

# COVID-19 as Eco-Pandemic Injustice: Opportunities for Collective and Antiracist Approaches to Environmental Health

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## Abstract

The COVID-19 pandemic has coincided with a powerful upsurge in antiracist activism in the United States, linking many forms and consequences of racism to public and environmental health. This commentary develops the concept of *eco-pandemic injustice* to explain interrelationships between the pandemic and socioecological systems, demonstrating how COVID-19 both reveals and deepens structural inequalities that form along lines of environmental health. Using Pellow's critical environmental justice theory, we examine how the crisis has made more visible and exacerbated links between racism, poverty, and health while providing opportunities to enact change through *collective embodied health movements*. We describe new collaborations and the potential for meaningful opportunities at the intersections between health, antiracist, environmental, and political movements that are advocating for the types of transformational change described by critical environmental justice.

## Keywords

COVID-19, eco-pandemic injustice, embodied health movements, environmental and structural racism, environmental justice

Crises, wars, and disasters often disrupt existing relationships—individual, community, occupational, economic, and political—while also illuminating the alienated nature of those relationships and creating potential conditions for new postcrisis alignments. The COVID-19 pandemic has revealed how structures of inequality are bound with health and environmental outcomes and simultaneously increased awareness of racism as a public health crisis that has permeated the history of the United States (Lee, Bentz, and Vasquez 2020). Here, we develop the concept of *eco-pandemic injustice* to explain interrelationships between global infectious diseases such as COVID-19 and socioecological systems, demonstrating how COVID-19 both

exposes and deepens structural inequalities along lines of environmental health that contribute to higher morbidity and mortality for Black, Indigenous, and people of color (BIPOC) communities. Eco-pandemic injustice integrates well-developed areas of research

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on environmental justice, environmental health inequalities, and embodied health movements while identifying a particular form of environmental injustice that is exacerbated under conditions of extreme global crises. The concept thus makes evident and available for analysis the ecological and social causes of injustices that are heightened and made more visible by the pandemic. We use critical environmental justice theory as our conceptual framework (Pellow 2018).

Eco-pandemic injustice calls attention to otherwise less visible interconnections between injustices from the pandemic and environmental arenas, including toxic contamination and impact on infectious disease outcomes, human–animal contact, and climate change. For example, COVID-19 has increased awareness of the impacts of exposure to air pollutants and environmental chemicals that act as immunotoxins and the ways that habitat destruction increases zoonotic spillover and disease risk.

By unveiling and intensifying environmental and social crises, moments of eco-pandemic injustice provide windows of opportunity to enact change through *collective embodied health movements*, defined as social movement activism that is anchored in the varied, intersectional lived experience of the health, social, and economic impacts of illness (Brown et al. 2004). In the case of COVID-19, we anticipate two divergent but not mutually exclusive paths: further neoliberal entrenchment and disaster capitalism that deepens inequality on the one hand (Klein 2007) and justice-minded, anti-racist approaches to environmental health protections catalyzed through collective embodied health movements on the other (Brown et al. 2011).

This commentary is inspired by the work of our collaborators in communities impacted by per- and polyfluoroalkyl substances (PFAS), a large class of human-made chemicals that have contaminated drinking water near hundreds of military, industrial, and firefighting sites (Social Science Environmental Health Research Institute 2020). PFAS have immunotoxic effects, including a suppressed vaccine response (Grandjean et al. 2012), and higher levels of certain PFAS may be associated with increased risk of more severe COVID-19 (Grandjean et al. 2020).

The multiple ways that environmental contamination impacts COVID-19 susceptibility necessitate this environmental health analysis of COVID-19 as eco-pandemic injustice. Our examples are specific to the United States given the impact of U.S. governance structures on COVID-related inequality and the pandemic's magnitude in the United States. We believe that academics have a role to play in

understanding, critiquing, and reshaping scientific logics and practices to challenge inequity and advance justice. Eco-pandemic injustice provides conceptual leverage for better understanding and acting on the current crisis.

