient circumstances
- Ensure emergency action plan in place; ability to activate EMS if necessary, a requirement for administration under EUA

Discharge patient immediately following monitoring completion
- Follow clear protocol to minimize risk of exposure to others

Post-treatment care encouraged to be via telemedicine as possible
- Normal follow-up care, no special data tracking requirements

1. CDC Quarantine and Isolation (https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html)
2. CDC Have You Been Fully Vaccinated https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html#vaccinated
3. CDC Science Brief: COVID-19 Vaccines and Vaccination (https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/fully-vaccinated-people.html)

4. Monoclonal Antibody Administration: *Team Roles and Responsibilities*

Monoclonal Administration Site Team Members

- Administration Site Leadership

- Administrative personnel

- Clinical Team

  - Composition dependent on state and local regulations and route of mAb administration (intravenous or subcutaneous)

  - Medical Provider (MD/NP/PA) on-site or available via telemedicine

  - Consider staff competence and comfort with IV insertion and management of pediatric patients if pediatric patients <40kg will be treated at the site

  - Under an amendment to the PREP Act, Pharmacists and qualified Pharmacy Technicians may prescribe and administer COVID-19 therapeutics (subcutaneously, orally, or intramuscularly) unless otherwise stated in the product EUA[1]

[1] HHS PREP Act Amendment 9 Fact Sheet (https://www.ashp.org/-/media/assets/advocacy-issues/docs/GRD-HHS-PREP-Act-Declaration-Amendment-9-Fact-Sheet.pdf)

4

Monoclonal Antibody Administration Site Leadership

- Ensure ordering process is implemented

- Ensure required elements for administration are available
  - Personnel
  - Supplies
  - Administrative support
  - Identified site for administration

- Determination of scheduling process/logistics if treatment and PEP provided at the same site (as not all patients are COVID-positive)

- Determine mechanism for reimbursement of administration fees (product provided by the US Government is provided at no cost)

- Consider mechanism for interpreter services if patients are non-English speaking

- Delegate or perform administrative responsibilities
  - Direct ordering
  - Reporting of adverse events
  - Utilization reporting

4

Record-Keeping Requirements and Adverse Event Reporting

Sites receiving monoclonal antibody will follow established mechanisms for tracking and reporting **serious adverse events**

- Events that are potentially attributable to monoclonal antibody use must be reported to the FDA
  - Refer to the Fact Sheet for Healthcare Providers as part of EUA for guidance
  - Complete and submit a MedWatch form or complete and fax FDA Form 3500 to report

Site must **maintain records** regarding use of the monoclonal antibody by patients

- **Inventory information:** e.g., lot numbers, quantity, receiving site, receipt date, product storage
- **Patient information:** e.g., patient name, age, disease manifestation, number of doses administered per patient, other drugs administered

Ensure that any records associated with this EUA are **maintained for inspection** upon request

Sites will report utilization weekly through the mechanism indicated by their local, state, or territorial health department

CMS: Coverage of Monoclonal Antibody Products to Treat COVID-19

4

Medicare

Site of Care[1]	Payable by Medicare	Expected Patient Cost-Sharing
Inpatient Hospital	✓	No patient cost-sharing
Outpatient Hospital or "Hospital without Walls[2]"	✓	No patient cost-sharing
Outpatient Physician Office/Infusion Center	✓	No patient cost-sharing[3]
Nursing Home (See third bullet in Key Facts on CMS enforcement discretion)	✓	No patient cost-sharing
Home	✓	No patient cost-sharing

[1] Services must be furnished within the scope of the product's FDA authorization or approval and within the provider's scope of practice.

[2] Under the Hospital Without Walls initiative, hospitals can provide hospital services in other healthcare facilities and sites that would not otherwise be considered to be part of a healthcare facility; or can set up temporary expansion sites to help address the urgent need to increase capacity to care for patients.

[3] Cost-sharing may apply to Medicare beneficiaries when they receive care from a provider that doesn't participate in Medicare.

Expected Payment to Providers: Key Facts

- Medicare payment for monoclonal antibody products to treat COVID-19 is similar across sites of care, with some small differences.

- Medicare pays for the administration of monoclonal antibody products to treat COVID-19. For example, Medicare will pay a national average of approximately $450 for the administration of certain monoclonal antibody products . Home infusion is reimbursed at a higher rate.

- CMS will exercise enforcement discretion to allow Medicare-enrolled immunizers working within their scope of practice and subject to applicable state law to bill directly and receive direct reimbursement from the Medicare program for administering monoclonal antibody treatments to Medicare Part A Skilled Nursing Facility residents

- Medicare will pay the provider for these monoclonal antibody products when they are purchased by the provider. Medicare won't pay if the product is given to the provider for free by, for example, a government entity.

- When purchased by the provider, Medicare payment is typically at reasonable cost or at 95% of the Average Wholesale Price (an amount determined by the manufacturer). These payment amounts vary depending on which type of provider is supplying the product. Original Medicare will pay for these products for beneficiaries enrolled in Medicare Advantage.

- For more specific information about Medicare payments to providers for these monoclonal antibody products, please see these Frequently Asked Questions.

Additional information can be found on Coverage of Monoclonal Antibody Products to Treat COVID-19 at https://www.cms.gov/files/document/covid-infographic-coverage-monoclonal-antibody-products-treat-covid-19.pdf

4

CMS Billing Codes for mAb Administration

Regen-COV Product Codes

M0243:

- Long Descriptor: intravenous infusion or subcutaneous injection, casirivimab and imdevimab includes infusion and post administration monitoring

M0244:

- Long Descriptor: intravenous infusion, casirivimab and imdevimab includes infusion and post administration monitoring in the home or residence

Bamlanivimab and Etesevimab Product Codes

M0245:
- Long Descriptor: intravenous infusion, bamlanivimab and etesevimab, includes infusion and post administration monitoring

M0246:
- Long Descriptor: intravenous infusion, bamlanivimab and etesevimab, includes infusion and post administration monitoring in the home or residence

Sotrovimab Product Codes

M0247:

- Long descriptor: intravenous infusion, sotrovimab, includes infusion and post-infusion monitoring

M0248:

- Long descriptor: intravenous infusion, sotrovimab, includes infusion and post-infusion monitoring in the home or residence

CMS.gov: Monoclonal Antibody COVID-19 Infusion – Monoclonal Antibody Products to Treat COVID-19
https://www.cms.gov/medicare/covid-19/monoclonal-antibody-covid-19-infusion

Clinical Team Responsibilities

Ensure appropriate infection control practices in place based on latest CDC guidelines, e.g.:

- Have patient **wait to enter the site** until scheduled time for treatment

- Ensure patient **wearing a mask or face covering** before entering the building

- Escort patient **directly to room, limit transport and movement of the patient outside of the room**

- As all patients treated are confirmed positive for COVID-19, **multiple patients may be treated simultaneously in one area**.

- Medical and support personnel entering room need to **wear sufficient PPE** based on CDC guidelines

- Room should undergo **appropriate cleaning and surface disinfection** before it is returned to routine use

Select [recommendations for outpatient setting](#), for more information reference CDC guidelines
https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html

Important to manage patient flow in a healthcare setting

4

Clinical Team Responsibilities: Patient Intake

- *If MD/NP/PA is on site, they can provide order for mAb after patient intake/screening completed*

- Patient intake (healthcare provider type determined by state regulations/ scope of practice)
  - Ensure patient is **masked** for duration of encounter
  - Patient registration completed
  - Vital signs obtained (ensure patient does not require oxygen unless on home 02, therefore making them ineligible for mAb therapy and requiring escalation of care)
  - Eligibility criteria reviewed
    - Treatment eligibility criteria
    - Post exposure Prophylaxis Criteria
  - Patient Fact Sheet provided to patient prior to administration of mAb

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Clinical Team Responsibilities Monoclonal Administration

- mAb preparation for subcutaneous or intravenous administration

- Ensure patient privacy is maintained in accordance with HIPPA

- mAb administration

- Post-administration monitoring (60 minutes for all patients)

- Response to administration reaction

- Patient discharge and follow-up instructions

4. Monoclonal Antibody Administration: *Indications and Administration*

4

Indications for Monoclonal Therapy & Appropriate mAbs for Treatment

- Pre-Exposure Prophylaxis in eligible persons
  - EVUSHELD (tixagevimab and cilgavimab)

- Active COVID-19 Infection in high risk individuals with mild to moderate symptoms
  - Bamlanivimab and Etesevimab
  - REGEN-COV (casirivimab and imdevimab)
  - Sotrovimab

- Post-Exposure Prophylaxis in vulnerable persons (i.e. not fully vaccinated or immunocompromised) who are at high risk for progression to severe COVID-19
  - REGEN-COV (casirivimab and imdevimab)
  - Bamlanivimab and Etesevimab

Indications for Pre-Exposure Prophylaxis (PrEP)

- EVUSHELD (tixagevimab and cilgavimab)

EVUSHELD (tixagevimab and cilgavimab)
Eligibility for Pre-Exposure Prophylaxis*

EVUSHELD (tixagevimab and cilgavimab) is indicated for pre-exposure prophylaxis of COVID-19 in adults and pediatric (12 years of age and older and weighing at least 40kg):

- Who are not currently infected with SARS-CoV-2 and who have not had a known recent exposure to an individual infected with SARS-CoV-2 **AND**

- who have moderate to severe immune compromise due to a medical condition or receipt of immunosuppressive medications or treatments and may not mount an adequate immune response to COVID-19 vaccination **OR**

- for whom vaccination with any available COVID-19 vaccine, according to the approved or authorized schedule, is not recommended due to a history of severe adverse reaction (e.g., severe allergic reaction) to a COVID-19 vaccine(s) and /or COVID-19 vaccine component(s)

See Limitations of Authorized Use

Fact Sheet for Health Care Providers Emergency Use Authorization for Evusheld (tixagevimab co-packaged with cilgavimab (https://www.fda.gov/media/154701/download)

Medical conditions or treatments that may result in moderate to severe immune compromise and an inadequate immune response to COVID-19 vaccination include but are not limited to[1]:

- Active treatment for solid tumor and hematologic malignancies

- Receipt of solid-organ transplant and taking immunosuppressive therapy

- Receipt of chimeric antigen receptor (CAR)-T-cell or hematopoietic stem cell transplant (within 2 years of transplantation or taking immunosuppression therapy)

- Moderate or severe primary immunodeficiency (e.g., DiGeorge syndrome, Wiskott-Aldrich syndrome)

- Advanced or untreated HIV infection (people with HIV and CD4 cell counts <200/mm^3, history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV)

- Active treatment with high-dose corticosteroids (i.e., ≥20 mg prednisone or equivalent per day when administered for ≥2 weeks), alkylating agents, antimetabolites, transplant-related immunosuppressive drugs, cancer chemotherapeutic agents classified as severely immunosuppressive, tumor-necrosis (TNF) blockers, and other biologic agents that are immunosuppressive or immunomodulatory (e.g., B-cell depleting agents)

[1]CDC Clinical Considerations for COVID-19 Vaccines (https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html)

EVUSHELD (tixagevimab and cilgavimab) Pre-Exposure Prophylaxis: Limitations of Authorized Use

- Evusheld is not authorized for use in individuals:
    - For treatment of COVID-19, or
    - For post-exposure prophylaxis of COVID-19 in individuals who have been exposed to someone infected with SARS-CoV-2

- Pre-exposure prophylaxis with EVUSHELD is not a substitute for vaccination in individuals for whom COVID-19 vaccination is recommended. Individuals for whom COVID-19 vaccination is recommended, including individuals with moderate to severe immune compromise who may derive benefit from COVID-19 vaccination, should receive COVID-19 vaccination

- In individuals who have received a COVID-19 vaccine, EVUSHELD should be administered at least two weeks after vaccination

- EVUSHELD may only be prescribed by a healthcare provider licensed under State law to prescribe drugs for an individually identified patient and who has the education and training to make the clinical assessment necessary for appropriate use of EVUSHELD

EVUSHELD (tixagevimab and cilgavimab)
Preparation, Dose, & Administration

- Dose: tixagevimab 150mg and cilgavimab 150mg

- Administration
  - Administer the two components sequentially
  - Withdraw 1.5mL of tixagevimab and 1.5mL of cilgavimab solution into TWO separate syringes
  - Administer the intramuscular (IM) injections at different injection sites, preferably one in each of the gluteal muscles, one after the other. The vastus lateralis is acceptable if gluteal injection is contraindicated
  - The solutions for injection do not contain a preservative. Discard unused portion in accordance with local requirements
  - As with any other IM injection, administer with caution to patients with thrombocytopenia or any coagulation disorder

- Observation: 60 minutes post-administration

- Storage: Refrigerate unopened vials at 2-8°C/36-46°F

Indications for Post-Exposure Prophylaxis (PEP)

- ## bamlanivimab and etesevimab**
- ## REGEN-COV (casirivimab and imdevimab)**

** Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Eligibility for POST-EXPOSURE PROPHYLAXIS**

Bamlanivimab/etesevimab or casirivimab/imdevimab indicated for post-exposure prophylaxis of COVID-19 in individuals who are:

- Adult or pediatric (≥ 12 years of age and weighing at least 40kg) patient **at high risk for progressing to severe disease or death (*see high risk criteria*) OR**

- Pediatric Patient <40kg (including neonates)*** **at high risk for progressing to severe disease or death (*see high risk criteria*) ***bamlanivimab/etesevimab only AND**

- Not fully vaccinated[1] **or** who are not expected to mount an adequate immune response to complete SARS-CoV-2 vaccination (for example, individuals with immunocompromising conditions including those taking immunosuppressive medications[2]) **AND**

  - have been exposed to an individual infected with SARS-CoV-2 consistent with close contact criteria per CDC[3] **OR**

  - **who are at high risk of exposure to an individual infected with SARS-CoV-2** because of occurrence of COVID-19 in other individuals in the same institutional setting (for example, nursing homes, prisons) [*see limitations of authorized use*]

***Limitations of Authorized Use:**

- *Post-exposure prophylaxis with monoclonal antibody therapy is not a substitute for vaccination against COVID-19*
- *Bamlanivimab/etesevimab or casirivimab/imdevimab antibody therapy is not authorized for pre-exposure prophylaxis for prevention of COVID-19*

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1. CDC's Have You Been Fully Vaccinated? (https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html#vaccinated)
2. CDC's Science Brief: COVID-19 Vaccines and Vaccination (https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/fully-vaccinated-people.html)
3. CDC's Quarantine and Isolation (https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html)

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Resources: Monoclonal Eligibility for POST-EXPOSURE PROPHYLAXIS

4

1 Individuals are considered to be **fully vaccinated** 2 weeks after their second vaccine dose in a 2-dose series (such as the Pfizer or Moderna vaccines), or 2 weeks after a single-dose vaccine (such as Johnson & Johnson's Janssen vaccine). See this CDC website for more details on Have You Been Fully Vaccinated? (https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html#vaccinated)

2 CDC's Science Brief: COVID-19 Vaccines and Vaccination (https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/fully-vaccinated-people.html)

3 Close contact with an infected individual is defined as: being within 6 feet for a total of 15 minutes or more, providing care at home to someone who is sick, having direct physical contact with the person (hugging or kissing, for example), sharing eating or drinking utensils, or being exposed to respiratory droplets from an infected person (sneezing or coughing, for example). See this website for additional details on Quarantine and Isolation (https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html)

Indications for Treatment of Patients with Confirmed COVID-19 Infection

- ## bamlanivimab and etesevimab**
- ## REGEN-COV (casirivimab and imdevimab)**
- ## sotrovimab

** Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

mAb Eligibility Criteria for TREATMENT of Mild-Moderate Covid-19 Infection in High Risk Adult and Pediatric (> 40kg) Patients

Mild to moderate COVID-19 cases early in infection, who are at **high risk for progressing to severe COVID-19 and/or hospitalization**; with following criteria:

- Adult or pediatric (> 12 years of age and weighing at least 40kg) patient
- Confirmation via **positive PCR or antigen test**
- Treatment **as soon as possible** following positive viral test and **within 10 days of symptom onset**
- Patient symptomatic but **not yet progressed to require hospitalization or oxygen therapy (or increase from baseline chronic oxygen therapy)**

Monoclonal antibodies given EUA for mild to moderate symptoms of COVID-19 are *not authorized* **for use in patients:**

- who are hospitalized due to COVID-19, OR
- who require oxygen therapy due to COVID-19, OR
- who require an increase in baseline oxygen flow rate due to COVID-19 in those on chronic oxygen therapy due to underlying non-COVID-19 related comorbidity

Benefit of treatment with mAbs has not been observed in patients hospitalized due to COVID-19. Monoclonal antibodies may be associated with worse clinical outcomes when administered to hospitalized patients with COVID-19 requiring high flow oxygen or mechanical ventilation

4

mAb Eligibility Criteria for TREATMENT of Mild-Moderate Covid-19 Infection in High Risk
Pediatric Patients <40kg**

Mild to moderate COVID-19 cases early in infection, who are at **high risk for progressing to severe COVID-19 and/or hospitalization**; with following criteria:

- Neonate through pediatric and less than 40 kg

- Confirmation via **positive PCR or antigen test**

- Treatment **as soon as possible** following positive viral test and **within 10 days of symptom onset**

- Patient symptomatic but **not yet progressed to require hospitalization or oxygen therapy (or increase from baseline chronic oxygen therapy)**

Monoclonal antibodies given EUA for mild to moderate symptoms of COVID-19 are *not authorized* **for use in patients:**

- 2 years and older who are hospitalized due to COVID-19, OR

   Regardless of age:

- who require oxygen therapy support due to COVID-19, OR

- who require an increase in baseline oxygen flow rate and/or respiratory support due to COVID-19 in those on chronic oxygen therapy or respiratory support due to underlying non-COVID-19 related comorbidity

Benefit of treatment with mAbs has not been observed in patients hospitalized due to COVID-19. Monoclonal antibodies may be associated with worse clinical outcomes when administered to hospitalized patients with COVID-19 requiring high flow oxygen or mechanical ventilation

**Indicated therapeutic not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant
https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

④

HIGH RISK FACTORS FOR TREATMENT AND POST-EXPOSURE PROPHYLAXIS WITH mAbs INCLUDE, BUT ARE NOT LIMITED TO:

- Older age (for example ≥ 65 years of age)
- Less than 1 year of age (bamlanivimab/etesevimab only)
- Obesity or being overweight (for example, adults with BMI ≥ 25, or if age 12-17, have BMI ≥ 85th percentile for their age and gender based on CDC growth charts)
- Pregnancy
- Chronic Kidney Disease
- Diabetes
- Immunosuppressive disease or immunosuppressive treatment
- Cardiovascular disease (including congenital heart disease) or hypertension
- Chronic lung diseases (for example, chronic obstructive pulmonary disease, asthma [moderate-to-severe], interstitial lung disease, cystic fibrosis, and pulmonary hypertension)
- Sickle cell disease
- Neurodevelopmental disorders (for example, cerebral palsy) or other conditions that confer medical complexity (for example, genetic or metabolic syndromes and severe congenital abnormalities)
- Having a medical-related technological dependence (for example, tracheostomy, gastrostomy, or positive pressure ventilation (not related to COVID-19)

⭐ Other medical conditions or factors (for example, race or ethnicity) may also place individual patients at high risk for progression to severe COVID-19 and **authorization of mAb therapy is not limited to the medical conditions or factors listed above**. For additional information on medical conditions and factors associated with increased risk for progression to severe COVID-19, visit the CDC website:

- CDC Underlying Medical Conditions Associated with High Risk for Severe COVID-19: Information for Healthcare Providers (https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html)

- CDC's Clinical Growth Charts (https://www.cdc.gov/growthcharts/clinical_charts.htm)

- The COVID-19 Treatment Guidelines Panel's Interim Statement on Patient Prioritization for Outpatient Anti-SARS-CoV-2 Therapies or Preventive Strategies When There Are Logistical or Supply Constraints

Product Storage

Product Storage	bamlanivimab/etesevimab	casirivimab/imdevimab	sotrovimab
Storage of UNOPENED VIALS in original carton	Refrigerated (2-8°C/36-46°F): until expired	Refrigerated (2-8°C/36-46°F): until expired Room temperature (up to 25°C/ 77°F): 30 days	Refrigerated (2-8°C/36-46°F): until expired
Storage of PREPARED IV SOLUTION	Refrigerated (2-8°C/36-46°F): 24 hours Room temperature (20-25°C/68-77°F): 7 hours	Refrigerated (2-8°C/36-46°F): 36 hours Room temperature (up to 25°C/ 77°F): 4 hours	Refrigerated (2-8°C/36-46°F): 24 hours Room temperature (up to 25°C/ 77°F): 6 hours
Storage of PREPARED SYRINGES**	n/a	Refrigerated (2-8°C/36-46°F): 24 hours Room temperature (up to 25°C/ 77°F): 8 hours	n/a
Time to Equilibrate to Room Temperature before Administration (Per EUA language)	Approximately 20 minutes	30 minutes	Approximately 15 minutes

For most up to date information, refer to product EUA Fact Sheets:
- EUA of bamlanivimab and etesevimab - http://pi.lilly.com/eua/bam-and-ete-eua-factsheet-hcp.pdf
- EUA of REGEN-COV (casirivimab and imdevimab) - https://www.regeneron.com/downloads/treatment-covid19-eua-fact-sheet-for-hcp.pdf
- EUA of sotrovimab - https://gskpro.com/content/dam/global/hcpportal/en_US/Prescribing_Information/Sotrovimab/pdf/SOTROVIMAB-EUA.PDF#nameddest=HCPFS

NOTE: Temperature ranges and specifications are per each product EUA

4

mAb Preparation

Note: product can be prepared for infusion and subcutaneous administration bedside by any qualified medical professional

Administration preparation process:
- Prepare sterile infusions in a manner consistent with local laws, regulations, guidelines and policies
- Obtain new vial(s) and/or IV bags if the drug product contains any visible particulate matter

Needs for space to prepare mAb drug:
- Dedicated preparation area with sufficient capacity onsite or nearby

Acceptable equipment for mAb drug storage:
- Refrigerated storage (2-8° C)
- Temperature control mechanism including temperature monitoring process
- Storage area for REGEN-COV if stored at room temperature

Please see EUA manufacturer fact sheet for drug-specific requirements

General Guidelines for bamlanivimab/etesevimab Dosing, Dilution, & Administration: Adult and Pediatric (40+kg) Patients**

Table 1: Recommended Dilution and Administration Instructions for Bamlanivimab and Etesevimab for IV Infusion[3] in Adults (≥18 years regardless of weight) and Pediatric Patients (<18 years and weighing at least 40 kg)

Drug[a]: Add 20 mL of bamlanivimab (1 vial) and 40 mL of etesevimab (2 vials) for a total of 60 mL to a prefilled infusion bag and administer as instructed below		
Size of Prefilled 0.9% Sodium Chloride Infusion Bag	**Maximum Infusion Rate**	**Minimum Infusion Time**
50 mL	310 mL/hr	21 minutes
100 mL	310 mL/hr	31 minutes
150 mL	310 mL/hr	41 minutes
250 mL For patients weighing at least 50 kg	310 mL/hr	60 minutes
250 mL[b] For patients weighing ≥40 kg and <50 kg	266 mL/hr	70 minutes

[a] 700 mg of bamlanivimab and 1,400 mg of etesevimab are added to the same infusion bag and administered together as a single intravenous infusion.

[b] The minimum infusion time for patients weighing at least 40 kg and less than 50 kg who are administered bamlanivimab and etesevimab diluted in a 250-mL prefilled 0.9% Sodium Chloride infusion bag must be extended at least 70 minutes to reduce endotoxin load.

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant
https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Fact Sheet for Health Care Providers Emergency Use Authorization of Bamlanivimab and Etesevimab (http://pi.lilly.com/eua/bam-and-ete-eua-factsheet-hcp.pdf)

General Guidelines for bamlanivimab/etesevimab Dosing & Administration: Pediatric Patients <40kg (including neonates)

Table 2: Recommended Dosing, Preparation and Administration Instructions for Undiluted Bamlanivimab (BAM) and Etesevimab (ETE) for IV Infusion in Pediatric Patients (<18 years and weighing less than 40 kg)**

Body Weight	BAM/ETE dose (mg)	Amount of BAM (as mL)[a]	Amount of ETE (as mL)[a]	Maximum Infusion Rate
>20 kg to <40 kg	350 mg / 700 mg	10 mL	20 mL	1.88 mL/min
>12 kg to 20 kg	175 mg / 350 mg	5 mL	10 mL	0.94 mL/min
>11 kg to 12 kg	138 mg / 276 mg	3.9 mL	7.9 mL	0.74 mL/min
>10 kg to 11 kg	126 mg / 252 mg	3.6 mL	7.2 mL	0.68 mL/min
>9 kg to 10 kg	114 mg / 228 mg	3.3 mL	6.5 mL	0.61 mL/min
>8 kg to 9 kg	102 mg / 204 mg	2.9 mL	5.8 mL	0.54 mL/min
>7 kg to 8 kg	90 mg / 180 mg	2.6 mL	5.1 mL	0.48 mL/min
>6 kg to 7 kg	78 mg / 156 mg	2.2 mL	4.5 mL	0.42 mL/min
>5 kg to 6 kg	66 mg / 132 mg	1.9 mL	3.8 mL	0.36 mL/min
>4 kg to 5 kg	54 mg / 108 mg	1.5 mL	3.1 mL	0.29 mL/min
>3 kg to 4 kg	42 mg / 84 mg	1.2 mL	2.4 mL	0.23 mL/min
>2 kg to 3 kg	30 mg / 60 mg	0.9 mL	1.7 mL	0.16 mL/min
>1.5 kg to 2 kg	21 mg / 42 mg	0.6 mL	1.2 mL	0.11 mL/min

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

casirivimab/imdevimab Formulations and Dose Preparation
Dose: REGEN-COV (casirivimab 600mg and imdevimab 600mg)**

Administration Route	Single Product Vials		REGEN-COV
Intravenous **(Mixed and administered per EUA instructions)** Intravenous infusion is strongly recommended for treatment of active infection. Subcutaneous injection is an alternative route of administration when intravenous infusion is not feasible and would lead to delay in treatment. *For Post-Exposure prophylaxis either subcutaneous injection or intravenous route can be used.* **Fact Sheet for Health Care Providers Emergency Use Authorization (EUA) of REGEN-COVTM (casirivimab and imdevimab)** [https://www.regeneron.com/downloads/treatment-covid19-eua-fact-sheet-for-hcp.pdf]	casirivimab (REGN10933) **5ml total** (from 2.5 or 11.1 mL vials) imdevimab (REGN10987) **5ml total** (from 2.5 or 11.1 mL vials) 		**10 mL total**
Subcutaneous	Two syringes with 2.5 mL each of casirivimab (REGN10933) (**total of 5 ml casirivimab**) Two syringes with 2.5 mL each of imdevimab (REGN10987) (**total of 5 ml imdevimab**)		Four syringes each containing 2.5mL REGEN-COV for a **total of 10mL**

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

casirivimab and imdevimab Co-Packaged Cartons (from Roche Pharmaceuticals)**

11.1 ML VIALS COPACK

1 VIAL OF CASIRIVIMAB
11.1 mL
NDC 61755-024-00

AND

1 VIAL OF IMDEVIMAB
11.1 Ml
NDC 61755-025-00

Although the carton is labeled "2 vials of 20 mL, "this is referring to the vial size and not the content of the vial.
This presentation contains 2 vials of 11.1 mL (one of casirivimab and one of imdevimab)

This co-pack contains product for two patient courses

2.5 ML VIALS CO-PACK

1 VIAL OF CASIRIVIMAB
2.5 mL
NDC 61755-026-00

AND

1 VIAL OF IMDEVIMAB
2.5 mL
NDC 61755-027-00

Although the carton is labeled "2 vials of 6 mL, "this is referring to the vial size and not the content of the vial.
This presentation contains 2 vials of 2.5 mL (one of casirivimab and one of imdevimab)

Two cartons of this combination are required for one patient course
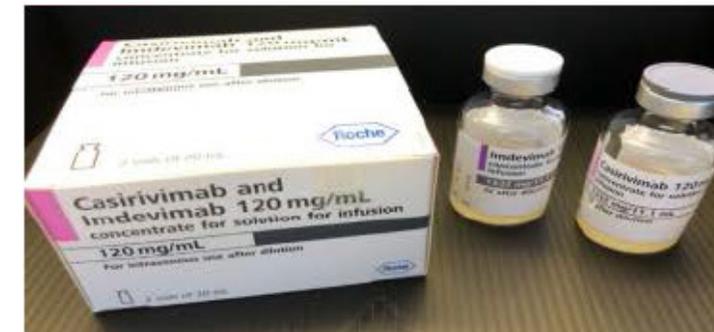
**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

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Utilizing REGEN-COV (casirivimab and imdevimab) Dose Pack**

NDC 61755-**035**-02
Combination of 2 vials

1 vial of
Casirivimab
11.1 mL

AND

1 vial of
imdevimab
11.1 mL

NDC 61755-**036**-08
Combination of 8 vials

4 vials of
Casirivimab
2.5 mL

AND

4 vials of
imdevimab
2.5 mL

Previously created REGEN-COV Dose Pack contains **2 patient courses** as of the June 2021 EUA[1] (enclosed information sheet has dosing from prior EUA). **1 patient course is 5ml casirivimab/ 5ml imdevimab**

The dose pack may be utilized for two doses. **Once punctured, the vials should be discarded after 4 hours.**

Refer to the "Regeneron Important Prescribing Letter" for more information

Please contact Regeneron Medical Affairs with any questions about using **existing** inventory to treat patients at 1-844-734-6643

**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

Guidelines for REGEN-COV Repeat Dosing for Post-Exposure Prophylaxis**

- For individuals whom repeat dosing is determined to be appropriate for ongoing exposure to SARS-CoV-2 for longer than 4 weeks and who are not expected to mount an adequate immune response to complete SARS-CoV-2 vaccination

- The initial dose is 600 mg of casirivimab and 600 mg of imdevimab by subcutaneous injection or intravenous infusion

- Followed by subsequent repeat dosing of 300 mg of casirivimab and 300 mg of imdevimab by subcutaneous injection or intravenous infusion once every 4 weeks for the duration of ongoing exposure.

