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Weathering the Pandemic: Dying Old at a Young Age from Pre-Existing Racist Conditions

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Weathering the Pandemic: Dying Old at a Young Age from Pre-Existing Racist Conditions

Arline T. Geronimus, ScD*

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* Arline T. Geronimus is a Professor of Public Health at the University of Michigan. A member of the National Academy of Medicine, Dr. Geronimus originated a structurally-rooted biopsychosocial analytic framework, "weathering," positing that the health of marginalized communities becomes increasingly vulnerable to infection, chronic disease, adverse pregnancy outcomes, disability and death in young through middle-adulthood as a consequence of active, high-effort coping with racialized stressors, both objective and subjective. She studies the collective strategies communities employ to mitigate, resist, or undo these harms; the trade-offs these strategies reflect; and the perturbations public policies and laws sometimes cause in these autonomous protections. She thanks Kari Hong JD, Associate Professor at Boston College Law School, for recognizing the implications of weathering for habeas petitions during the COVID-19 pandemic; and Brooke Wilson J.D. Candidate, Class of 2021 Washington & Lee University School of Law for the invitation to participate in this symposium.

I. Introduction

After failing the literacy test in her first attempt to register to vote, Fannie Lou Hamer, the Mississippi 1960s civil rights activist who died at age fifty-nine, stated to the registrar of voters, “You’ll see me every 30 days till I pass [the test].”¹ Reflecting in later years on her persistence against the aggressive campaign to suppress the Black vote in the Jim Crow South, Mrs. Hamer observed,

I guess if I’d had any sense, I’d have been a little scared—but what was the point of being scared? The only thing they could do to me was kill me, and it kind of seemed like they’d been trying to do that a little bit at a time ever since I could remember.²

Mrs. Hamer’s words read as metaphor, but they are quite literal. Marginalized Americans are disproportionately more likely to suffer from chronic diseases and to die at much younger ages than their middle- and upper-class white counterparts.³ The disproportionate injury to the Black, Latinx and Native American populations caused by the COVID-19 pandemic, highly publicized police killings of George Floyd and Breonna Taylor, among too many others, and renewed aggressive attempts to suppress voting rights made 2020 a year of reckoning.⁴ The country is waking up

1. Jerry DeMuth, *Fannie Lou Hamer: Tired of Being Sick and Tired*, THE NATION, <https://www.thenation.com/article/archive/fannie-lou-hamer-tired-being-sick-and-tired/> (last updated June 1, 1964) [perma.cc/LVM6-75TF].

2. JAMES MACGREGOR BURNS, THE CROSSWINDS OF FREEDOM, THE AMERICAN EXPERIMENT, VOL. III, 636 (2012) (quoting Fannie Lou Hamer).

3. See, e.g., Arline T. Geronimus, John Bound, Timothy A. Waidmann, Javier M. Rodriguez, & Brenden Timpe, *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*, 60(2) J. OF HEALTH & SOC. BEHAV., 222, 222–23 (2019) (discussing loss of life via weathering as it correlates with race and sex); see also Arline T. Geronimus, Margaret Hicken, Dayna Keene, John Bound, *Weathering’ and Age-Patterns of Allostatic Load Scores among Blacks and Whites in the United States*, 96(5) AM. J. OF PUB. HEALTH 826, 831 (2006) (explaining variations in allostatic load [a measure of how the body processes wear and tear] based on sex and race); Arline T. Geronimus, John Bound, & Cynthia G. Colen, *Excess Black Mortality in the United States and in Select Black or White High-Poverty Areas, 1980–2000*, 101(4) AM. J. OF PUB. HEALTH 720, 721 (2011) (discussing correlations between race and mortality).

4. See Maria Godoy, *What Do Coronavirus Racial Disparities Look Like State By State?*, NPR, <https://www.npr.org/sections/health-shots/2020/05/30/865413079/what-do-coronavirus-racial-disparities-look-like->

to what Black Americans have known for centuries and what public health statistics have evidenced for decades: Systemic injustice—not just in the form of racist cops, but in the form of everyday life—takes a physical, too often deadly toll on Black, Brown, poor, and other culturally oppressed and politically marginalized communities.⁵

Mainstream social epidemiology now acknowledges the contributions of interpersonal racism, racialized stress, and implicit bias to population health inequity.⁶ It also increasingly recognizes that current and historical racist policies place barriers in the way of healthy lifestyles by institutionalizing food deserts, housing decay, and austerity urbanism.⁷ Essential as these developments are, they only skim the surface of how insidiously structural racism establishes and reproduces population health inequity.⁸ I coined the term “weathering” to describe the effects of sustained cultural oppression upon the body.⁹ Weathering expands

state-by-state (last updated May 30, 2020, 6:00 AM) (explaining the disproportionate impact of COVID-19 on BIPOC) [perma.cc/9BUC-G7GX]; see also Ailsa Chang & Rachel Martin, *Summer of Racial Reckoning*, NPR, <https://www.npr.org/2020/08/16/902179773/summer-of-racial-reckoning-the-match-lit> (last updated Aug. 16, 2020, 9:00 AM) (“George Floyd, Breonna Taylor and Ahmaud Arbery all became part of a rallying cry in cities and towns across the country, forcing the United States to confront the racism of its past and present.”) [perma.cc/M5QV-VDNH]; *Block the Vote: Voter Suppression in 2020*, ACLU (Feb. 3, 2020), <https://www.aclu.org/news/civil-liberties/block-the-vote-voter-suppression-in-2020/> (“Certain communities are particularly susceptible to suppression and in some cases, outright targeted—people of color, students, the elderly, and people with disabilities.”) [perma.cc/SZN5-Y5RT].

5. See Chang & Martin, *supra* note 4 (discussing the state of racial inequality in America).

6. See, e.g., David R. Williams, Jourdyn A. Lawrence, & Brigitte A. Davis, *Racism and Health: Evidence and Needed Research*, 40 ANN. REV. PUB. HEALTH 105, 105 (2019) (“Racism is considered a fundamental cause of adverse health outcomes for racial/ethnic minorities and racial/ethnic inequalities in health.”).

7. See e.g., *Building a Culture of Health*, ROBERT WOOD JOHNSON FOUND., <https://www.rwjf.org/en/how-we-work/building-a-culture-of-health.html> (explaining barriers to good health based on discrimination) [perma.cc/LD28-JJV9].

8. See Williams, Lawrence, & Davis, *supra* note 6, at 117 (discussing that “there is still much that we do not understand” and that further research is needed into the negative effects of racism and how to “dismantle racism” within healthcare).

9. See Arline T. Geronimus, *The Weathering Hypothesis and the Health of African-American Woman and Infants: Evidence and Speculations*, 2(3) ETHNICITY & DISEASE 207–8 (1992) (proposing the “weathering hypothesis”

on the more conventional “social determinants of health” approach to understand the contextually fluctuating and historically structured and situated material, environmental and biopsychosocial stressors that wear-out the health of oppressed populations and shape their high effort coping strategies.¹⁰ I call this process “weathering” because that word is a contronym: Weathering can be a sign of deterioration and erosion as in “the rock was weathering;” and weathering can also be the opposite: A sign of strength and endurance as in “the family is weathering the recession.”¹¹ For health and aging, it can be both.¹²

Weathering emphasizes health as an emergent capacity that dynamically develops over the lifespan in response to multiple nested and contextually fluctuating socioeconomic, psychosocial, and physical environmental stressors.¹³ When oppressed groups use Mrs. Hamer’s words and speak of being “sick and tired of being sick and tired,” they are right, physiologically as well as existentially. To be weathered is to be subjected to the structural challenges and existential insults that our society creates for those we marginalize.¹⁴ Weathering also refers to how oppressed groups strategically organize family economic and caretaking systems to

for detreating health of African-American women).

10. See Arline T. Geronimus, Jay A. Pearson, Erin Linnenbringer, Alexa K. Eisenberg, Carmen Stokes, Landon D. Hughes, & Amy J. Schulz, *Weathering in Detroit: Place, Race, Ethnicity, and Poverty as Conceptually Fluctuating Social Constructs Shaping Variation in Allostatic Load*, 98(4) MILBANK Q. 1171, 1174 (2020) (discussing that weathering is the result of “collectively patterned coping strategies” and results in “biological wear and tear” to the body); see also Arline T. Geronimus, Jay A. Pearson, Erin P. Linnenbringer, Amy J. Schulz, Angela G. Reyes, Elissa S. Epel, Jue Lin, & Elizabeth H. Blackburn, *Race/Ethnicity, Poverty, Urban Stressors and Telomere Length in a Detroit Community-Based Sample*, 56(2) J. OF HEALTH & SOC. BEHAV. 199, 199 (2015) (describing a telomere length difference based on wealth and race which point to health outcomes that are “products of structurally rooted biopsychosocial processes”).

11. See Geronimus, *supra* note 10, at 1174 (explaining the weathering theory).

12. See *id.* at 1175 (discussing the accelerated cellular aging and other effects which result from “high-effort coping” and the “evidence of weathering has been well documented in the United States for blacks”).

13. See *id.* (“The concept of allostatic load—the idea that overexposure to stress hormones can cause wear and tear on important body systems—suggests one plausible biological mechanism for weathering.”).

14. See *id.* at 1174–75 (explaining the “physical environment and social exposures” of “material hardship and social exclusion” result in weathering).

resist such erosion, and how these tenacious and hopeful efforts, while, on balance, protective, can also exact health costs.¹⁵

A. What Is Weathering from a Biological Mechanistic Perspective?

Weathering is what happens to human bodies down to the cellular level when they grow, develop, and age in a systemically racist, classist, religiously intolerant, gender binary, or xenophobic society.¹⁶ Weathering leaves members of oppressed populations more likely to die or suffer chronic disease and disability long before they are chronologically old.¹⁷ No matter their work ethic or how decently they live—even, in part, *because* of how hard they work in the face of system-wide barriers—members of culturally sidelined groups weather.¹⁸

15. See Sherman A. James, *John Henryism and the Health of African Americans*, 18(2) *CULTURE, MED., & PSYCHIATRY* 163, 163 (1994) (discussing the interaction between “psychosocial environmental stressors” and African-American “selected core values of American culture” regarding hard work and success); see also Arline T. Geronimus, *To Mitigate, Resist, or Undo: Addressing Structural Influences on the Health of Urban Populations*, 90 *AM. J. OF PUB. HEALTH* 867, 867 (2000) (“Broad social and economic policies that intensify poverty or undermine autonomous protections can reap dire consequences for health.”); Arline T. Geronimus & J. Phillip Thompson, *To Denigrate, Ignore, or Disrupt: Racial Inequality in Health and the Impact of a Policy-Induced Breakdown of African American Communities*, 1(2) *DU BOIS REV.: SOC. SCI. RES. ON RACE* 247, 253 (2004) (discussing how family ties are “especially salient to Blacks in high-poverty areas” and that members of these groups “cannot take a moratorium from family responsibility”); Carol Stack & Linda Burton, *Kinscripts*, 24(2) *J. OF COMP. FAM. STUD.* 157, 158 (1993) (“Kinscripts, in contrast [to white middle class families], is an example of a framework that is derived from the study of low-income black families . . .”).