## COVID-19 AS ECO-PANDEMIC INJUSTICE

Eco-pandemic injustice extends beyond disproportionate environmental and health burdens to also recognize the links between environmental injustices and social inequities, including a lack of access to basic human needs, social recognition, and political and participatory rights (Schlosberg 2009). Eco-pandemic injustice can be closely analyzed using the four pillars of critical environmental justice (CEJ; Pellow 2018), which emphasizes intersections between forms of oppression and inequality, illuminates how some bodies are socially and politically categorized as “expendable,” acknowledges multiscalar causes of environmental injustice, and puts forward transformative understandings of social change.

First, we are attentive to multiple intersections of inequality and how inequality impacts health through multiple mechanisms. Medical sociology has shown that chronic diseases are amplified in incidence and severity when people face multiple stressors in family settings, community environments, interpersonal and work interactions, neighborhood effects, and political structures (Thoits 2010). The proliferation of COVID-19 research provides valuable opportunities to explore pathways that link the pandemic to environmental, biological, and social health factors.

Second, a CEJ perspective is cognizant of white supremacist and settler colonial ideology by recognizing excluded and marginalized individuals as indispensable to our collective futures (Pellow 2018). This includes incarcerated and detained populations as well as the disproportionate number of BIPOC, women, and undocumented workers that fill low-wage frontline jobs that have been deemed “essential” by the state. This categorization of only some bodies as essential reflects a fundamental prioritization of the economy over human life that is inseparable from the logics of racial capitalism, which requires the continual extraction of high-risk labor from Black and brown workers while repudiating accountability for their survival (Liebman, Rhiney, and Wallace 2020; Robinson 2000).

Third, CEJ calls attention to the scale and location of injustices and their links to white supremacy and settler colonialism (Pellow 2018). For example, exposure to air pollution has a substantial impact on health, including increased risk of cardiorespiratory disease. Air pollution is disproportionately produced by white people and disproportionately inhaled by Black and Latinx people (Tessum et al. 2019); research suggests a relationship between air pollution and COVID-19 mortality (Wu et al. 2020). The disparate impact of environmental contamination adds to the unequal impacts of COVID-19 experienced by BIPOC (Centers for Disease Control and Prevention 2020). Although racial and ethnic data are only available for 35% of total deaths in the United States, it shows the disproportionate infection and death rates for BIPOC. For example, Black Americans account for 34% of COVID-19 deaths but only make up 13% of the population (Johns Hopkins University & Medicine 2020).

Finally, in line with CEJ, the pandemic opens new opportunities for transformational change, giving new energy to movements targeting systemic injustices including racism, inadequate public health systems, and environmental pollution that increases disease susceptibility.

### *Exploiting the COVID-19 Crisis*

In disaster capitalism, governments exploit crises like COVID-19 to further a neoliberal agenda of conservative politics, austerity measures, and deregulation (Adams 2020; Klein 2007). The same month that President Trump declared COVID-19 a national emergency, the U.S. Environmental Protection Agency indefinitely suspended penalties for some environmental violations for companies who cited COVID-19 as their reason for noncompliance (Bodine 2020). Although public pushback led to the reversal of this policy, this suspension of regulatory activities during a pandemic occurred in the face of already plummeting environmental enforcement under the Trump administration (Environmental Data & Governance Initiative 2019). Even before the pandemic, the administration had dismantled or revoked 100 environmental rules (Popovich, Albeck-Ripka, and Pierre-Louis 2020).

Environmental and public health critics have accused the Trump administration of taking advantage of a time when “the public is distracted” and unable to fully engage against corporate deregulation (Friedman 2020). The continued relaxing of environmental regulatory enforcement during the pandemic, combined with the lack of protection for

frontline workers and communities, is indeed characteristic of disaster capitalism: exploiting a crisis as an occasion for deepening structural inequality while many people are disoriented and focused on daily survival (Klein 2007).

