

Widened Racial Inequities in Underutilized Medicare Beneficiary COVID-19 Claims Files Illustrate Lifelong Structural Racism Exposure

DATA BRIEF

KEY THEMES

- COVID-19 inequities among Black, Indigenous and other Populations of Color (BIPOC) in the US continue to be studied. However, one data source important for showing the magnitude of how lifelong systemic racism and adverse social risk manifests in the context COVID remains underutilized: Medicare Beneficiary COVID-19 Claims Data.
- In this Duke-Margolis data brief, we analyze these publicly-available data, representing race- and ethnicity-stratified COVID-19 cases and hospitalizations at 14 timepoints from May 2020-November 2021. For almost all BIPOC Medicare beneficiaries, caseload and hospitalization rates were higher than non-Hispanic, White beneficiaries, remaining essentially unchanged since December 2020.
- Notably, disparities in hospitalization ratios were much wider than disparities in case ratios. These ratios would be the same if the body's ability to fight off COVID infection and quality of health care were the same by race and ethnicity. We connect these findings to upstream causes in the context of COVID in a conceptual model guided by literature review.
- Many policymakers stood up programs during the pandemic to address social needs. This data brief can be used by policymakers—in tandem with our companion issue brief on lessons from pandemic health policies to address social needs—to help design and sustain whole-person efforts.

Introduction

The United States (US) showed promise in pandemic biomedical innovation, including rapid development of COVID-19 vaccines,¹ but achieved relatively poor and inequitable pandemic outcomes.^{2,3} Pandemic health impacts disproportionately affected Black, Indigenous and other Populations of Color (BIPOC) who are at increased risk for contracting, being undertreated for, and dying from COVID-19 relative to non-Hispanic White people.²⁻⁵ These inequities illustrate that “we’re not all in this together”⁶—at least not equally.

The US government defines health equity as all people attaining the highest level of health,⁷ and considerable research elucidates the root causes of health inequities.

Health inequities reflect long-standing downstream health consequences of systemic structural racism. Systemic structural racism refers to perpetuation of sets of social, cultural, institutional, and economic arrangements, relationships, and conditions widely normalized in American society through policy decision making—that are systemically advantageous to non-Hispanic White people and disadvantageous to BIPOC communities.⁸⁻¹⁴ These structural elements underlie interpersonal racism, xenophobia, and other forms of individual-level discrimination (whether in the context of American medicine and research,¹⁵ or in daily life).

AUTHORS

William K. Bleser, PhD, MSPH¹
Hannah L. Crook, BSPH^{2*}
Andrea Thoumi, MPP, MSc¹
Rushina Cholera, MD, PhD³
Jay A. Pearson, PhD, MPH⁴
Robert S. Saunders, PhD¹
Rebecca G. Whitaker, PhD, MSPH¹
Mark B. McClellan, MD, PhD¹

¹ Robert J. Margolis, MD, Center for Health Policy, Duke University; Washington, DC and Durham, NC

² Department of Health Policy, Vanderbilt University Medical Center, Vanderbilt University, Nashville, TN

³ Department of Pediatrics, Duke University School of Medicine; Durham, NC

⁴ Sanford School of Public Policy, Duke University; Durham, NC

*Work performed at the Robert J. Margolis, MD, Center for Health Policy, Duke University, Durham, NC

Inequities in COVID-19 outcomes are also well-studied, but one simple yet powerful data source is underutilized: Medicare Beneficiary COVID-19 Claims Data files.¹⁶ Medicare beneficiaries represent dozens of millions nationwide who experience the majority of COVID-19 morbidity and mortality due to age and comorbidities. Medicare beneficiaries' older average age also captures accumulation of lifelong exposures, allowing for visualization of how structural, "social drivers of health" affect outcomes.

This Duke-Margolis data brief uses these Medicare data to study COVID-19 inequities and their upstream causes. We first examine rates of COVID-19 cases and hospitalizations by race and ethnicity. We then compare these differences side-by-side as disparity rate ratios relative to non-Hispanic White beneficiaries. Caseload disparities ballooned into wider-than-expected hospitalization disparities for BIPOC populations. Widened caseload-hospitalization ratios are best described neither as "differences" nor "disparities" but rather as "inequities"

METHODS

Data are from Medicare COVID-19 claims (14 releases of cumulative claims, May 2020–November 2021).¹⁶ We first present race/ethnicity-stratified COVID-19 case (**Figure 1**) and hospitalization (**Figure 2**) rates per 100,000 over time. We then show relative case and hospitalization inequities (ratios of BIPOC rates relative to non-Hispanic White rates) (**Figure 3**). Finally, approaching our data brief from a qualitative perspective, we adapted the conceptual model for action on the social determinants of health¹⁹ to visually link quantitative findings to upstream causes and systemic racism literature in a new conceptual model (**Figure 4**).

There are strengths and weaknesses to CMS' Medicare COVID-19 claims data. Generally, Medicare claims are well-suited to track COVID-19 cases and hospitalizations over time.²⁰ Although claims data can undercount beneficiaries who are ill,²⁰ marginalized populations are more likely to be undercounted,²⁰ so inequities are likely not overstated but rather understated. Moreover, there are benefits to using these claims summary files over beneficiary-level claims files. First, available CMS beneficiary-level research files only contain Medicare fee-for-service claims whereas the data we use contain Medicare fee-for-service claims plus Medicare Advantage encounters. Second, beneficiary-

because they represent lifelong toxic stress "weathering"¹⁷ the body's defenses among older BIPOC. We then visually connect these findings to upstream social drivers of health and systemic racism in a novel conceptual framework to organize the literature. These inequities illustrate the underlying causes that explain why many communities in the US did not have equal opportunities to experience a low risk of COVID-19 transmission, hospitalization, and death.