**Not expected to retain activity against omicron variant
NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant
https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

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General Guidelines for REGEN-COV Intravenous Dosing, Dilution, and Administration**

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Dilution Instructions for REGEN-COV (600 mg Casirivimab and 600mg Imdevimab) for intravenous infusion

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Size of Prefilled 0.9% Sodium Chloride Infusion Bag	Preparing Using Co-Formulated Casirivimab and Imdevimab Vial	Preparing Casirivimab and Imdevimab Using Individual Vials[a]
50 mL	Add 10 mL of co-formulated Casirivimab and Imdevimab (1 vial) into a prefilled 0.9% sodium chloride infusion bag and administer as instructed below	Add: • 5 mL of Casirivimab (may use 2 vials of 2.5 ml OR 5 mL from 1 vial of 11.1 mL) • 5 mL of Imdevimab (may use 2 vials of 2.5 ml OR 5 mL from 1 vial of 11.1 mL And inject into a prefilled 0.9% sodium chloride infusion bag and administer as instructed below.
250 mL		

[a.] 600 mg of Casirivimab and 600 mg of Imdevimab are added to the same infusion bag and administered together as a single intravenous infusion.

Table 2: Recommended Administration Rate for Casirivimab and Imdevimab for Intravenous Infusion

Size of Prefilled 0.9% Sodium Chloride Infusion Bag used	Maximum Infusion Rate	Minimum Infusion Time
50 mL[b]	180 mL/hr	20 minutes
100 mL	310 mL/hr	21 minutes
150 mL	310 mL/hr	31 minutes
250 mL	310 mL/hr	50 minutes

[b.] The minimum infusion time for patients administered casirivimab and imdevimab together using the 50 mL prefilled 0.9% Sodium Chloride infusion bag must be at least 20 minutes to ensure safe use.

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**Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

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Fact Sheet for Health Care Providers Emergency Use Authorization (EUA) or REGEN-COVTNM (casirivimab and imdevimab)
https://www.regeneron.com/downloads/treatment-covid19-eua-fact-sheet-for-hcp.pdf

General Guidelines for REGEN-COV Subcutaneous Dosing and Administration** ④

Administration Instructions for REGEN-COV (600 mg Casirivimab and 600mg Imdevimab) for subcutaneous injection[1]

Prepare 600 mg of Casirivimab and 600 mg of Imdevimab	Preparation of 4 Syringes
Using Casirivimab and Imdevimab Co-formulated Vial	Withdraw 2.5 mL solution per syringe into FOUR separate syringes.
Using Casirivimab and Imdevimab Individual Vials	• Casirivimab: Withdraw 2.5 mL solution per syringe into TWO separate syringes. • Imdevimab: Withdraw 2.5 mL solution per syringe into TWO separate syringes. For total of 4 syringes.

Intravenous infusion is strongly recommended for treatment of active infection. Subcutaneous injection is an alternative route of administration when intravenous infusion is not feasible and would lead to delay in treatment.

For Post-Exposure Prophylaxis either subcutaneous or intravenous route can be used.

Fact Sheet for Health Care Providers Emergency Use Authorization (EUA) of REGEN-COV™ (casirivimab and imdevimab)
https://www.regeneron.com/downloads/treatment-covid19-eua-fact-sheet-for-hcp.pdf

Preparation and Administration:

- Obtain four 3mL or 5mL luer lock syringes and four 21 gauge 1½ inch transfer needles

- Withdraw 2.5 mL into each syringe per preparation instructions. **Prepare all four syringes at the same time.**

- Replace the 21 gauge transfer needle on each syringe with a 25-gauge or 27-gauge needle for subcutaneous injection

- Administer the subcutaneous injections consecutively, **each at a different injection site**, into the thigh, back of the upper arm, or abdomen, except for 2 inches (5 cm) around the navel. The waistline should be avoided.

- **It is recommended that providers use different quadrants of the abdomen, upper thighs, or back of the upper arms to space apart each injection**

- DO NOT inject into skin that is tender, damaged, bruised, or scarred

Not expected to retain activity against omicron variant
NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant
https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

REGEN-COV Subcutaneous Injection Sites**

- The prescribing healthcare provider and/or the provider's designee are responsible for mandatory reporting of all medication errors and **ALL SERIOUS ADVERSE EVENTS** potentially related to REGEN-COV. These adverse events must be reported within seven calendar days from the onset of the event.

- Healthcare facilities and providers must report therapeutics information and demonstrate adequate utilization via data reported through HHS Protect, TeleTracking or National Healthcare Safety Network (NHSN) as directed by the U.S. Department of Health and Human Services.

- **MedWatch adverse event reports can be submitted to the FDA, by submitting a postage-paid Form FDA 3500 and returning by mail/fax, or by calling 1-800-FDA-1088 to request a reporting form**. In addition, please provide a copy of all FDA MedWatch forms to Regeneron Pharmaceuticals, Inc via fax (1-888-876-2736) or email (medical.information@regeneron.com).
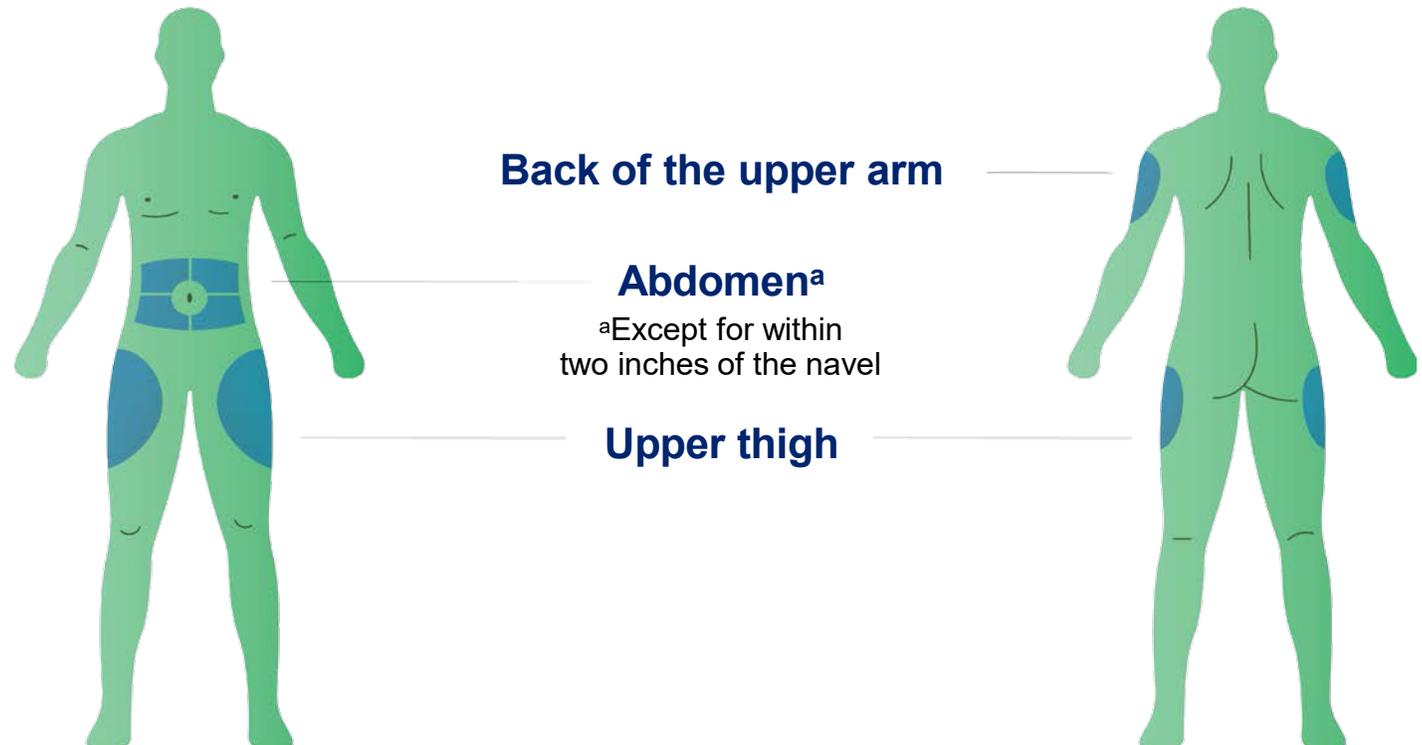
Back of the upper arm

Abdomen[a]
[a]Except for within two inches of the navel

Upper thigh

Not expected to retain activity against omicron variant

NIH COVID-19 Treatment Guidelines Panel's Statement on SARS-CoV2 Monoclonal Antibodies or Remdesidivir for the Treatment of COVID-19 in Nonhospitalized Patients When Omicron is the Predominant Circulating Variant

https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-anti-sars-cov-2-mabs-and-rdv-and-omicron/

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General Guidelines for sotrovimab Dosing, Dilution, and Administration

Preparation

Sotrovimab is supplied in a single-dose vial and must be diluted prior to administration.
Sotromivab injection should be prepared by a qualified healthcare professional using aseptic technique.

- Gather the materials for preparation
  - Polyvinyl chloride (PVC) or polyolefin (PO), sterile prefilled infusion bag. Choose one of the following sizes: prefilled 50-mL or 100 – mL infusion bag containing 0.9% Sodium Chloride Injection, and
  - One vial of sotrovimab (500 mg/8 mL).

- Remove one vial of sotrovimab from refrigerated storage and allow to equilibrate to room temperature, protected from light, for approximately 15 minutes.
- Inspect the vial of sotrovimab visually for particulate matter and discoloration prior to administration. Should either be observed, the solution must be discarded, and a fresh solution prepared.
  - Sotrovimab is a clear, colorless or yellow to brown solution

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- Gently swirl the vial several times before use without creating air bubbles. **Do not shake the vial.**

- Withdraw 8 mL sotrovimab from one vial and insect into a prefilled infusion bag containing 0.9% Sodium Chloride Injection.

- Discard any product remaining in the vial.

- Prior to the infusion, gently rock the infusion bag back and forth by hand 3 to 5 times. **Do not invert the infusion bag.** Avoid forming air bubbles.

- This product is preservative-free; therefore, the diluted infusion solution should be administered immediately.
  - If immediately administration is not possible, store the diluted solution of sotrovimab up to 4 hours at room temperature (20°C to 25°C [68°F to 77°F]) or refrigerated up to 24 hours (2°C to 8°C [36°F to 46°F])

Administration

- Infuse over 30 minutes
- Do NOT deliver via IV push or IV bolus
- Monitor patient for 60 minutes after infusion

Fact Sheet for Healthcare Providers Emergency Use Authorization (EUA) of Sotrovimab
https://gskpro.com/content/dam/global/hcpportal/en_US/Prescribing_Information/Sotrovimab/pdf/SOTROVIMAB-EUA.PDF#nameddest=HCPFS

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mAb Post-Administration Monitoring

- Per EUA, "Clinically monitor patients during dose administration and observe patients for at least 1 hour after intravenous infusion or subcutaneous dosing is complete"

- Provide education on follow-up, required isolation per CDC guidelines after COVID-19 exposure or diagnosis, red flags for seeking emergency care

- Respond to severe adverse events/ anaphylaxis

- "Discharge" patient after one hour post-administration monitoring if stable and without symptoms of severe adverse reaction

- Report any severe adverse events as required by the FDA through the process outlined in the EUA

4. **Monoclonal Antibody Administration:**
    Response to Adverse Events

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Managing Adverse Reactions to mAbs

- **Monoclonal antibodies may only be administered** in settings in which health care providers have immediate access to medications to treat a severe infusion or hypersensitivity reactions, such as anaphylaxis, and the ability to activate the emergency medical system (EMS), as necessary.

- Early identification of anaphylaxis. Symptoms may include:
  - Respiratory: throat tightness, stridor, hoarseness, wheezing, respiratory distress, coughing, trouble swallowing/drooling, nasal congestion/drainage, sneezing
  - Gastrointestinal: nausea, vomiting, diarrhea, abdominal pain, cramps
  - Cardiovascular: dizziness, fainting, tachycardia, hypotension, cyanosis, pallor, flushing
  - Skin/mucosal: hives, erythema, itching, swelling of eyes, lips, tongue, mouth, face, or extremities
  - Neurologic: agitation, convulsions, altered mental status, sense of impending doom
  - Other: sudden increase in secretions, urinary incontinence

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Managing Adverse Reactions to mAbs: Medications and Equipment

- **Should be available** at all sites:
  - Epinephrine (e.g., prefilled syringe or autoinjector)
  - H1 antihistamine (e.g., diphenhydramine, cetirizine)
  - Blood pressure monitor

- **If feasible,** include at sites (not required)
  - Oxygen
  - Bronchodilator (e.g., albuterol)
  - H2 antihistamine (e.g., famotidine, cimetidine)
  - Intravenous fluids
  - Intubation kit
  - Adult-sized pocket mask with one- way valve (CPR mask)

Adapted from CDC Interim Considerations: Preparing for the potential management of anaphylaxis at COVID-19 vaccination sites

https://www.cdc.gov/vaccines/covid-19/downloads/IntermConsid-Anaphylaxis-covid19-vaccine-sites.pdf

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**Please note…
EUA guidelines
continue to evolve**

Please reference [EUA fact-sheets](#) for latest treatment guidelines and information, including:

- Therapeutic dosing

- Administration routes

- Dilution requirements and infusion time for intravenous or parenteral administration

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COVID-19 Vaccination after mAb Administration

The current recommendation based on CDC guidance:

- **Delay COVID-19 vaccine for 90 days after mAb for treatment of COVID-19 infection**
- **Delay COVID-19 vaccine for 30 days after mAb for post exposure prophylaxis**

CDC Advisory Committee on Immunization Practices:
(*Updated August 21, 2021*)

People who previously received passive antibody therapy

Currently, there are limited data available on the safety and effectiveness of COVID-19 vaccines in people who received passive antibody products (anti-SARS-CoV-2 monoclonal antibodies or convalescent plasma) as part of COVID-19 treatment or post-exposure prophylaxis. Based on the estimated half-life of such products and the anticipated period of protection against infection (when receiving anti-SARS-CoV-2 monoclonal antibodies for post-exposure prophylaxis) or reinfection (when receiving passive antibody therapy for treatment), COVID-19 vaccination should be temporarily deferred as a precautionary measure during the time period specified below after receiving passive antibody products to avoid potential interference of the product with vaccine-induced immune responses:

Passive antibody product used for post-exposure prophylaxis: defer COVID-19 vaccination for 30 days
Passive antibody product used for COVID-19 treatment: defer COVID-19 vaccination for 90 days
However, if passive antibody products and a COVID-19 vaccine dose are administered within these recommended deferral periods (30 or 90 days), the vaccine dose does not need to be repeated.

CDC's Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Approved or Authorized in the United States
(https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html)

4. Monoclonal Antibody Administration: *Supplies and Resources*

Site Supplies Needed

Infrastructure

- Seating area with appropriate spacing for patients to receive mAb
- Steel table for product preparation
- Privacy screens if needed
- Protocol/outline for patient flow (written protocol not required however patient flow and infection control should be addressed at each administration site)
- Emergency response plan (written plan not required, however all staff should be aware of the plan for emergency response)

General supplies

- Infusion Reaction Kit
- Refrigerator
    - *Optional to store prepared solution onsite*
- Sharps container
- Biohazard disposal bag
- Trash bins and liners
- Disposable disinfecting wipes
- Hand sanitizer
- Thermometer probe covers *(if required)*
- 70% alcohol wipes
- Paper towels

PPE

- NIOSH-certified, disposable N95 filter facepiece respirators or better
- Gloves in appropriate sizes
- Gowns
- Surgical face masks for patients
- Eye and face protection (e.g. goggles, safety glasses, face shields)

Patient Intake

- Vital signs machine
- Pulse oximeter
- Thermometer
- Copies of eligibility checklist for treatment/ PEP

Administrative

- Site-specific documentation
- Patient fact sheets to provide each patient (copies in English, Spanish and other appropriate languages)

Administration Supplies- Subcutaneous

- Alcohol wipes
- 3 or 5mL luer lock syringes (4 required for each patient for subcutaneous administration)
- Appropriate needles for product preparation and subcutaneous administration
    - 21 gauge 1.5 inch needles for product transfer
    - 25 or 27 gauge needles for subcutaneous administration (4 per each patient course)

Administration Supplies- Intravenous

- IV poles
- Alcohol wipes
- 2x2 gauze pads
- Adhesive bandages
- Medical tape
- Tegaderm bio-occlusive dressing
- Absorbent underpads (blue pads)
- Normal saline bags for mixing/administration- 50-250 mL
- IV administration sets: *PVC infusion set with/without DEHP containing 0.2 or 0.22 micron polyethersulfone (PES) in-line filter*
- IV catheters
- IV extension set tubing
- 3mL saline syringes
- Needles – stainless steel 18ga
- *Optional: Transilluminator (vein finder)*

5.   Oral Antiviral Administration

5. Oral Antiviral Administration: *Introduction to COVID-19 Oral Antiviral Therapies*

Paxlovid (Pfizer)

- FDA has issued an EUA for the treatment of mild-to-moderate coronavirus disease (COVID-19) in adults (12 years of age and older weighing more than 40kg) who are at high risk for progression to severe COVID-19, including hospitalization and death.

- Paxlovid includes: nirmatrelvir (a SARS-CoV-2 main proteases inhibitor) and ritonavir (a CYP34A inhibitor)

- Limitations of authorized use:
  - Not authorized for initiation of treatment in patients requiring hospitalization due to severe or critical COVID-19
  - Not authorized for use longer than 5 consecutive days

- PAXLOVID may only be prescribed for an individual patient by physicians, advanced practice registered nurses, and physician assistants that are licensed or authorized under state law to prescribe drugs in the therapeutic class to which PAXLOVID belongs (i.e., anti-infectives).

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Fact Sheet for Health Care Providers Emergency Use Authorization of Paxlovid (https://www.fda.gov/media/155050/download)

Molnupiravir (Merck)

- Molnupiravir has been authorized for emergency use by FDA under an EUA, for the treatment of mild-to-moderate COVID-19 in adults who are at high-risk for progression to severe COVID-19, including hospitalization or death, and for whom alternative COVID-19 treatment options authorized by FDA are not accessible or clinically appropriate

- Not authorized for:
  - Patients less than 18 years of age
  - Initiation of treatment in patients requiring hospitalization due to COVID-19
  - Use longer than 5 consecutive days

- Molnupiravir may only be prescribed for an individual patient by physicians, advanced practice registered nurses, and physician assistants that are licensed or authorized under state law to prescribe drugs in the therapeutic class to which molnupiravir belongs (i.e., anti-infectives).

Fact Sheet for Health Care Providers Emergency Use Authorization of Molnupiravir (https://www.fda.gov/media/155054/download)

Oral Antiviral Indications and Dosing

Antiviral Agent	PRE-EXPOSURE PROPHYLAXIS (PREP) for eligible individuals	POST-EXPOSURE PROPHYLAXIS (PEP) for individuals who are not fully vaccinated or immunocompromised, with high risk of progression to severe disease	TREATMENT of Mild to Moderate within 5 days of symptom onset in patients with high risk or progression to severe disease
Paxlovid (Pfizer)	N/A	N/A	**Dose:** **eGFR ≥60 ml/min:** 300mg nirmatrelvir (#2 150mg tablets) with 100mg ritonavir (#1 100mg tablet) ORALLY twice daily for 5 days **eGFR ≥30 to <60 mL:** 150mg nirmatrelvir (#1 150mg tablet) with 100mg ritonavir (#1 100mg tablet) ORALLY twice daily for 5 days **Severe renal impairment (eGFR <30 mL/min):** NOT Recommended **Severe hepatic impairment (Child-Pugh Class C):** NOT recommended
Molnupiravir (Merck)	N/A	N/A	**Dose:** 800mg molnupiravir (#4 200mg tablets) ORALLY twice daily for 5 days (No renal or hepatic dosing restrictions)

Fact Sheet for Health Care Providers Emergency Use Authorization of Paxlovid (https://www.fda.gov/media/155050/download)
Fact Sheet for Health Care Providers Emergency Use Authorization of Molnupiravir (https://www.fda.gov/media/155054/download)

5.   Oral Antiviral Administration: *Prescriber Journey for Prescribing*

Paxlovid Provider Checklist

- ❑ Positive SARS-CoV-2 test
- ❑ Age ≥12 years
- ❑ Weight ≥40 kg
- ❑ High-risk criteria met
- ❑ Symptoms consistent with mild-moderate COVID-19
- ❑ Symptom onset with **5 days***
- ❑ Not hospitalized due to COVID-19
- ❑ If clinically indicated, assess patient renal function
  - eGFR ≥60 mL/min, standard dosing
  - eGFR 30-60 mL/min, dose modification
  - eGFR <30 mL/min, contraindicated
- ❑ If clinically indicated, assess patient hepatic function
  - Child-Pugh Class C, contraindicated
- ❑ Assess patient's home medication list for drug-drug interactions
  - See next slide for more detail

*Prescriber is encouraged to include a note to the pharmacist in the prescription stating: Please fill prescription by _____[insert date]_____. This prescription fill by date is within 5 days from symptom onset and complies with the patient eligibility criteria under the EUA.

Paxlovid Contraindications

Hypersensitivity Reactions

- History of clinically significant hypersensitivity reactions (e.g., TEN, SJS) to its active ingredients (nirmatrelvir or ritonavir) or any other components of the product

Drugs highly dependent on CYP3A4 for clearance and for which elevated concentrations are associated with severe/life-threatening reactions*

- Alpha1-adrenoreceptor antagonists: alfuzosin
- Analgesics: pethidone, piroxicam, propoxyphene
- Antianginal: ranolazine
- Antiarrhythmic: amiodarone, dronedarone, flecainide, propafenone, quinidine
- Anti-gout: colchicine
- Antipsychotics: lurasidone, pimozide, clozapine
- Ergot derivatives: dihydroergotamine, ergotamine, methylergonovine
- HMG-CoA reductase inhibitors: lovastatin, simvastatin
- PDE5 inhibitor: sildenafil (Revatio) when used for PAH
- Sedative/hypnotics: triazolam, oral midazolam

Drugs that are potent CYP3A inducers where significantly reduced nirmatrelvir or ritonavir concentrations are associated with loss of virologic response or resistance*

- Anticancer drugs: apalutamide
- Anticonvulsant:: carbamazepaine, phenobarbital., phenytoin
- Antimycobacterials: rifampin
- Herbal product: St John's Wort (*hypericum perforatum*)

*NOT COMPLETE LIST OF ALL DDI's. ALWAYS USE CLINICAL TOOLS/DDI CHECKER AND USE CLINICAL JUDGMENT   78

Molnupiravir Provider Checklist

❑ Positive SARS-CoV-2 test
❑ Age ≥18 years
❑ Alternate COVID-19 treatment options authorized by FDA are not accessible
❑ High-risk criteria met
❑ Symptoms consistent with mild-moderate COVID-19
❑ Symptom onset with **5 days***
❑ Not hospitalized due to COVID-19
❑ Assessment pregnancy and breastfeeding status (if applicable)
❑ Provide appropriate counseling
  • Females of childbearing potential treated: should use a reliable method of contraception correctly and consistently, as applicable, for the _duration of treatment and for **4 days** after the last dose of molnupiravir_
  • Breastfeeding is not recommended for the _duration of treatment and for **4 days** after the last dose of molnupiravir_
  • Males of reproductive potential treated: if sexually active with females of childbearing potential, should use a reliable method of contraception correctly and consistently _during treatment and for at least **3 months** after the last dose_

*Prescriber is encouraged to include a note to the pharmacist in the prescription stating:
Please fill prescription by _____[insert date]_____. This prescription fill by date is within 5 days from symptom onset and complies with the patient eligibility criteria under the EUA.

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Molnupiravir Prescriber Requirements

All Patients

1. Provide electronic or hard copy of patient fact sheet
2. Document that patient has received an electronic or hard copy of the patient fact sheet
3. Review the information contained within the patient factsheet with the patient and counsel patient on the known and potential benefits and risks of MOV
4. Advise patients on need for contraception use as appropriate
   - Females of childbearing potential treated: should use a reliable method of contraception correctly and consistently, as applicable, for the *duration of treatment and for **4 days** after the last dose of molnupiravir*
   - Breastfeeding is not recommended for the *duration of treatment and for **4 days** after the last dose of molnupiravir*
   - Males of reproductive potential treated: if sexually active with females of childbearing potential, should use a reliable method of contraception correctly and consistently *during treatment and for at least **3 months** after the last dose*
5. The prescribing healthcare provider and/or the provider's designee must report all medication errors and serious adverse events potentially related to molnupiravir within 7 calendar days from the healthcare provider's awareness of the event

Molnupiravir Prescriber Requirements

Individuals of Childbearing Potential

1. Assess whether pregnant or not
   - Report of LMP in an individual who has regular menstrual cycles, uses a reliable method of contraception correctly and consistently or has had a negative pregnancy test
   - Negative pregnancy test (recommended but not required if other criteria are not met)
2. If pregnant:
   - Counsel the patient regarding the known and potential benefits and potential risks of molnupiravir use during pregnancy
   - Document that the patient is aware of the known and potential benefits and potential risks of molnupiravir use during pregnancy
   - Make the individual aware of the pregnancy surveillance program
   - If the pregnant individual agrees to participate in the pregnancy surveillance program and allows the prescribing healthcare provider to disclose patient specific information to Merck, the prescribing healthcare provider must provide the patient's name and contact information to Merck (at 1-877-888-4231 or pregnancyreporting.msd.com)
3. If not pregnant:
   - Make the individual aware of the pregnancy surveillance program and encourage them to participate should they become pregnant
   - Review contraception requirements
4. How and where documentation occurs is at the discretion of the prescribing health care provider and their clinical site.

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Patient Flow for Antiviral Oral Therapies
Scenario 1: Patient arrives at provider visit and medication available onsite

Visit with Provider	Visit Discharge	Post-visit

Confirm documentation of COVID-19 infection via either
- Participant-provided lab report
- Medical record lab report
- Direct communication from a provider or laboratory

Discuss treatment with patient
- Ensure patient meets treatment requirements and understands risks

Prescribe therapy for patient & provide the medication fact sheet
- Document required patient assessment in medical record
- Provide patient education on medication therapy being prescribed.

Pre-treatment steps should be completed via telemedicine as possible (~30 mins)

Medication and Fact Sheet provided to the patient
- Ensure patient is understands medication therapy being provided
- Ensure medication therapy being dispensed complies with federal/state dispensing laws.

Patient to begin prescribed therapy immediately and continue x 5 days

Patient to report any adverse effect to FDA Medwatch
- Patients that present for hospital visit may continue their prescribed antiviral during hospitalization (at discretion of provider).

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Patient Flow for Antiviral Oral Therapies
Scenario 2: Patient arrives at provider visit and medication NOT available onsite

Visit with Provider	Visit Discharge	Post-visit

Confirm documentation of COVID-19 infection via either
- Participant-provided lab report
- Medical record lab report
- Direct communication from a provider or laboratory

Discuss treatment with patient
- Ensure patient meets treatment requirements and understands risks

Prescribe therapy for patient & provide the medication fact sheet
- Document required patient assessment in medical record
- Provide patient education on medication therapy being prescribed.

Determine locations medication is available in local area.

Prescription and Fact Sheet provided to the patient
- Ensure patient is understands medication therapy being prescribed
- Ensure patient is advised where to go pick up the medication therapy

Pharmacy receives patient prescription
- Pharmacy should prioritize the prescription fill and ensure timely turnaround to support same day start for therapy.
- Pharmacist verifies prescription is appropriate for patient. Any concerns are clarified with prescribing provider.

Pharmacy staff dispenses product to the patient
- Patient is counseled on medication therapy and reminded to start immediately.

Patient to begin prescribed therapy immediately and continue x 5 days

Patient to report any adverse effect to FDA Medwatch
- Patients that present for hospital visit may continue their prescribed antiviral during hospitalization (at discretion of provider).