## **OPPORTUNITIES FOR CHANGE: EMBODIED AND ANTIRACIST APPROACHES TO ENVIRONMENTAL HEALTH**

Moments of eco-pandemic injustice create openings for social change by enabling new forms and alignments of social movement activism. COVID-19 has made more visible the precarity of most workers, chronic underfunding of public health infrastructure and overfunding of prisons and policing, failings of for-profit health care, limits of global supply chains, and unequal impacts of pollution. Social movement organizers continue to connect the dots between the systemic injustices across housing; health care; education; police brutality; the prison, military, and immigration industrial complexes domestically; and imperialism abroad. Antiracist protesters in multiple cities have highlighted connections between inadequate public housing, entrenched residential and occupational segregation, health inequalities, and state-sanctioned police brutality. Contemporary calls to defund the police recognize that American policing arose from slave patrols in the South and suppression of labor rebellions in the North as well as the inequality and white supremacy that is constitutive of contemporary policing and prisons (Davis 2005). High rates of COVID-19 in prisons, detention facilities, and meatpacking plants are a direct outgrowth of the logics of racial capitalism, state-sanctioned environmental racism, and austerity politics that have eviscerated social and public health infrastructure and bolstered policing and surveillance. These crises are rooted in the same fundamental cause: a system that privileges profit over human life (Pellow 2017; Prins and Story 2020). Although organizers and BIPOC public intellectuals have tirelessly promulgated these ideas for decades, the current juncture has made some people newly aware of the extent and intersectionality of these struggles.

### *Toward Antiracist Collective Embodied Health Movements*

The pandemic creates openings for new forms and alignments of social movement organizing in collective embodied health movements, social movement

activism based in lived experience in response to the COVID-19 crisis (Brown et al. 2004). Although impacts differ greatly and inequitably, nearly everyone has embodied experience with the pandemic, whether expending effort to avoid infection, occupying a liminal position of unknown infection, or personal COVID-19 illness. Historically, social movements stemming from environmental health concerns have been deeply tied to political activism. Foundational sociologist W.E.B. Du Bois ([1899] 1995) connected the systemic inequality of racism to education, employment, and poverty in the United States, emphasizing race-based health disparities and laying the foundation for an understanding of social factors as the fundamental causes of disease (Link and Phelan 1995). Activism around asthma (Loh 2005), lead (Korfmaier 2019), uranium mining (Brugge and Goble 2002), and naval artillery (McCaffrey 2002) were led by BIPOC and low-income people. Likewise, the women's health movement (Nelson 2015), environmental breast cancer movement (Zavestoski, McCormick, and Brown 2004), and reproductive rights organizing (Zavella 2020) were all rooted in feminist activism.

That COVID-19 coincided with the police murders of George Floyd, Ahmaud Arbery, and Breonna Taylor among countless others fueled a powerful upsurge in health activism, including embedding an understanding of racism as a public health crisis within governmental units and professional associations. Antiracism protesters in hundreds of cities have demanded an end to state-sanctioned racist violence. Despite concerns about community spread, few COVID-19 cases have been directly linked to mass demonstrations (Dave et al. 2020). These protests explicitly problematize state-sanctioned racist violence, critiquing how Black and other marginalized lives are made expendable. This social movement activism has raised the visibility of the many forms and consequences of racism, including connections to public and environmental health.

Links between Black political activism and health are not new. The Black Panther Party's health activism in the 1960s through 1970s established free health clinics for underserved communities, directly challenging medical discrimination by making visible the links between politics and health (Nelson 2011). More broadly, health politics in the 1960s were thoroughly intertwined with the general political unrest of the time (Chowkwanyun 2011). Similar opportunities present themselves in the disruptive moments of the current pandemic. Responding to a failed for-profit health care system, medical

professionals have developed COVID-19 safety protocols and nonprofit supply chains and have been outspoken about white supremacy as "a lethal public health issue" (Chappell 2020). This includes broad transsector approaches to bring health care workers into coalition with other collectives, including worker coalitions and unions, disability rights groups, climate justice activists, and tenant associations (Morse et al. 2020).