To achieve health equity, linkages must be made between science, policy, and practice.⁷ Many policymakers stood up programs during the pandemic to address social needs. Findings from this data brief can be used by policymakers—in tandem with our companion *Health Affairs* health policy brief on lessons from pandemic health policies to address social needs¹⁸—to help design and sustain these whole-person efforts or build new ones.

level research CMS files take longer to prep for research use, and are only available to researchers under data use agreements involving significant time and fees—creating longer lags between data generation and access. The data we use are publicly-available—for free—and more quickly updated. To illustrate these points, we performed a brief review of other studies using Medicare claims data to study COVID inequities. A few example studies used fee-for-service claims through September 2020^{21,22} or December 2020;²³ one study used Medicare Advantage claims (no fee-for-service) from one national health insurer through September 2020;²⁴ and one commentary used the data we use but only through July 2020.²⁵

All-in all, while beneficiary-level fee-for-service claims data allow for more complex analysis adjusting for many factors, and allow for additional disaggregation, they are significantly more time-delayed and costly. The publicly-available data we use provide more timely analysis of high-level COVID caseload and hospitalizations trends (especially visualizing inequities) for all Medicare beneficiaries (not just fee-for-service). Nevertheless, they are underutilized, so we demonstrate their usefulness.

What the COVID-19 Medicare Claims Data Show

From mid-May 2020 through late-November 2021, Medicare beneficiaries of Black, American Indian and Alaskan Native (AI/AN), or Hispanic race and ethnicity had much higher COVID-19 caseload (Figure 1) and hospitalizations (Figure 2) than those of non-Hispanic White, Asian, or other race and ethnicity.

Figure 3 expresses these rate differences as ratios relative to non-Hispanic White beneficiaries.

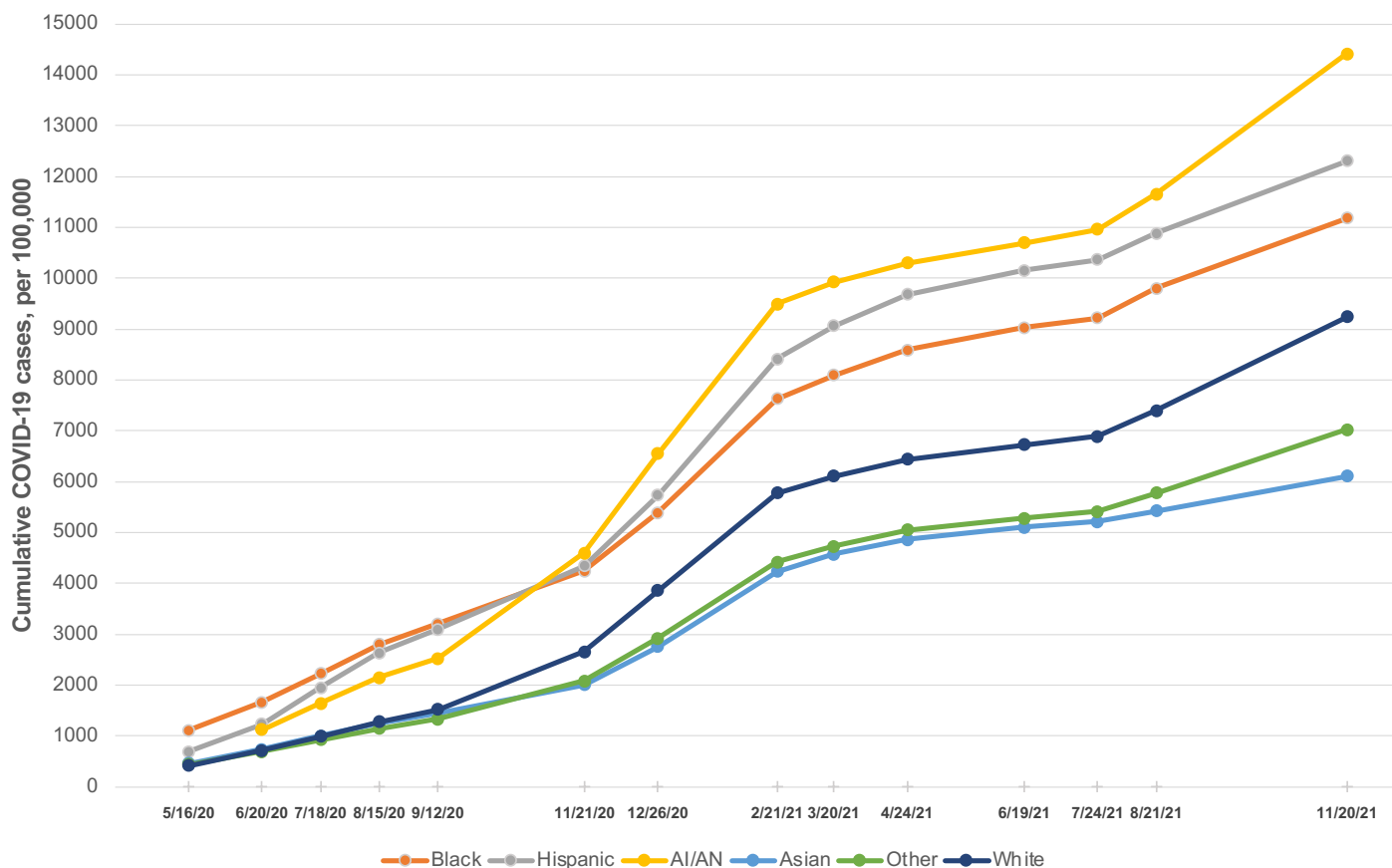
- Caseload and hospitalization inequities for Black, Hispanic, and AI/AN beneficiaries were massive at the outset (May 2020; e.g., Black beneficiaries had 3.8 times higher hospitalizations).
- For Black beneficiaries, inequities decreased then plateaued; for Hispanic beneficiaries they rose,

decreased, then plateaued; and for AI/AN beneficiaries they stayed relatively the same.