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5. Oral Antiviral Administration: *Pharmacy Journey for Dispensing*

Pharmacy Journey

Pharmacy receives antiviral Rx (either product) for patient

Pharmacist reviews fill-by date to ensure Rx still valid

STOP:
No fill if outside 5-day therapeutic window & contact prescriber

Molnupiravir

Paxlovid

Dispense prescribed product & Molnupiravir EUA Fact Sheet (if not provided by prescriber)

Responsibility of Prescriber to provide EUA Fact Sheet

If pharmacist has question regarding dosing/possible DDI/known contraindication, will need to contact prescriber same day in order to have minimal dispensing delay to patient (time-sensitive nature of drug)

Review patient chart for major drug interactions (if information available)

Review prescribed dosing for any required renal adjustment requirements prior to dispensing

Dispense prescribed product & Paxlovid EUA Fact Sheet (if not provided by prescriber)

Dispense prescribed product per EUA required renal dosing packaging requirements & Paxlovid EUA Fact Sheet (if not provided by prescriber)

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Paxlovid Renal Adjustment Instructions for Pharmacists

STEP 1:
remove one 150mg nirmatrelvir tablet from each dose of blister card (closet to middle)

STEP 2:
affix blister card with one sticker from the provided tear pad to cover the blister cavities

STEP 3:
repeat steps 1 and 2 for every blister card in the carton (total of 5)

STEP 4:
affix one sticker from provided tear pad to cover the pre-printed dosing regimen (new dosing regimen for renal adjustment)
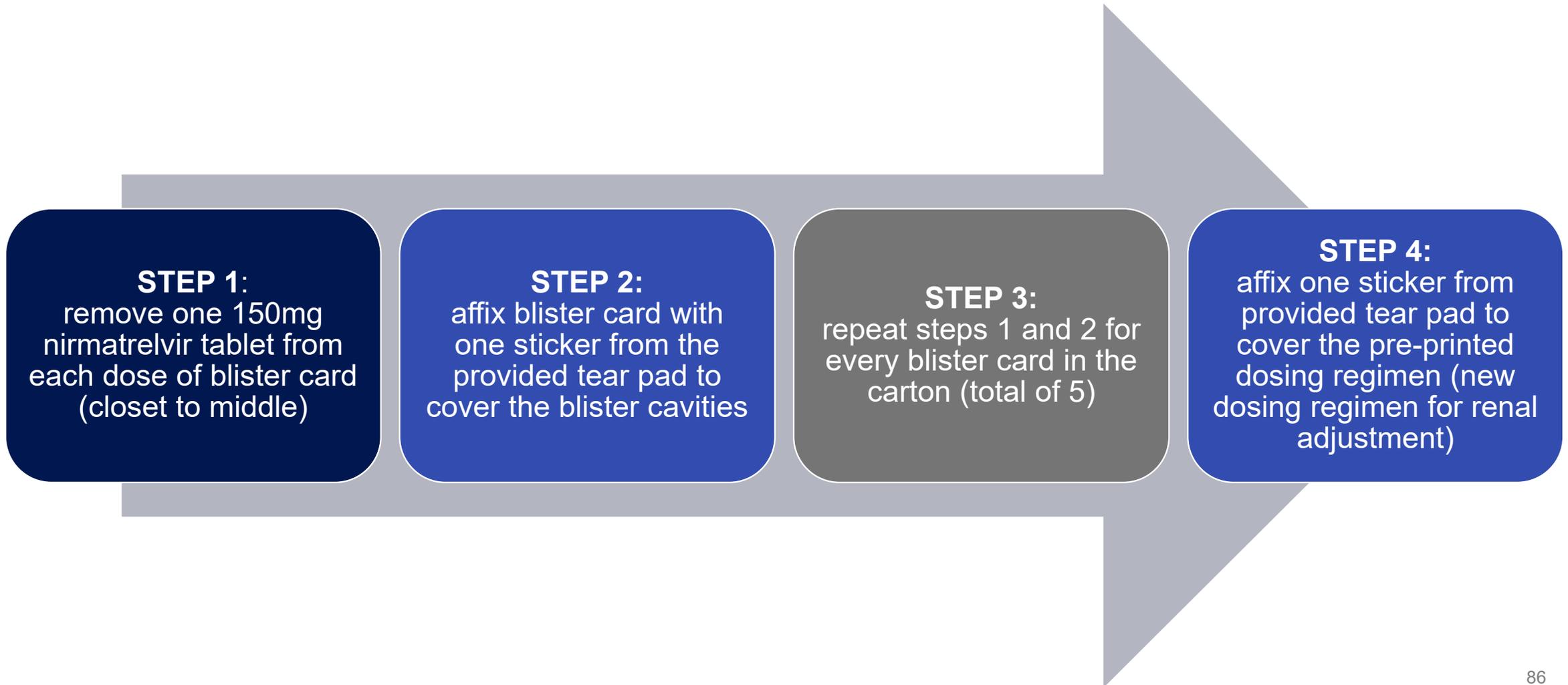
Paxlovid EUA Renal Adjustment Instructions for Pharmacists
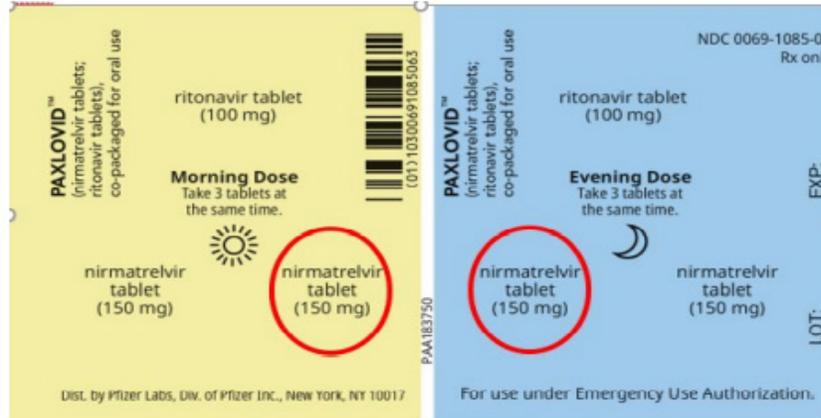
Figure 1: Remove the nirmatrelvir tablets circled in red from the blister card
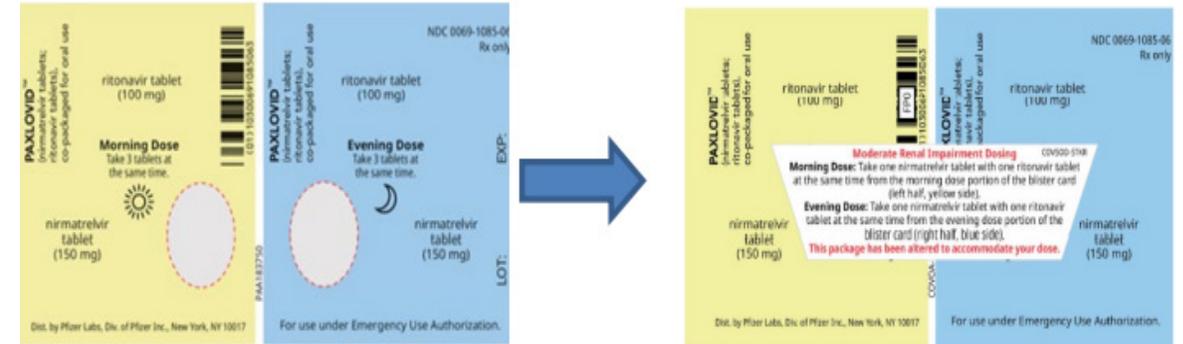
Figure 2: Placement of sticker over empty blister cavities and pre-printed dosing instruction after removal of nirmatrelvir tablets
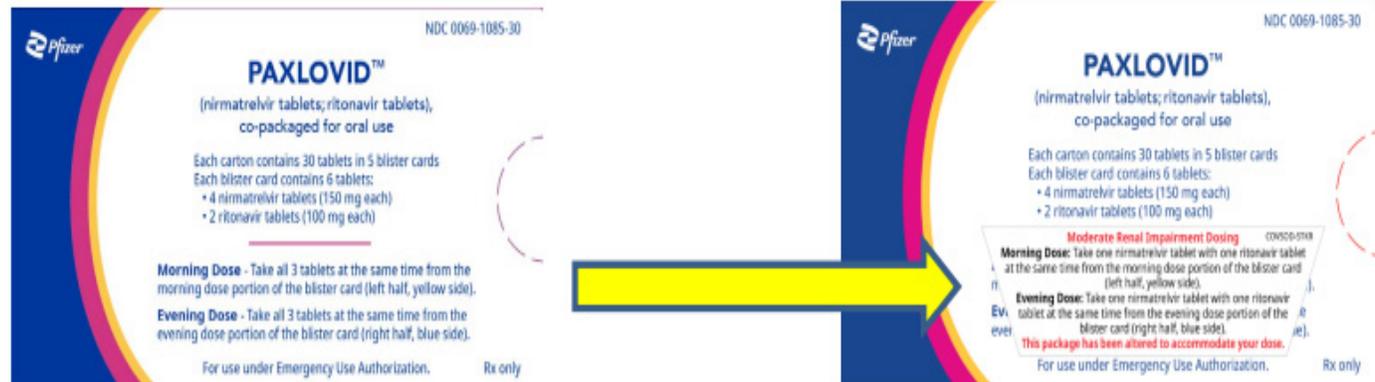
Figure 3: Placement of sticker over pre-printed dosing regimen on carton

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CMS: Coverage of Oral Antiviral Therapies to Treat COVID-19

Medicare

Site of Care[1]		Payable by Medicare	Expected Patient Cost-Sharing
Inpatient Hospital		✓	No patient cost-sharing
Outpatient Hospital or "Hospital without Walls[2]"		✓	No patient cost-sharing
Outpatient Physician Office		✓	No patient cost-sharing[3]
Nursing Home		✓	No patient cost-sharing
Pharmacy		✓	No patient cost-sharing

[1] Services must be furnished within the scope of the product's FDA authorization or approval and within the provider's scope of practice.

[2] Under the Hospital Without Walls initiative, hospitals can provide hospital services in other healthcare facilities and sites that would not otherwise be considered to be part of a healthcare facility; or can set up temporary expansion sites to help address the urgent need to increase capacity to care for patients.

[3] Cost-sharing may apply to Medicare beneficiaries when they receive care from a provider that doesn't participate in Medicare.

Expected Payment to Providers: Key Facts

- CMS will provide a list of pharmacies that have provider agreements with the USG to dispense the drug in compliance with the terms and conditions of authorization. CMS will provide a list of these pharmacies, including National Provider Identifier (NPI), on the Health Plan Management Site as soon as it is available.

- Pay dispensing fees: While certain USG-procured oral antiviral drug(s) will be made available at no cost to pharmacies, the procurement does not include payment of a dispensing fee to pharmacies. CMS encourages Part D sponsors to pay a dispensing fee to pharmacies that submit claims for these drugs. No ingredient cost can be paid on these claims.

- Part D sponsors should not charge enrollee cost sharing on dispensing fees paid to the pharmacies.

- Sponsors should consult NCPDP Emergency Preparedness Guidance for "Billing for Reimbursement of a Free Product (No associated cost) with No Administration Fee" as they prepare to implement these changes.

- For more specific information about Medicare payments to providers for these monoclonal antibody products, please see these Frequently Asked Questions.

Additional information can be found on Permissible Flexibilities Related to Oral Antiviral Drugs for Treatment of COVID-19 that May Receive U.S. Food and Drug Administration Emergency Use Authorization and are Procured by the U.S. Government https://www.cms.gov/files/document/hpms-memo-oral-antiviral-guidance.pdf

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CMS Billing Codes and HRSA Coverage for Uninsured

CMS Codes

- Molnupiravir Product Codes
  NDC numbers: 0006-5055-06, NDC-0006-5055-07

- Paxlovid Product Codes
  NDC number: 0069-1085-06

Continue to check CMS website for most up to date information: www.CMS.gov

HRSA Coverage for Uninsured

HRSA uninsured fund (https://www.hrsa.gov/CovidUninsuredClaim)

Emergency Use Authorization of Molnupiravir (https://www.fda.gov/media/155053/download)
Emergency Use Authorization of Paxlovid (https://www.fda.gov/media/155049/download)

5.   Oral Antiviral Administration: *Patient Journey*

Patient journey | Given need for treatment within 5 days of symptom onset, patient journey timeline should aim for rapid Rx access

Time

Day 0

Goal is __same day__ from test result to receiving Rx

Day X

Day X + ?

Time between infection & test varies

Rapid tests = same day results
Lab tests = 1-2 days

As fast as same day

As fast as same day; Mitigation measures needed to ensure access to same day pickup / delivery

1. Patient infected
2. Patient is tested and receives results of test
3. Patient is evaluated and prescribed treatment
4. Patient receives treatment

Note: If patient unvaccinated (or no booster) at time of oral antiviral treatment, patient may receive a COVID-19 vaccination once isolation/quarantine period completed.[1]

[1] CDC clinical considerations. (https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html#CoV-19-vaccination)

Patient journey | Overview of patient journey for oral antivirals based on testing channel

	1 Patient infected	**2** Patient is tested and receives results of test	**3** Patient is evaluated and prescribed treatment	**4** Patient receives treatment
Common steps across most patient journeys	• Patient infected (with/without symptoms) • Patient decides to get tested (symptoms/exposure)	• Patient tested with either rapid or lab test • Patient receives results	• Patient seeks treatment, makes appt, and is evaluated by provider • Provider issues Rx if patient eligible • Patient educated on Tx options	• Pharmacy/ clinic dispenses Rx to patient

Different channels where test occurs:

Retail Rx site	• Patient may also test due to regular screening	• Patient locates, makes appt, travels to retail pharmacy	• If clinic/prescriber is available at Retail site, potential for patient to seek care on-site	• Patient locates Pharmacy if using one different than retail site • Patient arranges for fulfillment of Rx (delivery or pick up)
Outpatient clinic	• *No variation to common steps*	• Patient locates, may make appt, travels to ER/urgent care/other HCP office	• Patient may see same or different provider for evaluation as they did for testing	• Patient locates Pharmacy or dispensed at point of care • Patient arranges for fulfillment of Rx (delivery or pick up)
Patient's Home	• *No variation to common steps*	• Patient locates then orders/picks up at home test • "At home collection" tests require patient to send sample; "At home self tests" patient conducts test	• *No variation to common steps*	• Patient locates Pharmacy • Patient arranges for fulfillment of Rx (delivery or pick up)
Temp. testing site (e.g., mass testing)	• *No variation to common steps*	• Patient locates, travels to site	• *No variation to common steps*	• Patient locates Pharmacy • Patient arranges for fulfillment of Rx (delivery or pick up)

Non-exhaustive list – many other patient journeys exist

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6. Additional Resources

Oral Antiviral Therapies

[Paxlovid Product Information](https://www.pfizer.com/products/product-detail/paxlovidtm)
https://www.pfizer.com/products/product-detail/paxlovidtm

[Molnupiravir Product Information](https://www.molnupiravir-us.com/)
https://www.molnupiravir-us.com/

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Other Oral Antiviral Resources

Paxlovid

➢ Paxlovid Provider fact sheet https://www.fda.gov/media/155050/download

➢ Paxlovid Patient fact sheet https://www.fda.gov/media/155051/download

➢ Paxlovid Patient fact sheet (Spanish) https://www.fda.gov/media/155075/download

Molnupiravir

➢ Molnupiravir Provider fact sheet https://www.fda.gov/media/155054/download

➢ Molnupiravir Patient fact sheet https://www.fda.gov/media/155055/download

➢ Molnupiravir Patient fact sheet (Spanish) https://www.fda.gov/media/155115/download

Submit adverse event and medication error reports to FDA MedWatch using one of the following methods:
- **Online:** https://www.fda.gov/medwatch/report.htm
- **Complete and submit a postage-paid** FDA Form 3500 **and returning by mail/fax**
- Call 1-800-FDA-1088 to request a reporting form

Centers for Disease Control and Prevention: Healthcare Workers Information on COVID-19
https://www.cdc.gov/coronavirus/2019-nCoV/hcp/index.html

Product-Specific Sites for Monoclonal Antibody Administration

Provides additional detail on administration of etesevimab and bamlanivimab

https://www.covid19.lilly.com/bam-ete/hcp

Provides additional detail on administration of REGEN-COV (casirivimab and imdevimab)

https://www.regencov.com/hcp

Provides additional detail on administration of sotrovimab

https://www.sotrovimab.com

Provides additional detail on administration of Evusheld (tixagevimab co-packaged with cilgavimab)

https://www.evusheld.com

Helpful Links

- **Federal Monoclonal Antibody Site**
  - https://www.phe.gov/mAbs

- **PHE COVID-19 Toolkit**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/toolkit.aspx

- **CMS Hospital Without Walls**
  - https://www.cms.gov/newsroom/press-releases/cms-announces-comprehensive-strategy-enhance-hospital-capacity-amid-covid-19- surge

- **CMS Monoclonal Antibody Reimbursement**
  - Coverage of Monoclonal Antibody Products to Treat COVID-19
    - https://www.cms.gov/files/document/covid-infographic-coverage-monoclonal-antibody-products-treat-covid-19.pdf
  - Monoclonal Antibody COVID-19 Infusion: Monoclonal Antibody Products to Treat COVID-19
    - https://www.cms.gov/medicare/covid-19/monoclonal-antibody-covid-19-infusion

- **CDC COVID Data Tracker**
  - https://covid.cdc.gov/covid-data-tracker/#datatracker-home

- **Clinical Trial Information for Patients not Eligible for EUA**
  - Lilly Clinical Trials
    - https://trials.lillytrialguide.com/en-US/
  - Regeneron Clinical Trials
    - https://www.regeneron.com/covid19

Helpful Resources for Clinicians

- **COVID-19 Outpatient Therapies Side-by-Side Overview**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/Side-by-Side-Overview-of-mAbs-Treatment.aspx

- **Patient Prioritization for Outpatient Anti-SARS-CoV-2 Therapies or Preventive Strategies When There Are Logistical or Supply Constraints**
  - https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-patient-prioritization-for-outpatient-therapies/

- **Therapies for High-Risk, Nonhospitalized Patients With Mild to Moderate COVID-19**
  - https://www.covid19treatmentguidelines.nih.gov/therapies/statement-on-therapies-for-high-risk-nonhospitalized-patients/

- **COVID-19 Monoclonal Antibody Eligibility Checklist: Treatment and PEP**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/mAb-eligibility-treatment-and-post-exposure-prophylaxis.aspx

- **COVID-19 Monoclonal Antibody Checklist for Subcutaneous and Intravenous Administration**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/covid19-mAb-checklist-subcutaneous-intravenous-administration.aspx

Helpful Resources for Clinicians continued

- **Subcutaneous Injection Instructions**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Documents/REGEN-COV-SubQ-FactSheet-July2021-508.pdf

- **EMS Template Protocol**
  - https://www.phe.gov/emergency/events/COVID19/therapeutics/Pages/EMS-Template-Protocol-for-COVID19-mAbs-Administration.aspx

- **Guidelines on Vaccination after mAb administration**
  - https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html

Educational Opportunities: Project Echo Sessions on Monoclonal Antibodies

HHS Collaboration with the University of New Mexico Project Echo Program

Recordings of past programs presented by panels of clinical experts

Project Echo Presentation Title	Date	Link
Monoclonal Antibodies - Bamlanivimab	2/9/2020	https://www.youtube.com/watch?v=YKjRgQGl-Nw
Equitable Access- Outpatient Infusion Site	2/16/2020	https://www.youtube.com/watch?v=0ZZixudBeog
Monoclonal Antibodies: OSU experience	12/3/2020	https://www.youtube.com/watch?v=p3Jsr9wasEU
Where are we now? mAb Therapy in Michigan	1/6/2021	https://www.youtube.com/watch?v=CnniyMayiXc
Monoclonal antibodies: A Healthcare system's approach (mAb Treatment at Mass General) • Presentation by Rajesh T. Gandhi, MD • Presentation by Inga T. Lennes MD, MPH.MBA	1/13/2021	https://hsc.unm.edu/echo/_docs/hhs-covid/rajgandhi1.13.21-monoclonalntibodies-.pdf https://hsc.unm.edu/echo/_docs/hhs-covid/1.13.21-hhs-mab-lennes.pdf
Managing infusion reactions Northwell Health Experience	1/27/2021	https://www.youtube.com/watch?v=zaem2mDUvKE
EMS involvement in mAb infusion programs	2/1/2021	https://www.youtube.com/watch?v=CZnCv4ktnmw
Achieving Speed and Scale in FQHCs and Health Systems • Presentation by Corinna Manini, MD • Presentation by Brandon Webb, MD	2/10/2021	https://hsc.unm.edu/echo/_docs/hhs-covid/2.10.21-manini.pdf https://hsc.unm.edu/echo/_docs/hhs-covid/2.10.21-webb.pdf
Regional Approaches to mAb Administration-Operationalizing Partnerships	2/17/2021	https://www.youtube.com/watch?v=h-ewtgAO1gI
Equity and Underserved Populations	2/24/2021	https://www.youtube.com/watch?v=IGeh2h5SlmQ
Clinical trials update and Patient/Provider Outreach	3/3/2021	https://www.youtube.com/watch?v=7AHSUqC5tWc
Partnering with Urgent Care Centers to Increase Access and Utilization of COVID mAbs: NYC Health	3/10/2021	https://www.youtube.com/watch?v=tDTVZy7FDe4
Where We're Headed: Variants and COVID-19 Therapy	3/24/2021	https://www.youtube.com/watch?v=edPa0zLmerM
Real world effectiveness and implementation of COVID-19 monoclonal antibodies	4/22/2021	https://www.youtube.com/watch?v=s2ktRGL4uJ4

For information on upcoming sessions visit: HHS ASPR Clinical Rounds

Questions?
https://phe.gov/mAbs
Email: covid19therapeutics@hhs.gov

Thank you!

NVSS Vital Statistics Rapid Release

Provisional Life Expectancy Estimates for 2020

Elizabeth Arias, Ph.D., Betzaida Tejada-Vera, M.S., Farida Ahmad, M.P.H., and
Kenneth D. Kochanek, M.A.

Introduction

The National Center for Health Statistics (NCHS) collects and disseminates the nation's official vital statistics through the National Vital Statistics System (NVSS). NCHS uses provisional vital statistics data for conducting public health surveillance and final data for producing annual national natality and mortality statistics. NCHS publishes annual and decennial national life tables based on final vital statistics. To assess the effects on life expectancy of excess mortality observed during 2020, NCHS published provisional life expectancy estimates for the months January through June, 2020 in February 2021 (1). This report presents updated estimates of life expectancy based on provisional mortality data for the full year, January through December, 2020. Provisional data are early estimates based on death certificates received, processed, and coded, but not finalized, by NCHS. These estimates are considered provisional because death certificate information may later be revised, and additional death certificates may be received until approximately 6 months after the end of the year.

This report presents life expectancy estimates calculated using abridged period life tables based on provisional death counts for 2020, by sex, for the total, Hispanic, non-Hispanic white, and non-Hispanic black populations. Estimates for the American Indian and Alaska Native (AIAN), Asian, and Native Hawaiian and Other Pacific Islander (NHOPI) populations were not produced due to the impact of race and ethnicity misclassification on death certificates for these populations on the precision of life expectancy estimates (2). There are two types of life tables: the cohort (or generation) and the period (or current) life table. The cohort life table presents the mortality experience of a particular birth cohort from the moment of birth through consecutive ages in successive calendar years. The period life table does not represent the mortality experience of an actual birth cohort but rather presents what would happen to a hypothetical cohort if it experienced throughout its entire life the mortality conditions of a particular period. Period life expectancy estimates based on final data for 2019 by sex, Hispanic origin, and race are also provided in this report for purposes of comparison (see Technical Notes and reference 3 for description of methodology). Unlike the previous estimates based on 6 months of data, this full-year report presents contributions of causes of death to the changes in life expectancy using a life table partitioning technique (see Technical Notes).

Keywords: life expectancy • Hispanic origin • race • cause of death • National Vital Statistics System

Data and Methods

Provisional life expectancy estimates were calculated using abridged period life tables based on provisional death counts for 2020 from death records received and processed by NCHS as of May 13, 2021; provisional numbers of births for the same period based on birth records received and processed by NCHS as of April 7, 2021; and, July 1, 2020, monthly postcensal population estimates based on the 2010 decennial census. Provisional mortality rates are typically computed using death data after a 3-month lag following date of death, as completeness and timeliness of provisional death data can vary by many factors, including cause of death, month of the year, and age of the decedent (4,5). Mortality data used in this report include over 99% of the deaths that occurred in 2020, but certain jurisdictions and age groups may be underrepresented for later months (5). Deaths requiring investigation, including infant deaths, deaths from external injuries, and drug overdose deaths may be underestimated (6,7). See Technical Notes for more information about the calculation of the abridged period life tables, 2019 life expectancy estimates by race and Hispanic origin, and life table partitioning by cause of death.

Results

Life expectancy in the United States

The Table summarizes life expectancy by age, Hispanic origin, race, and sex. Life expectancy at birth represents the average number of years a group of infants would live if they were to experience throughout life the age-specific death rates prevailing during a specified period. In 2020, life expectancy at birth for the total U.S. population

Vital Statistics Surveillance Report

Table. Provisional expectation of life, by age, Hispanic origin, race for the non-Hispanic population, and sex: United States, 2020

Age (years)	All races and origins			Hispanic			Non-Hispanic white			Non-Hispanic black		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
0	77.3	74.5	80.2	78.8	75.3	82.4	77.6	75.0	80.2	71.8	68.0	75.7
1	76.7	73.9	79.6	78.2	74.7	81.8	76.9	74.3	79.5	71.6	67.8	75.4
5	72.8	70.0	75.6	74.2	70.8	77.8	73.0	70.4	75.6	67.7	63.9	71.5
10	67.8	65.0	70.7	69.3	65.8	72.8	68.0	65.5	70.6	62.8	59.0	66.6
15	62.9	60.1	65.7	64.3	60.9	67.9	63.0	60.5	65.6	57.9	54.1	61.7
20	58.0	55.3	60.8	59.5	56.1	63.0	58.2	55.7	60.7	53.2	49.6	56.8
25	53.3	50.8	56.0	54.7	51.5	58.1	53.4	51.1	55.9	48.8	45.3	52.1
30	48.7	46.2	51.2	50.1	46.9	53.3	48.8	46.5	51.1	44.3	41.0	47.4
35	44.1	41.8	46.5	45.4	42.4	48.5	44.2	42.1	46.4	39.9	36.8	42.8
40	39.6	37.4	41.8	40.8	37.9	43.7	39.7	37.6	41.7	35.6	32.6	38.3
45	35.1	33.0	37.2	36.2	33.5	39.0	35.2	33.3	37.1	31.3	28.6	33.9
50	30.7	28.7	32.7	31.8	29.2	34.4	30.8	29.0	32.6	27.3	24.6	29.6
55	26.5	24.7	28.3	27.6	25.1	29.9	26.6	24.9	28.2	23.4	21.0	25.6
60	22.6	20.9	24.1	23.6	21.3	25.7	22.6	21.1	24.0	19.8	17.6	21.7
65	18.8	17.4	20.1	19.8	17.8	21.6	18.8	17.5	20.0	16.6	14.7	18.2
70	15.3	14.1	16.3	16.4	14.7	17.8	15.2	14.1	16.1	13.7	12.1	15.0
75	12.0	11.1	12.8	13.2	11.8	14.2	11.8	10.9	12.5	11.1	9.8	11.9
80	9.1	8.4	9.6	10.4	9.3	11.1	8.8	8.2	9.3	8.7	7.8	9.3
85	6.7	6.2	7.0	8.1	7.3	8.6	6.4	5.9	6.6	6.7	6.1	7.0

NOTES: Life tables by Hispanic origin are based on death rates that have been adjusted for race and ethnicity misclassification on death certificates. Updated classification ratios were applied; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality, 2020.

was 77.3 years, declining by 1.5 years from 78.8 in 2019 (8). Life expectancy at birth for males was 74.5 years in 2020, representing a decline of 1.8 years from 76.3 years in 2019. For females, life expectancy declined to 80.2 years, decreasing 1.2 years from 81.4 years in 2019 (Figure 1).

The difference in life expectancy between the sexes was 5.7 years in 2020, increasing from 5.1 in 2019. Between 2000 and 2010, the difference in life expectancy between the sexes narrowed from 5.2 years to a low of 4.8 years and then gradually increased to 5.1 in 2019 (Figure 1).

Life expectancy by Hispanic origin and race

Between 2019 and 2020, life expectancy decreased by 3.0 years for the Hispanic population (81.8 to 78.8) (Figure 2). It decreased by 2.9 years for the non-Hispanic black population (74.7 to 71.8) and by 1.2 years for the non-Hispanic white population (78.8 to 77.6). In 2020, the Hispanic population had a life expectancy advantage of 1.2 years over the non-Hispanic white population, declining from an advantage of 3.0 years in 2019 (Figure 3). The Hispanic advantage relative to the non-Hispanic black population decreased from 7.1 to 7.0 years between 2019 and 2020. The non-Hispanic white life expectancy advantage relative to the non-Hispanic black population increased from 4.1 to 5.8 years between 2019 and 2020.

