

The Weathering Framework and US Racial Health Disparities

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Slide 1:

Black-White disparities in health have been well-documented in the research literature and are acknowledged in the policy arena. However, while the disparities are well-known, their causes are not understood. In this presentation, I will provide an introduction to the “weathering” framework for understanding health disparities. According to the weathering framework, health disparities between races result from exposure to social, economic, and political marginalization experienced by Black (compared to White) Americans. By marginalization, I am referring to the exclusion from mainstream social, economic, and political systems. This marginalization takes many forms, including, for example, the residential segregation of Black Americans into poorer quality neighborhoods– with lower access to resources such as quality schools and employment. The physical and mental health toll of this marginalization accumulates with age.

The weathering approach to health disparities aligns with the principles of the life course approach to health, specifically:

- Today’s experiences and exposures influence tomorrow’s health
- Health trajectories are particularly affected during critical or sensitive periods
- Biologic, physical, and social environments affect the capacity to be healthy
- While genetics offer both protective and risk factors for disease, health disparities reflect more than genetics and personal choice

Relating life course theory to health disparities means that racial disparities in contextual factors accumulate with age to result in racial disparities in health.

While the weathering framework of health disparities can be applied to both men and women, I will focus on birth outcomes as a model for examining the health of women during their reproductive years.

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This table outlines recent data on the disparities between Black and White women in poor birth outcomes.

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For example, the infant mortality rate for White women in 2007 was 5.63 per 1000 live births.

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However, the rate for Black women was 13.31 per 1000 live births more than double that for White women. While the rates of poor birth outcomes have declined for both Black and White women and the magnitude of the disparities is lower, this roughly two- to three-fold disparity has persisted for decades.

In general, most research, intervention, and policies to address disparities have focused on health behaviors, access to healthcare, or medical technology. However, a growing body of research supports the argument that these “proximate” risk factors do not adequately address the dynamic and complex nature of health disparities.

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Let's look specifically at how the weathering framework, proposed over two decades ago by social scientist Arline Geronimus, provides a model for analyzing these disparities.

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First, the weathering framework assumes that context directly affects health. Many researchers have documented the robust association between contextual factors – such as neighborhood or socioeconomic status – and health. Researchers have also documented the disparities between Black and White Americans in both the level and quality of many of these factors including health care, education, income, occupation, housing, and neighborhood. The weathering framework, however, extends the concept of context further by asserting that the disparities are fundamentally due to the social, economic, and political marginalization of Black Americans. The extent of the health disparities reflects the level of marginalization experienced.

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A second component of the weathering framework is that the health effects of the contextual factors accumulate with age. In other words, health disparities are smaller at younger compared to older ages, reflecting the shorter cumulative exposure to these contextual factors.

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Geronimus tested the weathering hypothesis empirically in 1996 using population-based data. Her results are shown on the following table that illustrates the low and very low birthweight rates for singleton first births to Black and White women in Michigan in 1989 by age group.

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Note that both the low birthweight and very-low-birthweight rates for Black women increase with age.

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However, this is not the case for White women,

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and illustrates increased Black-White disparity occurring with age.

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Notably, after controlling for numerous traditional risk factors, such as inadequate prenatal care, smoking, diabetes, hypertension, and other high-risk factors, Black women in their mid-to-late 20s, conventionally considered the ideal childbearing period, still showed greater odds of low birthweight and very low birthweight compared to Black women in their late teens. In other words, the Black women in this study seemed to be aging at a faster rate – or weathering – than their White counterparts, as reflected in birth outcomes.

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In the research literature, the causes of the accelerated aging known as weathering are understood to be fundamental causes – as opposed to proximate risk factors – for health disparities. Social scientists Bruce Link and Jo Phelan, wrote, “. . . groups more advantaged with respect to knowledge, money, power, prestige, and social connections will, whatever the current profile of risk factors and diseases, come out ahead with respect to health. To the extent that this is so, inequalities in health will exist as long as social inequalities do. . .”

Although we may intervene on the more proximate risk factors, because the underlying fundamental causes for the distribution of these risk factors has not been eliminated, other new risk factors will emerge to reinforce continued health disparities.

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A category of proximate risk factors is medical technology. Link and Phelan (and others) argue that social disparities will widen in the face of important new technological advances, as access to these advances favor socially advantaged groups, such as White compared to Black Americans.

For example, researchers investigated potential explanations for why Black-White disparities in infant mortality increased over the 1990s – a period when infant mortality overall had decreased. An important technological advance at that time was the development and FDA approval in late 1990 of surfactant, a compound necessary for proper lung function not present in many infants born preterm.

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This table outlines the main results as the Black-White odds ratio of infant mortality due to respiratory distress syndrome and then due to other causes.

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During the pre-surfactant period, Black infants showed a slight survival advantage with respiratory distress syndrome after adjusting for numerous maternal and infant factors.