- Between December 2020 and August 2021, case and hospitalization ratio inequities relative to non-Hispanic White beneficiaries remained relatively constant (for AI/AN beneficiaries, 1.6 times and 2.5 times higher cases and hospitalizations; Black beneficiaries, 1.3 and 1.9 times higher; Hispanic beneficiaries, 1.5 and 1.7 times higher), followed by a small decrease in inequities by November 2021.
- Notably, the side-by-side comparison along a common horizontal axis in Figure 3 shows hospitalization inequities substantially wider and larger in magnitude than caseload inequities for Black, AI/AN, and Hispanic beneficiaries.

FIGURE 1

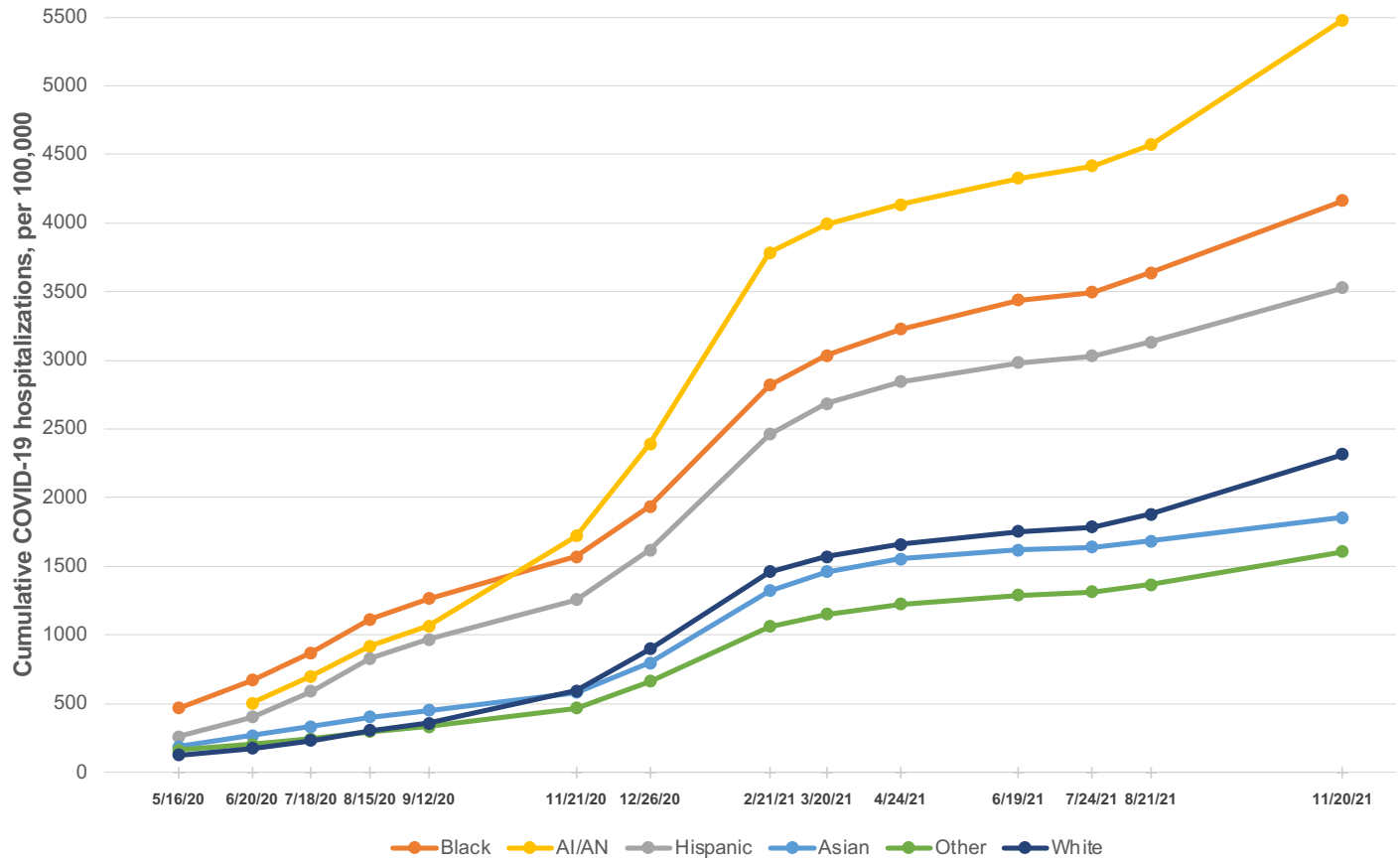
COVID-19 Caseload per 100,000 by Racial and Ethnic Group (Medicare)*



Authors' analysis of all 14 available CMS data releases of cumulative COVID-19 Medicare claims, cumulative by May 16, June 20, July 18, August 14, September 12, November 21, December 26, 2020; and February 21, March 20, April 24, June 19, July 24, August 21, and November 20, 2021 using categories provided by CMS (*which may conflate race and ethnicity especially for Latinx communities, potentially obscuring inequities). AI/AN is "American Indians and Alaska Natives." AI/AN populations, while not disaggregated by the CDC in the first iteration of data through May 16 were also burdened with inequitably high caseload according to multiple reports.