Among the six Hispanic origin -race-sex groups (Figure 4), the decrease in life expectancy between 2019 and 2020 was greatest for Hispanic males, whose life expectancy declined by 3.7 years (79.0 to 75.3), followed by non-Hispanic black males with a decline of 3.3 years (71.3 to 68.0), non-Hispanic black females with a decline of 2.4 years (78.1 to 75.7),

Figure 1. Life expectancy at birth, by sex: United States, 2000–2020

NOTES: Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

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Figure 2. Life expectancy at birth, by Hispanic origin and race: United States, 2019 and 2020
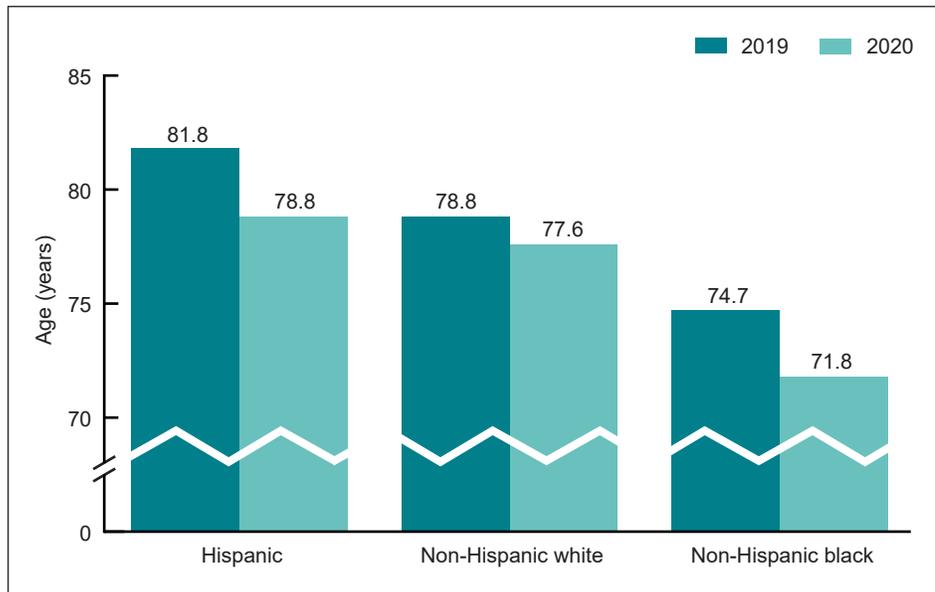
NOTES: Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

Hispanic females with a decline of 2.0 years (84.4 to 82.4), non-Hispanic white males with a decline of 1.3 years (76.3 to 75.0), and non-Hispanic white females with a decline of 1.1 years (81.3 to 80.2).

Effect on life expectancy of changes in cause-specific mortality

Increases or decreases in life expectancy represent the sum of positive and negative contributions of cause-specific death rates. Declines in cause-specific mortality contribute to increases in life expectancy while increases in cause-specific mortality contribute to decreases in life expectancy. If the negative contributions (i.e., increases in cause-specific death rates) are greater than the positive contributions (i.e., decreases in cause-specific deaths rates) then the result is a decline in life expectancy. If negative and positive contributions offset each other, then the result would be no change in life expectancy (see Technical Notes for a description of the partitioning method).

The decline of 1.5 years in life expectancy between 2019 and 2020 was primarily due to increases in mortality due to COVID-19 (73.8% of the negative

contribution), unintentional injuries (11.2%), homicide (3.1%), diabetes (2.5%), and Chronic liver disease and cirrhosis (2.3%) (Figure 5). The decline in life expectancy would have been even greater were it not for the offsetting effects of decreases in mortality due to cancer (45.2%), Chronic lower respiratory diseases (CLRD) (20.8%), heart disease (5.0%), suicide (4.6%), and

Certain conditions originating in the perinatal period (4.0%).

For the male population, the 1.8 year decline in life expectancy was mostly due to increases in mortality due to COVID-19 (68.7%), unintentional injuries (14.0%), homicide (4.4%), diabetes (2.4%), and Chronic liver disease and cirrhosis (2.3%). The decline in life expectancy was offset by decreases in mortality due to cancer (51.7%), CLRD (17.5%), Influenza and pneumonia (5.3%), Alzheimer disease (4.7%), and suicide (4.6%).

For females, the decline in life expectancy of 1.2 years was primarily due to increases in mortality due to COVID-19 (79.8%), unintentional injuries (6.8%), diabetes (2.7%), Chronic liver disease and cirrhosis (2.3%), and homicide (1.0%). These effects were offset by decreases in mortality due to cancer (34.7%), CLRD (21.2%), heart disease (16.3%), suicide (4.1%), and stroke (3.7%).

The Hispanic population experienced the largest decline in life expectancy between 2019 and 2020 (3.0 years). This decrease was primarily due to increases in mortality due to COVID-19 (90.0%), unintentional injuries (4.2%), diabetes

Figure 3. Differences between groups in life expectancy at birth: United States, 2019 and 2020
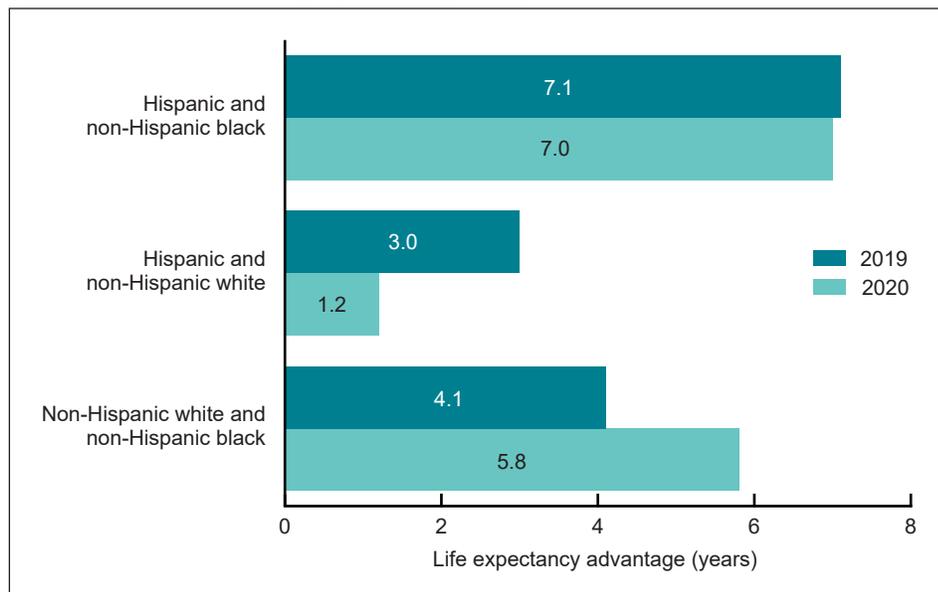
NOTES: Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

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Figure 4. Change in life expectancy at birth, by Hispanic origin and race and sex: United States, 2019–2020
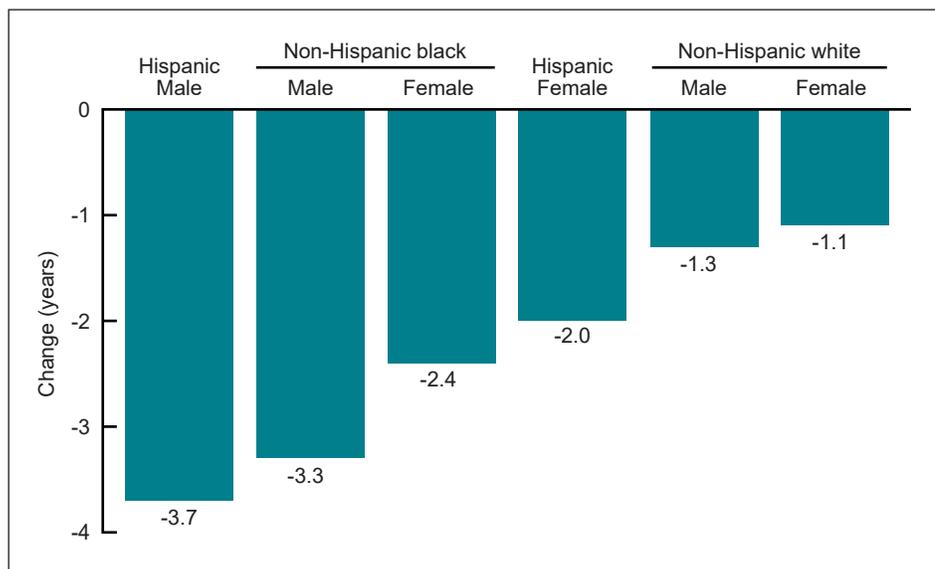
NOTES: Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

(1.8%), homicide (1.0%), and Chronic liver disease and cirrhosis (0.9%) (Figure 6). The decline in life expectancy would have been greater were it not for the offsetting effects of decreases in mortality due to cancer (38.2%), heart disease (14.1%), stroke (9.7%), CLRD (9.1%), and Alzheimer disease (8.4%).

The second greatest decline in life expectancy was experienced by the non-Hispanic black population (2.9 years). The decline was due primarily to increases in mortality due to COVID-19 (59.3%), unintentional injuries (11.9%), homicide (7.7%), heart disease (5.9%), and diabetes (3.6%). The decrease in life expectancy was offset by decreases in mortality due to cancer (68.0%); Certain conditions originating in the perinatal period (11.3%); Congenital malformations, deformations and chromosomal abnormalities (4.4%); Aortic aneurysm and dissection (2.5%); and Pneumonitis due to solids and liquids (2.2%).

The non-Hispanic white population experienced the smallest decline in life expectancy (1.2 years), primarily due to increases in mortality due to COVID-19 (67.9%), unintentional injuries (14.2%), Chronic liver disease and cirrhosis (3.3%), diabetes (2.2%), and homicide

(1.2%). The negative effects of these causes were offset by decreases in mortality due to cancer (40.1%), CLRD (28.2%), suicide (11.8%), kidney disease (4.4%), and Pneumonitis due to solids and liquids (2.8%).

Discussion and Conclusions

U.S. life expectancy at birth for 2020, based on nearly final data, was 77.3 years, the lowest it has been since 2003. Male life expectancy (74.5) also declined to a level not seen since 2003, while female life expectancy (80.2) returned to the lowest level since 2005. The Hispanic population experienced the largest decline in life expectancy between 2019 and 2020, from 81.8 to 78.8 years, reaching a level lower than what it was in 2006 (80.3 years), the first year for which life expectancy estimates by Hispanic origin were produced (9). The non-Hispanic black population experienced the second largest decline in life expectancy (from 74.7 to 71.8) and was the lowest estimate seen since 2000 for the black population (regardless of Hispanic origin). Life expectancy for the non-Hispanic white population declined from 78.8 to 77.6 years, a level

last observed in 2002 for the white population (regardless of Hispanic origin).

Racial and ethnic mortality disparities in life expectancy increased in 2020. For example, the non-Hispanic white life expectancy advantage over the non-Hispanic black population increased by 41.5% between 2019 (4.1) and 2020 (5.8). Life expectancy for the black population has consistently been lower than that of the white population, but the gap had been narrowing during the past three decades, from 7.1 years in 1993 to 4.1 years in 2019 (10). The last time the gap in life expectancy between the white and black populations was this large was in 1999 (10).

Conversely, the gap between the Hispanic and non-Hispanic white populations decreased by 60% between 2019 (3.0) and 2020 (1.2). The Hispanic population lost more than one-half of the mortality advantage it had experienced relative to the non-Hispanic white population. Rather than a positive outcome, the narrowing of the life expectancy gap between the two populations is a stark indicator of worsening health and mortality outcomes for a population that paradoxically has been, prior to the COVID-19 pandemic, able to defy expectations consistent with its disadvantaged socioeconomic profile (2,9,11).

Mortality due to COVID-19 had, by far, the single greatest effect on the decline in life expectancy at birth between 2019 and 2020, overall, among men and women, and for the three race and Hispanic-origin groups shown in this report. Among the causes contributing negatively to the change in life expectancy, COVID-19 contributed 90% for the Hispanic population, 67.9% for the non-Hispanic white population, and 59.3% for the non-Hispanic black population. Among the other causes of death that negatively contributed to the change in life expectancy, unintentional injuries, homicide, and diabetes affected all three Hispanic origin and race groups. For all three populations, unintentional injuries had the greatest

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Figure 5. Contribution of leading causes of death to the change in life expectancy, by sex and total population: United States, 2019–2020
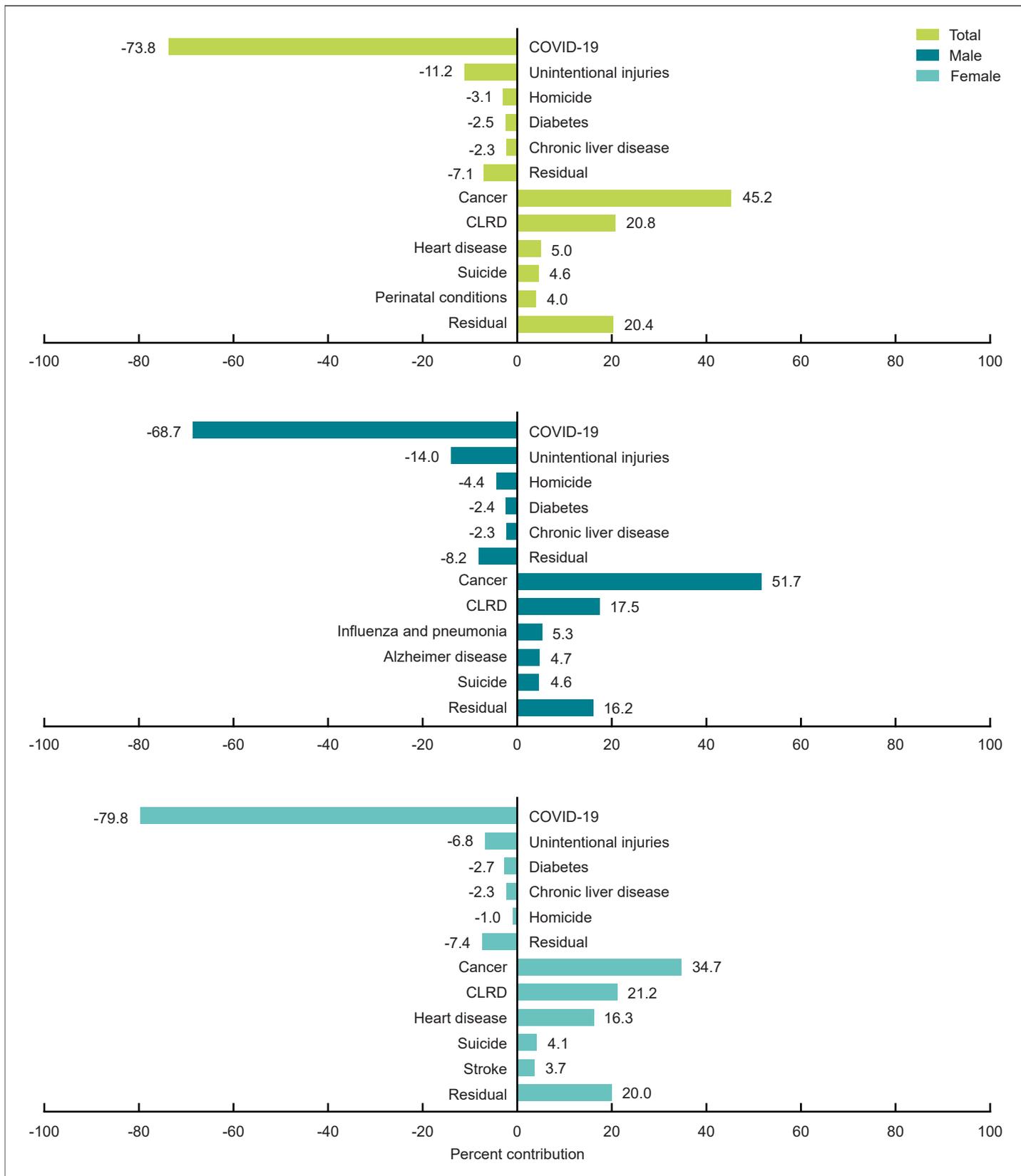
NOTES: CLRD is Chronic lower respiratory diseases. Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

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Figure 6. Contribution of leading causes of death to the change in life expectancy, by Hispanic origin and race: United States, 2019–2020

NOTES: CLRD is Chronic lower respiratory diseases. Life expectancies for 2019 by Hispanic origin and race are not final estimates; see Technical Notes. Estimates are based on provisional data for 2020. Provisional data are subject to change as additional data are received.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality data.

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effect out of these three causes (14.2%, 11.9%, and 4.2% for the non-Hispanic white, non-Hispanic black, and Hispanic populations, respectively). Increases in unintentional injury deaths in 2020 were largely driven by drug overdose deaths (12).

The life expectancy estimates presented in this report differ in important ways from those based on data for the first half of 2020 (January through June) (1). Life expectancy for the Hispanic population declined an additional 1.1 years from 79.9 years for the first half of 2020 to 78.8 years for the full-year 2020. Life expectancy declined a further 0.4 year for the non-Hispanic white population (78.0 to 77.6) and 0.2 year for the non-Hispanic black population (72.0 to 71.8). As a result, the Hispanic and non-Hispanic black populations switched places. Between 2019 and the first half of 2020, the non-Hispanic black population experienced a decline in life expectancy of 2.7 years, followed by the Hispanic population (1.9 years), and the non-Hispanic white population (0.8 year). Between 2019 and 2020 (full year), the Hispanic population experienced a decline in life expectancy of 3.0 years, followed by the non-Hispanic black (2.9 years), and non-Hispanic white (1.2 years) populations. A likely explanation for these changes may be group differences in the monthly distributions of COVID-19 deaths throughout the year. Indeed, a review of the monthly distribution of COVID-19 deaths revealed notable differences between the three populations. For the non-Hispanic black population, the percentages of COVID-19 deaths were similar across the two halves of the year (49.5% and 50.3%). In contrast, for the Hispanic population, 67.6% of all COVID-19 deaths occurred during the second half of the year. Similarly, for the non-Hispanic white population 70.5% of COVID-19 deaths occurred during the second half of the year.

The provisional mortality data on which the life tables are based have several limitations. First, the timeliness of death certificate data varies by jurisdiction and time. Some

jurisdictions have historically taken longer to submit death certificates because paper records were submitted rather than electronic records, staffing shortages, or other localized issues. More recently, jurisdictions were differently affected by the pandemic. Many jurisdictions increased their frequency of death certificate submissions, while some faced staffing challenges, data processing disruptions, or other issues. Some jurisdictions expanded their use of electronic death registration systems in 2020, which may have affected the timeliness of data submission. The effect of recent changes in timeliness will not be apparent until data are finalized. Another limitation is the variation in timeliness due to age and cause of death. Certain age groups, particularly under 5 years, may be underrepresented (5). Deaths requiring investigation, including infant deaths, deaths due to external injuries, and drug overdose deaths take longer to complete and may be underreported in the 3 to 6 months after the death occurred. Lastly, the timeliness of death certificate data by race or ethnicity has not been studied. Differences in timeliness by these factors may result in underestimation of deaths for specific groups. The underestimation of infant deaths, for example, will have a disproportionate effect on life expectancy at birth given the latter's sensitivity to infant mortality, which is generally higher than mortality at all other ages up to the mid-50s or so.

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Technical Notes

The methodology used to estimate the provisional 2020 life tables (Internet tables I–1 through I–12), on which the life expectancy estimates presented in this report are based, differs from what is used to estimate the annual U.S. national life tables in several ways (3). First, the life tables presented in this report are based on provisional death counts rather than on final death counts. Second, they are based on monthly population estimates rather than on annual mid-year population estimates. Third, they are abridged period life tables closed at ages 85 and over rather than complete period life tables closed at ages 100 and over. The main reason for the differences in methodology is data availability. Final death counts for the year 2020 will be not be available until late in 2021. Similarly, census mid-year population estimates for 2020 are not yet available. The tables are closed at ages 85 and over because Medicare data, used to supplement vital statistics data at older ages, are not yet available. Another difference is the use of provisional birth counts rather than final birth counts and linked birth and infant death data used for life tables by Hispanic origin and race as these data are not yet available. Finally, abridged rather than complete life tables are used to address the effects of small death counts for some Hispanic origin-race-sex-age groups (Internet tables I–1 through I–12).

Standard errors of the two most important functions, the probability of dying and life expectancy (Internet tables I–3 through I–4), are estimated under the assumption that the data are only affected by random error because over 99% of deaths that occurred during the first half of 2020 are included. However, the possibility that certain jurisdictions and age groups may be underrepresented for later months could potentially lead to biases not accounted for by the estimated standard errors. Other possible errors, including age, and Hispanic origin and race misreporting on death certificates are also not considered in the calculation of the variances or standard errors of the life table functions.

The methodology used to estimate the 2019 complete period life tables, from which the 2019 life expectancy estimates in this report are generated, is the same as that used every year to estimate the annual U.S. life tables, with a minor modification (3). The standard 2019 birth and mortality data files were used rather than the 2019 linked birth/infant death data file for the life tables by Hispanic origin and race, because the linked data for 2019 are not yet available. The final 2019 life tables by Hispanic origin and race will be updated once the linked birth and infant death data become available (Internet table I–15).

Data for calculating life table functions

Vital statistics data

Mortality data used to estimate the life tables presented in this report include over 99% of the deaths that occurred in 2020, although certain jurisdictions and age groups may be underrepresented for later months. Death data are typically over 99% complete 3 months after the date of death, but this can vary by jurisdiction, age of the decedent, and the cause of death. Most jurisdictions submit over 90% of death data by 3 months after the date of death, but some jurisdictions may take longer to submit death records. Death data for decedents aged under 5 years are 90% complete 3 months after the date of death, and 95% complete 6 months after the death occurred. Provisional estimates of infant mortality are typically presented with a 9-month lag as infant deaths require additional investigation and take longer to complete. Timeliness also varies by cause of death; with deaths due to external causes taking additional time to investigate and complete death certificates. Provisional estimates for most external causes of death (e.g., falls, suicides, unintentional injuries) are presented with a 6-month lag, while drug overdose deaths are presented with a 9-month lag.

Beginning with the 2018 data year, all 50 states and D.C. reported deaths based on the 2003 revision of the U.S. Standard Certificate of Death for the entire year (3). The revision is based on the 1997 Office of Management and Budget (OMB) standards (3). The 1997 standards allow individuals to report more than one race and increased the race choices from four to five by separating the Asian and Pacific Islander groups. The Hispanic category did not change, remaining consistent with previous reports.

The Hispanic origin and race groups in this report follow the 1997 standards and differ from the race categories used in reports for data years prior to 2018. From 2003 through 2017, not all deaths were reported using the 2003 certificate revision that allowed the reporting of more than one race based on the 1997 OMB race standards (3). During those years, multiple-race data were bridged to the 1977 standard single-race categories. Use of the bridged-race process was discontinued for the reporting of mortality statistics in 2018 when all states collected data on race according to 1997 OMB guidelines for the full data year.

Census population data

The population data used to estimate the life tables shown in this report are July 1, 2020, monthly postcensal population estimates based on the 2010 decennial census and are available from the U.S. Census website at https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-detail.html.

Preliminary adjustment of the data

Adjustments for unknown age

An adjustment is made to account for the small proportion of deaths for which age is not reported on the death certificate. The number of deaths in each age category is adjusted proportionally to account for those with not-stated age. The following factor (F) is used to make the adjustment. F is calculated for the total and for each sex group within a racial and ethnic population for which life tables are constructed:

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$$F = D / D^a$$

where D is the total number of deaths and D^a is the total number of deaths for which age is stated. F is then applied by multiplying it by the number of deaths in each age group.

Adjustment for misclassification of Hispanic origin and race on death certificates

The latest research to evaluate Hispanic origin and race reporting on U.S. death certificates found that the misclassification of Hispanic origin and race on death certificates in the United States accounts for a net underestimate of 3% for total Hispanic deaths, a net underestimate of less than one-half percent for total non-Hispanic black deaths, and no under or overestimate for total non-Hispanic white deaths or for the population racially classified as white or black, irrespective of Hispanic origin (10). These results are based on a comparison of self-reported Hispanic origin and race on Current Population Surveys (CPS) with Hispanic origin and race reported on the death certificates of a sample of decedents in the National Longitudinal Mortality Study (NLMS) who died during the period 1999–2011 (10).

NLMS-linked records are used to estimate sex-age-specific ratios of CPS Hispanic origin and race counts to death certificate counts (2). The CPS to death certificate ratio, or "classification ratio," is the ratio of the weighted count of self-reported race and ethnicity on the CPS to the weighted count of the same racial or ethnic category on the death certificates of the sample of NLMS decedents described above. It can be interpreted as the net difference in assignment of a specific Hispanic origin and race category between the two classification systems and can be used as a correction factor for Hispanic origin and race misclassification (10). The assumption is made that the race and ethnicity reported by a CPS respondent is more reliable than proxy reporting of race and ethnicity by a funeral director who has little personal knowledge of

the decedent. Further, public policy embodied in the 1997 OMB standard mandates that self-identification should be the standard used for the collection and recording of race and ethnicity information (10).

The NLMS-based classification ratios discussed above are used to adjust the age-specific number of deaths for ages 1–85 years and over for the total, Hispanic, non-Hispanic white, and non-Hispanic black populations, and by sex for each group, as follows:

$$_nD_x = {_nD_x}^F \bullet {_nCR_x}$$

where ${_nD_x}^F$ is the age-specific number of deaths adjusted for unknown age as described above, $_nCR_x$ are the sex- and age-specific classification ratios used to correct for the misclassification of Hispanic origin and race on death certificates, and $_nD_x$ are the final age-specific counts of death adjusted for age and Hispanic origin and race misclassification.

Because NLMS classification ratios for infant deaths are unreliable due to small sample sizes, corrections for racial and ethnic misclassification of infant deaths are addressed by using infant death counts and live birth counts from the linked birth and infant death data files rather than the traditional birth and death data files (3). In the linked file, each infant death record is linked to its corresponding birth record so that the race and ethnicity of the mother reported on the birth record can be ascribed to the infant death record. Due to the unavailability of birth and infant death data at this time, the traditional birth and death data files are used instead for both the 2019 and 2020 life tables. Typically, infant mortality rates based on these data are overestimated by approximately 4% for the Hispanic population and 3% for the non-Hispanic black population and underestimated by 2% for the non-Hispanic white population (1).

Calculation of abridged life tables

The abridged life tables were constructed using the methodology developed by Chiang with minor modifications described below (13). The life table columns include:

Age

The age interval between two exact ages, x and $x + n$. The abridged life tables contain 19 age groups (in years): 0–1, 1–5, 5–10, 10–15, …, 80–85, and 85 and over.

Probability of dying, $_nq_x$

The first step in the calculation of an abridged period life table is the estimation of the age-specific probability of dying, $_nq_x$. The probability of dying between two exact ages, x and $x + n$, is defined as:

$$_nq_x = \frac{n_x \bullet {_nM_x}}{1 + (1 - a_x) \bullet n_x \bullet {_nM_x}}$$

where $_nM_x$ is the age-specific period death rate, $\frac{_nD_x}{_nP_x}$, and $_nD_x$ is the age-specific provisional death count, $_nP_x$ is the July 1, 2020, age-specific monthly population estimates based on the 2010 decennial population census population count; n_x is the size in years of the age interval; and a_x is the fraction of life lived by those who died in the age interval.

Number surviving, l_x

The number of persons surviving to the beginning of the age interval from the original 100,000 hypothetical live births is defined as:

$$l_{x+n} = l_x - {_nd_x}$$

where the radix of the table $l_0 = 100,000$.

Number dying, $_nd_x$

The number of persons dying in the hypothetical life table cohort in the age interval x and $x + n$ is defined as:

$$_nd_x = l_x \bullet {_nq_x}$$

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Person-years lived, $_nL_x$

The number of person-years lived by the hypothetical life table cohort within an age interval x and $x + n$ is defined as:

$$_nL_x = n_x \bullet (l_x - {_nd_x}) + a_x \bullet n_x \bullet {_nd_x}$$

where $_\infty L_x$, the person-years lived in the final open-ended age interval, is defined as:

$$_\infty L_x = \frac{l_x}{_\infty M_x}$$

Total number of person-years lived, T_x

The number of person-years that would be lived by the hypothetical life table cohort after the beginning of the age interval x and $x + n$ is defined as:

$$T_x = \sum_{x=0}^{x=x+\infty} {_nL_x}$$

Expectation of life, e_x

The average number of years to be lived by those in the hypothetical life table cohort surviving to age x is defined as:

$$e_x = \frac{T_x}{l_x}$$

Variances and standard errors of the probability of dying and life expectancy

Variances are estimated under the assumption that the mortality data on which the life tables are based are not affected by sampling error and are subject only to random variation. However, although over 99% of deaths that occurred from January through December, 2020 are included, the data may be biased by the possibility that certain jurisdictions and age groups may be underrepresented for later months. These errors as well as those resulting from age and Hispanic origin and race misreporting on death certificates are not considered in the calculation of the variances or standard errors of the life table functions.