16. See Geronimus, *supra* note 10, at 1175 (“The concept of allostatic load—the idea that overexposure to stress hormones can cause wear and tear on important body systems—suggests one plausible biological mechanism for weathering.”).

17. See *id.* at 1175 (discussing how “prolonged psychosocial or physical challenges” can accelerate cellular aging resulting in increased susceptibility to infectious disease and “the early onset of chronic conditions, health-induced disability, and excess death”).

18. See *id.* at 1196 (explaining that their findings “suggest an interaction between race/ethnicity and poverty group within the Detroit sample” which results in weathering).

Through weathering, members of marginalized populations age young.¹⁹ How? Human bodies are adapted for short bouts of fight or flight in the face of acute life-or-death threats.²⁰ Mechanistically, the physiological stress response increases breathing, heart rate, and blood pressure to circulate oxygenated blood towards large muscles quickly.²¹ The body activates the sympathetic nervous system (SNS) to release the stress hormones norepinephrine and epinephrine and triggers the hypothalamic-pituitary-adrenal (HPA) axis to release the stress hormone cortisol.²² SNS activation causes the veins in our body to constrict, increasing blood pressure as the heart pumps with greater force.²³ The released stress hormones also activate a

19. See Geronimus, *supra* note 10, at 199 (finding that health outcomes are tied with race and socioeconomic statuses and that “health impacts of social identity” are “products of structurally rooted biopsychosocial processes”); see also Arline T. Geronimus, Margaret T. Hicken, Jay A. Pearson, Sarah J. Seashols, Kelly L. Brown, & Tracey Dawson Cruz, *Do U.S. Black Women Experience Stress-related Accelerated Biological Aging? A Novel Theory and First Population-Based Test of Black-White Differences in Telomere Length*, 21 *HUM. NATURE* 1938, 1938 (2010) (“We hypothesize that black women experience accelerated biological aging in response to repeated or prolonged adaptation to subjective and objective stressors.”); Sarah Forrester, David Jacobs, Rachel Zmora, Pamela Schreiner, Veronique Roger, & Catarina I. Kiefe, *Racial Differences in Weathering and Its Associations with Psychosocial Stress: The CARDIA Study*, 7 *SOC. SCI. MED.—POPULATION HEALTH* 1, 1 (2019) (“We confirmed racial differences in weathering, and newly documented that similar psychosocial factors may take a greater toll on the biological health of Blacks than Whites.”).

20. See A. S. Jansen, X. V. Nguyen, V. Karpitskiy, T. C. Mettenleiter, & A. D. Loewy, *Central Command Neurons of the Sympathetic Nervous System: Basis of the Fight-or-Flight Response*, 270 *SCIENCE* 644, 644 (1995) (“The sympathetic nervous system regulates a broad range of visceral functions and, during extreme emotional or physical states, activates both the cardiovascular and adrenal catecholamine systems for homeostatic adjustments.”).

21. See *What Happens to Your Body During the Fight or Flight Response*, CLEVELAND CLINIC, <https://health.clevelandclinic.org/what-happens-to-your-body-during-the-fight-or-flight-response/> (last updated Dec. 9, 2019) (explaining the physical response of the body to the fight or flight response) [perma.cc/84GE-P3NM].

22. See James P. Herman, Jessica M. McKlveen, Sriparna Ghosal, Brittany Kopp, Aynara Wulsin, Ryan Makinson, Jessie Scheimann, & Brent Myers, *Regulation of the Hypothalamic-Pituitary-Adrenocortical Stress Response*, 6 *COMPREHENSIVE PHYSIOLOGY* 603, 603 (2016) (“Activation of the HPA axis causes secretion of glucocorticoids [stress hormone cortisol], which act on multiple organ systems to redirect energy resources to meet real or anticipated demand.”).

23. See *id.* at 604 (describing the response to release of cortisol as “increased

breakdown of triglycerides in fat cells, protein in non-exercising muscles, and glycogen in other body cells.²⁴ (Glycogen is a form of glucose stored in reserve mainly in the liver and the skeletal muscles.²⁵ When energy is needed, glycogen is quickly mobilized to deliver the body the fuel that it needs).²⁶ Meanwhile, cortisol also disrupts any insulin in the bloodstream from storing these energy sources back into their storage cells.²⁷ As a result, the blood stream is flooded with glucose, fatty acids, and amino acids that are used to fuel the muscles in the body and respond to the stressor.²⁸ The

heart rate, increased blood pressure, increased hepatic glucose production, etc.”).

24. See *id.* at 604–05 (“For example, following acute or chronic exposure to glucocorticoids (e.g., under conditions of chronic stress) promote hepatic glycogenolysis and lipolysis, releasing stored energy.”).

25. See JM BERG, JL TYMOCZKO, & L. STRYER, *BIOCHEMISTRY*, CH. 21 (5th ed. 2002), <https://www.ncbi.nlm.nih.gov/books/NBK21190/> (“The two major sites of glycogen storage are the liver and skeletal muscle . . .”) [perma.cc/GJ7P-2R7S].

26. See Herman et al., *supra* note 22, at 604–05 (“For example, following acute or chronic exposure to glucocorticoids (e.g., under conditions of chronic stress) promote hepatic glycogenolysis and lipolysis, releasing stored energy.”).

27. See *Beware High Levels of Cortisol, the Stress Hormone*, PREMIER HEALTH (Feb. 5, 2017), <https://www.premierhealth.com/your-health/articles/women-wisdom-wellness-/beware-high-levels-of-cortisol-the-stress-hormone> (explaining that cortisol not only triggers an immediate release of glucose but that it “also inhibits insulin production so the glucose won’t be stored but will be available for immediate use”) [perma.cc/DW24-FJUW].

28. See Paul H. Black & Lisa D. Garbutt, *Stress, Inflammation and Cardiovascular Disease*, 52(1) J. OF PSYCHOSOMATIC RES. 1, 13 (2002) (“With repeated or chronic stress corticosteroids, together with fatty acids, cause insulin resistance in peripheral tissues, which may result in hyperglycemia.”); see also Sheldon Cohen, Denise Janicki-Deverts, & Gregory E. Miller, *Psychological Stress and Disease*, 298(14) JAMA 1685, 1685 (2007) (examining “the plausibility of the belief that stress contributes to a variety of disease processes . . .”); Elissa S. Epel & Gordon J. Lithgow, *Stress Biology and Aging Mechanisms: Toward Understanding the Deep Connection Between Adaptation to Stress and Longevity*, 69 J. OF GERONTOLOGY SERIES A: BIOMEDICAL SCI. AND MED. SCI. S10, S10 (2014) (“The psychological stress response promotes regulatory changes important in aging (e.g., increases in stress hormones, inflammation, oxidative stress, insulin).”); Tara L. Gruenewald, Sheldon Cohen, Karen A. Matthews & Tracy R. Seeman, *Association of Socioeconomic Status with Inflammation Markers in Black and White Men and Women in the Coronary Artery Risk Development in Young Adults (CARDIA) Study*, 69(3) SOC. SCI. & MED. 451, 451 (2009) (“Growing evidence also suggests [socioeconomic status] gradients in levels of peripheral blood markers of inflammation.”); Denise Janicki-Deverts, Sheldon Cohen, Karen A. Matthews & Mark R. Cullen, *History of Unemployment Predicts Future Elevations in C-reactive Protein among Male Participants in the Coronary Artery Risk Development in Young Adults (CARDIA) Study*, 36(2) ANNALS OF BEH. MED. 176, 176 (2008) (finding that a history of unemployment in male participants

unleashing of this complex cascade into our system can also physiologically propel people toward eating “comfort” foods, high in fats and sugars and to experience drug cravings.²⁹

predicted future C-reactive proteins which are associated with coronary artery risk); ROBERT M. SAPOLSKY, WHY ZEBRAS DON'T GET ULCERS: THE ACCLAIMED GUIDE TO STRESS, STRESS-RELATED DISEASES, AND COPING (2004); Henry Holt, Yoichi Chida & Mark Hamer, *Chronic Psychosocial Factors and Acute Physiological Responses to Laboratory-Induced Stress in Healthy Populations: A Quantitative Review of 30 Years of Investigations*, 134(6) PSYCHOL. BULL. 829, 829 (2008) (analyzing numerous studies into “acute stress responsivity”); Stephen J. Bunker, David M. Colquhoun, Murray D. Esler, Ian B. Hickie, David Hunt, V. Michael Jelinek & Andrew M. Tonkin, *Stress and Coronary Heart Disease: Psychosocial Risk Factors*, 178(6) MED. J. OF AUSTRALIA, 272, 272 (2003) (examining how psychosocial risk factors are associated with coronary heart disease); Moisés E. Bauer, Cristina M. Moriguchi & Jecke Clairice, *The Role of Stress Factors during Aging of the Immune System*, ANNALS OF THE N. Y. ACAD. OF SCI. 1153, 1153 (2009) (suggesting that how the immune system ages may be closely related to chronic stress); S. Demissie, D. Levy, E.J. Benjamin, L.A. Cupple, J.P. Gardner, A. Herbert, M. Kimura, M.G. Larson, J.B. Meigs, J.F. Keaney & A. Aviv, *Insulin Resistance, Oxidative Stress, Hypertension, and Leukocyte Telomere Length in Men from the Framingham Heart Study*, 5(4) AGING CELL. 325, 325 (2006) (examining the relationship between telomere length with insulin resistance, oxidative stress and hypertension); David G. Harrison, Kathy K. Griendling, Ulf Landmesser, Burkhard Hornig & Helmut Drexler, *Role of Oxidative Stress in Atherosclerosis*, 91(3) THE AM. J. OF CARDIOLOGY. 7, 7–8 (2003) (“Oxidative stress in humans with coronary artery disease is also exacerbated by a reduction of vascular extracellular superoxide dismutase, normally an important protective enzyme against the superoxide anion.”); Constantine Tsigos & George P. Chrousos, *Hypothalamic–Pituitary–Adrenal Axis, Neuroendocrine Factors and Stress*, 53(4) J. OF PSYCHOSOMATIC RES. 865, 866 (2002) (discussing the adaptive response systems of organisms); Carol T. Miller & Cheryl R. Kaiser, *A Theoretical Perspective on Coping With Stigma*, 57(1) J. OF SOC. ISSUES 73, 73 (2001) (providing a theoretical perspective on coping with stigma and responses related to stigma-related stressors); Gregory E. Miller, Edith Chen, Alexandra K. Fok, Hope Walker, Alvin Lim, Erin F. Nicholls & Michael S. Kobor, *Low Early-Life Social Class Leaves a Biological Residue Manifested by Decreased Glucocorticoid and Increased Proinflammatory Signaling*, 106(34) PROCEEDINGS OF THE NAT'L ACAD. OF SCI. OF THE U.S. 14716, 14716 (2009) (“Children reared in unfavorable socioeconomic circumstances show increased susceptibility to the chronic diseases of aging when they reach the fifth and sixth decades of life.”); Sheila F. Castañeda, Christine Buelna, Rebecca Espinoza Giacinto, Linda C. Gallo, Daniela Sotres-Alvarez, Patricia Gonzalez, Addie L. Fortmann, Sylvia Wassertheil-Smoller, Marc D. Gellman, Aida L. Giachello & Gregory A. Talavera, *Cardiovascular Disease Risk Factors and Psychological Distress among Hispanics/Latinos: The Hispanic Community Health Study/Study of Latinos (HCHS/SOL)*, 87 PREVENTIVE MED. 144, 144 (2016) (studying the relationship between cardiovascular disease risk factors and psychological distress in Hispanic/Latino populations in large metropolitan areas).