FIGURE 2

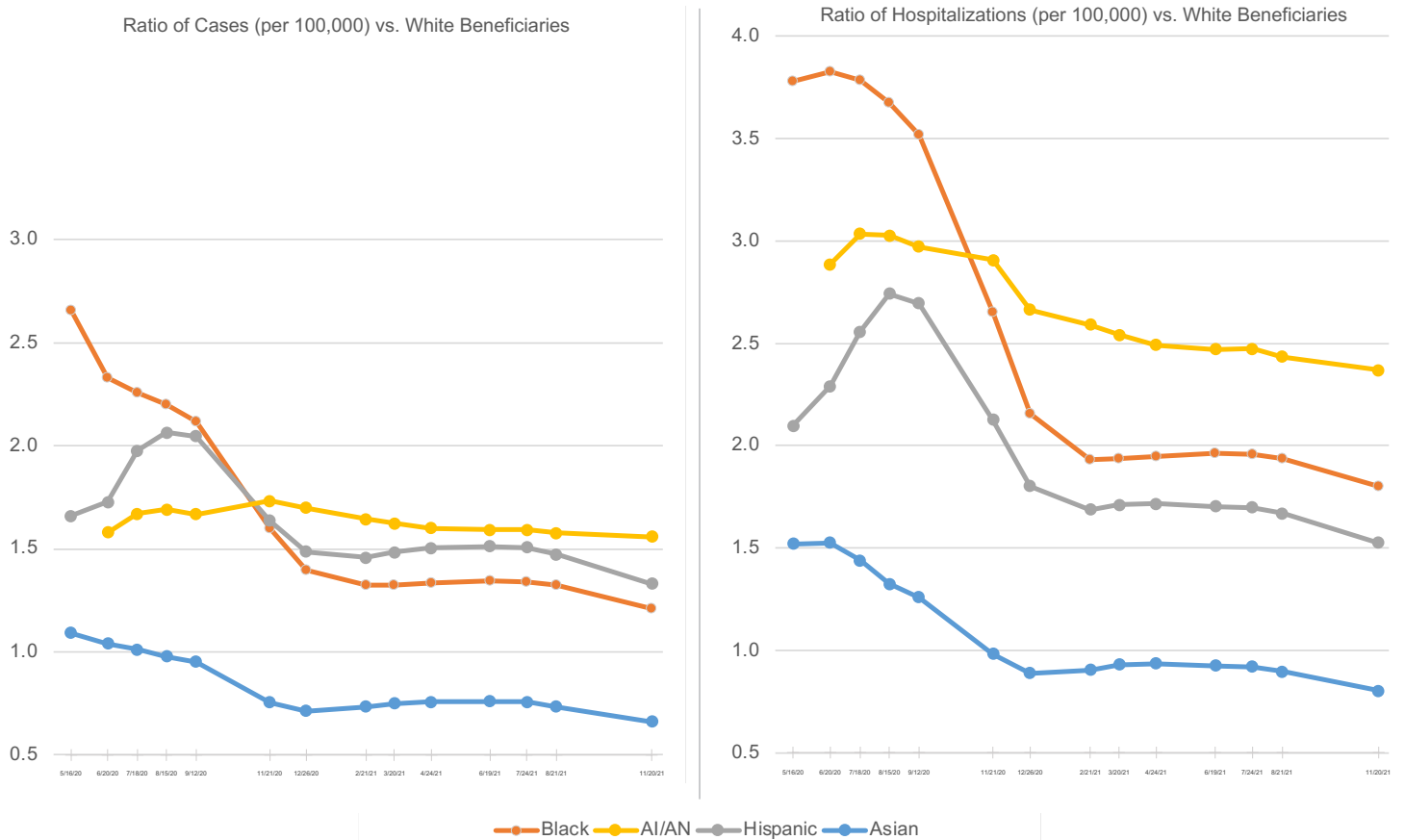
COVID-19 Hospitalizations per 100,000 by Racial and Ethnic Group (Medicare)*



Authors' analysis of all 14 available CMS data releases of cumulative COVID-19 Medicare claims, cumulative by May 16, June 20, July 18, August 14, September 12, November 21, December 26, 2020; and February 21, March 20, April 24, June 19, July 24, August 21, and November 20, 2021 using categories provided by CMS (*which may conflate race and ethnicity especially for Latinx communities, potentially obscuring inequities). AI/AN is "American Indians and Alaska Natives." AI/AN populations, while not disaggregated by the CDC in the first iteration of data through May 16 were also burdened with inequitably high caseload according to multiple reports.

FIGURE 3

Side-by-Side Comparison of Relative Rates of COVID-19 Cases and Hospitalizations by Racial and Ethnic Group (Medicare)*



Authors' analysis of all 14 available CMS data releases of cumulative COVID-19 Medicare claims, cumulative by May 16, June 20, July 18, August 14, September 12, November 21, December 26, 2020; and February 21, March 20, April 24, June 19, July 24, August 21, and November 20, 2021 using categories provided by CMS* (which may conflate race and ethnicity especially for Latinx communities, potentially obscuring inequities). Note that the hospitalization inequities are both wider and larger in magnitude than the case inequities. AI/AN is "American Indians and Alaska Natives." AI/AN populations, while not disaggregated by the CDC in the first iteration of data through May 16 were also burdened with inequitably high caseload according to multiple reports.

Connecting Medicare COVID-19 Inequities to Upstream Causes

Approaching our data brief from a qualitative perspective, we developed a new conceptual model connecting the observed caseload-hospitalization discrepancy to known upstream causes of inequities in the literature (**Figure 4**), briefly summarized below:

Upstream causes of caseload inequities.