The methods used to estimate the variances of $_nq_x$ and e_x are based on Chiang (13) with a minor modification in the estimate of the variance of e_x in the closing age of the life table (14). Based on the assumption that deaths are binomially distributed, Chiang proposed the following equation for the variance of $_nq_x$:

$$Var(_nq_x) = \frac{_nq_x^2(1 - {_nq_x})}{_nD_x}$$

where $_nD_x$ is the age-specific number of deaths.

$$Var(e_x) = \frac{\sum_{x=0}^{x=75-84} l_x^2 \bullet [(1-a_x) \bullet n_x + e_{(x+n)}]^2 \bullet Var(_nq_x)}{l_x^2}$$

and for ages 85 and over:

$$Var(e_{85+}) = \frac{l_{85+}^2}{M_{85+}^4} \bullet Var(M_{85+})$$

Causes of death contributing to changes in life expectancy

To measure changes in mortality, a discrete method, developed by Arriaga (15–17), was used to estimate the contribution of mortality change by causes of death based on changes in life expectancy, which is described as a procedure that "estimates the number of years added to or removed from life expectation because of the decrease or increase (respectively) of the central mortality rates of life tables" (16). With this method one can partition the change in life expectancy over time or between two separate groups of populations. In this report, Arriaga's technique is used to partition by cause-of-death changes in life expectancy at birth in the United States from 2019 to 2020.

The method partitions changes into component additive parts and identifies the causes of death having the greatest influence, positive or negative, on changes in life expectancy based on rankable causes of death (15–17). This is the same method as that used by NCHS annually to analyze changes in life expectancy (18).

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U.S. Department of Health and Human Services • Centers for Disease Control and Prevention • National Center for Health Statistics • National Vital Statistics System

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Vital Statistics Surveillance Report

Suggested citation

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CDC Centers for Disease Control and Prevention

COVID-19

Risk of Severe Illness or Death from COVID-19

Racial and Ethnic Health Disparities

Updated Dec. 10, 2020

Why are some racial and ethnic minority groups disproportionately affected by COVID-19? The following ⌄ links provide specific information about underlying health and social inequities that put many racial and ethnic minority groups at increased risk of getting sick, having more severe illness, and dying from COVID-19.

Some of the many inequities in social determinants of health that may increase risk of severe illness (such as hospitalization, intubation, and death) from COVID-19 include access to quality healthcare, general health status, education, economic stability, and many other factors that affect health risks and outcomes. Because of these and other inequities, people from some racial and ethnic minority groups are less likely to be vaccinated against COVID-19 than non-Hispanic White people. COVID-19 vaccination reduces the risk of COVID-19 and its potentially severe complications. Discrimination, which includes racism, shapes social and economic factors that put people at increased risk of severe COVID-19 illness.[1,2,3,4,5] Unfortunately, discrimination exists in systems meant to protect well-being and health. For example, discrimination within the healthcare system may deter people from seeking or receiving timely testing, vaccination, and treatment for health concerns, including COVID-19.[6]

To explore additional information and data related to COVID-19 health and vaccination disparities, please visit the Health Equity and Vaccine Equity landing pages within the CDC COVID Data Tracker.

Evidence for factors that contribute to risk for severe illness from COVID-19

Severe illness means that the person with COVID-19 requires hospitalization, intensive care, or a ventilator to help them breathe. Severe illness can lead to death. Among adults, the risk of severe illness from COVID-19 increases with age, with older adults at highest risk. Additionally, people of any age, race, ethnicity, and sex with certain underlying medical conditions are at increased risk of severe illness from COVID-19. CDC continues to review the evidence and provide updates about the underlying medical conditions that might increase risk of severe illness from COVID-19. More detailed evidence summaries are also available.

COVID-19 is a new disease. Currently, few studies have examined the social factors that increase risk of severe illness from COVID-19. However, these limited studies have found differences between racial and ethnic groups in the health and social factors that may increase risk of severe illness or death from COVID-19.[7–21] Some of the studies are from the entire United

States; others are from specific cities and communities. These studies consistently identify underlying factors that are associated with increased risk of severe illness from COVID-19. CDC will continue to monitor the latest evidence and provide updated information.
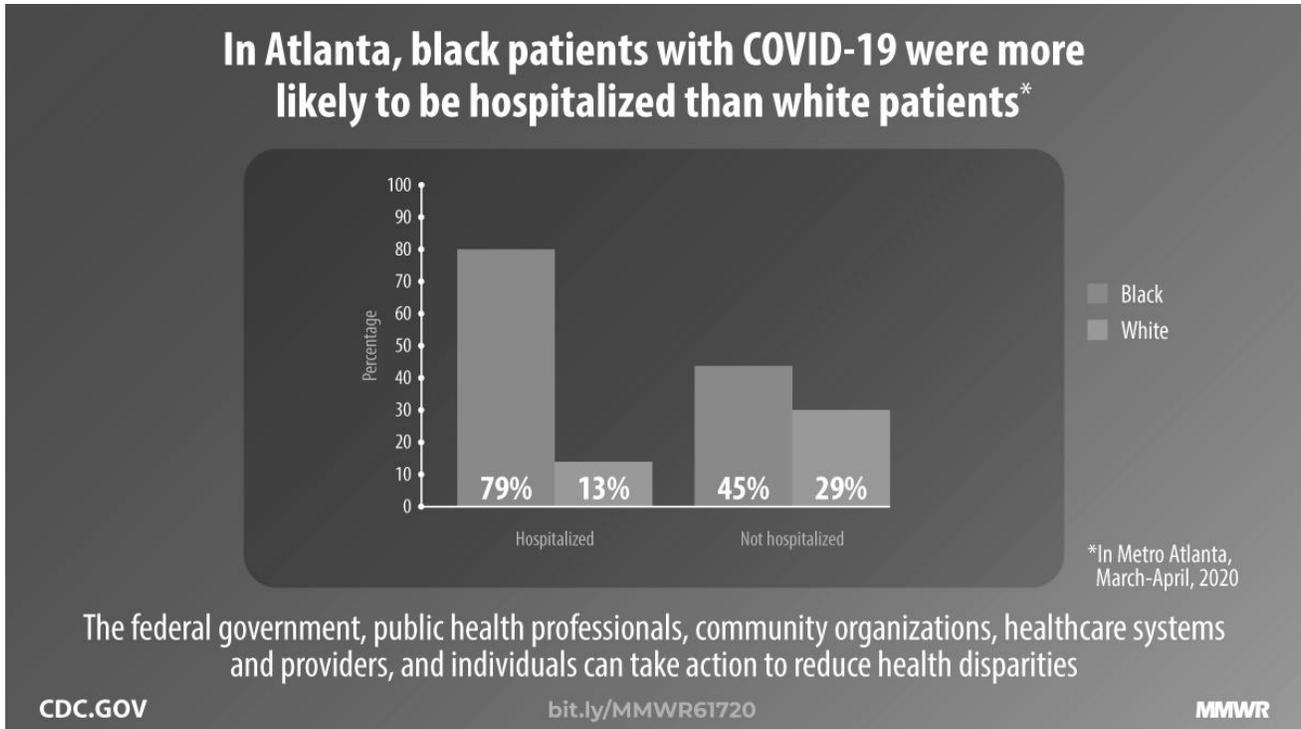
✕ View Larger

Text Description   ⌄

Title:
In Atlanta, black patients with COVID-19 were more likely to be hospitalized than white patients*

Body of Graphic:
Y axis shows Percentage
X axis shows Hospitalized and Not hospitalized
Each racial/ethnic group has two vertical bars, different color—first color is blue for black persons, second color is green for white persons
Hospitalized: 79% black, 13% white
Not hospitalized: 45% black, 29% white

Bottom of graphic:
The federal government, public health professionals, community organizations, healthcare systems and providers, and individuals can take action to reduce health disparities

Footnote:
*In Metro Atlanta, March-April, 2020

Current evidence shows that the following factors are associated with increased risk of severe illness from COVID-19 for racial and ethnic minority groups:

- **Healthcare:** A recent study found that people from racial and ethnic minority groups were more likely to have increased COVID-19 disease severity upon admission at the hospital compared with non-Hispanic White people.[7,8,9,10] Healthcare access can also be limited for these groups by other factors, such as lack of transportation or child care, inability to take

time off work, communication and language barriers, cultural differences between patients and providers, not having a usual source of care, and historical and current discrimination in healthcare systems.[11] Some people from racial and ethnic minority groups may hesitate to seek care because they distrust the government and healthcare systems. This distrust may be due to the roles of the government and healthcare systems in current inequities in treatment [12] and their responsibility for discriminatory, unethical, and abusive historical events. These historical events include the Tuskegee Study, which studied intentionally untreated syphilis in non-Hispanic Black men without their knowledge, and the sterilization of racial and ethnic minority people without their knowledge or permission. [13,14,15,16]

A recent study found that people from racial and ethnic minority groups were more likely to have increased COVID-19 disease severity upon admission at the hospital compared with non-Hispanic White people. More severe disease increased the likelihood that these patients would need intubation, be admitted to the Intensive Care Unit, or die. [17] A separate study found that compared with non-Hispanic White people, non-Hispanic Black people were more likely to be hospitalized and were more likely to be tested for COVID-19 at a hospital than in the ambulatory (outpatient) setting. The researchers noted that the findings suggest non-Hispanic Black people may have delayed seeking care. [18]

- **General health status:** Underlying medical conditions that increase risk for severe illness from COVID-19 may be more common among people from racial and ethnic minority groups.[19] Common underlying conditions among those who require mechanical ventilation or died included diabetes, high blood pressure, obesity, chronic kidney disease on dialysis, and congestive heart failure. [20] It is important to note that many of the same social determinants of health that increase risk of COVID-19 illness also increase the risk of health conditions such as obesity, high blood pressure, and diabetes. These specific social determinants of health include education, economic stability, and physical environment, and healthcare system factors (e.g., insurance coverage, access to care and treatment).

  A study in New York City found that non-Hispanic Black and Hispanic or Latino people had higher obesity rates and higher COVID-19 mortality rates compared with non-Hispanic Asian and non-Hispanic White people. [21] A study in Boston found that among patients hospitalized with COVID-19 at an urban medical center, non-Hispanic Black patients were more likely to have one or more underlying medical conditions than people from other racial or ethnic groups. In another study of patients hospitalized with COVID-19, non-Hispanic Black patients were more likely to have high blood pressure and diabetes compared with all other racial and ethnic groups combined. [22] Another study found that among Black patients hospitalized with COVID-19, those with higher body mass index at arrival to the hospital were more likely to die.[23] Additionally, pregnant people may have an increased risk of severe illness from COVID-19. [24, 25] Given long-standing disparities in maternal health and birth outcomes, [26] it is important to consider how COVID-19 may affect these outcomes for people from racial and ethnic minority groups.

- **Education, income, and wealth gaps:** Inequities in access to high-quality education for people from racial and ethnic minority groups can lead to lower high school completion rates and barriers to college entrance.[27] This may limit future job options and lead to lower paying or less stable jobs. People with lower paying jobs often do not have paid sick leave and cannot afford to miss work, even if they're sick, because they would not be able to pay for essential items like food or other important living needs if their income decreased. Lower income is strongly associated with morbidity and mortality. Compared with non-Hispanic White people, American Indian, non-Hispanic Black, and Hispanic or Latino people have lower household incomes and shorter life expectancies, as well as higher rates of underlying medical conditions that increase risk of severe illness from COVID-19.[28,29]

  As of August 2020, more Hispanic or Latino people (53%) and non-Hispanic Black people (43%) reported that they had lost a job or taken a pay cut because of COVID-19 compared with non-Hispanic White people (38%). More non-Hispanic Black and Hispanic or Latino people, 40% and 43%, respectively, reported that they had to use money from savings or retirement to pay bills since the outbreak began, compared with 29% of non-Hispanic White people. Additionally, 43% of non-Hispanic Black people and 37% of Hispanic or Latino people reported having trouble paying their bills in full compared with non-Hispanic White people (18%). [30]

To reduce the substantial toll COVID-19 has had on individuals and communities, we need to work together to address inequities in the social determinants of health that increase risk of severe illness from COVID-19 for racial and ethnic minority groups. We must also ensure that everyone has fair and just access to COVID-19 vaccination. Learn more about what we can do to move towards health equity and about what CDC is doing to address COVID-19 Vaccine Equity for Racial and Ethnic Minority Groups (cdc.gov).

Related Pages

› COVID-19 Health Equity – Promoting Fair Access to Health

› CDC Social Determinants of Health: Know What Affects Health

› Environmental Public Health Tracking Network – Select "COVID-19" content area for options to view data on several factors related to increased risk of COVID-19

More Information

Robert Wood Johnson Foundation's 2020 County Health Ranking State Reports ⬀

National Association of County and City Health Officials' COVID-19 Resources for Local Health Departments ⬀

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Last Updated Dec. 10, 2020

![CDC Centers for Disease Control and Prevention]

COVID Data Tracker

United States at a Glance   Collapse ▬

| United States | Cases Total | **77,179,255** |
| At a Glance | Last 30 Days | |

| Deaths Total | **910,373** |
| Last 30 Days | |

80.6% of People 5+ with At Least
One Vaccination

Community High
Transmission

| Data Tracker Home | # COVID-19 Weekly Cases and Deaths per 100,0 Population by Age, Race/Ethnicity, and Sex |
| COVID Data Tracker Weekly Review | View Footnotes and Additional Information |

Your Community ✛

Health Equity Data

Pediatric Data

Pregnancy Data

Vaccination Delivery and Coverage ✛

Vaccine Effectiveness and Breakthrough Surveillance ✛

Cases, Deaths, and Testing ✛

Demographic Trends ▬

Trends in Cases and Deaths by Race/Ethnicity, Age, and Sex

Total Cases and Deaths by Race/Ethnicity, Age, and Sex

COVID-19 Weekly Cases per 100,000 Population by Race/Ethnicity, United States
March 01, 2020 - February 12, 2022*

Jurisdiction
US

3/7/2020   2/12/2022

Cases
Sex
Age - All Groups
Pediatric Case Proportions
Race/Ethnicity

Deaths
Sex
Age - All Groups
Race/Ethnicity
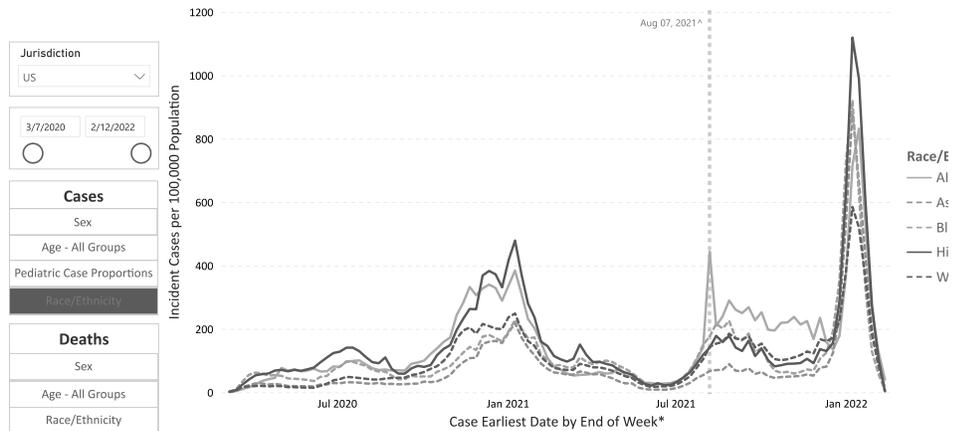
US: The most recent line level case record was reported during the week ending on Feb 12, 2022. Percentage of cases reporting race by date - 63.05%.
US territories are included in case and death counts but not in population counts. Potential six-week delay in case reporting to CDC denoted by gray bars. AI = American Indian, AN = Alaska Native, NH = Non-Hispanic, PI = Pacific Islander. Ex unknown or multiple races. *Case Earliest Date is the earliest of the clinical date (related to illness or specimen collection and chosen by a defined hierarchy) and the Date Received by CDC. The date for the current week extends through Sa
^Case rates during the week ending Aug 07, 2021 are reflective of a data reporting artifact from South Dakota. Surveillance data are provisional, and as additional clinical date data becomes available, the case rates over time are subject to
Last Updated: Feb 11, 2022   Source: CDC COVID-19 Case Line-Level Data, 2019 US Census, HHS Protect; Visualization: Data, Analytics & Visualization Task Force and CDC CPR DEO Situational Awareness Publi

Microsoft Power BI   ‹   4 of 7   ›

Footnotes and Additional Information
Expand each accordion to view footnotes

Footnotes

View and Download COVID-19 Case Surveillance Public Use Data with Geography

Cases and Deaths by Urban/Rural Status and Social Factors

Health Care Settings ✛

Variants and Genomic Surveillance ✛

Antibody Seroprevalence ✛

People at Increased Risk ✛

Multisystem Inflammatory Syndrome in Children (MIS-C)

Wastewater Surveillance

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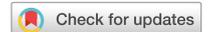
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Racial disparities in COVID-19 outcomes exist despite comparable Elixhauser comorbidity indices between Blacks, Hispanics, Native Americans, and Whites

Fares Qeadan[1]✉, Elizabeth VanSant-Webb[2], Benjamin Tingey[1], Tiana N. Rogers[2], Ellen Brooks[1], Nana A. Mensah[1], Karen M. Winkfield[3,4], Ali I. Saeed[5], Kevin English[6] & Charles R. Rogers[1]

Factors contributing to racial inequities in outcomes from coronavirus disease 2019 (COVID-19) remain poorly understood. We compared by race the risk of 4 COVID-19 health outcomes—maximum length of hospital stay (LOS), invasive ventilation, hospitalization exceeding 24 h, and death—stratified by Elixhauser comorbidity index (ECI) ranking. Outcomes and ECI scores were constructed from retrospective data obtained from the Cerner COVID-19 De-Identified Data cohort. We hypothesized that racial disparities in COVID-19 outcomes would exist despite comparable ECI scores among non-Hispanic (NH) Blacks, Hispanics, American Indians/Alaska Natives (AI/ANs), and NH Whites. Compared with NH Whites, NH Blacks had longer hospital LOS, higher rates of ventilator dependence, and a higher mortality rate; AI/ANs, higher odds of hospitalization for ECI = 0 but lower for ECI ≥ 5, longer LOS for ECI = 0, a higher risk of death across all ECI categories except ECI ≥ 5, and higher odds of ventilator dependence; Hispanics, a lower risk of death across all ECI categories except ECI = 0, lower odds of hospitalization, shorter LOS for ECI ≥ 5, and higher odds of ventilator dependence for ECI = 0 but lower for ECI = 1–4. Our findings contest arguments that higher comorbidity levels explain elevated COVID-19 death rates among NH Blacks and AI/ANs compared with Hispanics and NH Whites.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, has disproportionately affected counties across the United States (US) that have substantially more racially and ethnically diverse populations[1,2]. Total deaths from COVID-19 in the US have eclipsed 540,000 (as of March 24, 2021)[3], with the highest mortality occurring among non-Hispanic (NH) Blacks and American Indians/Alaska Natives (AI/ANs), whose mortality rates are 1.9 and 2.4 times higher, respectively, than those of NH Whites (as of March 12, 2021)[4].

A confluence of social, economic, and biologic factors, together with a higher prevalence of comorbidities in AI/AN, Hispanic/Latino, and NH Black communities, has resulted in a greater COVID-19 burden and worse outcomes among medically underserved and minority populations[2]. According to the Centers for Disease Control and Prevention (CDC), comorbidities such as cardiovascular diseases, cancer, and obesity present some of the strongest and most consistent evidence for risk of hospitalization, intensive care unit admission, need for ventilation, and death due to COVID-19[5]. The higher prevalence of comorbidities experienced by Hispanics/Latinos, NH Blacks, and AI/ANs may account for why these populations are, respectively, 3.1, 2.9, and 3.7 times more likely than NH Whites to be hospitalized for COVID-19[4]. NH Blacks are more likely to require mechanical ventilation[6]. Despite similar median lengths of hospital stay across racial/ethnic groups[7,8], and despite race

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not being associated with an increased risk of in-hospital death from COVID-19[9], minority populations often experience twice the mortality rate of NH Whites[6,10]. While studies of other respiratory infectious diseases such as influenza, specifically H1N1 influenza, have suggested links between race and worse outcomes[11,12], the wide-spread nature of the COVID-19 pandemic also suggests that factors independent of underlying health conditions may be contributing to COVID-19 severity in the US.

The increased burden of comorbidity among NH Blacks[13,14] is hypothesized to be a major contributing factor to adverse COVID-19 outcomes[15,16], including an increased risk of death[17,18]. However, both single-site and multisite studies report that disparities in COVID-19 hospitalizations and deaths among NH Blacks persist after adjustment for comorbid conditions[7,19,20]. We hypothesize that racial disparities in COVID-19 outcomes exist despite comparable Elixhauser comorbidity index (ECI) scores among AI/ANs, NH Blacks, Hispanics/Latinos, and NH Whites.

We used the ECI[21] to further interrogate COVID-19 disparities and objectively ascertain the burden of comorbid conditions on COVID-19 health outcomes. The ECI encompasses 31 diagnoses, including cardiovascular disease, diabetes, liver disease, and pulmonary disease, each weighted by mortality risk. A total ECI score is generated from the sum of individual weights; a higher score indicates a higher burden of comorbidity[21,22]. Studies with sample sizes ranging from 574 to more than 14,000,000 have established the ECI's validity as a prognostic indicator[23,24].

Prior studies using the Charlson[25] and Elixhauser comorbidity indices to account for comorbid conditions in the context of COVID-19 have (1) failed to account for racial disparities[26], (2) used data from single sites or single hospital systems[19,27–29] or (3) failed to capture other relevant COVID-19 health outcomes beyond death and hospitalization (e.g., length of hospital stay[30] [LOS], need for ventilation[31,32]). Our study therefore aimed to evaluate 4 COVID-19 health outcomes stratified by ECI ranking: hospitalizations exceeding 24 h, maximum LOS, ventilation, and death.

Methods

Settings.   We used data from the Cerner COVID-19 De-Identified Data cohort, a subset of the Cerner Real-World Data cohort. Data in Cerner Real-World Data is extracted from the electronic health records (EHRs) of hospitals with which Cerner has a data use agreement and may include pharmacy, clinical and microbiology laboratory, and admission data, as well as billing information from affiliated patient-care locations. All admissions, medication and dispensing orders, laboratory orders and specimens are date and time stamped, providing a temporal relationship between treatment patterns and clinical information. Cerner Corporation has established Health Insurance Portability and Accountability Act (HIPAA)–compliant operating policies to establish de-identification for Cerner Real-World Data[33,34]. EHR data are cleaned, standardized, and person-matched before being completely de-identified per HIPAA standards. Records of patients identified as having an encounter associated with a diagnosis of or a recent (up to 2 weeks prior) positive lab test for COVID-19 between January and June 2020 were included in the COVID-19 data set. To assess possible disease histories, all encounters and additional medical information for this patient cohort are collected, extending as far back as January 1, 2015, where available. A total of 62 health systems across the US contributed records to this data set.

The University of Utah Institutional Review Board (IRB #136696) determined that this study did not meet the definition of human subjects research according to federal regulations because (1) the investigators used secondary data and did not collect data through intervention or interaction with an individual, and (2) no personally identifiable information was captured in the data. The IRB also determined that the study did not meet the US Food and Drug Administration's (FDA's) definition of human subjects research because it did not involve a drug, device, or any other FDA-regulated product. Thus, the IRB waived the requirements for ethical approval and informed consent for this study.

Measurements.   The outcomes of interest involved 4 indications of clinical complications in patients with COVID-19: hospitalization, maximum hospital LOS, invasive ventilator dependence, and death. These indications were constructed from EHR data to reflect a unique risk profile per patient. Additionally, every outcome had to involve a COVID-19 diagnosis or laboratory indication.

We measured maximum LOS by calculating the difference in days between the start and end dates of each patient encounter and taking the maximum difference per patient. Hospitalization was a binary indicator of whether a patient ever had an LOS of 1 day or more. Invasive ventilator dependence was a binary indicator of whether a patient ever had a diagnosis, procedure, encounter, result, or indication signifying reliance on an invasive ventilator. The full list of code types (Current Procedural Terminology [CPT], International Classification of Diseases [ICD], Logical Observation Identifiers Names and Codes [LOINC], and Systematized Nomenclature of Medicine—Clinical Terms [SNOMED CT]) and the corresponding codes used to define invasive ventilator dependence are found in Supplemental Table 1. These codes were kept separate from indications of less-severe ventilator dependence. Death was a binary indicator of whether a patient died at discharge or any time thereafter until the time of data collection. For additional analyses, in-hospital death was obtained and restricted to death at discharge (excluding any later deaths occurring outside of the hospital).

The predictors of interest were race (AI/AN, Asian/Pacific Islander [API], NH Black/African American, White, other/unknown race); ethnicity (Hispanic or Latino); and a comorbidity score derived from the ECI. Like the Charlson comorbidity index (CCI)[18], the ECI measures patient comorbidity by calculating a risk-assessment score based on ICD-10 diagnosis codes. However, the ECI considers more chronic disease indications (with some more relevant to COVID-19 complications) than does the CCI (31 vs. 17)[35] The ECI is weighted using the Agency for Health Care Research and Quality (AHRQ) methodology[36] and scores are grouped into categories of less than 0, 0, 1–4, and 5 or higher[24]. A full list of the diseases involved in the score calculation and the corresponding

ICD-10 codes is found in Supplemental Table 2[37]. Other demographic characteristics included for analysis were sex, insurance status, and 1-digit zip-code region (categorical variables) and age in years (a continuous variable).

Statistical analysis. Overall demographic characteristics were presented for patients in the COVID-19 cohort. Categorical variables were expressed by frequencies and percentages. Because continuous variables were not normally distributed, they were expressed as medians and interquartile ranges (IQRs). These characteristics were also stratified by ECI group to assess significant demographic differences across comorbidity groups. Categorical variables were compared using a chi-square test and nonparametric continuous variables by a Kruskal–Wallis rank sum test. Each outcome was presented across the demographic and clinical characteristics of interest: gender, race/ethnicity, insurance status, and ECI group. Medians (IQRs) were presented for maximum LOS and frequencies (percentages) for hospitalization, invasive ventilator dependence, and death.

To determine the adjusted associations of race/ethnicity and comorbidity with outcomes, multi-level regression models were fit using logistic regression models for hospitalization, invasive ventilator dependence, and death. Because LOS followed a continuous, exponential distribution, an exponential regression model was fit for maximum LOS. Adjusted odds ratios with 95% confidence intervals (CIs) were reported for the logistic model predictors. Adjusted exponentiated coefficients relating to the percentage change in expected maximum LOS with 95% CIs were reported for the exponential model predictors. All models were fit with race/ethnicity and ECI score and adjusted for age, sex, and insurance status. Additionally, models involved a random effect of 1-digit zip-code to account for clustering of results in similar regions. The predictive ability of the models was assessed for both logistic and exponential models. For logistic regression models, an area under the receiver operating characteristic curve (AUC) was calculated to assess the models' ability to correctly classify outcome categories. For the exponential model, the coefficient of determination (R^2) was calculated to estimate the percentage of variation in LOS as explained by the model predictors.

To assess the adjusted impact of race/ethnicity and comorbidity on the hazard of death, a Cox proportional hazards regression model was fit and adjusted for all variables included in the previous models. The outcome involved both time (from hospital admission to hospital discharge) and indication of in-hospital death (dead or alive at discharge).Adjusted hazard ratios (aHRs) and 95% CIs were reported. For all models, diagnostics were performed to ensure optimal model fit.

To further assess differences across comorbidities, sub-analyses were performed by stratifying the cohort by ECI groups (less than 0, 0, 1–4, 5 or higher) and running the same models within each group. Additionally, scatterplot figures were constructed to show the impact of race/ethnicity and comorbidity on the predicted outcomes of clinical complications. Each figure showed the predicted outcome against the ECI score. Smoothed lines were fit amongst the data by generalized additive regression models with shrinkage cubic-regression splines. This was done by fitting different lines for the different racial/ethnic groups. All hypothesis tests were 2-sided with a significance level of 5%. R version 3.6.1 (R Foundation for Statistical Computing, Vienna, Austria) was used for all analyses. In addition, R package "comorbidity" (version 0.5.3) was used to calculate comorbidity scores.

Sample size calculation. Using 80% power, the stratified race/ethnicity distribution by Elixhauser AHRQ-weighted comorbidity group (Table 1), and the risk of COVID-19 complications by race/ethnicity (Table 2), we needed a sample size of at least 3,591 subjects for each ECI category, assuming the most stringent comparison between AI/AN and NH Whites, to achieve a small effect size[38] of OR = 1.68 in a 2-sided examination. This sample size was attainable in our study given that we had a total of 52,411 subjects (8976; 16,177; 4220; and 23,038 for ECI groups less than 0, 0, 1–4, and 5 or higher, respectively), as shown in the data flow chart (Fig. 1).