29. See generally S. R. Dube, R. S. Caraballo, S. S. Dhingra, W.S. Pearson,

The hormonal cascade activated by the physiological stress reaction recedes in a matter of minutes when triggered in response to occasional, acute life-threatening encounters. However, the same physiological response that protects us against immediate and finite life-or-death threats can be damaging if it is sustained, whether through repeated acute or chronic adverse experiences, exposures, thoughts, or protracted vigilance.³⁰ Moreover, such exposures are often psychosocial rather than direct physical attacks.³¹ They can encompass fears and anxieties, sustained cognitive and emotional engagement with social injustice or material hardship, and vigilance to threat.³² Injustice and trauma

A.K. McClave, T.W. Strine, J.T. Berry & A.H. Mokdad, *The Relationship Between Smoking Status and Serious Psychological Distress: Findings from the 2007 Behavioral Risk Factor Surveillance System*, 54(1) INT'L J. OF PUB. HEALTH 68 (2009) (explaining that there is an association between smoking behaviors and psychological distress and that tobacco prevention efforts should address mental health components); *see also*, E. Epel, R. Lapidus, B. McEwen & K. Brownell, *Stress May Add Bite to Appetite in Women: A Laboratory Study of Stress-Induced Cortisol and Eating Behavior*, 26(1) PSYCHONEUROENDOCRINOLOGY 37, 37 (2001) (finding that when exposed to stress food consumption increased and suggesting that “psychophysiological response to stress may influence subsequent eating behavior” and impact health over time); Lisa M. Groesz, Shannon McCoy, Jenna Carl, Laura Saslow, Judith Stewart, Nancy Adler, Barbara Laraia & Elissa Epel, *What is Eating You? Stress and the Drive to Eat*, 58(2) APPETITE 717, 717 (2012) (examining “the relationship between stress (perceived and chronic)” in women and finding a greater stress was associated with “greater drive to eat-including feelings of disinhibited eating, binge eating, hunger, and more ineffective attempts to control eating”).

30. *See* Cohen et al., *supra* note 28, at 1685 (examining “the plausibility of the belief that stress contributes to a variety of disease processes”); *see also* Epel & Lithgow, *supra* note 28, at S10 (2014) (“The psychological stress response promotes regulatory changes important in aging (e.g., increases in stress hormones, inflammation, oxidative stress, insulin).”); *see generally* Cohen et al., *supra* note 28 and accompanying text.

31. *See* Bauer et al., *supra* note 28, at 1153 (suggesting that how the immune system ages may be closely related to chronic stress); *see also* Demissie et al., *supra* note 28, at 325 (examining the relationship between telomere length with insulin resistance, oxidative stress and hypertension); Harrison et al., *supra* note 28, at 7–8 (“Oxidative stress in humans with coronary artery disease is also exacerbated by a reduction of vascular extracellular superoxide dismutase, normally an important protective enzyme against the superoxide anion.”).

32. *See* Bauer et al., *supra* note 28, at 1153 (suggesting that how the immune system ages may be closely related to chronic stress); *see also* Demissie et al., *supra* note 28, at 325 (examining the relationship between telomere length with insulin resistance, oxidative stress and hypertension); Harrison et al., *supra* note 28, at 7–8 (“Oxidative stress in humans with coronary artery disease is also exacerbated by a reduction of vascular extracellular superoxide dismutase,

can be relived or ruminated upon without a clear endpoint.³³ In these cases, one's state of physiological stress arousal will not recede quickly, and psychologically adverse experiences can remain physiologically stressful far beyond their actual occurrence.³⁴ Elevated heart rates activated by a stressful exposure can continue for hours and even days beyond the encounter, itself, even during sleep.³⁵ Sometimes, the toothpaste cannot be put back in the tube. Yet, if the physiological stress process is not completely deactivated, the body experiences overexposure to stress hormones.³⁶ Long periods of overexposure to physiological stressors result in "allostatic load," or stress-mediated wear and tear throughout the body, which is associated with multisystem health vulnerability and dysregulation, damaged tissues and organs, and accelerated cell aging.³⁷

normally an important protective enzyme against the superoxide anion.").

33. See Miller & Kaiser, *supra* note 28, at 73 (providing a theoretical perspective on coping with stigma and responses related to stigma-related stressors); see also Miller et al., *supra* note 28, at 14716 ("Children reared in unfavorable socioeconomic circumstances show increased susceptibility to the chronic diseases of aging when they reach the fifth and sixth decades of life."); Castañeda et al., *supra* note 28, at 144 (studying the relationship between cardiovascular disease risk factors and psychological distress in Hispanic/Latino populations in large metropolitan areas).

34. See Bauer et al., *supra* note 28, at 1153 (suggesting that how the immune system ages may be closely related to chronic stress); see also Demissie et al., *supra* note 28, at 325 (examining the relationship between telomere length with insulin resistance, oxidative stress and hypertension); Harrison et al., *supra* note 28, at 7–8 ("Oxidative stress in humans with coronary artery disease is also exacerbated by a reduction of vascular extracellular superoxide dismutase, normally an important protective enzyme against the superoxide anion."); Miller & Kaiser, *supra* note 28, at 73 (providing a theoretical perspective on coping with stigma and responses related to stigma-related stressors); Miller et al., *supra* note 28, at 14716 ("Children reared in unfavorable socioeconomic circumstances show increased susceptibility to the chronic diseases of aging when they reach the fifth and sixth decades of life."); Castañeda et al., *supra* note 28, at 144 (studying the relationship between cardiovascular disease risk factors and psychological distress in Hispanic/Latino populations in large metropolitan areas).

35. See Tsigos & Chrousos, *supra* note 28, at 865 (discussing the adaptive response systems of organisms); see also Miller & Kaiser, *supra* note 28, at 73 (providing a theoretical perspective on coping with stigma and responses related to stigma-related stressors).

36. See generally Holt & Chida, *supra* note 28, at 829 (analyzing numerous studies into "acute stress responsivity").

37. See Bruce S. McEwen, *Protective and Damaging Effects of Stress*

Weathering stressors go well beyond the stresses one cognitively perceives or identifies as “stress.”³⁸ They can be objective and environmental—for example, being exposed to toxic environmental and ambient stressors like air or noise pollution or living through a very cold winter with rodents but not heat in your apartment.³⁹ They can be subjective, such as having sustained cognitive and emotional engagement with your landlord while trying to persuade him to fix the furnace over weeks, months or even years. They can be massive, such as when your child is ripped away from you at the border as you cross to seek asylum;⁴⁰ or you experience a militarized drug raid of your apartment while your kids and elderly grandmother hide in the corners of the room and the police refuse to realize they have the wrong address;⁴¹ or if you are subjected to—or even simply hear about—a militarized ICE raid in a meat packing plant that employs people who share your

Mediators, 8 DIALOGUES IN CLINICAL NEUROSCIENCE 367, 368 (2006) (“Because chronically increased allostasis can lead to disease, we introduced the term ‘allostatic load or overload’ to refer to the wear and tear that results from either too much stress or from inefficient management of allostasis, eg, not turning off the response when it is no longer needed.”); *see also* Arline T. Geronimus, Margaret Hicken, Danya Keene, & John Bound, “Weathering” and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States, 96 AM. J. OF PUB. HEALTH 826, 826 (2006) (“McEwen and colleagues developed the concept of *allostatic load*, or the cumulative wear and tear on the body’s systems owing to repeated adaptation to stressors.”); *see also* Geronimus et al., *Weathering in Detroit*, *supra* note 10, at 1175 (“Mechanistically, prolonged psychosocial or physical challenges to metabolic homeostasis induced by unremitting exposure to stressors, and the persistent high-effort coping they entail, can accelerate cellular aging.”).

38. *See* McEwen, *supra* note 29, at 171 (providing examples of stressful events).

39. *See id.* (“Stressful experiences . . . are sometimes related to environment in the home, workplace, or neighborhood.”).

40. *See* Daniella Silva & Suzanne Gamboa, *They Came Seeking Asylum. Now They Want Their Children Back*, NBC NEWS (Jun. 28, 2018, 4:31 AM EDT), <https://www.nbcnews.com/storyline/immigration-border-crisis/they-came-seeking-asylum-now-they-want-their-children-back-n886781> (last updated Jun. 28, 2018, 12:14 PM EDT) (describing how ICE separates children from parents at the border) [perma.cc/K7LK-LJRQ].