COVID-19 health protection can take on overtly political forms that intersect with antiracism protests. After workers at multiple Whole Foods stores were disciplined for wearing Black Lives Matter masks (Hauser 2020), customers and others protested at stores and at the home of Amazon/Whole Foods CEO Jeff Bezos. Other forms of community organizing have included the proliferation of mutual aid networks, sewing masks for health workers, and local restaurants and cooperative donations providing free meals to frontline workers. These mobilizations are direct responses to failures of state and federal governments to provide adequate social protections during the pandemic.

### *Deepening Inequality and/or Social Justice Collaborations?*

COVID-19 may ultimately further neoliberal entrenchment and deepen inequality in the style of disaster capitalism. The 1918 flu pandemic could have sparked change to address health care inequalities for Black Americans, but this did not happen (Wade 2020). Tens of millions of Americans filed for unemployment in 2020, impacts disproportionately experienced by BIPOC, those with less education, immigrants, and women (Kochhar 2020). The Trump administration supported bailouts for the meat and dairy industries, even as hundreds of thousands of workers at processing facilities were infected with COVID-19 due to a lack of worker protections (Taylor, Boulos, and Almond 2020).

Simultaneously, new collaborations have arisen at the intersections described above between health, antiracist, environmental, and political movements to advance the type of transformational change described by CEJ scholarship. In the convergence of these movements, "boundary actors" are working across topical and science/advocacy fields (Brown et al. 2004), demonstrating a commitment to self-education, advocating for people unlike themselves, and modeling what a more equitable society looks like individually and organizationally. Some activists point to reducing police budgets and redirecting those resources to fund public-directed

investment in education, health care, and housing (Black Lives Matter 2020). Some campaigns aim to educate communities on causes of systemic oppression, whereas others prioritize addressing structural inequalities (Kendi 2019). Declining fossil fuel demand and economic fallout for the energy sector during the COVID-19 crisis may aid long-standing direct activism against oil and gas pipelines, perhaps reflected in the defeat of the Atlantic Coast Pipeline (Tabuchi and Plumer 2020).

## CONCLUSION

Through the concept of eco-pandemic injustice, we observe how COVID-19 both reveals and deepens inequalities in the United States, highlighting relevant environmental and health disparities along intersectional axes of inequality. Eco-pandemic injustice is also manifested in the weaknesses of U.S. environmental regulatory and health care systems, a problem compounded by a federal government that has used the pandemic to expand its deregulatory agenda. Despite openings for greater social and environmental justice with the next presidential administration, the pandemic may still result in greater neoliberal entrenchment and the exacerbation of inequality, as is often the case following disaster events. Regulatory rollbacks and evidence of increasingly concentrated disadvantage and advantage demonstrate the inextricable links between neoliberal capitalism and harms to health and the environment.

However, recognizing and acting on inequality offers new opportunities to develop alternative approaches to environmental health in tandem with antiracist social movement activism, contributing to collective embodied health movements that center the lived experiences of the health, economic, and racial inequalities intensified by COVID-19. The social movement responses already observed suggest that transformational, multiscale change is possible, and further research is needed on the form and impacts of these social movement responses. Researchers and scientific institutions can provide essential support for this collective embodied health movement. We recognize the need for public health research to find avenues to rapidly collect data and disseminate analyses that advance understanding of the pandemic, guide response, and inform policymakers. Examples include the Johns Hopkins University COVID-19 Dashboard (Dong, Du, and Gardner 2020) and the Natural Hazards Center at the University of Colorado-Boulder, which supports quick-response research on extreme events

(University of Colorado-Boulder 2020). Academics can continue to lead this charge by mining existing cohort studies for COVID-relevant research with results informing disaster preparedness and public health action, and researchers at government health agencies can use existing federal environmental-reporting databases to expand understanding of modifiable environmental risk factors.