Results

A total of 52,411 unique patients with a COVID-19 diagnosis or recent positive laboratory result were included in the analysis cohort. The median (IQR) patient age was 53 years (35–68); 50.6% (26,512) were female. Most patients were Hispanic/Latino (18,425; 35.2%), followed by NH White (15,048; 28.7%), NH Black/African American (10,667; 20.4%), NH other or unknown race (5754; 11.0%), API (1447; 2.8%), and AI/AN (1070; 2.0%). Most had private insurance (18,015; 34.4%), followed by Medicare (11,791; 22.5%) or Medicaid (8597; 16.4%) coverage. Most lived in the southeastern US (9867; 18.8%). Forty-four percent of patients (23,038) had an ECI score of 5 or higher; 30.9% (16,177) had an ECI score of 0 (Table 1).

Table 1 also shows patient demographic characteristics stratified by ECI group. Those with higher comorbidity were older and more likely to be male, NH White, and covered by Medicare. Significant differences were observed between all demographic groups when stratified by ECI group (all $p < 0.001$).

Table 2 shows crude risk results for COVID-19-related clinical complications across patient characteristics. Compared with women, men had higher percentages of hospitalization (55.8% vs. 50.2%), a higher median LOS (2.0 vs. 1.0), higher percentages of invasive ventilator dependence (14.2% vs. 9.3%), and higher percentages of death (10.6% vs. 7.4%). NH Whites had the highest outcomes for all clinical complications except invasive ventilator dependence (hospitalization, 65.2%; median LOS, 3.0 days; death, 13.3%). AI/ANs had the highest odds of invasive ventilator dependence (22.1%). Hispanics consistently had the lowest risk of complications across all outcomes. Patients covered by Medicare and those with ECI scores of 5 or higher had the highest risk of complications across all outcomes.

Table 3 shows the association of the adjusted predictors with the 4 clinical complications of hospitalization, maximum LOS, invasive ventilator dependence, and death. (Survival modeling for time to death is presented here; logistic modeling for death is reported in Supplemental Table 3). Older patients and men (compared with women) consistently showed a higher risk of complications for all outcomes. AI/ANs had consistently higher risk of complications for all outcomes than NH Whites, all of which were significant (hospitalization aOR 1.21;

| | | Elixhauser AHRQ-weighted comorbidity group | | | | |
| | | < 0 | 0 | 1–4 | ≥ 5 | |
	Total n (%ᵃ)	n (%ᵃ)	n (%ᵃ)	n (%ᵃ)	n (%ᵃ)	p valueᶠ
Comparison	52,411 (100.00)	8976 (17.1)	16,177 (30.9)	4220 (8.1)	23,038 (44.0)	
Age (Years)ᵇ	53 (35–68)	51 (37–62)	32 (20–47)	46 (28–61)	64 (48–77)	**< 0.001ᵍ**
Gender						**< 0.001**
Female	26,512 (50.6)	4902 (54.6)	8206 (50.7)	2354 (55.8)	11,050 (48.0)	
Male	25,800 (49.2)	4053 (45.2)	7950 (49.1)	1857 (44.0)	11,940 (51.8)	
Otherᶜ	99 (0.2)	21 (0.2)	21 (0.1)	9 (0.2)	48 (0.2)	
Race and ethnicity						**< 0.001**
Non-Hispanic American Indian or Alaska Native	1070 (2.0)	179 (2.0)	503 (3.1)	72 (1.7)	316 (1.4)	
Non-Hispanic Asian or Pacific Islander	1447 (2.8)	208 (2.3)	401 (2.5)	98 (2.3)	740 (3.2)	
Non-Hispanic Black or African American	10,667 (20.4)	2200 (24.5)	2429 (15.0)	954 (22.6)	5084 (22.1)	
Non-Hispanic White	15,048 (28.7)	2141 (23.9)	3197 (19.8)	1156 (27.4)	8554 (37.1)	
Non-Hispanic Otherᵈ	5754 (11.0)	877 (9.8)	2236 (13.8)	381 (9.0)	2260 (9.8)	
Hispanic or Latino	18,425 (35.2)	3371 (37.6)	7411 (45.8)	1559 (36.9)	6084 (26.4)	
Insurance						**< 0.001**
Private	18,015 (34.4)	3678 (41.0)	7129 (44.1)	1687 (40.0)	5521 (24.0)	
Government/misc	1853 (3.5)	312 (3.5)	676 (4.2)	138 (3.3)	727 (3.2)	
Medicaid	8597 (16.4)	1837 (20.5)	2936 (18.1)	782 (18.5)	3042 (13.2)	
Medicare	11,791 (22.5)	1262 (14.1)	929 (5.7)	743 (17.6)	8857 (38.4)	
Self-pay	4906 (9.4)	804 (9.0)	2842 (17.6)	371 (8.8)	889 (3.9)	
Missing	7249 (13.8)	1083 (12.1)	1665 (10.3)	499 (11.8)	4002 (17.4)	
Zip-code regionᵉ						**< 0.001**
0	6210 (11.8)	958 (10.7)	1451 (9.0)	388 (9.2)	3413 (14.8)	
1	5593 (10.7)	1050 (11.7)	1754 (10.8)	437 (10.4)	2352 (10.2)	
2	8139 (15.5)	1468 (16.4)	1893 (11.7)	667 (15.8)	4111 (17.8)	
3	9867 (18.8)	1725 (19.2)	4552 (28.1)	978 (23.2)	2612 (11.3)	
4	2701 (5.2)	546 (6.1)	753 (4.7)	218 (5.2)	1184 (5.1)	
5	337 (0.6)	65 (0.7)	122 (0.8)	33 (0.8)	117 (0.5)	
6	1551 (3.0)	241 (2.7)	491 (3.0)	120 (2.8)	699 (3.0)	
7	3116 (5.9)	522 (5.8)	834 (5.2)	232 (5.5)	1528 (6.6)	
8	3321 (6.3)	477 (5.3)	1156 (7.1)	257 (6.1)	1431 (6.2)	
9	9012 (17.2)	1589 (17.7)	2803 (17.3)	698 (16.5)	3922 (17.0)	
Missing	2564 (4.9)	335 (3.7)	368 (2.3)	192 (4.5)	1669 (7.2)	

Table 1. Demographic and clinical characteristics of COVID-19 infected patients by Elixhauser AHRQ-weighted comorbidity Index and overall. ᵃ% = column percentage. ᵇMedian (Q1–Q3). ᶜOther or unknown. ᵈOther, unknown, or mixed race. ᵉ0 (Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, Rhode Island, Vermont), 1 (Delaware, New York, Pennsylvania), 2 (DC, Maryland, North Carolina, South Carolina, Virginia, West Virginia), 3 (Alabama, Florida, Georgia, Mississippi, Tennessee), 4(Indiana, Kentucky, Michigan, Ohio), 5 (Iowa, Minnesota, Montana, North Dakota, South Dakota, Wisconsin), 6 (Illinois, Kansas, Missouri, Nebraska), 7 (Arkansas, Louisiana, Oklahoma, Texas), 8 (Arizona, Colorado, Idaho, New Mexico, Nevada, Utah, Wyoming), 9 (Alaska, California, Hawaii, Oregon, Washington). ᶠChi-squared test (unless otherwise noted). ᵍKruskall–Wallis rank-sum test. Bold indicates statistical significance at the 5% level (i.e., p value < 0.05).

maximum LOS $e^{\hat{\beta}}$ 1.32; ventilator aOR 3.49; death aHR 2.06). Compared with NH Whites, APIs stayed significantly longer in the hospital (maximum LOS $e^{\hat{\beta}}$ 1.15; 95% CI [1.05, 1.27]) and were significantly more likely to be ventilator dependent (aOR 1.44; 95% CI [1.22, 1.69]).

Compared with NH Whites, NH Blacks/African Americans had significantly longer hospital LOS ($e^{\hat{\beta}}$ 1.13; 95% CI [1.08, 1.19]), and were significantly more likely to be ventilator dependent (aOR 1.31; 95% CI [1.21, 1.43]) or die (aHR 1.22; 95% CI [1.13, 1.32]). Other race groups showed significantly higher associations with ventilator dependence and death compared with NH Whites (ventilator dependence aOR 1.72; death aHR 1.58). Hispanics/Latinos had lower odds of hospitalization (aOR 0.81; 95% CI [0.77, 0.86]), lower LOS (maximum LOS $e^{\hat{\beta}}$: 0.88; 95% CI [0.85, 0.92]), and a lower hazard of death (aHR 0.89; 95% CI [0.82, 0.97]) compared with NH Whites. There was no evidence that Hispanics/Latinos had significantly higher odds of ventilator dependence (aOR: 1.09; 95% CI [1.00, 1.19]). All logistic models were classified with an AUC of 0.86. The exponential model explained 33% of the variation in maximum LOS.

Comparison	Hospitalization n (%[a])	Maximum length of stay (days) Median (IQR: Q1–Q3)	Invasive ventilator dependence n (%[a])	Deceased n (%[a])
Total	27,774 (53.0)	1.6 (0.1–6.5)	6150 (11.7)	4695 (9.0)
Gender				
Female	13,307 (50.2)	1.0 (0.1–5.8)	2472 (9.3)	1962 (7.4)
Male	14,406 (55.8)	2.0 (0.1–7.2)	3664 (14.2)	2723 (10.6)
Other	61 (61.6)	2.4 (0.2–6.7)	14 (14.1)	10 (10.1)
Race and ethnicity				
Non-Hispanic American Indian or Alaska Native	574 (53.6)	1.9 (0.1–7.8)	236 (22.1)	113 (10.6)
Non-Hispanic Asian or Pacific Islander	876 (60.5)	2.7 (0.2–8.3)	220 (15.2)	150 (10.4)
Non-Hispanic Black or African American	6131 (57.5)	2.1 (0.2–7.5)	1383 (13.0)	1072 (10.0)
Non-Hispanic White	9811 (65.2)	3.0 (0.2–7.8)	2020 (13.4)	1998 (13.3)
Non-Hispanic other	2944 (51.2)	1.2 (0.1–6.9)	822 (14.3)	533 (9.3)
Hispanic or Latino	7438 (40.4)	0.2 (0.1–4.1)	1469 (8.0)	829 (4.5)
Insurance				
Private	7067 (39.2)	0.2 (0.1–3.8)	1538 (8.5)	677 (3.8)
Government/miscellaneous	957 (51.6)	1.2 (0.11–6.1)	221 (11.9)	173 (9.3)
Medicaid	4209 (49.0)	0.9 (0.1–5.1)	850 (9.9)	367 (4.3)
Medicare	9442 (80.1)	5.5 (1.9–10.9)	2213 (18.8)	2606 (22.1)
Self-pay	97 (2.0)	0.1 (0.1–0.7)	173 (3.5)	97 (2.0)
Missing	775 (10.7)	3.4 (0.2–8.8)	1155 (15.9)	775 (10.7)
Elixhauser AHRQ-weighted comorbidity group				
< 0	3874 (43.2)	0.3 (0.1–4.0)	440 (4.9)	195 (2.2)
0	3041 (18.8)	0.1 (0.1–0.3)	496 (3.1)	252 (1.6)
1–4	1867 (44.2)	0.3 (0.1–4.3)	313 (7.4)	190 (4.5)
≥ 5	18,992 (82.4)	5.4 (2.0–11.2)	4901 (21.3)	4058 (17.6)

Table 2. Risk of complications from COVID-19 by patient characteristics. [a]Row percentage.
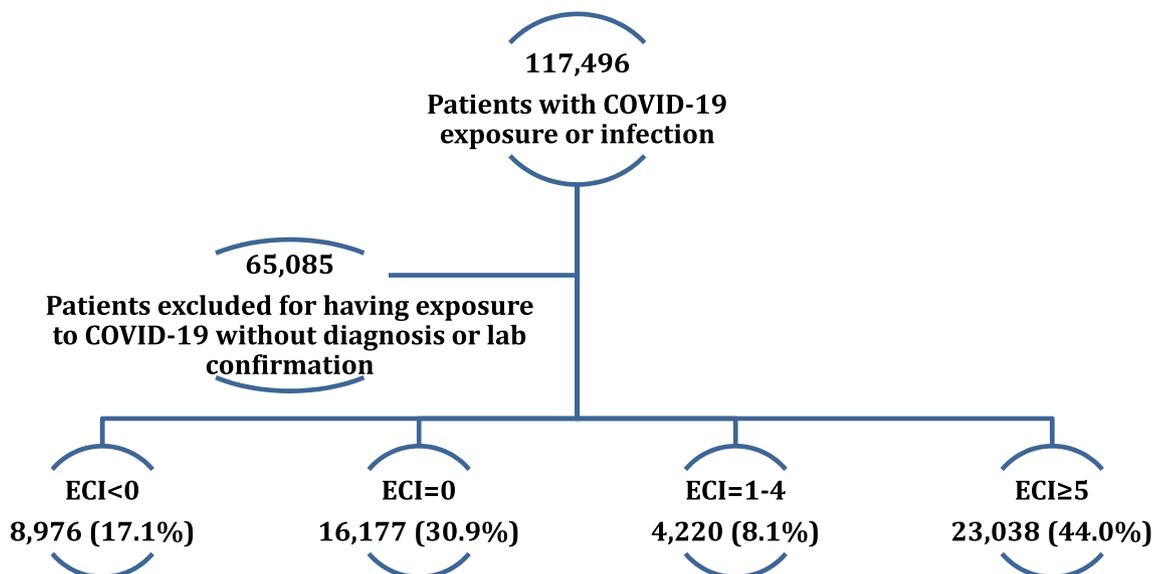
Figure 1. Data flow chart for the study. The final cohort size of 52,411 COVID-19 patients is stratified by ECI group.

Racial disparities with comparable ECI scores.
Stratified analyses (in Supplemental Tables 4, 5, 6, and 7, Figs. 2 and 3, and Supplemental Figs. 1 and 2) showed differences among the outcomes. Although weighted ECI scores were comparable among races, we observed significant disparities in outcomes of COVID-19 complications. Compared with NH Whites, NH Blacks had longer hospital LOS (e^{β}: 1.20; 95% CI [1.01, 1.43] for ECI = 1–4; 1.11; 95% CI [1.04, 1.17 for ECI of 5 or higher); were more likely to be ventilator dependent (aOR:

Variables	Hospitalization aOR[a] (95% CI)	Maximum length of stay e^{β_b} (95% CI)	Invasive ventilator dependence aOR[a] (95% CI)	Deceased aHR[c] (95% CI)
Age (years)[d]	**1.30 (1.28, 1.32)**	**1.30 (1.29, 1.31)**	**1.16 (1.14, 1.18)**	**1.58 (1.55, 1.63)**
Gender				
Female	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Male	**1.23 (1.18, 1.28)**	**1.22 (1.18, 1.26)**	**1.55 (1.46, 1.64)**	**1.40 (1.32, 1.49)**
Other	*1.60 (1.00, 2.57)[f]*	*1.37 (0.96, 1.95)[f]*	1.50 (0.82, 2.75)	1.35 (0.70, 2.60)
Race and ethnicity				
Non-Hispanic White	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Non-Hispanic American Indian or Alaska Native	**1.21 (1.03, 1.43)**	**1.32 (1.16, 1.51)**	**3.49 (2.87, 4.25)**	**2.06 (1.70, 2.50)**
Non-Hispanic Asian or Pacific Islander	1.08 (0.95, 1.23)	**1.15 (1.05, 1.27)**	**1.44 (1.22, 1.69)**	1.12 (0.95, 1.33)
Non-Hispanic Black or African American	1.02 (0.95, 1.08)	**1.13 (1.08, 1.19)**	**1.31 (1.21, 1.43)**	**1.22 (1.13, 1.32)**
Non-Hispanic other	0.99 (0.91, 1.06)	1.06 (1.00, 1.12)	**1.72 (1.56, 1.90)**	**1.58 (1.43, 1.74)**
Hispanic or Latino	**0.81 (0.77, 0.86)**	**0.88 (0.85, 0.92)**	1.09 (1.00, 1.19)	**0.89 (0.82, 0.97)**
Insurance				
Private	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Government/misc	1.09 (0.98, 1.22)	**1.11 (1.02, 1.21)**	0.93 (0.79, 1.09)	**1.51 (1.27, 1.79)**
Medicaid	**1.64 (1.54, 1.74)**	**1.65 (1.58, 1.74)**	**1.11 (1.01, 1.22)**	**1.45 (1.27, 1.65)**
Medicare	**1.51 (1.41, 1.62)**	**1.50 (1.42, 1.58)**	**0.90 (0.82, 0.98)**	**1.34 (1.22, 1.48)**
Self-pay	**0.60 (0.55, 0.65)**	**0.66 (0.62, 0.70)**	**0.47 (0.40, 0.56)**	**1.44 (1.16, 1.80)**
Missing	**1.87 (1.74, 2.01)**	**1.69 (1.60, 1.78)**	**1.32 (1.20, 1.45)**	**1.23 (1.10, 1.37)**
Elixhauser AHRQ weighted comorbidity score[e]	**2.34 (2.28, 2.41)**	**1.78 (1.75, 1.80)**	**1.60 (1.56, 1.63)**	**1.17 (1.15, 1.20)**
AUC	0.86	–	0.86	–
R²	–	0.33	–	–

Table 3. Adjusted associations with hospitalization, maximum length of hospital stay, dependence on invasive ventilator, and death from COVID-19. [a]Adjusted odds ratio from mixed-effect logistic regression model (clustering on one-digit zip-code). [b]Adjusted exponentiated coefficients (mixed-effect exponential regression model clustering on one-digit zip-code) relating to change in the ratio of expected maximum length of hospital stay (i.e., "male" coefficient is the ratio of the expected max LOS for males over expected max LOS for females, so max LOS is 16% greater for males than for females). [c]Adjusted hazard ratios from Cox-Proportional Hazard regression model. [d]Adjusted change in outcome for every 10 year increase in age. [e]Adjusted change in outcome for every 10 point increase in ECI. [f]p values on the boundary of significance: Hospitalization gender other: 0.0503, max LOS gender other: 0.08. Bold indicates statistical significance at the 5% level (i.e., p value < 0.05). Italic indicates p values are on the boundary of statistical significance (i.e.,0.05)

1.85; 95% CI [1.30, 2.64] for ECI = 0; 1.23; 95% CI [1.12, 1.35] for ECI of 5 or higher); and were more likely to die (aOR: 1.47; 95% CI [0.95, 2.27] for ECI = 0; 1.13; 95% CI [1.02, 1.25] for ECI of 5 or higher). Compared with NH Whites, AI/ANs had higher odds of hospitalization for ECI = 0 (aOR: 2.30; 95% CI [1.75, 3.02]) but lower odds of hospitalization for ECI of 5 or higher (aOR: 0.76; 95% CI [0.57, 1.02]); longer hospital LOS for ECI = 0 (e^{β}: 2.75; 95% CI [2.28, 3.32]); a higher risk of death (aOR: 3.34; 95% CI [1.17, 9.56]) for ECI of less than 0; aOR: 5.77; 95% CI [3.07, 10.83] for ECI = 0; aOR: 2.69; 95% CI [0.87, 8.31] for ECI = 1–4); and higher odds of ventilator dependence across all ECI categories. Hispanics had a lower risk of death across all ECI categories except for ECI = 0, lower odds of hospitalization across all ECI categories, shorter hospital LOS for ECI of 5 or higher, and higher odds of ventilator dependence for ECI = 0 but lower odds of ventilator dependence for ECI = 1–4. Compared with NH Whites, patients of NH other or unknown race had longer LOS for all ECI categories except for ECI = 0 (aOR: 0.91; 95% CI [0.83, 0.99]), higher odds of invasive ventilator dependence across all ECI categories, and higher odds of death for ECI = 0 (aOR: 1.81; 95% CI [1.12, 2.91]) and ECI of 5 or higher (aOR: 1.27; 95% CI [1.11, 1.44]).

Discussion

This study answers the question of whether racial disparities in COVID-19 outcomes exist despite comparable ECIs among NH Black, Hispanic, AI/AN, and White patients. To our knowledge, it is one of the largest systematic evaluations in the US of racial and ethnic differences in survival outcomes stratified by ECI score for patients with COVID-19. Our analyses revealed significant racial disparities in health outcomes among COVID-19 patients with comparable ECI scores. In particular, compared with NH Whites, most race groups had higher risk for all outcomes (hospitalization, LOS, ventilation, and death), with greater clinical and statistical significance for AI/ANs and NH Blacks. For example, using adjusted estimates, NH Blacks had longer LOS and higher odds of both
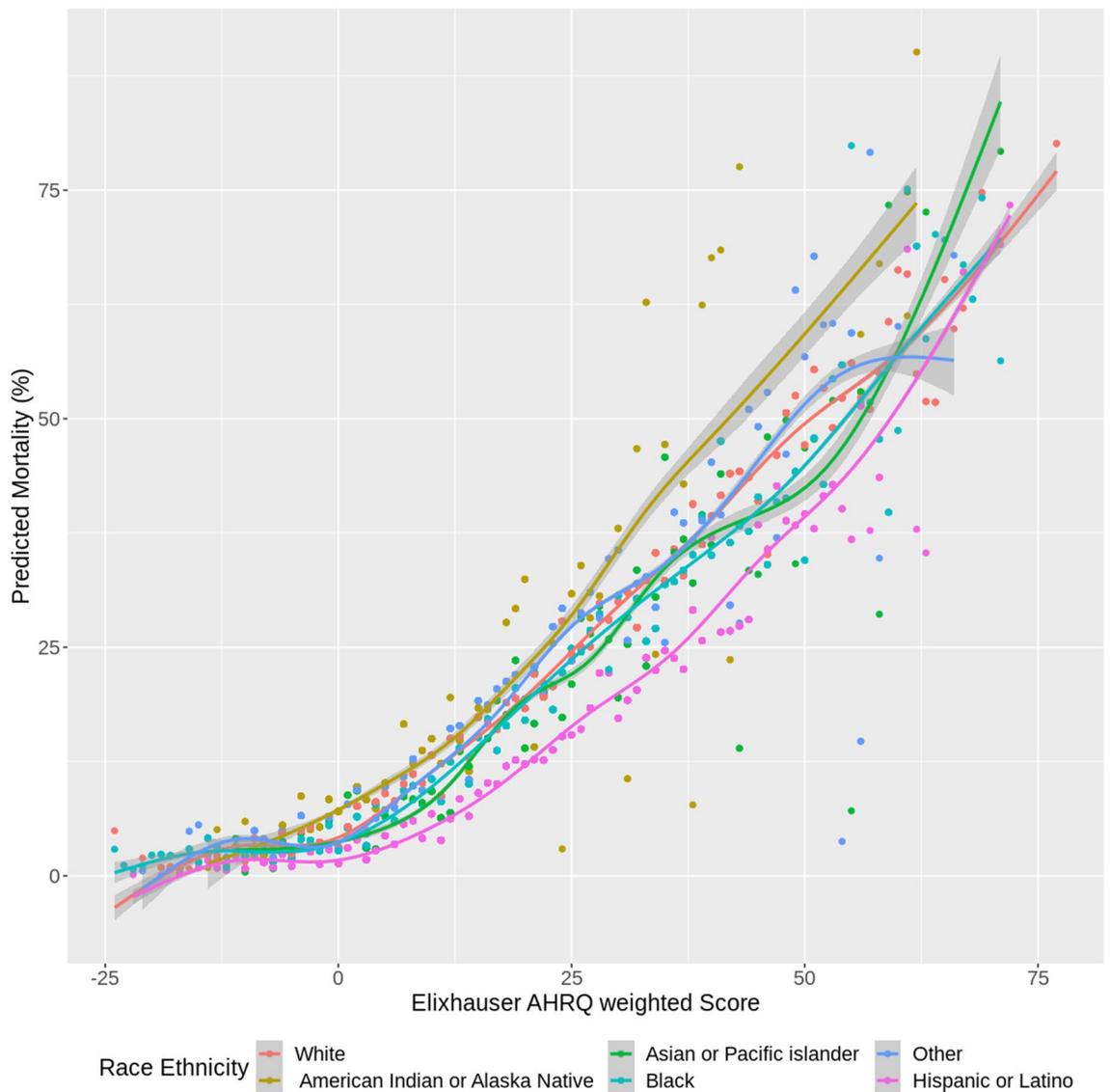
Figure 2. Predicted mortality versus Elixhauser AHRQ weighted score, among COVID-19 infected patients (by race).

ventilator dependence and death compared with NH Whites. NH Blacks and Native Americans were at increased risk for complications and death from COVID-19 compared with NH Whites.

Previous studies suggest that racial disparities in COVID-19 incidence and mortality can be explained by the complex interaction of inequities in social determinants of health, including access to health care[2,39,40], poverty[40,41], systemic racism[2,40], socioeconomic status[2], lack of testing for SARS-CoV-2 infection[39,42], discrimination[2], and virus exposure due to employment in essential-worker occupations[43,44], all of which may be best viewed through a biopsychosocial framework akin to the weathering hypothesis, which posits that cumulative exposure to chronic stress can lead to accelerated aging by inducing physiologic changes that diminish the body's ability to respond appropriately to acute stressors[45]. Preliminary investigations suggest that a higher prevalence of medical comorbidities explains the clinical differences in outcomes among patients with COVID-19[7,17,46–48]. Yet in our analysis of the 4 above-mentioned outcomes stratified by ECI AHRQ-weighted group, we still observed significant racial disparities in COVID-19 complications. Contrary to previous studies[7,17,46,49], our analysis showed that for all races, the probability of hospitalization due to COVID-19 increased in unison with an increasing ECI. Accordingly, our findings contest arguments that NH Black and AI/AN patients are dying from COVID-19 at higher rates than their NH White counterparts because they have more comorbidities.

After adjustment for predictive association with our chief outcomes, our analysis revealed a higher risk for all 4 outcomes (hospitalization, LOS, ventilation, and death) among older patients, men (compared with women), patients with higher ECI scores, and patients covered by Medicare or Medicaid (compared with those covered by private insurance). These findings align with patterns identified in previous studies of cohorts ranging in size from 191 to 11,210[7,46].
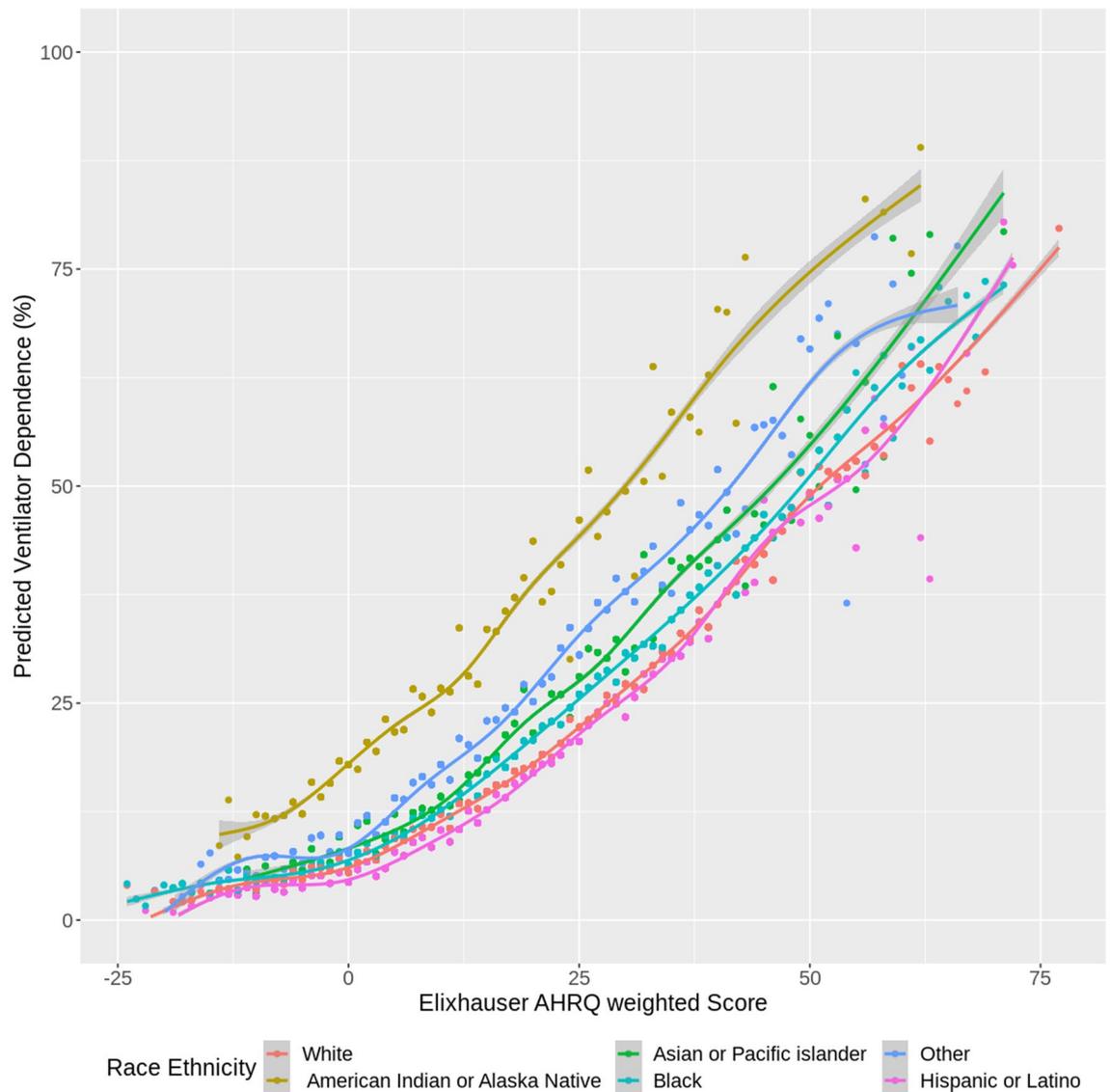
Figure 3. Predicted ventilator dependence versus Elixhauser AHRQ weighted score, among COVID-19 infected patients (by race).