41. *See* Brian Doherty, *SWAT Team Liable for Wrong-House Flash-Bang Raid on Grandmother, Teen Girl; Can Be Sued For Their Actions*, REASON.COM (Aug. 3, 2015, 4:19 PM), <https://reason.com/2015/08/03/swat-team-liable-for-wrong-house-flash-b/> (describing a police raid on the house of Stephanie Milan) [perma.cc/6J9W-HJZL].

ethnic profile.⁴² They can be symbolically triggered, such as when you are exposed to the footage of Black individuals being killed by the police in the light of day for no justifiable reason in looping news clips shown over and over for days.⁴³ And they can be part and parcel of the emotional and physical toll of activism and peaceful protest if these efforts fall on societal deaf ears or are met by violent counter-protests or police brutality.⁴⁴

The chronic exposure to objective and subjective stressors over years and decades owing to structural racism means that stress hormones chronically flood the body, when human bodies are only adapted for brief upsurges of these hormones during life-or-death, fight-or-flight situations.⁴⁵ These hormones elevate blood pressure,

42. See Nicole L. Novak, Arline T. Geronimus, & Aresha M. Martinez-Cardoso, *Change in Birth Outcomes Among Infants Born to Latina Mothers After a Major Immigration Raid*, 46 INT'L J. EPIDEMIOLOGY 839, 845–46 (2017) (describing the decreased birth weight among Latina mothers who experienced a major immigration raid).

43. See, e.g., Li Cohen, *Police in the U.S. Killed 164 Black People in the First 8 Months of 2020. These Are Their Names*, CBS NEWS (Sept. 10, 2020), <https://www.cbsnews.com/pictures/black-people-killed-by-police-in-the-u-s-in-2020/> (listing names of Black individuals killed by police in the U.S. during the first part of 2020) [perma.cc/9JLX-R54H].

44. See Madeleine List, *Protest, Sit-in for George Floyd Aims to Uplift, Build Momentum*, THE PROVIDENCE J. (Aug. 5, 2020, 7:41 PM), <https://www.providencejournal.com/story/news/2020/08/05/protest-sit-in-for-george-floyd-aims-to-uplift-build-momentum/113738612/> (“Mark Fisher, an organizer with Black Lives Matter Rhode Island, said that protests are continuing because protesters’ cries for justice continue to fall on deaf ears.”) [perma.cc/6ZR4-5E2S].

45. See Bruce S. McEwen & Eliot Stellar, *Stress and the Individual: Mechanisms Leading to Disease*, 153 ARCH. INTERNAL MED. 2093, 2096 (1993) (“[O]ne of the best examples of allostastic load is that elevated cortisol secretion promotes elevated insulin secretion, and the combined elevation of these two hormones may accelerate atherosclerosis.”); see also Robert M. Sapolsky, L. Michael Romero, & Allan U. Munck, *How Do Glucocorticoids Influence Stress Responses? Integrating Permissive, Suppressive, Stimulatory, and Preparative Actions*, 21 ENDOCRINE REVS. 55, 55–89 (2000) (considering the different effects of glucocorticoids as a response to stressors); see also Tina Traustadóttir, Pamela R. Bosch, & Kathleen S. Matt, *The HPA Axis Response to Stress in Women: Effects of Aging and Fitness*, 30 PSYCHONEUROENDOCRINOLOGY 392, 392–402 (2005) (“Our result shows that among unfit women, aging is associated with greater HPA axis reactivity to psychological stress, and that higher aerobic fitness among older women can attenuate these age-related changes as indicated by a blunted cortisol response to psychological stress.”); see also Bruce S. McEwen & John C. Wingfield, *The Concept of Allostasis in Biology and Biomedicine*, 43 HORMONES & BEHAV. 2, 2–15 (2003) (“If allostastic load is chronically high, then pathologies develop. Type

and, eventually, in order to withstand the increasing blood pressure, veins that regulate blood flow become hardened.⁴⁶ As a result, immune cells begin to cluster in these areas, along with the fatty acids, amino acids, elevated low-density lipoprotein cholesterol (LDL) and glucose that are excreted from the cells for energy, creating a build-up of atherosclerotic plaque in the damaged veins and arteries.⁴⁷ Hardened arteries induce increased blood pressure and over time can lead to hypertensive disease.⁴⁸ In the heart, blood returning at a higher force can cause the muscles in the left ventricle to thicken, enlarging the heart and potentially triggering an irregular heartbeat.⁴⁹ Disruptions in the heart can cause heart failure, while clogged circulatory systems or traveling plaque can obstruct blood flow leading to heart attack or stroke.⁵⁰

2 allostatic overload does not trigger an escape response, and can only be counteracted through learning and changes in the social structure.”); *see also* Gregory E. Miller, Tianyi Yu, Edith Chen, & Gene H. Brody, *Self-control Forecasts Better Psychosocial Outcomes But Faster Epigenetic Aging in Low-SES Youth*, 112 PNAS 10325, 10325–330 (2015) (“To the extent that they had better self-control, low-SES children went on to experience greater cardiometabolic risk as young adults, as reflected on a composite of obesity, blood pressure, and the stress hormones cortisol, epinephrine, and norepinephrine.”).

46. *See* McEwen & Stellar, *supra* note 45, at 2096 (noting that increased stress leads to increased hormone secretion, which “may accelerate atherosclerosis”); *see also* Sapolsky et al., *supra* note 45, at 60 (explaining that the fight or flight response “involves elevated arterial pressure, heart rate, and cardiac output, accompanied by diversion of blood to muscle via constriction of mesenteric and renal vessels and dilation of vessels supplying skeletal muscles”).

47. *See* McEwen & Stellar, *supra* note 45, at 2097 (“The interactions between diet and stress lead to an allostatic load that promotes endocrine imbalances that alter metabolism and body fat distribution, as well as increase atherosclerosis.”).

48. *See* *Arteriosclerosis / Atherosclerosis*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/arteriosclerosis-atherosclerosis/symptoms-causes/syc-20350569> (listing, among other factors, “high blood pressure” as a cause and risk of atherosclerosis) [perma.cc/ZNW9-S9W3].

49. *See* *Left Ventricular Hypertrophy*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/left-ventricular-hypertrophy/symptoms-causes/syc-20374314> (last visited Jan. 29, 2021) (explaining that high blood pressure, i.e., hypertension, “is the most common cause of left ventricular hypertrophy”) [perma.cc/V6UX-G9F4].

50. *See* McEwen, *supra* note 37, at 368 (“[C]hronically increased heart rate and blood pressure [] produce chronic wear and tear on the cardiovascular system that can result, over time, in disorders such as strokes and heart attacks.”); *see also* McEwen & Stellar, *supra* note 45, at 2095 (listing “Coronary Heart Disease” as one of the disease outcomes to allostatic load); *see also* Sapolsky et al., *supra* note 45, at 60 (considering the glucocorticoids “actions upon blood pressure, heart

Over years and decades, chronic activation of physiological stress processes has both rapid and enduring consequences for physical health and longevity. A massive acute stress exposure on a weathered body can result in cardiac events or poor birth outcomes.⁵¹ Over time, chronic exposure to everyday challenges and threats has detrimental effects on cellular systems, including pathogenic gene expression and acceleration of the cellular aging process.⁵² Prolonged exposure to stressors weakens the cardiovascular, immune, neuroendocrine and metabolic systems; damages vital tissues and organs; and increases obesity, the risk of early onset of diseases of aging, poor immune response to infections, autoimmune disorders, and cancers.⁵³

Through weathering, members of marginalized populations age young, no matter how well they follow the American Creed or the latest dispatches from the front of healthy behavior science.⁵⁴ Sometimes because they do.⁵⁵ For example, if one must work

rate, and cardiac output during stress”); *see also* ROBERT M. SAPOLSKY, *WHY ZEBRAS DON'T GET ULCERS: THE ACCLAIMED GUIDE TO STRESS, STRESS-RELATED DISEASES, AND COPING—NOW REVISED AND UPDATED* 42 (3d ed. 2004) (“Thus, chronic stress causes atherosclerosis—the accumulation of plugs called plaques, made of fats, starches, calcium, and so on underneath the inner lining of blood vessels.”).

51. *See* Novak et al., *supra* note 42, at 846 (“Our findings are consistent with studies observing change in adverse birth outcomes after a major population-level stressor and contribute to literature on racialized stressors and ethnicity-specific birth outcomes.”).

52. *See* McEwen, *supra* note 37, at 367 (explaining that not only dramatic events, but also the many events of daily life, produce harm and over time can produce “allostatic load”).

53. *See* McEwen & Stellar, *supra* note 45, at 2097 (discussing asthma, diabetes, gastrointestinal disorders, myocardial infarction, cancer, viral infections, and autoimmunity as effects of stress on health).

54. *See* Geronimus et al., *supra* note 67, at 826 (“Not only do Blacks experience poor health at earlier ages than do whites, but this deterioration in health accumulates, producing ever-greater racial inequality in health with age through middle adulthood.”).

55. *See, e.g.*, Sherman A. James, Nora L. Keenan, David S. Strogatz, Steven R. Browning, & Joanne M. Garrett, *Socioeconomic Status, John Henryism, and Blood Pressure in Black Adults: The Pitt County Study*, 135 *AM. J. EPIDEMIOLOGY* 59, 59 (1992) (exploring prior research indicating “that, for [B]lacks, the inverse association between socioeconomic status and hypertension may be stronger for individuals who score high on John Henryism”); *see also, e.g.*, Arline T. Geronimus & J. Phillip Thompson, *To Denigrate, Ignore, or Disrupt: Racial Inequality in Health and the Impact of a Policy-induced Breakdown of African American Communities*, 16 *DU BOIS REV.: SOCIAL SCI. RSCH. ON RACE* 247, 252–58 (2004)

nightshifts to make ends meet, that employment provides necessary income, a plus. Yet, it also exposes the night-shift worker to several sources of physiological stress that may be weathering. For example, night shift work disrupts circadian rhythms, which is identified as a probable carcinogen associated with cancers of the breast, prostate, colon and rectum.⁵⁶ Night-shift work may also expose workers to toxins in the workplace or at the bus stop, anxieties about whether their children are okay home alone at night, and fear or protracted vigilance as they navigate their way home on unreliable and deserted public transportation, feeling compelled to remain hyper-alert to possible threats no matter their state of exhaustion, or any indignities they may have suffered recently or on which they may be ruminating.⁵⁷

Among its physical health effects, chronic exposure to physiological stress processes also impacts the brain, can affect brain structure, and leave people more susceptible to anxiety and mood disorders, including depression.⁵⁸ Prolonged toxic stress exposure can result in the propensity toward anxiety, vigilance, and a low threshold for physiological stress arousal to become embedded, resulting in enduring changes in brain architecture and hair-trigger stress arousal, setting off negative recursive processes that can be weathering to mind and body.⁵⁹

(discussing the effects of the “American Creed” on perceptions of Black health issues); *see also, e.g.*, Miller et al., *supra* note 45, at 10325–330 (“[E]merging data suggest that for low-SES youth, self-control may act as a ‘double-edged sword,’ facilitating academic success and psychosocial adjustment, while at the same time undermining physical health.”).