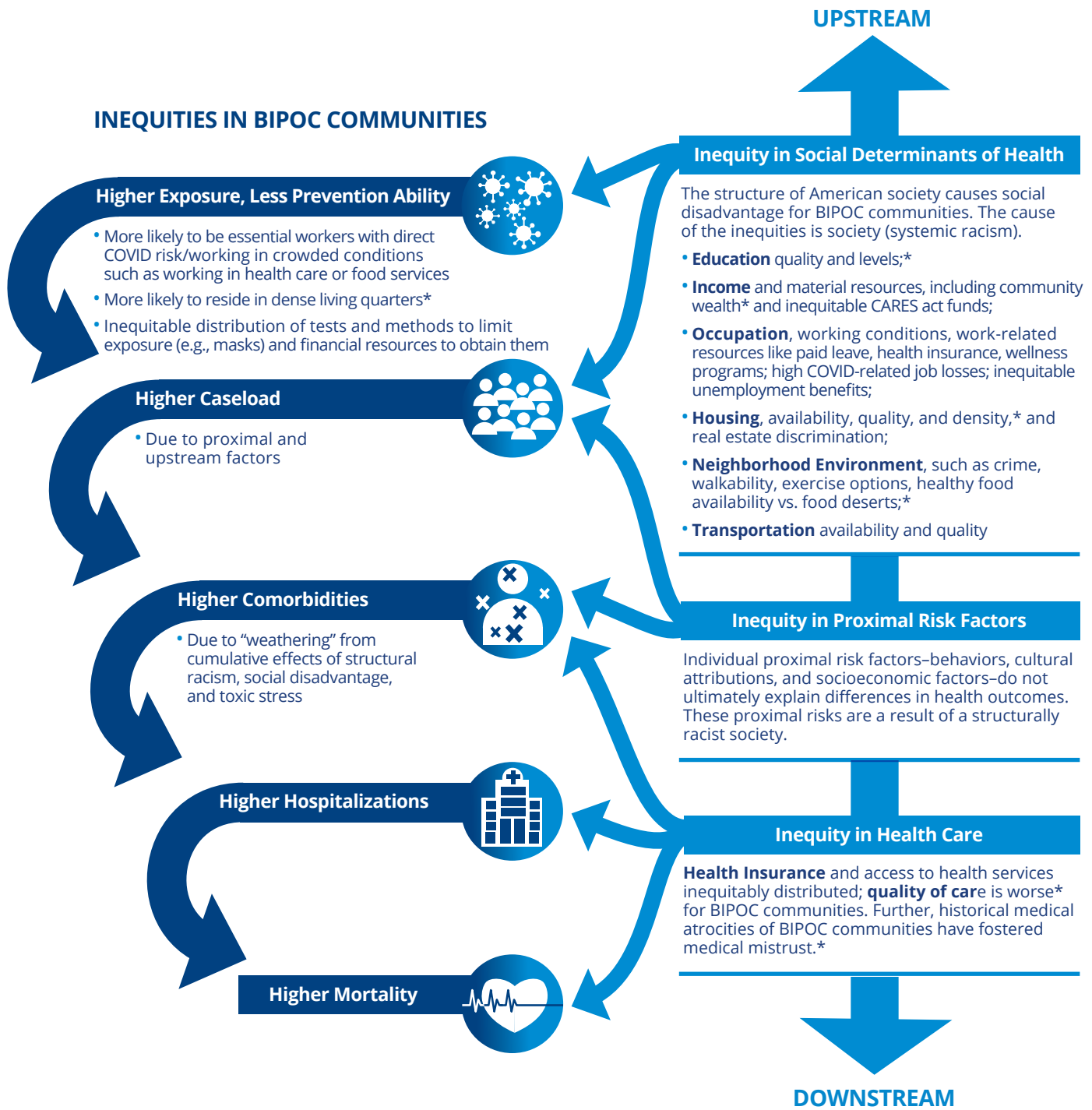
- Housing for older BIPOC populations—lower affordability and quality, and higher density all affect transmission,^{26–28} especially nursing homes affected by COVID-19 and multigenerational households³⁰ (despite the latter being significant source of social support and resilience).
- Family exposures and resources—higher multi-generational housing in older BIPOC introduces:
 - Inequitably higher COVID-19 exposures of working age family; for example, BIPOC working adults are more likely to be essential workers interacting with the public or caring for COVID-19 patients (health care, community housing, food services,³¹ schools,³² crowded spaces³³).
 - Inequitably lower family ability to prevent COVID-19 exposure; for example, lower financial resources to purchase masks, sanitizer, cleaning supplies, sufficient open space³⁴ (notably, working age BIPOC have higher COVID-related job loss,³⁵ lower receipt of unemployment benefits,³⁶ lower job recovery³⁵)
- Community testing: Black and Latinx communities had longer wait times for testing, understaffed testing centers, and more shortages of tests.³⁷
- See **Figure 4** for other factors not directly affecting older BIPOC but affecting transmission of family members and caregivers.

Upstream causes of accumulated toxic stress that cause downstream COVID comorbidities³⁸ resulting in widened hospitalization rates. Socioeconomic status, health insurance, access to care, quality of care, home environment, and myths of differences in biology or individual behavior due to race do not explain the following disparities^{9,39–42} that cause inequitable accumulation of toxic stress among older BIPOC:

- Inequitable distribution of neighborhoods and housing unsuitable for safe, active living (walkability/exercisability, crime,^{43,44} food insecurity,⁴⁵ historical mortgage redlining practices' health effects⁴⁶)
- Widening inequities in income, education,^{47,48} and English proficiency to improve access to health services and health-risk behaviors.³⁹
- Inequitable access to and quality of health services:
 - Access to, timely use of, and quality of health services prior to aging into Medicare are inequitably distributed.⁴⁹
 - Even among Medicare beneficiaries, who have health insurance, considerable research shows differences by race and ethnicity in access to preventive services, effective medical management of chronic conditions, mental health status, adverse health symptoms, and activities of daily living, among others.^{50–52} Despite BIPOC Medicare fee-for-service beneficiaries having higher absolute rates of COVID-19 mortality,²¹ COVID-19 mortality inequities looking at relative rate ratios are currently larger in working age populations⁵³ compared to prior, non-COVID years. This suggests that higher insurance coverage rates among older adults (largely due to Medicare) may have lessened COVID-19 death disparities.

FIGURE 4

Conceptual Model of How COVID-19 Inequities are Caused by Systemic Structural Racism and Social Determinants of Health



Authors’ linkage of downstream COVID-19 inequities to literature on upstream systemic structural racism and social drivers of health, guided by the conceptual model for action on the social determinants of health.¹⁹ *Causes more directly affect older adults.