Disaggregation by race and ethnicity of the analysis of all 4 primary outcomes uncovered 3 overarching disparities while controlling for comorbidity. First, we found that APIs, NH Blacks, and patients of NH other or unknown race had a higher risk for all outcomes. This aligns with previous findings on racial disparities for NH Blacks for hospitalization[50], mortality[19], and ventilation[7], and raises questions about the intersection of anti-Asian discrimination and xenophobia with health outcomes for API patients[51]. Secondly, our findings showed that, compared with NH Whites, AI/AN patients had a higher risk of death and higher odds of ventilator dependence but lower odds of hospitalization and a trend toward lower LOS for ECI of 5 or higher. These disproportionalities may be understood by the transfer of patients from Indian Health Service (IHS) facilities to non-IHS facilities, as IHS facilities are commonly ill-equipped to care for AI/AN patients with COVID-19 (e.g., they may lack invasive ventilation equipment)[52]. Third, our analysis showed that, compared with NH Whites, Hispanics/Latinos had a lower risk for death, hospitalization, and LOS, but higher odds of ventilator dependence for ECI = 0. Although these findings contradict epidemiological studies that have found a higher risk of COVID-19–related deaths within Hispanic/Latino communities[53,54], they align with the "Hispanic epidemiological paradox," which suggests that, although the socioeconomic characteristics of Hispanics/Latinos are similar to those of NH Blacks, comorbidity, mortality, and longevity outcomes in this subpopulation mirror or exceed those of NH Whites[55].

Our data clearly show that a higher percentage of older patients were NH White and a higher percentage of younger patients were Hispanic/Latino (Supplemental Fig. 3). Other studies have found that, compared with NH Whites, Hispanic/Latino patients with COVID-19 tend to be younger[56] and that older Hispanic/Latino patients with COVID-19 may have a higher risk for death[57,58]. Recent reports of higher COVID-19 death rates among older Hispanic/Latino populations[57] and higher COVID-19 hospitalization rates among Hispanic/Latino

children[59] may challenge the "Hispanic paradox." To better address the needs of the Hispanic/Latino population, future researchers should employ additional data disaggregation to address this question.

Lastly, our results indicate that older patients and individuals with higher ECI scores had an increased risk of death from COVID-19. Likewise, men compared with women, all races (except Hispanics/Latinos) compared with NH Whites, and patients with all other health insurance types compared with those with private insurance had an increased likelihood of death. These results are supported by recent findings of higher COVID-19 fatality rates among men, older persons, and patients with a disproportionate burden of comorbidities[60,61]. Emerging literature also points to an association of minority status and insurance type with poor COVID-19 outcomes[7]. Our logistic regression findings reveal similar associations with minority status and insurance type for hospitalizations, death, ventilator dependence, and hospital LOS.

This study has potential limitations. Some of the outcomes and predictors were identified by medical record codes (i.e., ICD and LOINC) that are known to limit the specificity of a study. However, we additionally applied a variety of alternative methods, such as text matching, to provide an additional net with which to capture all possible indications in the data. Medical histories were only available going back 5 years on qualifying patients included in the cohort. Our study included only patients who sought treatment for COVID-19. It is important to note that medically underserved and minority populations without insurance may not seek testing and treatment for COVID-19[62], which has implications for both Hispanics/Latinos and NH Blacks, who are 2–3 times more likely to be uninsured compared with their NH White counterparts[63]. In addition, because (1) the data we analyzed included only individuals who had accessed health care services, and (2) post-mortem COVID testing is not routinely done, we may have underestimated the death rate among Hispanics/Latinos. Lastly, social variables that could play a potential confounding role in our study were not captured in the EHR data that we analyzed and thus were not included in the multilevel analyses.

Conclusion
Compared with NH White patients with similar ECI scores, NH Black patients had significantly higher LOS and odds of ventilator dependence and death, while AI/AN patients were more likely to have worse indications across all 4 outcomes analyzed: hospitalization, LOS, ventilation, and death. COVID-19 has laid bare an imperative to investigate its negative health outcomes that may be exacerbated by a complex interplay of social, environmental, and behavioral factors faced by indigenous, Hispanic/Latino, and NH Black communities[31], indicating a need for upstream intervention at patient, community, and policy levels to close the health equity gap.

Data availability
The datasets generated and/or analyzed during the current study are not publicly available due to restrictions by Cerner, the owner of the data. Data may be accessed by signing a data-sharing agreement with Cerner and covering any costs that may be involved.

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Author contributions

Conceptualization, F.Q. and C.R.R.; methodology, F.Q.; formal analysis, B.T.; writing—original draft preparation, F.Q., C.R.R., N.A.M., B.T., E.V.W, T.N.R. and E.B.; writing—review and editing, F.Q., C.R.R., N.A.M., B.T., E.B., E.V.W, T.N.R., K.M.W., A.S., and K.E. All authors read and approved the manuscript.

Competing interests

The authors declare no competing interests.

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Variation in COVID-19 Mortality in the US by Race and Ethnicity and Educational Attainment

Justin M. Feldman, ScD; Mary T. Bassett, MD, MPH

Abstract

IMPORTANCE Racial and ethnic inequities in COVID-19 mortality have been well documented, but little prior research has assessed the combined roles of race and ethnicity and educational attainment.

OBJECTIVE To measure inequality in COVID-19 mortality jointly by race and ethnicity and educational attainment.

DESIGN, SETTING, AND PARTICIPANTS This cross-sectional study analyzed data on COVID-19 mortality from the 50 US states and the District of Columbia for the full calendar year 2020. It included all persons in the United States aged 25 years or older and analyzed them in subgroups jointly stratified by age, sex, race and ethnicity, and educational attainment.

MAIN OUTCOMES AND MEASURES Population-based cumulative mortality rates attributed to COVID-19.F

RESULTS Among 219.1 million adults aged 25 years or older (113.3 million women [51.7%]; mean [SD] age, 51.3 [16.8] years), 376 125 COVID-19 deaths were reported. Age-adjusted cumulative mortality rates per 100 000 ranged from 54.4 (95% CI, 49.8-59.0 per 100 000 population) among Asian women with some college to 699.0 (95% CI, 612.9-785.0 per 100 000 population) among Native Hawaiian and Other Pacific Islander men with a high school degree or less. Racial and ethnic inequalities in COVID-19 mortality rates remained when comparing within educational attainment categories (median rate ratio reduction, 17% [IQR, 0%-25%] for education-stratified estimates vs unstratified, with non-Hispanic White individuals as the reference). If all groups had experienced the same mortality rates as college-educated non-Hispanic White individuals, there would have been 48% fewer COVID-19 deaths among adults aged 25 years or older overall, including 71% fewer deaths among racial and ethnic minority populations and 89% fewer deaths among racial and ethnic minority populations aged 25 to 64 years.

CONCLUSIONS AND RELEVANCE Public health research and practice should attend to the ways in which populations that share socioeconomic characteristics may still experience racial and ethnic inequity in the distribution of risk factors for SARS-CoV-2 exposure and infection fatality rates (eg, housing, occupation, and prior health status). This study suggests that a majority of deaths among racial and ethnic minority populations could have been averted had all groups experienced the same mortality rate as college-educated non-Hispanic White individuals, thus highlighting the importance of eliminating joint racial-socioeconomic health inequities.

Key Points

Question How did COVID-19 mortality rates during 2020 in the United States vary by race and ethnicity in combination with educational attainment?

Findings In this cross-sectional study of 219.1 million adults aged 25 years or older, most racial and ethnic minority populations had higher age-adjusted mortality rates than non-Hispanic White populations, including when comparing within levels of educational attainment. If all racial and ethnic populations had experienced the same mortality rates as college-educated non-Hispanic White populations, 71% fewer deaths among racial and ethnic minority populations would have occurred.

Meaning This study suggests that public health research and practice should attend to the ways in which populations that share socioeconomic characteristics may still experience racial and ethnic inequity in COVID-19 mortality rates.

➕ **Supplemental content**

Author affiliations and article information are listed at the end of this article.

Introduction

Numerous studies have documented racial and ethnic inequities in COVID-19 mortality rates in the United States.[1-3] Racial and ethnic inequalities are large, with cumulative mortality rate ratios (MRRs) exceeding those of other major causes of death.[3] However, to our knowledge, few studies have assessed COVID-19 mortality inequities by race and ethnicity in combination with socioeconomic position, and the data to conduct such analyses on the national level have been unavailable until recently. One US-wide study found roughly equal cumulative mortality rates by race and ethnicity within educational attainment categories, but the data source did not allow for age standardization and, as the authors noted, the results were likely to underestimate racial and ethnic inequities because US White populations have distributions that skew older.[2] That study, along with another analysis of California's Latinx population,[4] found that persons in the lowest socioeconomic position experienced the highest COVID-19 mortality rates within racial and ethnic groups.

Our study uses a recently available public data set on COVID-19 mortality, which permits subgroup analysis by race and ethnicity, educational attainment, age, and sex, and therefore allows for a more complete examination of racialized socioeconomic inequities than previous studies. Our research is informed by prior literature that has illustrated how racialized differences in health are not reducible to inequalities in educational attainment, and involve multiple other pathways (eg, medical discrimination, inequitable treatment by the criminal justice system, and environmental injustice).[5] We assessed 3 hypotheses with our study: (1) racial and ethnic minority populations would experience higher age-adjusted COVID-19 mortality rates than the non-Hispanic White population; (2) within racial and ethnic groups, age-adjusted COVID-19 mortality rates would be highest among those with the lowest educational attainment; and (3) racial and ethnic inequalities in COVID-19 mortality rates would remain when comparing within levels of educational attainment.

Methods

We conducted cross-sectional analyses of cumulative COVID-19 mortality rates for US population aged 25 years or older. Although data on younger individuals were available, we excluded them for 2 reasons. First, there were a small number of deaths among those aged 24 years or younger (n = 714; <0.3% of all deaths). Second, educational attainment may not be a valid indicator of socioeconomic position for this group, as many are too young to have been able to complete schooling. Reflecting this concern, the US Census Bureau's own analyses of education data typically exclude those younger than 25 years of age.[6] This study analyzed solely deidentified, public-use data and was therefore exempt from institutional review board approval. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines for cross-sectional studies.[7]

We quantified racial and ethnic inequity as MRRs, both overall and within educational attainment categories. The analyses were conducted separately for each age-sex subgroup. Finally, we calculated the number of COVID-19 deaths that would have occurred if everyone had experienced the same mortality rate as college-educated non-Hispanic White individuals (the group that theoretically has the most racialized socioeconomic privilege) of the same age and sex. All analyses were based on publicly available US Census and US mortality data.

Data Sources

We analyzed open access COVID-19 mortality data provided by the US Centers for Disease Control and Prevention (CDC).[8] The data set is based on reporting by the 50 states and the District of Columbia for the full calendar year 2020 and reported to CDC by February 24, 2021. This data set represents the most recent available data. The file includes counts of deaths due to COVID-19 stratified by race and ethnicity, age group, sex, and educational attainment (reported as 3 categories: high school or General Educational Development (GED) certification or less; some college, which

includes an associate's degree; or a bachelor's degree or more). We treated educational attainment as a measure of socioeconomic position; other measures such as income, wealth, and occupation were not provided in the data set and are not as readily available on death certificate–based mortality reporting systems.[9] The CDC notes that the data set is provisional because there may be undercounts in later weeks due to reporting lags—however, the data were current as of 8 weeks past December 31, 2020, so the effect of lags should be minimal.

Sociodemographic data are reported on death certificates, typically by the funeral director. Sex was reported as "male" and "female," with no data on whether decedents were nonbinary or transgender. Race and ethnicity were reported as "Hispanic" (Latinx; in combination with any race), as well as non-Hispanic racial groups: non-Hispanic Black, non-Hispanic White, non-Hispanic Asian, non-Hispanic American Indian or Alaska Native, and non-Hispanic Native Hawaiian and Other Pacific Islander. We treated the small proportion of decedents (<0.3%) whose race and ethnicity was categorized as "non-Hispanic more than one race" as missing and excluded them from subsequent analyses. We additionally obtained census microdata from the US Census American Community Survey for the period from 2017 to 2019.[10] We tabulated these data for use as population denominators for all cumulative mortality rate calculations.

Statistical Analysis

We calculated cumulative mortality rates for COVID-19 by race and ethnicity, sex, and educational attainment for the population aged 25 years or older. We conducted analyses for the entire population aged 25 years or older, as well as for the younger (25-64 years) and older (≥65 years) populations. When calculating rates for the overall, younger, and older populations, we applied direct standardization using the *dstdize* command in Stata, version 16 (StataCorp LLC) based on the CDC year 2000 standard population.[11] To compare racial and ethnic inequality within educational attainment categories, we calculated age-adjusted cumulative MRRs comparing COVID-19 death rates for each racial and ethnic group with non-Hispanic White individuals of the same age group, sex, and education group.

In addition, we simulated a counterfactual scenario to estimate the number of deaths that would have occurred had each population group experienced the same cumulative mortality rate as the group that, theoretically, has the most racialized socioeconomic privilege: college-educated non-Hispanic White individuals. We did this by multiplying each stratum's populations size by the mortality rate observed among college-educated non-Hispanic White individuals of the same age and sex.

All 95% CIs for cumulative mortality rates and MRRs reported below assume that mortality rates follow a Poisson distribution and are calculated using standard formulas for directly standardized rates and rate ratios.[12,13] However, the 95% CIs represent uncertainty owing to sampling, but the mortality data represent a finite population (ie, all deaths attributed to COVID-19 in the United States), which are not subject to sampling error. Confidence intervals for MRRs that include the null value of 1.0 should therefore not be interpreted as "no statistically significant difference." We include uncertainty estimates by convention, but focus our interpretations on the point estimates of rates and MRRs.

Results

Among 219.1 million adults aged 25 years or older (113.3 million women [51.7%]; mean [SD] age, 51.3 [16.8] years), 376 125 individuals ages 25 years or older died of COVID-19 during the year 2020 (**Table**). Among these decedents, missingness was less than 2% for educational attainment and less than 1% for race and ethnicity. Age-adjusted cumulative mortality rates for the overall population were highest among persons with the lowest educational attainment (208.1 per 100 000 population [95% CI, 207.3-208.9 per 100 000 population]). Within racial and ethnic groups, mortality rates were highest among American Indian or Alaska Native individuals (334.5 per 100 000 population

[95% CI, 324.2-344.7 per 100 000 population]) and Native Hawaiian and Other Pacific Islander individuals (356.9 per 100 000 population [95% CI, 327.6-386.2 per 100 000 population]) and lowest among non-Hispanic White individuals (116.4 per 100 000 population [95% CI, 115.9-116.8 per 100 000 population]) and non-Hispanic Asian individuals (110.9 per 100 000 population [95% CI, 108.9-112.8 per 100 000 population]) (**Figure 1**). Racial and ethnic minority women of died at higher rates than non-Hispanic White men of the same age group, with the exception of non-Hispanic Asian women.

Age-adjusted cumulative mortality rates per 100 000 population ranged from 54.4 (95% CI, 49.8-59.0 per 100 000 population) among Asian women with some college to 699.0 (95% CI, 612.9-785.0 per 100 000 population) among Native Hawaiian and Other Pacific Islander men with a high school degree or less. Within race-gender groups, the highest age-adjusted cumulative mortality rates were consistently experienced by those with the lowest educational attainment (**Figure 2**). For the population aged 25 years or older, non-Hispanic White men with the least education died at a rate of 199.7 per 100 000 population (95% CI, 198.2-201.3 per 100 000 population), similar to the rates of college-educated non-Hispanic Black men (199.4 per 100 000 population [95% CI, 192.0-206.8 per 100 000 population]), college-educated American Indian or Alaska Native men (196.3 per 100 000 population [95% CI, 166.3-226.3 per 100 000 population]), and college-educated Latino men (198.6 per 100 000 population [95% CI, 190.7-206.5 per 100 000 population]) and lower than that of college-educated Native Hawaiian and Other Pacific Islander men (259.6 per 100 000 population [95% CI, 175.5-343.6 per 100 000 population]).

Nearly all racial and ethnic minority subgroups (54 of 60 age-sex-race-education subgroups, with age strata defined as 25-64 years or ≥65 years) experienced higher mortality (MRR >1.0) than

Table. COVID-19 Cumulative Deaths and Mortality Rates by Select Characteristics (2020)

Characteristic	Deaths, No.	Population, millions	Cumulative mortality rate per 100 000 population (95% CI)	
			Crude	Adjusted for age[a]
Total	376 125	219.1	116.2 (115.7-116.7)	145.9 (145.5-146.4)
Age group, y[b]				
25-39	5023	65.0	7.7 (7.5-7.9)	NA
40-54	21 896	60.5	36.2 (35.7-36.7)	NA
55-64	44 565	41.7	106.9 (105.9. 107.9)	NA
65-74	80 413	30.3	265.4 (263.6-267.2)	NA
≥75	224 228	21.6	1038.1 (1033.8-1042.4)	NA
Missing	0	NA	NA	NA
Sex				
Women	172 124	113.3	151.9 (151.2-152.6)	119.3 (118.7-119.8)
Men	204 715	105.9	193.3 (192.5-194.1)	178.6 (177.8-179.4)
Missing	0	NA	NA	NA
Race and ethnicity[c]				
American Indian or Alaska Native	4474	1.4	322.0 (312.6-331.4)	334.5 (324.2-344.7)
Asian	13 346	13.1	101.8 (100.1-103.5)	110.9 (108.9-112.8)
Black	59 528	26.2	226.9 (225.0-228.7)	237.9 (235.9-239.9)
Hawaiian and Other Pacific Islander	679	0.2	297.1 (274.8-319.5)	356.9 (327.6-386.2)
Latinx or Hispanic	68 577	34.2	200.3 (198.8-201.8)	265.2 (263.1-267.2)
White	227 532	143.9	158.1 (157.4-158.7)	116.4 (115.9-116.8)
Missing[d]	2703	NA	NA	NA
Educational attainment				
≤High school or GED	247 745	85.0	289.8 (290.3-292.6)	208.1 (207.3-208.9)
Some college	61 116	62.9	96.5 (96.4-97.9)	97.1 (96.3-97.9)
≥Bachelor's degree	57 711	71.3	80.5 (80.3-81.6)	89.3 (88.6-90.0)
Missing	10 267	NA	NA	NA

Abbreviations: GED, General Educational Development certification; NA, not applicable.

[a] Age-adjusted rates based on the 2000 standard US population, and numerators include complete cases only.

[b] Age group–specific rates are not further adjusted for age.

[c] Groups other than Latinx or Hispanic are non-Hispanic.

[d] Includes 1124 decedents identified as having more than 1 non-Hispanic race and ethnicity.

COVID-19 Mortality in the US by Race and Ethnicity and Educational Attainment

their non-Hispanic White counterparts (**Figure 3**). The only groups with lower mortality than non-Hispanic White individuals were: older non-Hispanic Asian women of all 3 education levels, younger non-Hispanic Asian women in the lowest education category, older non-Hispanic Asian men in the highest education category, and older Native Hawaiian and Other Pacific Islander men in the highest education category. Although death was relatively rare among younger adults, the MRRs measuring racial and ethnic inequity were highest among this age group, ranging from 0.8 (95% CI, 0.6-0.1) for non-Hispanic Asian women with the least education to 11.1 (95% CI, 6.5-18.9) for Native Hawaiian and Other Pacific Islander men with some college.

Racial and ethnic inequality in mortality for the overall population remained and was slightly attenuated, on average, when comparing within education categories. For the results presented in Figure 3, the median within-education MRR was 17% lower (IQR, 0%-25%) than the MRR for all education categories combined. In some cases, the within-education MRR was larger than the overall MRR. For example, younger non-Hispanic Black women died at 4.2 (95% CI, 3.9-4.5) times the rate of younger non-Hispanic White women. Within education categories, the MRR for younger non-Hispanic Black women (vs younger non-Hispanic White women of the same education level), ranged from 3.2 (95% CI, 2.9-3.5) for those with the lowest education level to 5.4 (95% CI, 4.6-6.4) for those with the highest education level.

In a counterfactual scenario in which all people experienced the same mortality rates as college-educated non-Hispanic White individuals of the same age and sex, the total number of deaths due to COVID-19 would have been 48% lower among adults aged 25 years or older, preventing 176 000 of the 364 000 deaths for which complete sociodemographic data were available. For all racial and ethnic minority individuals, the number of deaths due to COVID-19 would have been 71% lower, preventing 100 000 deaths out of 141 000. For racial and ethnic minority individuals aged 25 to 64 years, the number of deaths would have been 89% lower, preventing 40 000 deaths out of 45 000.

Discussion

Public-access data covering the entire United States have recently become available to examine inequities in COVID-19 mortality jointly by race and ethnicity and socioeconomic position. Our study of population-based data among adults aged 25 years or older identified inequities by educational attainment for the overall population and within racial and ethnic groups. Racial and ethnic minority

Figure 1. Cumulative Mortality Rates for COVID-19 in the US by Race and Ethnicity and Sex (2020)
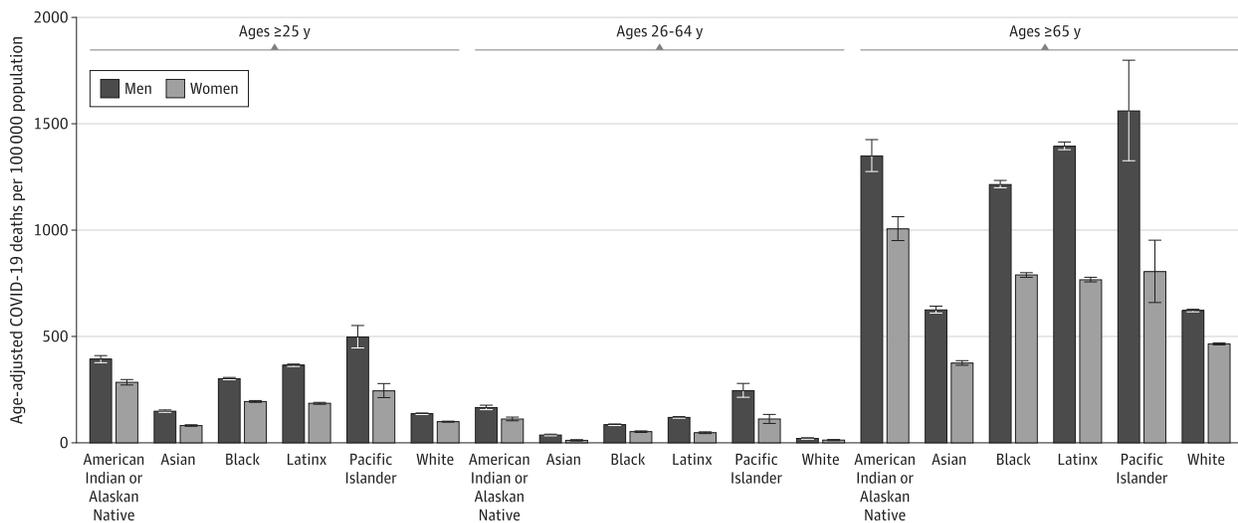
Error bars indicate 95% CIs.

populations typically experienced higher age-adjusted mortality rates than non-Hispanic White individuals and those with the lowest socioeconomic position (high school or GED completion or less) also died at the highest rates within racial and ethnic groups. The socioeconomic privilege afforded by higher educational attainment among racial and ethnic minority populations was often insufficient to overcome racial and ethnic inequality. For example, adjusting for age, college-educated non-Hispanic Black men had higher COVID-19 mortality rates than non-Hispanic White men who had completed high school or GED or less. Although a gradient in mortality rates by educational attainment was found within all population groups, the association of unequal educational attainment with racial and ethnic inequalities in COVID-19 deaths was likely modest.

Racialized socioeconomic inequities played a substantial role in the overall death toll of the pandemic. Had all population groups experienced the mortality rates observed among the group

Figure 2. Cumulative Mortality Rates for COVID-19 in the US by Race and Ethnicity, Sex, and Educational Attainment (2020)
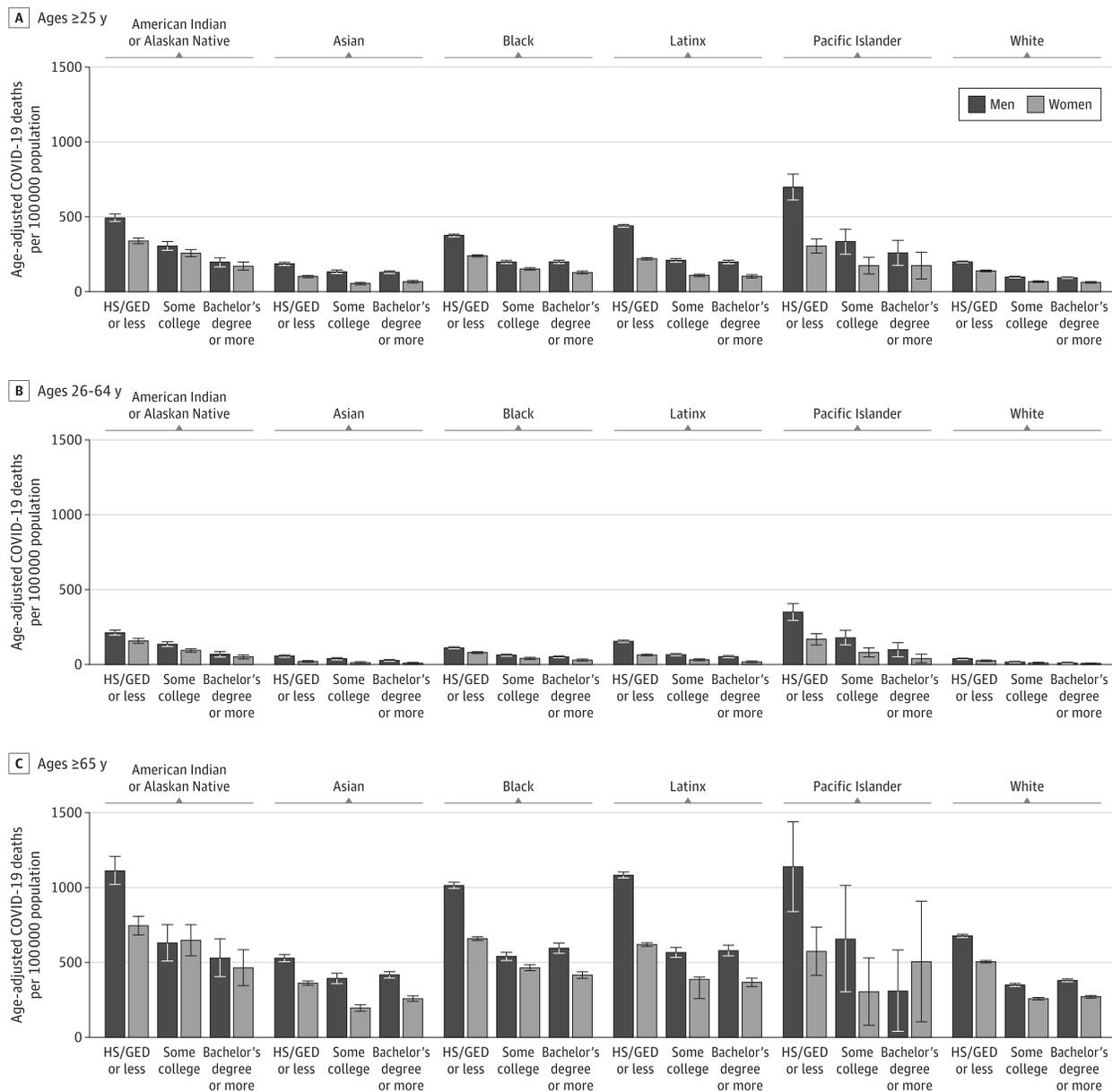
HS/GED indicates high school or General Educational Development certification. Error bars indicate 95% CIs.

COVID-19 Mortality in the US by Race and Ethnicity and Educational Attainment

assumed to be the most racially and socioeconomically privileged (college-educated non-Hispanic White individuals), the overall number of COVID-19 deaths in the US during 2020 would have been halved, and deaths among racial and ethnic minorities aged 25 to 64 years would have been reduced to about one-tenth of the observed number.