56. *See* IARC, *Painting, Firefighting, and Shiftwork*, 98 IARC MONOGRAPHS EVALUATION CARCINOGENIC RISKS HUMS., 2010, at 566 [hereinafter *Painting*] (“Different shiftwork systems have potentially different impacts on the health of the workforce, disturbing the circadian rhythm, an essential biological function, in different ways.”); IARC, *Night Shift Work*, 124 IARC MONOGRAPHS IDENTIFICATION CARCINOGENIC HAZARDS HUMS., 2020, at 58 (indicating that night shift is disruptive to typical circadian functions).

57. *See Painting, supra* note 56, at 593–97 (indicating that night shift workers were more likely to have been exposed to workplace toxins).

58. *See* Bruce S. McEwen & Peter J. Gianaros, *Stress- and Allostasis-Induced Brain Plasticity*, 62 ANN. REV. MED. 431, 431–45 (2011) (“[W]hen they are prolonged or not terminated promptly, allostatic systems undermine mental and physical health—primarily because of their effects on brain plasticity.”).

59. *See id.* (“[I]t is likely that states of prolonged anxiety and anticipation

The majority of empirical literature has documented patterns of weathering among U.S. Blacks.⁶⁰ There is also a growing literature illustrating that increased risks of poor health outcomes related to weathering are observed in U.S. Latinx populations,⁶¹ Muslim populations,⁶² the poor across race/ethnicity,⁶³ and people who have been subjected to adverse childhood experiences or severe trauma.⁶⁴

can result in allostatic load.”); see also Bruce S. McEwen, *Physiology and Neurobiology of Stress and Adaptation: Central Role of the Brain*, 87 PHYSIOLOGICAL REVS. 873, 875 (2007) (summarizing the interplay between stress, aging, and the structure of the brain); see also Bruce S. McEwen & Peter J. Gianaros, *Central Role of the Brain in Stress and Adaptation: Links to Socioeconomic Status, Health, and Disease*, 1186 ANN. N.Y. ACAD. SCI. 190, 194–95 (2010) (discussing the effects of prolonged anxiety and allostatic load on the mind and body).

60. See, e.g., Geronimus et al., *supra* note 67, at 826–33 (comparing the effects of weathering between Black and white individuals).

61. See Robert Kaestner, Jay. A. Pearson, Danya Keene, & Arline T. Geronimus, *Stress, Allostatic Load and Health of Mexican Immigrants*, SOC. SCI. Q., Dec. 1, 2009, at 1089 (concluding that “repeated or chronic physiological adaptation to stressors is one contributor to the ‘unhealthy assimilation’ effect observed for Mexican immigrants”); see also Nicole L. Novak et al., *supra* note 42, at 845–46 (describing the decreased birth weight among Latina mothers who experienced a major immigration raid).

62. See Diane S Lauderdale, *Birth Outcomes for Arabic-Named Women in California Before and After September 11*, 43 DEMOGRAPHY 185, 197–98 (2006) (discussing the results of a study of birth outcomes for Arabic-named women in California before and after September 11).

63. See Teresa Seeman, Elissa Epel, Tara Gruenewald, Arun Karlamangla, & Bruce S. McEwen, *Socio-economic Differentials in Peripheral Biology: Cumulative Allostatic Load*, 1186 ANN. N.Y. ACAD. SCI. 223, 223–32 (2010) (examining “evidence linking lower [socio-economic status] with greater cumulative physiological toll on multiple major biological regulatory systems over the life course”); see also Geronimus et al., *supra* note 10, at 203 (hypothesizing “that the effects of material, psychosocial, and environmental stressors induce weathering among Detroit residents, which is expressed in accelerated biological aging as gauged by telomere length”).

64. See Andrea Danese & Bruce S. McEwen, *Adverse Childhood Experiences, Allostasis, Allostatic load, and Age-related Disease*, 106 PHYSIOLOGY & BEHAV. 29, 29–36 (2012) (reviewing research that “suggests that adverse childhood experiences are associated with changes in biological systems responsible for maintaining physiological stability through environmental changes, or allostasis”); see also Paula S. Nurius, Sara Green, Patricia Logan-Greene, Dario Longhi, & Chiho Song, *Stress Pathways to Health Inequalities: Embedding ACEs Within Social and Behavioral Contexts*, 8 INT’L PUB. HEALTH J. 241, 241–56 (2016) (discussing “novel insights as to the ‘long reach’ of childhood adversity on health, conditioned by circumstances under which these effects may occur”); see also

In sum, whether your stress response is protective or damaging depends on whether the stressors you face are acute or chronic, whether you can achieve a satisfying outcome and in short order, and whether you have sufficient health, support, resources, and power to do so.⁶⁵ To the extent that you are marginalized culturally, residentially, economically, or politically, you are more likely to face unremitting stressors—i.e., to be subject to “structural violence” and the weathering it induces.⁶⁶

B. Weathering Populations and the Pandemic

Assessments that individuals aged sixty-five and older are at highest risk of dying from COVID-19 may be true for the advantaged yet ignore the basic fact of weathering: Members of populations subject to weathering are biologically older than their chronological age.⁶⁷ This historically and structurally rooted fact contributes to most racialized health inequities from infectious and chronic diseases, to maternal and infant mortality, to cancers.⁶⁸

Hector F. Myers et al., *Cumulative Burden of Lifetime Adversities: Trauma and Mental Health in Low-SES African Americans and Latino/as*, 7 PSYCH. TRAUMA 243, 243–51 (2015) (examining “the utility of a lifetime cumulative adversities and trauma model in predicting the severity of mental health symptoms of depression, anxiety, and posttraumatic stress disorder”); see also Novak et al., *supra* note 42, at 845–46 (describing the decreased birth weight among Latina mothers who experienced a major immigration raid).

65. See McEwen & Stellar, *supra* note 45, at 2097 (“[T]here is evidence that acute or chronic stress contribute significantly as a risk factor to expression of disease.”); see also *id.* at 2098 (“[B]ehavior resulting from processing of a potentially stressful experience may itself contribute to a more or less stressful outcome and to increased or decreased risk of disease or damage.”).

66. See McEwen & Gianaros, *supra* note 58, at 431 (“[The brain] determines what individuals will experience as stressful, it orchestrates how individuals will cope with stressful experiences, and it changes both functionally and structurally as a result of stressful experiences.”).

67. See Geronimus et al., *supra* note 37, at 826 (explaining that because of weathering, “a Black individual may show the morbidity and mortality typical of a white individual who is significantly older”).

68. See Erin Linnenbringer, Arline T. Geronimus, Kia L. Davis, John Bound, Libby Ellis, & Scarlett L. Gomez, *Associations Between Breast Cancer Subtype and Neighborhood Socioeconomic and Racial Composition Among Black and White Women*, 180 BREAST CANCER RSCH. AND TREATMENT 437, 437–47 (2020) (discussing the “[d]isparities between Black and white women . . . across the breast cancer continuum”); see also Erin Linnenbringer, Sarah Gehlert, & Arline T. Geronimus, *Black-White Disparities in Breast Cancer Subtype: The*

Systematically racist labor market segmentation unduly exposes people of color to the virus.⁶⁹ Disproportionately deemed “essential” workers, more likely to be detained or incarcerated, and more likely to live and work in overcrowded and unhealthy conditions with others who are also excessively vulnerable, they cannot social distance.⁷⁰ It is arithmetically straightforward that so-called “essential” workers are disproportionately infected by COVID-19 because they are much more likely to be exposed to the virus.⁷¹ As the better off among us have the means and the opportunity to practice social distancing and work remotely from our apartments, spacious houses, and, for some, even vacation homes, the less privileged essential workers often live in overcrowded and decaying apartments and travel to work standing shoulder-to-shoulder on public buses with strangers who are heading to risky workplaces themselves.⁷²

Given the role of our racist history in labor market segmentation, there is no reason to be surprised that bus drivers, or the nursing assistants, orderlies, and cleaning crews who handle the body fluids, human waste, and dead bodies of COVID victims

Intersection of Socially Patterned Stress and Genetic Expression, 4 AIMS PUB. HEALTH 526, 526–56 (2017) (exploring the distinction between hormone receptor negative breast cancer subtypes and estrogen receptor positive breast cancer subtypes and the disparities in the more aggressive subtype in Black women in the United States compared to white women).

69. See David Freeman Engstrom, *The Lost Origins of American Fair Employment Law: Regulatory Choice and the Making of Modern Civil Rights*, 63 STAN. L. REV. 1071, 1084 (2011) (“A complex mix of racial ideology, labor market segmentation, and internal firm dynamics combined to relegate African Americans to mostly unskilled positions and casual labor markets within the American industrial order—the ‘meanest and dirtiest jobs.’”).

70. See LISA DUBAY, JOSHUA AARONS, K. STEVEN BROWN, & GENEVIEVE M. KENNEY, HOW RISK OF EXPOSURE TO THE CORONAVIRUS AT WORK VARIES BY RACE AND ETHNICITY AND HOW TO PROTECT THE HEALTH AND WELL-BEING OF WORKERS AND THEIR FAMILIES 3 (Urban Institute 2020) (“In particular, people of color are overrepresented among both essential workers and those who have contracted and died from COVID-19.”).

71. See *id.* at 11 (explaining that “essential workers” are in person and close proximity to others, making them more likely to be exposed to the Coronavirus through their work).

72. See Phi Hong Su & Malte Reichelt, *The Freedom to Move—or Stay Still*, SLATE (May 26, 2020, 10:27 AM), <https://slate.com/news-and-politics/2020/05/covid-mobility-movement-privilege.html> (explaining that essential workers tend to be less privileged and unable to work from home as many more privileged workers do) [perma.cc/YE5U-Z9RD].

in the big city are disproportionately Black or Brown; or that the line workers in meat-packing plants in the rural south and Midwest, often Latinx, have higher infection rates.⁷³ Meat packers work in over-crowded conditions, amidst forced refrigerated air systems that can blow droplets containing COVID-19 into their eyes, mouths, and noses like the Big Bad Wolf.⁷⁴ People of color are also disproportionately confined in jails, prisons, or immigration detention centers. As a function of their design and operation, all of these detention settings are flash-points for the rapid spread of infectious diseases such as COVID-19.⁷⁵ It is estimated that one in five of those detained have been infected (compared to one in twenty in the general population), and that each detainee who is infected likely spreads the infection to about 8.5 others (compared to one to three others in the general population.)⁷⁶

While necessary, the greater likelihood of exposure and, thus, infection does not on its own adequately explain why working class and people of color with COVID-19, especially young and middle-aged adults, are so much more likely to die.⁷⁷ At all ages people of color die at higher rates than their proportion of cases,

73. See Freeman Engstrom, *supra* note 69, at 1084 (“A complex mix of racial ideology, labor market segmentation, and internal firm dynamics combined to relegate African Americans to mostly unskilled positions and casual labor markets within the American industrial order—the ‘meanest and dirtiest jobs.’”).