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However, during the post-surfactant period, Black infants showed a greater odds of infant mortality due to respiratory distress syndrome. These results support the hypothesis that when the underlying fundamental causes – the marginalization of Black compared to White families – is not addressed, the opportunity to use important new technology heightens racial health disparities.

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The disparities in poor birth outcomes persist after accounting for individual-level income and education. Interestingly, research has shown that there are racial disparities in the meaning of income and education. For example, for the same level of education, Black women earn less than White women. Research shows that socioeconomic status intersects with race to generate particularly marginalized populations.

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To address the intersection between race and socioeconomic status, researchers examined low birth weight in New York City in poor and nonpoor Black and White women. Poverty was measured as Medicaid eligibility. They found an increase in moderately low birth weight among poor Black women, but not among other poverty-race groups. Because women who are both poor and Black are a particularly marginalized group, especially in urban settings such as New York City, these results support the hypothesis that the weathering of Black women is due to social, economic, and political marginalization.

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Because weathering results from the accumulated exposure to marginalization, one would expect that longer exposure to marginalizing environments would result in a greater risk for poor birth outcomes. To test this idea, researchers linked Census information on neighborhood economic indicators to a dataset of intergenerational birth certificates from Cook County, Illinois. In this dataset, there is economic information about the neighborhood in which the mother was born and her current residence for the years 1989-1991.

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The first panel shows the Black-White disparity in low birthweight in Cook County. This panel also shows that the disparity widens with age, as the low birthweight rate increases for Black women and decreases for White women with age.

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Building on these results, the researchers examined the role of neighborhood economic conditions within race. Women who had spent much of their lives in poor neighborhoods were compared to women in nonpoor neighborhoods, as measured by the median family income of the neighborhood they lived in when they were born and the neighborhood they lived in when they gave birth to their first singleton infant.

The second panel shows the results. Black women who had lived in a poor neighborhood at both time points – their birth and the birth of their first infant, represented by the solid line on the graph show an increase in low birthweight with age. Black women who had lived in a nonpoor neighborhood at both times, represented by the dashed line, show a decrease in low birthweight with increasing age.

These results suggest that neighborhood environments make an important cumulative contribution to the accelerated aging seen in Black compared to White women. These results are consistent with other research showing that neighborhoods reflect the extent of community marginalization and are sources of social and economic stressors that are more than simply the collection of individual incomes. Poor neighborhoods – particularly poor, Black neighborhoods – experience considerable civic and economic disinvestment in social and health wellbeing such as lower levels of police protection, lack of full-service grocery stores, more sources for buying fast food, fewer green spaces, and fewer well-stocked pharmacies. Residents of poor neighborhoods also pay more for goods and services including food, gasoline, and insurance.

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Research in the biological sciences supports a biological plausibility for the weathering framework. Neuroscientist Bruce McEwen described the concept of allostatic load as the biological wear and tear on the body due to chronic stress. Notably, stress in this example encompasses chronic stimuli that challenge the biological stress response systems to adapt, including psychological and psychosocial stressors, as well as physical stressors.

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In a recent study, we showed weathering patterns in a measure of allostatic load using data from the National Health and Nutrition Examination Survey. Conceptually, allostatic load is the increase in poor health due to chronic stress. In empirical studies such as this one, allostatic load is measured as an index – the sum of a number of physiological markers of poor health. In this study specifically, ten biomarkers such as blood pressure, creatinine clearance, and c-reactive protein were included in the allostatic load “score”. Each biomarker was dichotomized as “high” – or in the high quartile of the distribution—or “low” – in the lower three quartiles. The high levels of biomarkers were summed to result in a score that reflected the dysfunction of numerous physiological systems. We then calculated the predicted probability of having an allostatic load score of four or more.

As you can see from the graph, disparities in allostatic load are small during young adulthood and then increase substantially through middle adulthood.

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Note in particular the difference between Black and White women during what is considered to be healthy reproductive ages, the 20s. As early as the mid-20s, Black women, represented by the hollow circles and the green line, show the allostatic load of White women, represented by the hollow squares and the blue line, in their mid-30s

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How might the social, economic, and political marginalization experienced by Black compared to White women result in their accelerated aging or weathering? There are several potential mechanisms.

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One mechanism is through the increased exposure to social and economic stressors. A growing literature indicates that psychosocial stress – or stress resulting from social sources – is associated with poor health. In fact, researchers theorize that disparities in stress are an important component of the disparities in health, including birth outcomes.

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Another mechanism is exposure to environmental hazards. The environmental justice literature has long documented Black-White disparities in exposure to hazards including lead and other toxic waste. In fact, a recent report documented that race – particularly Black race – has been the most important factor associated with the placement of hazardous waste in the US. Numerous environmental hazards have been linked not only to poor birth outcomes, but to chronic conditions such as hypertension, which is linked to poor birth outcomes.

