

# A Life Course Perspective on How Racism May Be Related to Health Inequities

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Recent studies show that racism may influence health inequities. As individuals grow from infancy into old age, they encounter social institutions that may create new exposures to racial bias. Yet, few studies have considered this idea fully. We suggest a framework that shows how racism and health inequities may be viewed from a life course perspective. It applies the ideas of age-patterned exposures, sensitive periods, linked lives, latency period, stress proliferation, historic period, and cohorts. It suggests an overarching idea that racism can structure one's time in asset-building contexts (e.g., education) or disadvantaged contexts (e.g., prison). This variation in time and exposure can contribute to racial inequities in life expectancy and other health outcomes across the life course and over generations. (*Am J Public Health*. 2012;102:967–974. doi:10.2105/AJPH.2012.300666)

From crib to coffin, race is invented, recorded, and reported. The classification of people's race on their birth certificates, college applications, medical charts, and death certificates highlights the central role of racial stratification in US society.<sup>1,2</sup> Racial classification follows one across the life course, and with this classification comes the potential for exposure to racism and health inequities.<sup>3</sup> A recent study suggested that in 2000, about 176 000 deaths were attributable to one specific form of racism, racial residential segregation.<sup>4</sup>

Segregation, however, is but one type of inequality.<sup>5</sup> The complexity of the effects of racism over the course of development is insufficiently recognized. Most studies emphasize the main effect of a given exposure at a specific period in the life course. For instance, many studies demonstrate that the reporting of racial discrimination in childhood or adulthood is associated with illness.<sup>6,7</sup> A few studies go further, perhaps by specifying discrimination in multiple contexts (e.g., everyday discrimination vs workplace discrimination)<sup>8,9</sup> or by examining the interaction between discrimination and other factors, such as social strains.<sup>10</sup>

However, a more complex and potentially more realistic model of racial health inequities can consider how race and racism intersect throughout the life course. The life course perspective emphasizes that one of the most

important functions of age and time are not simply their biological and developmental significance, but also their social significance.<sup>11</sup> Eighteen-year-old persons do not simply have older organs than 17-year-old individuals; they also possess rights, roles, and obligations that 17-year-old individuals do not. These include (depending on place and historical time) the ability to drive, vote, marry, smoke cigarettes, drink alcohol, be sued, and hold a prison record. Each of these rights, roles, and obligations is potentially shaped by race and racism.<sup>12</sup>

A life course perspective emphasizes the importance of change. Exposure to racism can change in nature, importance, and intensity.<sup>13–15</sup> Similarly, health and the factors that produce health can change. A growing body of research shows that health is not merely the result of risks that occur sporadically at one point in time.<sup>16</sup> Failure to attend to these temporal changes not only shortchanges our knowledge base, but also can lead to missed opportunities for intervention. The principles of the life course perspective have been well described in the literature.<sup>11,16,17</sup> We focus on a subset of ideas that may be particularly useful for studies of racial health inequities. They include the ideas of age-patterned exposures, sensitive periods, linked lives, latency periods, stress proliferation, historical period, and cohorts.

These ideas are summarized in Table 1 and elaborated in the remainder of the article.

## AGE-PATTERNED EXPOSURES AND SOCIAL PATHWAYS

The life course perspective emphasizes that as individuals age, they exit some social systems and enter new ones.<sup>11</sup> These systems—including the educational system, criminal justice system, and labor market—have been viewed as fundamental drivers of health inequities.<sup>22–24</sup>

Transitions into new systems provide additional contexts for potential exposure to racial discrimination.<sup>21</sup> Studies document that youths, adults, and older adults all report experiences with racial discrimination to varying degrees.<sup>10,25</sup> Indeed, children as young as 3 years old appear to recognize racial groups and treat one another differently on the basis of race.<sup>26</sup> There is insufficient documentation as to how experiences with discrimination change across the entire life course, but such changes are likely. For example, high school students' reports of discrimination from adults appear to increase over time, whereas their reports of discrimination from peers remain stable.<sup>27</sup> Indirect evidence comes from research on age discrimination, which shows that reports of age discrimination in the workplace vary as women move from being young job seekers to mid-career employees to retirees.<sup>28</sup>