Scholarship in every discipline can be overtly antiracist, critically self-reflective, and focused on engaging with and supporting communities most impacted by global crises. As COVID-19 simultaneously exposes deep structural inequalities and creates opportunities to address them, there is the potential for the creation of collective, humanist, egalitarian structures and relationships that are better suited to preventing and weathering future pandemics and crises.

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## REFERENCES

- Adams, Vincanne. 2020. "Disasters and Capitalism... and Covid-19." *Somatosphere*. <http://somatosphere.net/2020/disaster-capitalism-covid19.html/>.
- Black Lives Matter. 2020. "BLM Global Network." [www.blacklivesmatter.com](http://www.blacklivesmatter.com).
- Bodine, Susan Parker. 2020. *Covid-19 Implications for EPA's Enforcement and Compliance Assurance Program*. Washington, DC: United States Environmental Protection Agency. <https://www.epa.gov/sites/production/files/2020-03/documents/oecamemooncovid19implications.pdf>.
- Brown, Phil, Rachel Morello-Frosch, Stephen Zavestoski, Laura Senier, Rebecca Altman, Elizabeth Hoover, Sabrina McCormick, Brian Mayer, and Crystal Adams. 2011. "Social Movements and Health" Pp. 117–37 in *Handbook of the Sociology of Health, Illness, and Healing a Blueprint for the 21st Century*, edited by B. A. Pescosolido, J. K. Martin, J. D. McLeod, and A. Rogers. New York, NY: Springer.
- Brown, Phil, Stephen Zavestoski, Sabrina McCormick, Brian Mayer, Rachel Morello-Frosch, and Rebecca Gasior Altman. 2004. "Embodied Health Movements: New Approaches to Social Movements in Health." *Sociology of Health & Illness* 26(1):50–80. doi:10.1111/j.1467-9566.2004.00378.x.
- Brugge, Doug, and Rob Goble. 2002. "The History of Uranium Mining and the Navajo People." *American Journal of Public Health* 92(9):1410–19. doi:10.2105/AJPH.92.9.1410.
- Centers for Disease Control and Prevention. 2020. "Preliminary Estimates of the Prevalence of Selected Underlying Health Conditions among Patients with