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One other mechanism that contributes to the increased risk for poor birth outcomes with age for Black women is the coping behavior within the social and economic constraints of many poor Black neighborhoods. While coping can mitigate the harmful health consequences of chronic stress, how one copes depends on available resources. Access to healthy foods and green spaces is lower for many Black compared to White communities, while access to fast food, convenience stores, and tobacco advertising is higher. Research has shown that tobacco use, for example is lower among Black compared to White youth, but then increases for Black adults over age, resulting in higher use for Black adults by middle age.

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There are numerous implications for interventions to alleviate the greater burden of poor birth outcomes experienced by Black compared to White women.

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First, contextual factors ultimately drive health disparities. Both the weathering framework and the life course perspective draw from the robust research documenting that social and economic context are closely linked to health. Context can be interpreted to mean social and economic factors ranging from individual-level socioeconomic status to neighborhood quality. The intervention and policy implications may be different with regard to specific strategies, but are similar with respect to the urgency of moving beyond traditional ideas about health intervention and policy to viewing social and economic policies as health policies. There is growing interest in integrating concern about health in all policies.⁴ I recently argued that, because of the research that suggests an interaction between social factors and environmental hazards in the development and stagnation of Black-White disparities in health, there is a need for cross-agency collaboration to address health and health disparities.

Such collaboration is a key element in life course discussions. Recently, researchers argued that “As a society, we have a choice: We can . . . develop health promoting communities for all, thereby turning around some of the deep-seeded determinants of poor health that are passed down through generations. Or, we can wait until symptoms of preventable diseases and disorders appear and then try to treat them after the fact. To date, we have taken the second course which has proven to be costly, and by no means the most effective, efficient, or just way to address the health of our nation.”^{5, p. 4}

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Extending these ideas, Geronimus argues that in order for fundamental change to be successful, we must address the social, economic, and political marginalization of Black Americans that ultimately results from racial stereotypes and ideologies. She states, “Without neutralizing pervasive racial ideology, sustaining health-enhancing political successes will be difficult, and the biological potential of African American women to lead long, healthy lives, will be eclipsed by weathering.” In order to address this marginalization, Geronimus calls for an “understanding [of] what factors shape public sentiment on race and how they might be influenced [as] critical public health objectives.”^{5, p. 136}

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Finally, because the racial disparities in the health effects of contextual factors accumulate with age, this means that by the time Black women reach reproductive age, their health has already begun to deteriorate. The increase in poor birth outcomes for Black women even in their 20s implies that to improve the disparities in birth outcomes, we must address the factors that drive health disparities long before the reproductive period of the life course.

In conclusion, the life course perspective builds on the concept of weathering as the accumulation of the health toll taken by contextual experiences of Black women. We have seen that disparities in birth outcomes increase over the life course – as birth outcomes reflect women’s health during the reproductive years. This understanding of birth outcomes as a reflection of women’s health implies that in order to prevent disparities in birth outcomes, we must address the contextual factors that exist before the perinatal period. This more holistic approach to women’s, family, and even community health occurs when health is addressed across the life course.

Slide 12:

With this presentation, I have provided a brief introduction to the weathering framework of health disparities. For more information on the topics discussed, I suggest the articles and book on this slide.

Weathering and birth outcomes:

Geronimus, AT. Understanding and eliminating racial inequalities in women's health in the United States: The role of the weathering conceptual framework. *JAMWA* 2001. 133-137.

Marginalization and the health of Black Americans:

Geronimus AT. To mitigate, resist, or undo: addressing structural influences on the health of urban populations. *AJPH* 2000. 90:867-872.

Geronimus AT, Thompson JP. To denigrate, ignore, or disrupt: the health impact of policy-induced breakdown of urban African American communities of support. *Du Bois Review* 2004. 1(2): 247-279.

Fundamental causes of health disparities:

Link B, Phelan J. Understanding sociodemographic differences in health – the role of fundamental social causes. *AJPH* 1996. 86(4):471-473.

Social and economic policies as health policies:

Schoeni RF, House JS, Kaplan GA, Pollack H, Eds. *Making Americans Healthier: Social and Economic Policy as Health Policy*. Russell Sage Foundation. 2008.

Life course perspective and disparities in birth outcomes:

Lu MC, Halfon N. Racial and ethnic disparities in birth outcomes: A life-course perspective. *Matern Child Health J* 2003. 7(1):13-30.

Slide 13:

My name is Margaret Hicken and I am currently a Robert Wood Johnson Foundation Health & Society Scholar in the Department of Epidemiology at the University of Michigan. I earned a master's in public health in maternal and child health from the University of North Carolina at Chapel Hill and a PhD in public health from the University of Michigan. Broadly speaking, my research focuses on the role of social factors in Black-White health disparities, with a particular emphasis on the role of social stressors and psychosocial stress. In one thread of my research I examine the notion that psychosocial stress exacerbates the harmful health effects of environmental hazards to result in environmental health disparities. I also examine novel survey and biological measures of stress that may better capture the stress of being Black in a racially-hierarchical and racialized society such as the US and the biological effects of chronic stress. Throughout my research program, I integrate disciplines ranging from the social

to the biological sciences to better understand the root causes of Black-White health disparities.