74. See Quentin Durand-Moreau et al., *COVID-19 In Meat and Poultry Facilities: A Rapid Review and Lay Media Analysis*, THE CTR. FOR EVIDENCE BASED MED. (June 4, 2020), <https://www.cebm.net/covid-19/what-explains-the-high-rate-of-sars-cov-2-transmission-in-meat-and-poultry-facilities-2/> (studying the heightened risk factors which contribute to higher infection rates) [perma.cc/MR4Q-YLMG].

75. See KEVIN T. SCHNEPEL, COVID-19 IN U.S. STATE AND FEDERAL PRISONS, 3 (Council On Criminal Justice 2020) (“COVID-19 infections in prisons continue to outpace those outside of prisons.”).

76. See Lisa B. Pugsli, Giovanni S.P. Malloy, Tyler D. Harvey, Margaret L. Brandeau, & Emily A. Wang, *Estimation of COVID-19 Basic Reproduction Ratio In a Large Urban Jail in the United States*, 53 ANNALS OF EPIDEMIOLOGY 103–105 (2021) (estimating the reproduction ratio of SARS-CoV-2 inside a correctional facility during the COVID-19 pandemic),

77. See *COVID-19 Hospitalization and Death by Race/Ethnicity*, CTRS. FOR DISEASE CONTROL & PREVENTION (Nov. 30, 2020), <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html> (indicating that Black and Hispanic persons die of COVID-19 at a rate 2.8 times higher than white persons) [perma.cc/46L6-DNA6].

while whites die at lower rates.⁷⁸ Overall, more than ninety percent of younger adults who get sick from COVID-19 have mild to moderate symptoms—if they have symptoms at all—and recover at home.⁷⁹ However, among adults ages twenty-five to forty-four years old, Black, Latinx, and Native people not only account for a disproportionate number of COVID-19 deaths as they do at all ages, but they account for the vast majority of deaths in this age-group.⁸⁰

While lesser access to medical care does play some role in the higher rates of COVID-19 deaths that are being documented in Black, Brown, and Native communities, that role was severely limited early in the pandemic by the fact we had no treatments or cures for or vaccines against the virus.⁸¹ So, why were the young and middle-aged in marginalized groups more likely to suffer severe COVID-19 and die in this early period? The disproportionate death toll of the COVID-19 pandemic on the poor and people of color lays bare the fact that weathered bodies are more vulnerable to the worst ravages of infectious disease outbreaks.⁸² Once infected, weathering has left them with dysregulated or exhausted immune systems that undercut their ability to mount proper immune responses.⁸³

78. See *id.* (citing the higher rate of death from COVID-19 for people of color in comparison to white people).

79. See Jennifer Abbasi, *Younger Adults Caught in COVID-19 Crosshairs as Demographics Shift*, 324 JAMA 2141, 2141 (Nov. 11, 2020) (describing the lower incidence of serious illness and hospitalization amongst young adults).

80. See *United States COVID-19 Cases and Deaths by State*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://covid.cdc.gov/covid-data-tracker/#demographics> (tracking data on COVID-19 cases and deaths by state) [perma.cc/LQ9X-76C8].

81. See Rashawn Ray, *Why Are Blacks Dying at Higher Rates from COVID-19?*, BROOKINGS INST. (Apr. 9, 2020), <https://www.brookings.edu/blog/fixgov/2020/04/09/why-are-blacks-dying-at-higher-rates-from-covid-19/> (suggesting that there was more to the racial disparity in COVID-19 infection and death than lack of access to medical care) [perma.cc/DMV9-RSXU].

82. See *id.* (outlining the structural conditions that create health disparities in the African American community which cause Black people to be more vulnerable to illness, specifically COVID-19).

83. See Merlin Chowkwanyun, *Racial Health Disparities and Covid-19—Caution and Context*, 383 NEW ENG. J. MED. 201, 203 (July 16, 2020) (“Weathering has been linked, in turn, to cardiovascular disease and diabetes, two conditions that have been associated, in preliminary research, with elevated risk for severe

The stress-mediated wear and tear on body systems and accelerated biological aging weathering portends, increases susceptibility to infectious disease, generally, and also increases the chances of succumbing to infectious disease.⁸⁴ One critical reason for this is the dysregulation and weakening of the immune system, itself, that is characteristic of weathered bodies.⁸⁵ One early observation is that many patients who died from COVID-19 first experienced a “cytokine storm”⁸⁶ whereby an overproduction of immune cells and their activating compounds—cytokines—results in a surge of activated immune cells into the lungs.⁸⁷ The resulting lung inflammation and fluid buildup can lead to respiratory distress and can be contaminated by a secondary bacterial pneumonia, widespread damage to other organs, including permanent injury to the kidneys and neurologic injury, multi-organ dysfunction, sepsis and death.⁸⁸ Symptoms of cytokine storms can manifest as early as two days after exposure; the deterioration that results in death can occur in less than one week.⁸⁹ That weathered people may already suffer damaged tissues and organs leaves them more vulnerable to organ failure.⁹⁰ Those few who may survive a cytokine storm are at greatly increased risk of harboring long-term damage to their respiratory and cardiovascular systems, implying they may be further weathered by the autoimmune sequelae of this acute infectious assault.⁹¹

Covid-19.”).

84. See Geronimus et al., *supra* note 37, at 831 (“It is possible that for some of these biomarkers, having a value at the other end of the distribution may confer high-risk status for disease outcomes that are not stress related.”).

85. See *id.* at 826 (stating that weathering disrupts the regulation of many systems throughout the body including the immune system).

86. *Cytokine Storm: The Sudden Crash in Patients with COVID-19*, PHYSICIAN’S WKLY. (Apr. 8, 2020), <https://www.physiciansweekly.com/cytokine-storm-the-sudden-crash-in-patients-with-covid-19/> [perma.cc/4EF9-XXK]; see generally Alison George, *Cytokine Storm*, NEW SCIENTIST, <https://www.newscientist.com/term/cytokine-storm/> [perma.cc/C5SC-233W].

87. See *id.* (attributing the severity of some COVID-19 cases to cytokine storm phenomena).

88. See *id.* (outlining the resulting health problems of a cytokine storm).

89. See *id.* (informing on the onset and symptoms of the condition).

90. See Geronimus et al., *supra* note 37, at 827 (describing those who may have experienced weathering as more at risk for high-risk status).

91. See *Cytokine Storm: The Sudden Crash in Patients with COVID-19*,

*II. Distinction Between the Constructs of Weathering vs.
Pre-Existing Medical Conditions*

Weathering occurs across body systems in response to accumulated impacts of lives persistently affected by structural racism, poverty, social exclusion, and cultural oppression.⁹² It is expressed in the aging ahead of schedule of cells, tissues, and organs across body systems including the immune, cardiovascular, metabolic, and neuroendocrine systems.⁹³ While it often manifests in the early onset of at least one diagnosable chronic disease of aging in young through middle adulthood, such diagnosable disease may be the tip of the iceberg of physiological breakdown and vulnerability.⁹⁴

It is well accepted that individuals with the underlying diseases that weathering mechanisms can lead to, such as diabetes, obesity, heart disease and respiratory disease, and individuals who are of older age, (sixty-five plus), are at increased risk of having severe cases of COVID-19 and of dying from the infection.⁹⁵ These conditions and diseases are most often construed as “pre-existing medical conditions.”⁹⁶ Through a weathering lens,

supra note 86 (confirming the effect of cytokine storms on the lungs and respiratory system).

92. See Geronimus et al., *supra* note 37, at 826 (“Blacks experience early health deterioration as a consequence of the cumulative impact of repeated experience with social or economic adversity and political marginalization.”).

93. See Arline T. Geronimus, *Deep Integration: Letting the Epigenome out of the Bottle without Losing Sight of the Structural Origins of Population Health and Disease*, 103 AM. J. PUB. HEALTH S56, S57 (Oct. 2013) (defining weathering as “prolonged psychosocial or physical challenges to metabolic homeostasis in socially marginalized groups increase the risk of disease and early onset of chronic conditions and ultimately, accelerate aging”); see also Geronimus et al., *supra* note 37, at 826 (defining the physiological characteristics of weathering).

94. See Arline T. Geronimus, Margaret Hicken, Danya Keene & John Bound, *Black-White Differences in Age Trajectories of Hypertension Prevalence Among Adult Women and Men, 1999–2002*, 17 ETHNICITY & DISEASE 40, 40 (2007) (specifying the typical manifestation of weathering in young adults).

95. See *People at Increased Risk*, CTRS. FOR DISEASE CONTROL & PREVENTION, (2021) <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-higher-risk.html> (listing the people at increased risk for severe illness if they contract COVID-19) [perma.cc/R2A5-MRXG].

96. See Ray, *supra* note 81 (speculating that pre-existing conditions health conditions are contributing to racial disparities in COVID-19).

this construction is problematic and allows many high-risk cases to slip through the cracks.

A clinical diagnosis of hypertension, cardiovascular disease, diabetes or autoimmune disease is based on reaching a specific score on the relevant laboratory test.⁹⁷ Having any of those underlying diseases is known to place people in a high-risk group for death to COVID-19 infection.⁹⁸ What is missed by using only rigid clinical definitions of these diseases is that members of weathered populations often have high values across multiple morbidities, and an older biological compared to chronological age.⁹⁹ The broad range of elevated values indicates the person has suffered the stress-mediated wear and tear across body systems, known as high allostatic load, that indicates weathering and an increased risk of death or disability at an early age.¹⁰⁰

In other words, weathering implies that even if the stress-mediated biological processes have not yet resulted in diagnosable disease, or if a person has not yet achieved the chronological age of sixty-five, they are likely to experience early

97. See *Diabetes and Your Heart*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/diabetes/library/features/diabetes-and-heart.html> (last updated Jan. 31, 2020) (discussing the link between the listed conditions and methods for diagnosis) [perma.cc/C8SW-FDXS].

98. See *People with Medical Conditions*, CTRS. FOR DISEASE CONTROL & PREVENTION (2020), https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fneed-extra-precautions%2Fgroups-at-higher-risk.html (listing hypertension, cardiovascular disease, diabetes, and autoimmune diseases in the high risk category for COVID-19 infection) [perma.cc/2EFT-EWEM].