Conclusion

Our analysis highlights the value of underutilized Medicare data in timely assessment of persistent racial and ethnic disparities in COVID-19 caseload and hospitalization. Wider-than-expected hospitalization inequities visualize lifelong accumulation of chronic stress due to BIPOC Medicare beneficiaries' older age. We linked these findings to literature in a conceptual model showing how systemic structural racism manifests in upstream (e.g., food and housing insecurity) and downstream determinants of poor health (e.g., health care access) that contribute to higher risk of COVID-19 infection, accumulation of chronic stress leading to comorbidities, and amplification of suffering for BIPOC during the pandemic. By definition, mitigating structural systemic racism requires system-level structural changes, which take time. Many policymakers stood up programs during the pandemic to address social needs. Findings from this data brief can be used by policymakers—in tandem with our companion issue brief on lessons from pandemic health policies to address social needs¹⁸—to help design and sustain these whole-person efforts.

Acknowledgments

The authors thank Humphrey Shen, BA for his assistance and Duke University's Robert J. Margolis, MD, Center for Health Policy for providing support. William K. Bleser, PhD, MSPH, has previously received consulting fees from Merck for research for vaccine litigation unrelated to this work, from BioMedical Insights, Inc. for subject matter expertise on value-based cardiovascular research unrelated to this work, from Gerson Lehrman Group, Inc. on health policy subject matter expertise unrelated to this work, and from StollenWerks LLC on health policy delivery system change unrelated to this work. He also serves as Board Vice President (uncompensated) for Shepherd's Clinic, a clinic providing free healthcare to the uninsured in Baltimore, MD. Robert Saunders, PhD, has a Consulting Agreement with Yale-New Haven Health System for development of measures and development of quality measurement strategies for CMMI Alternative Payment Models under CMS Contract Number 75FCMC18D0042/ Task Order Number 75FCMC19F0003, "Quality Measure Development and Analytic Support," Option Year 2. Mark B. McClellan, MD, PhD, is an independent director on the boards of Johnson & Johnson, Cigna, Alignment Healthcare, and PrognomiQ; co-chairs the Guiding Committee for the Health Care Payment Learning and

Action Network; and receives fees for serving as an advisor for Arsenal Capital Partners, Blackstone Life Sciences, and MITRE. All other authors report no disclosures. The Duke-Margolis Center for Health Policy values academic freedom and research independence, and its policies on research independence and conflict of interest are available at: <https://healthpolicy.duke.edu/research-independence-and-conflict-interest>.

About the Duke Margolis Center for Health Policy

The mission of the Robert J. Margolis, MD, Center for Health Policy at Duke University is to improve health, health equity, and the value of health care through practical, innovative, and evidence-based policy solutions. For more information, visit healthpolicy@duke.edu and follow us on Twitter [@DukeMargolis](https://twitter.com/DukeMargolis).

For more information about this brief, please contact: William K. Bleser at william.bleser@duke.edu.