- Coronavirus Disease 2019—United States, February 12–March 28, 2020.” *Morbidity and Mortality Weekly Report* 69(13):382–86.
- Chappell, Bill. 2020. “Protesting Racism Versus Risking Covid-19: ‘I Wouldn’t Weigh These Crises Separately.’” *NPR*. <https://www.npr.org/sections/coronavirus-live-updates/2020/06/01/867200259/protests-over-racism-versus-risk-of-covid-i-wouldn-t-weigh-these-crises-separate>.
- Chowkwanyun, Merlin. 2011. “The New Left and Public Health the Health Policy Advisory Center, Community Organizing, and the Big Business of Health, 1967–1975.” *American Journal of Public Health* 101(2):238–49. doi:10.2105/AJPH.2009.189985.
- Dave, Dhaval M., Andrew I. Friedson, Kyutaro Matsuzawa, Joseph J. Sabia, and Samuel Safford. 2020. “Black Lives Matter Protests, Social Distancing, and Covid-19.” Working Paper No. 27408. National Bureau of Economic Research, Cambridge, MA.
- Davis, Angela. 2005. “Are Prisons Obsolete?” *Radical Philosophy Review* 8(1):83–96.
- Dong, Ensheng, Hongru Du, and Lauren Gardner. 2020. “An Interactive Web-Based Dashboard to Track Covid-19 in Real Time.” *The Lancet Infectious Diseases* 20(5):533–34. doi:10.1016/S1473-3099(20)30120-1.
- Du Bois, W. E. B. [1899] 1995. *The Philadelphia Negro: A Social Study*. Reprint, Philadelphia, PA: University of Pennsylvania Press.
- Environmental Data & Governance Initiative. 2019. “Update of Sheep in the Closet Report: EPA Enforcement Record in the Trump Administration through Fiscal Year 2018.” <https://envirodatagov.org/update-of-sheep-in-the-closet-report-epa-enforcement-record-in-the-trump-administration-through-fiscal-year-2018/>.
- Friedman, Lisa. 2020. “Coronavirus Doesn’t Slow Trump’s Regulatory Rollbacks.” *The New York Times*, March 25. <https://www.nytimes.com/2020/03/25/climate/coronavirus-environmental-regulations-trump.html>.
- Grandjean, Philippe, Elisabeth Wreford Andersen, Esben Budtz-Jørgensen, Flemming Nielsen, Kåre Mølbak, Pal Weihe, and Carsten Heilmann. 2012. “Serum Vaccine Antibody Concentrations in Children Exposed to Perfluorinated Compounds.” *Journal of the American Medical Association* 307(4):391–97. doi:10.1001/jama.2011.2034.
- Grandjean, Philippe, Clara Amalie Gade Timmermann, Marie Kruse, Flemming Nielsen, Pernille Just Vinholt, Lasse Boding, Carsten Heilmann, and Kåre Mølbak. 2020. “Severity of COVID-19 at Elevated Exposure to Perfluorinated Alkylates.” *PloS One* 15(12):e0244815. doi:10.1371/journal.pone.0244815.
- Hauser, Christine. 2020. “Whole Foods Punished Workers for Black Lives Matter Masks, Suit Says.” *The New York Times*, July 21. <https://www.nytimes.com/2020/07/21/business/whole-foods-black-lives-matter.html>.
- Johns Hopkins University & Medicine. 2020. “Coronavirus Resource Center: Racial Data Transparency.” <https://coronavirus.jhu.edu/data/racial-data-transparency>.
- Kendi, Ibram X. 2019. *How to Be an Antiracist*. New York, NY: One World.
- Klein, Naomi. 2007. *The Shock Doctrine: The Rise of Disaster Capitalism*. New York, NY: Picador.
- Kochhar, Rakesh. 2020. “Unemployment Rate Is Higher Than Officially Recorded, More So for Women and Certain Other Groups.” *Pew Research Center*. <https://pewrsr.ch/3ifZ0VU>.
- Korfmacher, Katrina Smith. 2019. *Bridging Silos: Collaborating for Environmental Health and Justice in Urban Communities*. Cambridge, MA: The MIT Press.
- Lee, Sandra Soo-Jin, Michael Bentz, and Emily Vasquez. 2020. “Covid-19 and America’s Racial Violence Are Inextricable.” *Health Affairs*, blog. <https://www.healthaffairs.org/doi/10.1377/hblog20200626.937724/full/>.
- Liebman, Alexander, Kevon Rhiney, and Rob Wallace. 2020. “To Die a Thousand Deaths: Covid-19, Racial Capitalism, and Anti-Black Violence.” *Human Geography* 13(3): 331–35. doi:10.1177/1942778620962038.
- Link, Bruce, and Jo Phelan. 1995. “Social Conditions as Fundamental Causes of Disease.” *Journal of Health and Social Behavior* Extra Issue:80–94.
- Loh, Penn. 2005. “T Riders’ Union: A Tale of Two Campaigns in Boston.” *Race, Poverty & the Environment* 12(1):47–50.
- McCaffrey, Katherine T. 2002. *Military Power and Popular Protest: The US Navy in Vieques, Puerto Rico*. New Brunswick, NJ: Rutgers University Press.
- Morse, Michelle, Amy Finnegan, Bram Wispelwey, and Chandra Ford. 2020. “Will Covid-19 Pave the Way for Progressive Social Policies? Insights from Critical Race Theory.” *Health Affairs*, blog. <https://www.healthaffairs.org/doi/10.1377/hblog20200630.184036/full/>.
- Nelson, Alondra. 2011. *Body and Soul: The Black Panther Party and the Fight against Medical Discrimination*. Minneapolis, MN: University of Minnesota Press.
- Nelson, Jennifer. 2015. *More Than Medicine: A History of the Feminist Women’s Health Movement*. New York, NY: NYU Press.
- Pellow, David N. 2017. “Environmental Inequalities and the US Prison System: An Urgent Research Agenda.” *International Journal of Earth & Environmental Sciences* 2:140–41.
- Pellow, David Naguib. 2018. *What Is Critical Environmental Justice?* Cambridge; Malden, MA: Polity Press.
- Popovich, Nadja, Livia Albeck-Ripka, and Kendra Pierre-Louis. 2020. “All 98 Environmental Rules the Trump Administration Is Revoking or Rolling Back.” *The New York Times*, May 10.