One of our key findings—that the magnitude of racial inequities was only slightly attenuated on average when stratifying by educational attainment categories—warrants further explanation and, ultimately, more exploration in future research. Racial and ethnic differences in educational attainment, and in socioeconomic position more broadly, capture only one mechanism through which structural racism is associated with health. Prior research shows that racial and ethnic

Figure 3. Cumulative Mortality Rate Ratios for COVID-19 in the US by Race and Ethnicity, Sex, and Education (2020)
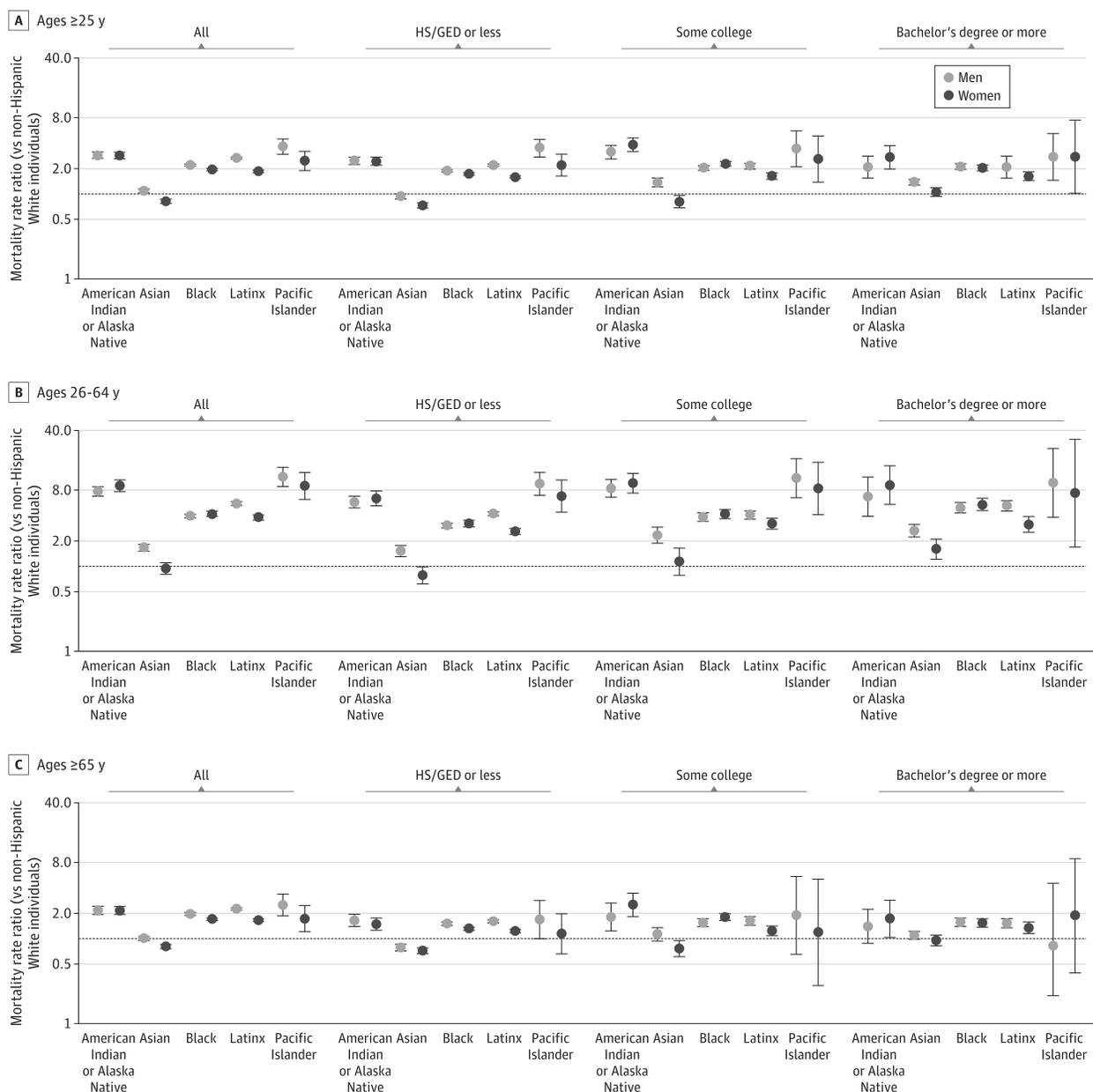
HS/GED indicates high school or General Educational Development certification. The black horizontal line at 1.0 indicates the mortality rate among non-Hispanic White individuals. Error bars indicate 95% CIs.

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differences in economic assets vary considerably even within education levels. For example, non-Hispanic Black college graduates in the US have less wealth and lower rates of home ownership when compared with non-Hispanic White college graduates and even when compared with non-Hispanic White indiviuals who have not graduated high school.[14,15] With regard to COVID-19 specifically, census data show all racial and ethnic groups other than non-Hispanic White individuals are more likely to have risk factors for SARS-CoV-2 exposure (household crowding, multigenerational housing, and potential occupational and paraoccupational exposure owing to employment in high-risk jobs or cohabitation with such workers) than non-Hispanic White individuals of the same educational attainment category (eFigure in the Supplement). Prior research suggests that racial and ethnic minority populations have been infected with COVID-19 at far higher rates than non-Hispanic White individuals,[16-18] and that inequities in COVID-19 mortality rates may in large part be associated with these differences in exposure to the virus.[19] Although there has been a small number of studies exploring the degree to which racial and ethnic differences in COVID-19 outcomes may be associated with differences in population genetics, the evidence for this has so far been very limited.[20] In addition, racial and ethnic groups that do not share geographic ancestry (eg, American Indian and Pacific Islander) have nevertheless experienced the highest COVID-19 mortality rates, suggesting that similarities in COVID-19 outcomes are associated more with similar social conditions than population genetics.

Different measures of socioeconomic position such as wealth or income may have yielded different patterns of racial inequality. In addition, accounting for social class, which, unlike socioeconomic position, is defined by one's position in economic relationships (eg, as a worker or owner),[9] may be particularly useful in analyses of COVID-19 outcomes, because class is closely tied to power—in this case, power to mitigate exposure to SARS-CoV-2.

Limitations

This study has some limitations. The analyses in this study relied on race and ethnicity classification of decedents from death certificates, which prior research has demonstrated to substantially underestimate mortality for American Indian or Alaska Native populations.[21] It is unclear whether similar underestimation of mortality also applies to Native Hawaiian and Other Pacific Islander individuals, as they have not been disaggregated from non-Hispanic Asian individuals in prior research on misclassification of race and ethnicity in mortality data. In addition, COVID-19 is likely misclassified in mortality data, and the CDC estimates that the true number of COVID-19 deaths was 30% higher than reported for the period from March 2020 to May 2021,[22] although whether misclassification varies by sociodemographic groups is unknown. As this was a cross-sectional study, we were also unable to assess whether the magnitude of inequalities changed over time. Finally, owing to limitations in the mortality data set, we were not able to assess potential mediators associated with racial and ethnic and socioeconomic inequalities, including geography, SARS-CoV-2 exposure, health care access, and comorbidities.

Conclusions

During the first year of the COVID-19 pandemic, which largely preceded the availability of vaccines, there were extremely high levels of racialized economic inequity in the distribution of COVID-19 mortality. Future research may investigate the specific pathways that produced these joint racial and ethnic and socioeconomic inequities, as well as whether the longstanding political disempowerment of populations among whom the virus was most lethal (ie, economically marginalized racial and ethnic minority groups) was associated with policy responses to the pandemic. What is clear is that the mortality burden of these inequities is high. Future research can help inform interventions that yield equitable responses to both the ongoing burden of COVID-19 and potential future pandemics that spread similarly to SARS-CoV-2.

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SUPPLEMENT.
eFigure A. Distribution of Household Crowding (>1 Person/Room)
eFigure B. Distribution of Employment in Exposure Occupations and/or Household Exposure to Such Workers
eFigure C. Multigenerational Housing Among Those Ages ≥65 Years

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

_____

WILLIAM A. JACOBSON, on behalf of himself and
others similarly situated,

                                        Plaintiff,

                                                                    22-CV-0033
                -against-
                                                                    MAD/ML

MARY T. BASSETT, in her official capacity as Acting
Commissioner of the New York Department of Health,

                                        Defendant.

_____

**MEMORANDUM OF LAW IN OPPOSITION TO PLAINITFF'S MOTION FOR CLASS
CERTIFICATION**

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Defendant, Mary T. Bassett, Commissioner of the New York State Department of Health, sued in her official capacity ("Defendant"), submits this memorandum of law, together with the accompanying Declaration of Eugene Heslin, MD, FAAFP, dated February 17, 2022, ("Heslin Decl."), and its exhibits, in opposition to Plaintiff's motion for class certification. Plaintiff fails to offer any evidence sufficient to entitle him to class certification. Accordingly, Plaintiffs' motion must be denied in its entirety.

PRELIMINARY STATEMENT

As the COVID-19 pandemic continues, the State remains steadfast in its efforts to carefully calibrate its response to end the spread of the virus and ensure that its citizens have access to life saving vaccines and medical treatment. Toward this end, on December 27, 2021, the New York State Department of Health ("DOH") issued a guidance document to New York State health care providers and health care facilities entitled "COVID-19 Oral Antiviral Treatments Authorized and Severe Shortage of Oral Antiviral and Monoclonal Antibody Treatment Products" ("Guidance"), which advises health care providers of new drug treatments and therapies found to reduce the risk of hospitalization and death in high-risk patients when taken by the patients early after symptom onset. Heslin Decl., ¶ 10. The Guidance advises providers about, inter alia, risk factors to consider when providing the drug treatments and therapies. Plaintiff takes issue with the portion of the Guidance advising providers and hospitals that they should consider race and ethnicity as a risk factor when making decisions as to whether an individual meets the criteria for oral antiviral treatment. *Id*., ¶ 13. Specifically, the language states as follows: "Non-white race or Hispanic/Latino ethnicity should be considered a risk factor, as longstanding systemic health and

social inequities have contributed to an increased risk of severe illness and death from COVID-19." *Id.*, Exh. A.

Plaintiff is a white law professor who does not have COVID-19 and seeks to represent a class of all white people. Complaint, ECF No. 1 ("Compl."). Specifically, Plaintiff seeks an order certifying a class of "individuals in New York State who do not qualify '[n]on-white race or Hispanic/Latino ethnicity' under the New York Department of Health's guidelines for distributing oral antiviral COVID treatments." Plaintiff's Memorandum of Law, ECF No. 31-1 ("Pl. Mem. Law"), p. 4. However, Plaintiff fails to satisfy the requirements of Fed. R. Civ. P. 23 necessary to certify a class. Additionally, for the reasons discussed in Defendant's cross-motion to dismiss the Complaint, Defendant's Memorandum of Law, ECF No. 42-10, ("Def. Mem. of Law"), the Complaint should be dismissed in its entirety. As a result, Plaintiff's motion for class certification should be denied.

STATEMENT OF FACTS

The Guidance was issued at a time when oral antiviral treatments were anticipated to be in short supply based upon information provided by the federal government prior to their initial distribution. Heslin Decl., ¶ 28. However, there is currently no shortage of the medications in New York, *id.*, and no one in New York, who is otherwise qualified based on their individual risk factors, will be turned away from life-saving treatment because of their race or any demographic identifier. *Id.*, ¶ 31.

The recommendation that providers and hospitals should consider race and ethnicity as a risk factor when prescribing oral antiviral treatments is not a mandate, or a restriction of COVID-19 treatments by race. *Id.*, ¶ 24. The Guidance does not replace doctors' clinical judgment and does not prevent any patient from receiving necessary treatment. *Id.* Rather, the Guidance is

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intended to address the well documented reality that communities of color have been

disproportionately impacted by the COVID-19 pandemic. *Id.*

Despite Plaintiff's argument to the contrary, the Guidance does not, nor is it intended to,

operate as a barrier to care for white people or create a racial hierarchy in the delivery of care.

Id., ¶ 25. In a clinical setting, a practitioner should: (1) take a detailed history and conduct a

physical examination; (2) understand the risks and benefits of treatment versus non treatment

based upon the individual patient; and (3) have a discussion with the patient about risk, benefits,

and alternatives. *Id.* Only then after using appropriate medical clinical judgment should a

medication be prescribed. *Id.* These decisions should always be based upon the physician-patient

relationship and a shared decision-making process that is part and parcel to patient care. *Id.* The

Guidance is simply a suggestion to help focus the thoughts of practitioners and inform

reasonable discussion. *Id.* It is not mandate, *id.*, ¶ 23, and is not subject to enforcement. *Id.*, ¶

27.

ARGUMENT

<u>PLAINTIFF FAILS TO ESTABLISH THE REQUIREMENTS NECECESSARY TO CERTIFY
A CLASS</u>

"Class certification is the exception, not the rule, so the party moving for class certification

'must affirmatively demonstrate' compliance with [Fed. R. Civ. P.] 23." *Raymond v. N.Y. State*

Dep't of Corr. & Cmty. Supervision, 2022 U.S. Dist. LEXIS 5522, *6 (Jan. 11, 2022) (quoting

Wal-Mart Stores, Inc. v. Dukes, 564 U.S. 338, 350 (2011)). "Rule 23 requires that a proposed

class action (1) be sufficiently numerous, (2) involve questions of law or fact common to the class,

(3) involve class plaintiffs whose claims are typical of those of the class, and (4) involve a class

representative or representatives who adequately represent the interests of the class." *Myers v.*

Hertz Corp., 624 F. 3d 537, 547 (2d Cir. 2010) (citing Fed. R. Civ. P. 23(a)), *cert. denied*, 565

U.S. 930 (2011). "Once the prerequisites of Rule 23(a) are satisfied, plaintiffs seeking to maintain a class action must also satisfy one of the three subsections of Rule 23(b)." *De la Cruz v. Gill Corn Farms, Inc.*, 2005 U.S. Dist. LEXIS 44675, **12-13 (N.D.N.Y. Jan. 25, 2005).

"The Rule 23 requirements must be established by at least a preponderance of the evidence. The burden of proving compliance with all of the requirements of Rule 23 rests with the party moving for certification." *Levitt v. J.P. Morgan Sec., Inc.*, 710 F. 3d 454, 465 (2d Cir. 2013) (internal citation and quotation marks omitted). "A party seeking class certification must affirmatively demonstrate his compliance with [Rule 23]—that is, he must be prepared to prove that there are *in fact* sufficiently numerous parties, common questions of law or fact, etc." *Wal-Mart Stores, Inc. v. Dukes*, 564 U.S. 338, 350 (2011).

Plaintiff fails to establish his entitlement to class certification. First, Defendant's cross-motion to dismiss the Complaint should be granted, making Plaintiff's motion for class certification moot. Second, Plaintiff fails to offer sufficient evidence to permit the Court to undertake the rigorous analysis required to rule on a motion for class certification. Third, Plaintiff's lack of standing is fatal to his motion for class certification because he cannot establish that he can adequately protect the interests of the class. Fourth, Plaintiff fails to establish that his claims are common and typical of those of the putative class. Finally, Plaintiff fails to establish the requirements of Rule 23(b)(2).

A. Defendant's Pending Cross-Motion to Dismiss the Complaint Should be Granted, so Class Certification is Unnecessary

As an initial matter, Plaintiff's motion must be denied because the Complaint should be dismissed in its entirety. The granting of Defendant's pending cross-motion to dismiss will "render the Plaintiff['s] motion for class certification moot." *Samele v. Zucker*, 324 F. Supp. 3d 313, 321 (E.D.N.Y. 2018). Accordingly, Plaintiff's motion should be denied.

B. Plaintiff Fails to Submit Sufficient Evidence to Permit the Court to Perform a Rigorous Analysis

Plaintiff fails to submit evidence establishing Rule 23's requirements by a preponderance of the evidence. In support of the present motion, Plaintiff submits only a four-page memorandum of law, Pl. Mem. of Law, ECF 33-1, and a ten-paragraph speculative and conclusory hearsay declaration. Jacobson Declaration, ECF No. 33-2 ("Jacobson Decl."). In addition to stating alleged statistical information about the rates of COVID-19 infection worldwide and a recent COVID-19 outbreak at Cornell University, Jacobson Decl., ¶¶ 4, 5, Plaintiff's Declaration states that Plaintiff: (1) is "of Eastern European ancestry and not 'non-white' and not of Hispanic/Latino ethnicity," *id*., ¶ 2; (2) is 62 years old, *id*., ¶ 3; (3) is a law professor at Cornell, *id*., ¶ 4; and (4) "want[s] to immediately access oral antiviral treatments to reduce [his] risk of serious illness or death" when he "inevitable contract[s] COVID-19." *Id*., ¶ 7. Based on this information, Plaintiff seeks to represent a class of all white people who may contract COVID-19 sometime in the future.

These statements are completely devoid of any evidentiary value, and fail to demonstrate the elements of numerosity, commonality, typicality, adequacy of class representatives, ascertainability, or the Rule 23(b)(2) factor. *Giannullo v. City of New York*, 322 F. 3d 139, 142 (2d Cir. 2003) (observing that a memorandum of law "is not evidence at all."). The Court cannot perform the requisite "rigorous analysis" of Rule 23's certification requirements on the basis of the bare evidentiary record supplied by Plaintiff. *Wal-Mart Stores, Inc*., 564 U.S. at 350-351. *See also Kassman v. KPMG LLP*, 416 F. Supp. 3d 252, 273-274 (S.D.N.Y. 2018) ("A certifying court must receive enough evidence, by affidavits, documents, or testimony, to be satisfied that each Rule 23 requirements has been met." (internal quotation marks omitted)); *Himmelfarb v. Nat'l Bureau Collection Corp.,* 2017 U.S. Dist. LEXIS 161403, *8 (E.D.N.Y. Sept. 28, 2017) (determining that "Plaintiff has not submitted sufficient evidence for the Court to rule on class

certification on the merits."). Accordingly, based on Plaintiff's failure to present any relevant evidence, Plaintiff's motion should be denied.

C. Plaintiff Fails to Establish Adequacy Because He Lacks Standing

Plaintiff must show that "the representative part[y] will fairly and adequately protect the interests of the class." Fed. R. Civ. P. 23(a)(4). "The adequacy inquiry under Rule 23(a)(4) serves to uncover conflicts of interest between named parties and the class they seek to represent." *Amchem Prod., Inc. v. Windsor*, 521 U.S. 591, 625 (1997). "To satisfy Rule 23(a)(4), the named plaintiffs must possess the same interests and suffer the same injuries as the class members." *In re Literary Works in Elec. Databases Copyright Litig.*, 654 F. 3d 242, 249 (2d Cir. 2011) (internal quotation marks and alterations omitted). "[A]n analysis of adequacy of representation considers 'whether the class representative has adequate incentive to pursue the class's claim, and whether some difference between the class representative and some class members might undermine that incentive.'" *In re LIBOR-Based Fin. Instruments Antitrust Litig.*, 299 F. Supp. 3d 430, 461 (S.D.N.Y. 2018) (quoting *In re Payment Card Interchange Fee & Merch. Disc. Antitrust Litig.*, 827 F.3d 223, 231 (2d Cir. 2016), *cert. denied*, 137 S. Ct. 1374 (2017)).

Plaintiff fails to meet his burden of demonstrating that he will adequately represent the proposed class because he lacks standing. "A plaintiff seeking to represent a class must personally have standing." *Nicosia v. Amazon.com, Inc.*, 834 F. 3d 220, 239 (2d Cir. 2016). "To satisfy this jurisdictional requirement, (1) the plaintiff must have suffered an injury-in-fact; (2) there must be a causal connection between the injury and the conduct at issue; and (3) the injury must be likely to be redressed by a favorable decision." *Id.* (internal quotation marks omitted).

For the reasons fully discussed in Defendants' cross-motion to dismiss the Complaint, Def. Mem. of Law, ECF No. 42-10, incorporated herein, Plaintiff does not have standing.

Plaintiff alleges that a person of non-white race or Hispanic/Latino ethnicity may receive

antiviral therapies because of their race or ethnicity alone, but a person of white race or non-

Hispanic/Latino ethnicity must show a medical condition or risk factor to receive the therapies.

In other words, Plaintiff alleges that the Guidance erects a "barrier" for one group to access

antiviral therapies that another group does not face. In this type of equal protection claim, an

"injury in fact" occurs "[w]hen the government erects a barrier that makes it more difficult for

members of one group to obtain a benefit than it is for members of another group." *Ne. Fla.*

Chapter of Associated Gen. Contractors of Am. v. City of Jacksonville, Fla., 508 U.S. 656, 666

(1993). Therefore, to establish Article III standing, Plaintiff must allege the following: (1)

"there exists a reasonable likelihood that the plaintiff is in the disadvantaged group, (2) there

exists a government-erected barrier, and (3) the barrier causes members of one group to be

treated differently from members of the other group." *Comer v. Cisneros*, 37 F. 3d 775, 793 (2d

Cir. 1994).

"[E]ven if a governmental actor is discriminating on the basis of race, the resulting injury

'accords a basis for standing only to those persons who are personally denied equal treatment by

the challenged discriminatory conduct.'" *U.S. v. Hays*, 515 U.S. 737, 743-744 (1995). Plaintiff

alleges that he has standing to bring his claims because the provision of the Guidance that

permits the consideration of race in determining a patient's risk factors is a "barrier" to white

people's access to antiviral therapies. However, these allegations are insufficient to establish

standing. First, the Guidance is not a "barrier" to Plaintiff's ability to receive antiviral therapies.

To establish standing, Plaintiff must prove that the Guidance makes it "more difficult" for

white/non-Hispanic or Latino individuals to obtain antiviral therapies than it is for non-

white/Hispanic or Latino individuals. *Dixie v. Antonacci*, 2017 U.S. Dist. LEXIS 79449, at **18-

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19 (N.D.N.Y. May 24, 2017) (citing *Comer*, 37 F. 3d at 791). As Dr. Heslin explains,

"[n]othing in the Guidance prevents the Plaintiff, or anyone similarly situated, from receiving

treatment with oral antivirals in the unfortunate event that they contract COVID-19," Heslin

Decl., ¶ 30, and "[n]o one in New York, who is otherwise qualified based on their individual risk

factors, will be turned away from life-saving treatment because of their race or any demographic

identifier." *Id.*, ¶ 31.

Notwithstanding, Plaintiff appears to allege that the "barrier" created by the Guidance is

that he must demonstrate a medical condition or other risk factor that increases his risk for severe

illness in order to be eligible for antiviral therapies in short supply. In order to be prescribed

antiviral therapies, a person must have a "medical condition or other factors that increase their

risk for severe illness." Guidance, Heslin Decl., Exh. A. And those conditions or factors are

evaluated and determined by a physician using his or her medical judgment to determine if

antiviral therapy is an appropriate treatment for a particular patient. Heslin Decl., ¶¶ 24-25.

There is no "barrier" to Plaintiff's, or any patient's, access to antiviral therapies created by the

Guidance. *MGM Resorts Int'l Global Gaming Dev., LLC v. Malloy*, 2016 U.S. Dist. LEXIS

81635, at *20 (D. Conn. 2016) (discussing how the statute was not a "barrier" to a benefit and

distinguishing classes of cases to the contrary) *affirmed* 861 F.3d 40 (2d Cir. 2017).

Second, Plaintiff must show that he intends to or is "able and ready" to "pursue the

benefit" to establish standing. *Martinez v. Malloy*, 350 F. Supp. 3d 74, 85 (D. Conn. 2018). He

cannot do so. The allegations in the Complaint, and the proof submitted by Plaintiff in support

of his motion for a preliminary injunction—a ten paragraph declaration—states only that

Plaintiff wants to "immediately access oral antiviral treatments to reduce [his] risk of serious

illness or death" when he "inevitably contracts COVID-19." Jacobson Declaration, ECF No. 34-

2, ¶ 7. But, because he would need to "demonstrate a 'medical condition or other factors that increase [his] risk for severe illness," *id*., ¶ 9, he has "heightened concern when [he goes] about his daily activities." *Id*., ¶ 10.

This kind of speculative and tenuous situation is not the type in which standing is established simply by showing that a plaintiff is a member of a group that cannot access a benefit because of a government-created barrier. To fall within this line of cases, Plaintiff must show that he is "ready and able" to access a government benefit; here, an antiviral therapy. *Ne. Fla. Chapter of Associated Gen. Contractors of Am.*, 508 U.S. at 658-659. He cannot do so. Plaintiff does not have COVID-19 and may never contract it. If he does contract it, his physician may or may not deem Plaintiff's medical condition suitable for antiviral therapy. If his physician does deem Plaintiff's condition to be warranted, Plaintiff may or may not be eligible for the therapy for reasons unrelated to his race. If he is eligible, there is no shortage of antiviral therapies such that the Guidance would be invoked. If there was a shortage, a physician's medical judgment may or may not result in plaintiff receiving the therapy. There is no automatic qualifier/disqualifier for the antiviral therapy and whether or not Plaintiff will ever be given the therapy will be in accordance with his health care provider's medical judgment.

Inasmuch as Plaintiff lacks standing, Plaintiff fails to demonstrate adequacy of representation. This failure requires that Plaintiff's motion for class certification be denied.

D. Plaintiff Fails to Establish Commonality and Typicality

Plaintiff's motion for class certification should be denied because he also fails to establish the required elements of commonality and typicality. These requirements "tend to merge" as they "'[b]oth serve as guideposts for determining whether under the particular circumstances maintenance of a class action is economical and whether the named plaintiff's claim and the class

claims are so interrelated that the interests of the class members will be fairly and adequately protected in their absence.'" *Wal-Mart Stores, Inc.*, 564 U.S. at n. 5 (quoting *General Telephone Co. of Southwest v. Falcon*, 457 U.S. 147, n. 13 (1982)).

To establish commonality plaintiff must demonstrate that "there are questions of law or fact common to the class." Fed. R. Civ P. 23(a)(2). To establish typicality, Plaintiff must demonstrate that "the claims or defenses of the representative parties are typical of the claims or defenses of the class." Fed. R. Civ. P. 23(a)(3).[1] Plaintiff alleges that the question of law common to all putative class members is whether DOH is violating the equal protection clause, Title VI and the ACA by "rationing lifesaving COVID-19 medications on the basis of race and ethnicity," Pl. Mem. of Law, p. 5, and that the claims of each putative class member, which are allegedly based on the same legal argument, stems from the same course of events, i.e. the issuance of the Guidance. *Id*. "[M]erely raising common questions" is not sufficient to satisfy the commonality requirement. *Pagan v. Abbott Labs., Inc.*, 287 F.R.D. 139, 148 (E.D.N.Y. 2012).

As discussed fully in the Declaration of Dr. Eugene Heslin, the Guidance does not "ration" medications at all, much less on the basis of race and ethnicity. Heslin Decl., generally. If a white person is prescribed antiviral therapy to treat COVID-19, such a decision would be based on the professional judgment of that person's health care provider based on individualized medical assessment. *Id*., ¶¶ 23-24, 30. Since medical assessments are specific to each patient, factual issues are not common among the class.

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[1] "To establish typicality under Rule 23(a)(3), the party seeking certification must show that each class member's claim arises from the same course of events and each class member makes similar legal arguments to prove the defendant's liability." *In re Flag Telecom Holdings, Ltd. Sec. Litig.*, 574 F. 3d 29, 35 (2d Cir. 2009) (internal quotation marks omitted).

Additionally, "[c]ommonality requires the plaintiff to demonstrate that the class members have suffered the same injury. This does not mean merely that they have all suffered a violation of the same provision of law." *Wal-Mart Stores, Inc.*, 564 U.S. at 349-350 (internal quotation marks and citation omitted). As discussed above, Plaintiff fails to allege or establish that he has suffered any injury at all. Therefore, he cannot possibly demonstrate that he and other putative class members have suffered the same injury.

Since Plaintiff fails to establish the requirements of commonality and typicality, his motion for class certification should be denied.

E. Plaintiff Fails to Establish the Requirements of Rule 23(b)(2)

A class action may only be pursued in three circumstances set forth in Rule 23(b). Plaintiff contends that his motion satisfies the requirements of Rule 23(b)(2). Pl. Mem. of Law, p. 4. Rule 23(b)(2) provides that a "class action may be maintained if Rule 23(a) is satisfied and if … the party opposing the class has acted or refused to act on grounds that apply generally to the class, so that final injunctive relief or corresponding declaratory relief is appropriate respecting the class as a whole …." "Rule 23(b)(2) applies only when a single injunction or declaratory judgment would provide relief to each member of the class. It does not authorize class certification when each individual class member would be entitled to a *different* injunction or declaratory judgment against the defendant." *Wal-Mart Stores, Inc.*, 564 U.S. at 360.

The evidence before the Court establishes that Defendant has not "acted or refused to act on grounds that apply generally to the class." To the contrary, the Guidance operates to provide information to health care providers who must exercise their medical judgment in determining whether or not to prescribe antiviral therapies to a particular patient. Heslin Decl., ¶¶ 9, 11-13, 24-26. The Guidance does not direct that antiviral therapies be given, or refused to, any class of

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people. As a result, Plaintiff fails to satisfy Rule 23(b)(2).

<div align="center">**CONCLUSION**</div>

For the reasons discussed above, Plaintiff's motion for class certification should be

denied in its entirety with prejudice.

Dated: Albany, New York
         February 18, 2022

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