References

- ¹ Harrison NR, Kroetsch A, Bleser W, Romine M, McClellan M. *COVID-19 Vaccines: Ensuring Regulatory and Scientific Integrity During the Approval Process*. Robert J. Margolis, MD, Center for Health Policy, Duke University; 2020. Accessed October 22, 2020. https://healthpolicy.duke.edu/sites/default/files/2020-10/COVID-19%20Vaccines%20-%20Regulatory%20and%20Scientific%20Credibility%20Final_1.pdf
- ² Oppel Jr RA, Gebeloff R, Lai KKR, Wright W, Smith M. The Fullest Look Yet at the Racial Inequity of Coronavirus. *The New York Times*. <https://www.nytimes.com/interactive/2020/07/05/us/coronavirus-latinos-african-americans-cdc-data.html>. Published July 5, 2020. Accessed October 8, 2020.
- ³ Centers for Disease Control and Prevention. Health Equity Considerations and Racial and Ethnic Minority Groups. Centers for Disease Control and Prevention. Published November 30, 2021. Accessed January 11, 2022. <https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html>
- ⁴ Joseph A. Amid pandemic, U.S. has seen 300,000 'excess deaths,' with highest rates among people of color. STAT. <https://www.statnews.com/2020/10/20/cdc-data-excess-deaths-covid-19/>. Published October 20, 2020. Accessed November 16, 2020.
- ⁵ Barrón-López L, Schneider E, Ollstein AM. 'People can't ignore it anymore': Across the country, minorities hit hardest by pandemic. POLITICO. <https://www.politico.com/news/2020/07/08/racial-disparities-coronavirus-political-divide-353226>. Published July 8, 2020. Accessed October 8, 2020.
- ⁶ Bowleg L. We're Not All in This Together: On COVID-19, Intersectionality, and Structural Inequality. *American Journal of Public Health*. 2020;110(7):917. doi:10.2105/AJPH.2020.305766
- ⁷ Centers for Disease Control and Prevention. Paving the Road to Health Equity. Published November 30, 2020. Accessed December 2, 2020. https://www.cdc.gov/minorityhealth/publications/health_equity/index.html
- ⁸ Hardeman RR, Murphy KA, Karbeah J, Kozhimannil KB. Naming Institutionalized Racism in the Public Health Literature: A Systematic Literature Review. *Public Health Reports*. 2018;133(3):240-249. doi:10.1177/0033354918760574
- ⁹ Dressler WW, Oths KS, Gravlee CC. Race and Ethnicity in Public Health Research: Models to Explain Health Disparities. *Annu Rev Anthropol*. 2005;34(1):231-252. doi:10.1146/annurev.anthro.34.081804.120505
- ¹⁰ Geronimus AT. To mitigate, resist, or undo: addressing structural influences on the health of urban populations. *American Journal of Public Health*. 2000;90(6):867-872. doi:10.2105/ajph.90.6.867
- ¹¹ Williams DR, Collins C. US Socioeconomic and Racial Differences in Health: Patterns and Explanations. *Annual Review of Sociology*. 1995;21(1):349-386. doi:10.1146/annurev.so.21.080195.002025
- ¹² Bonilla-Silva E. Rethinking Racism: Toward a Structural Interpretation. *American Sociological Review*. 1997;62(3):465. doi:10.2307/2657316
- ¹³ Gee GC, Ford CL. Structural Racism and Health Inequities: Old Issues, New Directions. Du Bois Review: *Social Science Research on Race*. 2011;8(1):115-132. doi:10.1017/S1742058X11000130
- ¹⁴ Aspen Institute Roundtable on Community Change, Lawrence K, Sutton S, Kubisch A, Susi G, Fullbright-Anderson K. *Structural Racism and Community Building*. Aspen Institute Roundtable on Community Change; 2004.
- ¹⁵ Scharff DP, Mathews KJ, Jackson P, Hoffsuemmer J, Martin E, Edwards D. More than Tuskegee: understanding mistrust about research participation. *Journal of Health Care for the Poor and Underserved*. 2010;21(3):879-897. doi:10.1353/hpu.0.0323
- ¹⁶ Centers for Medicare & Medicaid Services. Preliminary Medicare COVID-19 Data Snapshot. Published November 5, 2021. Accessed January 11, 2022. <https://www.cms.gov/research-statistics-data-systems/preliminary-medicare-covid-19-data-snapshot>
- ¹⁷ Geronimus AT, Hicken M, Keene D, Bound J. "Weathering" and age patterns of allostatic load scores among blacks and whites in the United States. *Am J Public Health*. 2006;96(5):826-833. doi:10.2105/AJPH.2004.060749
- ¹⁸ Bleser W, Shen H, Crook HL, et al. Pandemic-Driven Health Policies To Address Social Needs And Health Equity. *Health Affairs*; 2022. Accessed March 10, 2022. <https://www.healthaffairs.org/doi/10.1377/hpb20220210.360906/full/>
- ¹⁹ Solar O, Irwin A. *A Conceptual Framework for Action on the Social Determinants of Health*. World Health Organization; 2010. Accessed December 2, 2020. https://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf
- ²⁰ Majumder MS, Rose S. Health Care Claims Data May Be Useful For COVID-19 Research Despite Significant Limitations. *Health Affairs Blog*. Published October 6, 2020. Accessed October 9, 2020. <https://www.healthaffairs.org/doi/10.1377/hblog20201001.977332/full/>
- ²¹ Tarazi WW, Finegold K, Sheingold SH, Wong Samson L, Zuckerman R, Bosworth A. COVID-19-Related Deaths And Excess Deaths Among Medicare Fee-For-Service Beneficiaries. *Health Aff (Millwood)*. 2021;40(6):879-885. doi:10.1377/hlthaff.2020.02521
- ²² Chang MH, Moonesinghe R, Truman BI. COVID-19 Hospitalization by Race and Ethnicity: Association with Chronic Conditions Among Medicare Beneficiaries, January 1-September 30, 2020. *J Racial Ethn Health Disparities*. Published online January 8, 2021. doi:10.1007/s40615-020-00960-y
- ²³ Tsai Y, Vogt TM, Zhou F. Patient Characteristics and Costs Associated With COVID-19-Related Medical Care Among Medicare Fee-for-Service Beneficiaries. *Ann Intern Med*. Published online June 1, 2021. doi:10.7326/M21-1102
- ²⁴ Asch DA, Islam MN, Sheils NE, et al. Patient and Hospital Factors Associated With Differences in Mortality Rates Among Black and White US Medicare Beneficiaries Hospitalized With COVID-19 Infection. *JAMA Netw Open*. 2021;4(6):e2112842. doi:10.1001/jamanetworkopen.2021.12842
- ²⁵ Adashi EY, Gruppuso PA. The Centers for Medicare and Medicaid Services (CMS) COVID-19 Brief: Unsettling Racial and Ethnic Health Disparities. *J Am Board Fam Med*. 2021;34(Suppl):S13-S15. doi:10.3122/jabfm.2021.S1.200450
- ²⁶ Mehdipanah R. Housing as a Determinant of COVID-19 Inequities. *American Journal of Public Health*. 2020;110(9):1369-1370. doi:10.2105/AJPH.2020.305845
- ²⁷ Figueroa JF, Wadhera RK, Lee D, Yeh RW, Sommers BD. Community-Level Factors Associated With Racial And Ethnic Disparities In COVID-19 Rates In Massachusetts. *Health Affairs (Project Hope)*. Published online August 27, 2020:101377/hlthaff202001040. doi:10.1377/hlthaff.2020.01040