- Prins, Seth J., and Brett Story. 2020. "Connecting the Dots between Mass Incarceration, Health Inequity, and Climate Change." *American Journal of Public Health* 110(S1):S35–36. doi:10.2105/AJPH.2019.305470.
- Robinson, Cedric J. 2000. *Black Marxism the Making of the Black Radical Tradition*. Chapel Hill, NC: University of North Carolina Press.
- Schlosberg, David. 2009. *Defining Environmental Justice: Theories, Movements, and Nature*. New York, NY: Oxford University Press.
- Social Science Environmental Health Research Institute. 2020. "PFAS Contamination Database." <https://pfasproject.com/>.
- Tabuchi, Hiroko, and Brad Plumer. 2020. "Is This the End of New Pipelines?" *The New York Times*, July 8. <https://www.nytimes.com/2020/07/08/climate/dakota-access-keystone-atlantic-pipelines.html>.
- Taylor, Charles A., Christopher Boulos, and Douglas Almond. 2020. "Livestock Plants and Covid-19 Transmission." *Proceedings of the National Academy of Sciences (PNAS)* 117(50):31706–15. doi:10.1073/pnas.2010115117.
- Tessum, Christopher W., Joshua S. Apte, Andrew L. Goodkind, Nicholas Z. Muller, Kimberley A. Mullins, David A. Paoletta, Stephen Polasky, et al. 2019. "Inequity in Consumption of Goods and Services Adds to Racial-Ethnic Disparities in Air Pollution Exposure." *Proceedings of the National Academy of Sciences of the United States of America* 116(13):6001–6006. doi:10.1073/pnas.1818859116.
- Thoits, Peggy A. 2010. "Stress and Health: Major Findings and Policy Implications." *Journal of Health and Social Behavior* 51(Suppl):S41–53. doi:10.1177/0022146510383499.
- University of Colorado-Boulder. 2020. "University of Colorado-Boulder, Natural Hazards Center." <https://hazards.colorado.edu>.
- Wade, Lizzie. 2020. "An Unequal Blow." *Science* 368(6492):700–703. doi:10.1126/science.368.6492.700.
- Wu, X., R. C. Nethery, M. B. Sabath, D. Braun, and F. Dominici. 2020. "Air Pollution and Covid-19 Mortality in the United States: Strengths and Limitations of an Ecological Regression Analysis." *Science Advances* 6(45):eabd4049. doi:10.1126/sciadv.abd4049.
- Zavella, Patricia. 2020. *The Movement for Reproductive Justice: Empowering Women of Color through Social Activism*. Vol. 5. New York, NY: NYU Press.
- Zavestoski, Stephen, Sabrina McCormick, and Phil Brown. 2004. "Gender, Embodiment, and Disease: Environmental Breast Cancer Activists' Challenges to Science, the Biomedical Model, and Policy." *Science as Culture* 13(4):563–86.

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