99. See Geronimus et al., *supra* note 37, at 826 (describing age patterns in people of color consistent with a weathering hypothesis).

100. See *id.* (introducing the indicators of weathering); Bruce S. McEwen, *Stress, Adaptation, and Disease. Allostasis and Allostatic Load*, ANNALS OF THE N.Y. ACAD. OF SCI. 33, 33 (1998) (explaining the various maladies stress can contribute to); Bruce S. McEwen & Teresa Seeman, *Protective and Damaging Effects of Mediators of Stress. Elaborating and Testing the Concepts of Allostasis and Allostatic Load*, 896 ANNALS OF THE N.Y. ACAD. OF SCI. 30, 35 (1999) (indicating that high allostatic load can lead to death in extreme cases); Arline T. Geronimus, John Bound, Timothy A. Waidmann, Cynthia G. Colen & Dianne Steffick, *Inequality in Life Expectancy, Functional Status, and Active Life Expectancy Across Selected Black and White Populations in the United States*, 38 DEMOGRAPHY 227, 246 (2001) (explaining that a substantial portion of African Americans disabling and potentially life threatening diseases as early as their twenties).

onset of elevated pre-clinical values on laboratory indices of chronic diseases, including in their blood pressure, blood sugar, weight, and amount of pro-inflammatory cytokines circulating in their blood.¹⁰¹ The construct of “pre-existing condition” leads us to miss large numbers of younger and apparently healthy people who, in reality, are at great risk of dying from COVID-19 should they contract it.¹⁰² Bodies—especially chronologically younger bodies—can be subject to the breakdown and vulnerability of weathering short of having a diagnosable disease.¹⁰³

Erica Garner died at age twenty-seven in the last days of 2017.¹⁰⁴ Her own difficulty breathing due to severe asthma precipitated a major heart attack that killed her four months after the birth of her first child, classifying hers as a maternal death.¹⁰⁵ According to her doctors, the pregnancy had stressed Garner’s already enlarged heart.¹⁰⁶

Conventional wisdom has us simply classifying her enlarged heart as a pre-existing condition; but we should ask how she had an enlarged heart at such a young age.¹⁰⁷ Vague attributions to

101. See Geronimus, *supra* note 100, at 831 (explaining research surrounding Black people and how stress causes early onset of high allostatic loads); Geronimus, et al., *supra* note 94, at 40 (explaining the significance of the weathering hypothesis).

102. See Geronimus, *supra* note 100, at 827 (providing that Black people experience early health deterioration causing them to show morbidity and mortality typical of a significantly older white person).

103. See *id.* at 826 (“Because the stress response disrupts regulation of various systems throughout the body—for example, the cardiovascular, metabolic, and immune systems—the concept of weathering encompasses multiple systems and includes impacts on them that might not yet register clinically.”).

104. See Vivian Wang, *Erica Garner, Activist and Daughter of Eric Garner, Dies at 27*, N.Y. TIMES (Dec. 30, 2017), <https://www.nytimes.com/2017/12/30/nyregion/erica-garner-dead.html> (announcing the death of Erica Garner) [perma.cc/Y8B5-QMQN].

105. See Christen A. Smith, *The Fallout of Police Violence is Killing Black Women Like Erica Garner*, PBS (Jan. 5, 2018), <https://www.pbs.org/newshour/nation/the-fallout-of-police-violence-is-killing-black-women-like-erica-garner> (reporting Garner’s cause of death and categorizing it as a maternal death) [perma.cc/UXX3-539Z].

106. See *id.* (“The enlarged heart that in part caused her heart attack was strained due to her recent pregnancy.”).

107. See *id.* (considering the death of Garner’s father by police violence and experience with racism as a potential factor in her condition).

“family history” or presumed unhealthy behavior allow many to answer this question casually; yet the mechanisms of weathering provide a plausible scenario.¹⁰⁸ Let us consider the intersection of history and Ms. Garner’s biography. Erica Garner was a Black woman of modest means raised in a segregated urban area who became a tireless advocate for racial justice after her father, Eric Garner, became a victim of homicide at the hands of a New York City police officer who placed him in an unauthorized chokehold for selling untaxed cigarettes.¹⁰⁹ Her father’s dying words, “I can’t breathe” became a rallying cry for the Black Lives Matter movement, and Erica Garner, although initially apprehensive, became a major force in the movement for police accountability.¹¹⁰ Given her lifelong hardships and stressors, intensified by her father’s brutal and very public death, and the sober and unrelenting activities she then assumed as a leader in the Black Lives Matter movement, it is easy to posit a cascade of weathering processes that enlarged her heart by her mid-twenties and contributed to her death.¹¹¹

The weathering cascade starts with Ms. Garner’s being chronically subjected to environmental, material, and biopsychosocial stressors from an early age.¹¹² Recalling the impacts of chronic physiological stress response on elevating heart rate, hardening and narrowing arteries, and increased blood pressure, her heart would have needed to pump more forcefully to circulate blood and oxygen throughout her body.¹¹³ Eventually, this would have enlarged her heart.¹¹⁴ Ms. Garner’s enlarged heart

108. *See id.* (suggesting that the stress of racism and police brutality could have lasting negative impacts on Black women’s health).

109. *See id.* (recounting the traumatic details of Eric Garner’s death and the impact of reliving his murder in the media).

110. *See* Wang, *supra* note 104 (quoting Eric Garner’s last words and describing the impact that they would have in the larger Black Lives Matter movement).

111. *See id.* (associating the stressful circumstances of her upbringing to her health conditions that led to her death).

112. *See id.* (recounting the extreme trauma Ms. Garner’s family faced as a repercussion of her father being placed in a chokehold and brutally murdered by a New York police officer).

113. *See* McEwen, *supra* note 29, at 172 (paraphrasing the body’s physical response to stressors).

114. *See id.* at 172–77 (examining the long-term effects that stress has on the

then places her at greater risk of being unable to maintain a normal electrical heart rhythm and, instead, being vulnerable to irregular heartbeats (called arrhythmias), which can precipitate a lethal heart attack.¹¹⁵ The physiological requirements of pregnancy stresses any mother's body, yet, most American twenty-seven year-old women are able to withstand that stress.¹¹⁶ For weathered women, pregnancy can be a stress test that pushes the limits of their weakened or dysregulated body systems.¹¹⁷

In the weeks before her death, Erica Garner described the stress, exhaustion, and frustration that was exacted by her activism as a leader in the Black Lives Matter movement for police accountability.¹¹⁸ "I'm struggling right now with the stress and everything," she said.¹¹⁹ "This thing, it beats you down. The system beats you down to where you can't win."¹²⁰ Or as her sister, Emerald Snipes Garner, described it a week after Erica's death, "It was like a Jenga"; they were "Taking out pieces, taking out pieces, ripping her apart."¹²¹

Weathering is a life-or-death game of Jenga. The scaffolding appears strong as blocks are eliminated; it remains upright as the first pieces are removed, one by one. To all appearances, it continues to stand strong until the removal of that last fateful

body).

115. See *Heart Arrhythmia*, MAYO CLINIC (Aug. 9, 2020), <https://www.mayoclinic.org/diseases-conditions/heart-arrhythmia/symptoms-causes/syc-20350668> (describing that irregular heartbeats make it much more likely that a person will suffer from heart failure) [perma.cc/H4YZ-PXX5].

116. See Patricia A. Cavazos-Rehg et al., *Maternal Age and Risk of Labor and Delivery Complications*, MATERNAL CHILD HEALTH J. 1202–1211 (2015) (finding that women between the ages of 20 and 35 have the least amount of risk associated with pregnancy and childbirth).

117. See Geronimus, *supra* note 37, at 827 (using pregnancy as an example of an exacerbating factor that contributes to a person's physiological response to stress).

118. See Wang, *supra* note 111 (quoting Ms. Garner regarding the negative impact the stress of leading the Black Lives Matter movement had on her health and well-being).

119. *Id.*

120. *Id.*

121. *Transcript 1/7/18 Politics Nation*, MSNBC (Jan. 7, 2018, 8:00 AM), <https://www.msnbc.com/transcripts/politicsnation/2018-01-07-msna1058631> [perma.cc/67NS-NDMG].

block exposes the many weaknesses of its interior, and the tower collapses.

In 2020, COVID-19 turned out to be that last fateful block for tens of thousands of people of color.¹²² Before COVID-19 and for those who evade or survive it, members of populations that are marginalized—whether by race, ethnicity, poverty, religious affiliation, sexual orientation, gender identity, immigrant status, or identified at the intersection of any of these—will succumb to the loss of their last fateful block sooner than if society had assured them equal opportunity to die from natural causes at the close of a long life.¹²³ It is long past time to do something about it. Every day, towers are collapsing before our eyes.

A. Legal Applications of Weathering Knowledge in the Pandemic

Congregate settings including nursing homes and also jails, prisons, and immigration detention centers, especially when densely populated and poorly ventilated, as they too often are, facilitate the swift and efficient transmission of infectious disease across persons.¹²⁴ Shared facilities such as showers and dining halls, along with the regular influx of new people to a specific facility, increase exponentially the chances of exposure and transmission.¹²⁵ Visitors and staff bring new vectors of infection into the facility; and their return to their homes at day's end, increases transmission possibilities in their communities.¹²⁶ As a point of reference for congregate and confined living, the rate of

122. See Linda Villarosa, 'A Terrible Price': The Deadly Racial Disparities of Covid-19 in America, N.Y. TIMES (Apr. 29, 2020), <https://www.nytimes.com/2020/04/29/magazine/racial-disparities-covid-19.html?auth=login-facebook> (unveiling the disproportionate effect Covid-19 has on minority groups) [perma.cc/A79G-2L7X].

123. See *id.* (remarking on a specific black community with a large percentage of individuals with preexisting conditions, making them more susceptible to a shorter life).

124. See WORLD HEALTH ORG., MANAGING EPIDEMICS: KEY FACTS ABOUT MAJOR DEADLY DISEASES 25–26 (2018) (promulgating information about how viruses are introduced and spread into a population through dense populations).

125. See *id.* at 40 (reiterating that outbreaks are spread through personal contact and exposure to new close contacts).