- ²⁸ Parker K, Horowitz J, Brown A, Fry R, Cohn D, Igielnik R. *What Unites and Divides Urban, Suburban and Rural Communities*. Pew Research Center; 2018. Accessed October 22, 2020. <https://www.pewsocialtrends.org/wp-content/uploads/sites/3/2018/05/Pew-Research-Center-Community-Type-Full-Report-FINAL.pdf>
- ²⁹ Gebeloff R, Ivory D, Richtel M, et al. Covid-19 and Nursing Homes: A Striking Racial Divide. *The New York Times*. <https://www.nytimes.com/article/coronavirus-nursing-homes-racial-disparity.html>. Published September 20, 2020. Accessed October 22, 2020.
- ³⁰ Lofquist DA. *Multigenerational Households: 2009–2011*. United States Census Bureau; 2012:1-7. Accessed July 18, 2020. <https://www2.census.gov/library/publications/2012/acs/acsbr11-03.pdf>
- ³¹ Williams JC, Anderson N, Holloway T, Samford E, Eugene J, Isom J. Reopening the United States: Black and Hispanic Workers Are Essential and Expendable Again. *American Journal of Public Health*. 2020;110(10):1506-1508. doi:10.2105/AJPH.2020.305879
- ³² Selden TM, Berdahl TA, Fang Z. The Risk Of Severe COVID-19 Within Households Of School Employees And School-Age Children. *Health Affairs (Project Hope)*. Published online September 17, 2020:101377hlthaff202001536. doi:10.1377/hlthaff.2020.01536
- ³³ Waltenburg MA, Victoroff T, Rose CE, et al. Update: COVID-19 Among Workers in Meat and Poultry Processing Facilities - United States, April-May 2020. *MMWR Morbidity and mortality weekly report*. 2020;69(27):887-892. doi:10.15585/mmwr.mm6927e2
- ³⁴ National Immigration Forum. Fact Sheet: Mixed Status Families and COVID-19 Economic Relief. Published online August 12, 2020. Accessed October 8, 2020. https://immigrationforum.org/wp-content/uploads/2020/08/Mixed-Status-Families-and-COVID-19-Economic-Relief_UPDATED.pdf
- ³⁵ Long H, van Dam A, Fowers A, Shapiro L. The covid-19 recession is the most unequal in modern U.S. history. *Washington Post*. <https://www.washingtonpost.com/graphics/2020/business/coronavirus-recession-equality/>. Published September 30, 2020. Accessed October 9, 2020.
- ³⁶ Kofman A, Fresques H. Black Workers Are More Likely to Be Unemployed but Less Likely to Get Unemployment Benefits. *ProPublica*. <https://www.propublica.org/article/black-workers-are-more-likely-to-be-unemployed-but-less-likely-to-get-unemployment-benefits?token=0ceHGXeAOXnSqRQtXN6xdb2ukKaUJw>. Published August 24, 2020. Accessed October 8, 2020.
- ³⁷ Vann M, Kim SR, Bronner L. White neighborhoods have more access to COVID-19 testing sites: ANALYSIS. ABC News. <https://abcnews.go.com/Politics/white-neighborhoods-access-covid-19-testing-sites-analysis/story?id=71884719>. Published July 22, 2020. Accessed October 8, 2020.
- ³⁸ Selden TM, Berdahl TA. COVID-19 And Racial/Ethnic Disparities In Health Risk, Employment, And Household Composition. *Health Affairs (Project Hope)*. 2020;39(9):1624-1632. doi:10.1377/hlthaff.2020.00897
- ³⁹ Lantz PM, Lynch JW, House JS, et al. Socioeconomic disparities in health change in a longitudinal study of US adults: the role of health-risk behaviors. *Soc Sci Med*. 2001;53(1):29-40.
- ⁴⁰ Boen C. The role of socioeconomic factors in Black-White health inequities across the life course: Point-in-time measures, long-term exposures, and differential health returns. *Social Science & Medicine (1982)*. 2016;170:63-76. doi:10.1016/j.socscimed.2016.10.008
- ⁴¹ Sommers BD, McMurtry CL, Blendon RJ, Benson JM, Sayde JM. Beyond Health Insurance: Remaining Disparities in US Health Care in the Post-ACA Era. *The Milbank Quarterly*. 2017;95(1):43-69. doi:10.1111/1468-0009.12245
- ⁴² Chowkwanyun M, Reed AL. Racial Health Disparities and Covid-19 - Caution and Context. *The New England Journal of Medicine*. 2020;383(3):201-203. doi:10.1056/NEJMp2012910
- ⁴³ Bereitschaft B. Equity in neighbourhood walkability? A comparative analysis of three large U.S. cities. *Local Environment*. 2017;22(7):859-879. doi:10.1080/13549839.2017.1297390
- ⁴⁴ Neckerman KM, Lovasi GS, Davies S, et al. Disparities in urban neighborhood conditions: evidence from GIS measures and field observation in New York City. *Journal of Public Health Policy*. 2009;30 Suppl 1:S264-285. doi:10.1057/jphp.2008.47
- ⁴⁵ Shanks CB, Hingle MD, Parks CA, Yaroch AL. The COVID-19 Pandemic: A Watershed Moment to Strengthen Food Security Across the US Food System. *American Journal of Public Health*. 2020;110(8):1133-1134. doi:10.2105/AJPH.2020.305760
- ⁴⁶ Poteat T, Millett GA, Nelson LE, Beyrer C. Understanding COVID-19 risks and vulnerabilities among black communities in America: the lethal force of syndemics. *Annals of Epidemiology*. 2020;47:1-3. doi:10.1016/j.annepidem.2020.05.004
- ⁴⁷ Nuru-Jeter AM, LaVeist TA. Racial segregation, income inequality, and mortality in US metropolitan areas. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*. 2011;88(2):270-282. doi:10.1007/s11524-010-9524-7
- ⁴⁸ Geronimus AT, Bound J, Waidmann TA, Rodriguez JM, Timpe B. Weathering, Drugs, and Whack-a-Mole: Fundamental and Proximate Causes of Widening Educational Inequity in U.S. Life Expectancy by Sex and Race, 1990-2015. *Journal of Health and Social Behavior*. 2019;60(2):222-239. doi:10.1177/0022146519849932
- ⁴⁹ Andersen RM, Davidson PL, Baumeister SE. Improving Access to Care. In: *Changing the U.S. Health Care System: Key Issues in Health Services Policy and Management*. 4th ed. Jossey-Bass; 2014:33-69.
- ⁵⁰ Lind KE, Hildreth KL, Perrillon MC. Persistent Disparities in Medicare's Annual Wellness Visit Utilization. *Med Care*. 2019;57(12):984-989. doi:10.1097/MLR.0000000000001229
- ⁵¹ Martin JY, Schiff MA, Weiss NS, Urban RR. Racial disparities in the utilization of preventive health services among older women with early-stage endometrial cancer enrolled in Medicare. *Cancer Med*. 2017;6(9):2153-2163. doi:10.1002/cam4.1141
- ⁵² Ng JH, Bierman AS, Elliott MN, Wilson RL, Xia C, Scholle SH. Beyond black and white: race/ethnicity and health status among older adults. *Am J Manag Care*. 2014;20(3):239-248.
- ⁵³ Rossen LM, Branum AM, Ahmad FB, Sutton P, Anderson RN. Excess Deaths Associated with COVID-19, by Age and Race and Ethnicity — United States, January 26–October 3, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(42):1522-1527. doi:10.15585/mmwr.mm6942e2