126. See *id.* at 41 (discussing the relationship between individuals, their communities, and the rapid spread of viruses).

infection (RO) among prisoners and detainees is estimated to be two to three times higher than occurred on the Diamond Princess Cruise Ship, which has been publicized as the ultimate tinder box for COVID-19 spread.¹²⁷ This excess RO in prisons compared to cruise ships pertains even though those confined to prison tend to be chronologically younger populations than cruise ship customers.¹²⁸

Mitigation measures such as social distancing are not practical in detainment settings, while simple supplies such as soap, antibacterial cleaning agents, bleach or sanitizers are severely lacking in these settings.¹²⁹ So, too, are personal protective equipment such as masks or gloves.¹³⁰ Overcrowding and the nature of detainment facilities do not easily allow for quarantining of those with symptoms or of those who have known exposure to those who are sick.¹³¹ Shortages of medical personnel and equipment in such facilities also increase the risk of death for those who become sick.¹³²

127. See Beth Schwartzapfel, Katie Park, & Andrew Demillo, *1 in 5 Prisoners in the U.S. Has Had Covid-19*, THE MARSHALL PROJECT (Dec. 18, 2020), <https://www.themarshallproject.org/2020/12/18/1-in-5-prisoners-in-the-u-s-has-had-covid-19> (providing statistics about the number of prisoners in the United States that have contracted Covid-19) [perma.cc/D3WZ-BBL7]; see also Sheng Zhang, MengYuang Diao, Wenbo Yu, Lei Pei, Zhaofen Lin, & Dechang Chen, *Estimation of the reproductive number of novel coronavirus (COVID-19) and the probable outbreak size on the Diamond Princess cruise ship: A data-driven analysis*, INT. J. INFECT. DIS. (2020) (analyzing the significant spread of the Covid-19 virus on the Diamond Princess cruise ship).

128. *Compare Inmate Age*, FED. BUREAU OF PRISONS (Jan. 9, 2021), https://www.bop.gov/about/statistics/statistics_inmate_age.jsp (reporting that the highest percentage of inmates are ages 36–40) [perma.cc/8UM6-AK58]; with FLORIDA-CARIBBEAN CRUISE ASS'N, *CRUISE INDUSTRY OVERVIEW 7* (2011) (publishing that the average age of cruisers is 50 years old).

129. See Puglisi et al., *supra* note 76, at 103 (emphasizing that the Covid-19 virus will continue to spread in the absence of more aggressive public health strategies).

130. See *id.* at 103–04 (finding that transmission is higher in facilities that lack appropriate public health measures).

131. See *id.* at 104 (explaining the difficulties posed by quarantining asymptomatic individuals who have contracted the virus but display no symptoms).

132. See MARCELLA ALSAN & CRYSTAL S. YANG, NAT'L COMM. ON CORR. HEALTH CARE, *NCCHC-HU COVID-19 SURVEY OF CORRECTIONAL FACILITIES: WEEKLY REPORT 2* (2020) (summarizing that over 100 health staff members across 300 facilities have contracted the COVID-19 virus, resulting in less opportunity for

Many incarcerated and detained people are held pretrial or pre-asylum hearing, and most convicts are not being punished for capital crimes.¹³³ Thus, the government's decision to detain violators of immigration civil laws, for example, or those detained pre-trial during a pandemic is arguably legally and constitutionally excessive, especially for those at high-risk, including the weathered.¹³⁴ Starting early in the pandemic, and based on a statistical risk-factor understanding, habeas petitions were granted to release people whom the CDC deemed at extra risk of dying from COVID-19, including those who were "65 years or older, and those who have certain medical conditions, such as moderate to severe asthma, diabetes, chronic kidney disease and hypertension."¹³⁵ These habeas petitions were granted based on the argument that keeping detained persons with increased risk of death to COVID-19, "fail[s] to address the stark reality of this particular global public health crisis."¹³⁶ In the face of a deadly pandemic with no cure, limited testing capacity, and the ability to spread quickly through asymptomatic human vectors, a 'generalized risk' is a 'substantial risk' of catching the COVID-19 virus for any group of human beings in highly confined conditions."¹³⁷

inmates to receive treatment).

133. See Wendy Sawyer & Peter Wagner, *Mass Incarceration: The Whole Pie 2020*, PRISON POL'Y INIT. (Mar. 24, 2020), <https://www.prisonpolicy.org/reports/pie2020.html#slideshows/slideshow1/2> (reporting that high percentages of prison populations are inmates who have not yet been convicted, also finding that a large portion of prison populations is comprised of "low-level fugitives") [perma.cc/2M86-PX8Q].

134. See Gregory Hooks & Wendy Sawyer, *Mass Incarceration, COVID-19, and Community Spread*, PRISON POL'Y INIT. (Dec. 2020), <https://www.prisonpolicy.org/reports/covidspread.html> (reporting on the correlation between mass incarceration and the Covid-19 public health crisis) [perma.cc/U7F3-2JUA].

135. See, e.g., *Bahena Ortuño v. Jennings*, No. 20-cv02064-MMC, 2020 WL 1701724, at *3 (N.D. Cal. Apr. 8, 2020) (citing CDC resources as a tool for determining whether petitioner has a greater likelihood of severe symptoms of COVID-19).

136. See *Malam v. Adduci*, 452 F. Supp. 3d 643, 663 (E.D. Mich. Apr. 5, 2020) (granting Petitioner's application for habeas corpus in light of the COVID-19 pandemic and the confined jail populations).

137. *Id.* at 657.

While the early release of detainees over the age of sixty-five or with a diagnosed preexisting medical condition that statistically heightens their risk of severe morbidity or death from COVID-19 have been grounds for granting early release, using these categorizations alone is far too blunt an instrument for informing humane or efficient decision rules meant to save individual lives or stem the rapid transmission of COVID within the institution, its proximate community, or protecting local medical facilities from surges of disease among the highly vulnerable, yet poorly protected.¹³⁸ Taking weathering into account allows for increased sensitivity in removing detainees who are the most vulnerable from congregate settings.¹³⁹ [In epidemiological terminology, a highly “sensitive” screening metric is one that will include all people truly at high-risk, although it may also include some who, as individuals, are not in reality high-risk (false positives). In a lethal pandemic that can spread through communities and overwhelm local health systems, one wants to err on the side of the metric being too sensitive, rather than the alternative of prioritizing “specificity.” Specificity refers to tolerating having a large percentage of false negatives rather than let anyone who is not at high risk be given the benefit of the doubt.].¹⁴⁰

Expanding on this reasoning, weathering has been a consideration applied in support of habeas petitions to request early release of detainees in jails, prisons and immigration detention centers who are not chronologically old or do not have any of the specified diagnosable pre-existing conditions.¹⁴¹ The initial and most general theory, first successfully forwarded by immigration lawyer Kari Hong, was that being Black in the United States statistically increases risk of injury or death during the

138. See Hooks & Sawyer, *supra* note 134 (expounding on the adverse effects of not permitting detainees release from incarceration and allowing them to spread the COVID-19 virus).

139. See Geronimus, *supra* note 37, at 826 (examining how weathering would make an individual more vulnerable and susceptible to disease).

140. See Robert Trevethan, *Sensitivity, Specificity, and Predictive Values: Foundations, Plabilities, and Pitfalls in Research and Practice*, FRONT PUB. HEALTH 2–3 (2017) (elaborating on the distinction between sensitivity and specificity tests).

141. See *Bare v. Wolf*, 5:20CV00715 (C.D. Cal. June 1, 2020) (arguing that race is a factor to consider when deciding who is most at-risk for the COVID-19 virus).

pandemic.¹⁴² As determinations that old age or specific diagnosed medical conditions are grounds for release were based on their statistical associations with COVID-19 death, it was noted that race/ethnicity was often the greatest statistical predictor of death.¹⁴³

In this general and in later extensions of this theory, I provided expert declarations that specific detained individuals should be released owing to their high likelihood of being weathered and the implications of weathering for the chance of severe morbidity and death should they contract COVID-19.¹⁴⁴ Individuals as chronologically young as in their mid-thirties, were granted early release when we were able to make a case based on intersections between salient details of their specific biographies, the historical moment, and the conditions under which they were being held, that they had likely experienced weathering and, thus, faced increased chance of death should they become infected with COVID-19.¹⁴⁵

These cases addressed the questions of whether the petitioners were being put at increased risk of contracting COVID-19; and whether the petitioners had characteristics suggesting they were at increased risk of dying of COVID-19, once contracted.¹⁴⁶ For reasons described above and placed in the specific context of the facilities in which they were being held, the

142. *See id.* (making an argument that race impacts an individual's susceptibility of contracting the COVID-19 virus).

143. *See id.* (factoring race into consideration when determining the likelihood of morbidity upon contracting the Covid-19 virus); *see also* Reis Thebault, Andrew Ba Tran, & Vanessa Williams, *The Coronavirus is Infecting and Killing Black Americans at an Alarming High Rate*, WASH. POST (Apr. 7, 2020), <https://www.washingtonpost.com/nation/2020/04/07/coronavirus-is-infecting-killing-black-americans-an-alarmingly-high-rate-post-analysis-shows/?arc404=true> (reporting on the disproportionate number of Black Americans who are severely affected by the Covid-19 virus) [perma.cc/6JU7-BD7B].

144. *See supra* Part II.A. Legal Applications of Weathering Knowledge in the Pandemic (proffering numerous legal implications of detained weathered individuals as a result of the COVID-19 pandemic).

145. *See, e.g.*, Garcia-Lopez v. Barr, No. 2:20-cv-00665-RSM-BAT, at 857–58 (May 4, 2020) (providing contextual details of their background as support for early release amidst the COVID-19 pandemic).

146. *See id.* at 858 (balancing the likelihood of contracting the COVID-19 virus and characteristics that made them more vulnerable).

answer to the first question was clearly “yes,” as would be true for many detainees in densely crowded, under-resourced facilities.¹⁴⁷ Weathering theory was used to make an affirmative case for the second question: That it was highly plausible that each would be at increased risk of requiring hospitalization or dying should they become infected with COVID-19. For this reason, it was argued that the reality of the COVID-19 global pandemic made the government decision to detain violators of immigration civil laws, for example, legally and constitutionally excessive.¹⁴⁸

III. Conclusion

Additional legal applications of weathering knowledge are imaginable. Any circumstance where the construct of “biological age” rather than chronological age comes into play, or where a measure of underlying health status is a salient consideration, even in the absence of a clinically diagnosed disease of aging, is one where it would be worthwhile to consider whether the person’s historically structured lived experience has subjected them to weathering.

147. See Hooks & Sawyer, *supra* note 134 (examining the environments of detainment facilities during the COVID-19 pandemic).

148. See *id.* (arguing that mass incarceration, including the detainment of pre-trial and asylum individuals, during the COVID-19 pandemic is unlawful).