Hence, the forms and frequency of discrimination may change with age. Moreover, the effects of certain types of discrimination may reverberate across the life course and reinforce one another. For example, racism in the form of residential and school segregation may influence the development of social networks, which may then shape employment opportunities and health.<sup>29–31</sup> One study suggested that youths attending racially isolated high schools were more likely to work in racially isolated workplaces in adulthood, even after

**TABLE 1—Description of Life Course Concepts**

Life Course Concept	Definition	Implications
Age-patterned exposures (also termed “social pathways”)	The pathways that individuals follow throughout the life course, which historical events can alter and social institutions can structure. <sup>11</sup> Accordingly, as individuals age, they exit some social institutions and enter new ones. Thus, exposure to discrimination within one social institution may reverberate across the life course and increase the risk of exposure to discrimination within other social institutions later in life.	Prevalence of discrimination within certain settings (e.g., employment) is likely to vary over the life course. Racism researchers should consider tailoring measurement instruments to a given developmental stage and context.
Sensitive period	Certain events have a more profound effect on health when they are experienced during specific developmental stages. Outside of this period, the effect is much weaker. <sup>18</sup>	Exposure to discrimination at certain developmental periods may have a greater effect on health than at other developmental periods. Studies should consider “age × exposure to discrimination” effects on health.
Linked lives	Events that affect one person also affect other persons in their network. <sup>11,19</sup> Thus, individuals are interdependent.	Research on racism that focuses solely on the target of racism is missing important indirect effects of racism on others in the target’s social networks. Interventions against racism that are focused on a single individual are incomplete.
Latency period	The period between exposure and disease appearance. <sup>20</sup>	Exposure to discrimination may have a longer latency period for physical health than for mental health. Short-term reactions (e.g., pulse rate, somatic symptoms) may or may not have long-term health outcomes.
Stress proliferation	Exposure to a single stressor may lead to additional secondary stressors. <sup>21</sup>	Researchers must pay careful attention to whether a given factor is a confounder or mediator of the discrimination-health pathway.
Period effect	Historical events and social change affect individuals’ life course trajectories or pathways, but the effect is relatively uniform across birth cohorts. <sup>11</sup>	Historical, racialized events can provide natural experiments from which to study the effects of discrimination on health.
Cohort effect	Historical events and social change differentially affect individuals’ life course trajectories or pathways across successive birth cohorts. <sup>8</sup>	Historical, racialized events can provide natural experiments from which to study the differential effects of discrimination on health across generations.

accounting for residential segregation, region, school, and personal resources.<sup>32</sup>

These observations imply 3 important considerations for future research. First, it suggests that specific types of racial discrimination (e.g., in employment) would likely vary in prevalence across the life course. These changes could be conceptually and statistically modeled as trajectories.<sup>27,28,33,34</sup> Second, the idea of transitions is not limited to moving from one life stage to another (e.g., work to retirement), nor is the issue of “age” simply one of biology. Both of these issues are generalizable to other phenomena. One extension is to do research on emigrants, whereby migration itself is a major transition. It is well established that immigrants are healthier than nonimmigrants, but that the

immigrant health advantage erodes with time. This erosion is often attributed to acculturation—the adoption of American culture—but new research suggests that the erosion might also be related to increased exposure to racism.<sup>35</sup> For example, a recent study of Asian Americans found that the erosion of the immigrant advantage occurred only among those who reported discrimination, not among those who did not report it.<sup>36</sup> Third, it implies that researchers may consider using multiple sets of instruments to measure discrimination, one set that may be tailored to a given stage (e.g., retirement) and another set that is less age specific (e.g., general disrespect).

Understanding when and where discrimination occurs is critical for developing sensitive

and specific measures of discrimination and increasing the efficiency of research.<sup>9,37</sup> Failure to attend to age and context may result in incomplete and overly simplistic assessments of discrimination that may result in type II error. Moreover, greater precision in understanding age-related differences in exposure to discrimination is important for evaluating potential sensitive periods.

**SENSITIVE PERIODS**

Certain events may have a greater impact on well-being when they occur during specific developmental stages. This interaction between age and exposure is referred to as a “sensitive period.”

Early childhood may be an important sensitive period that interacts with social stressors to exert long-term effects on well-being. For instance, Duncan et al. demonstrated that parental income when a child is between the ages of 1 and 5 years has long-term effects on that child's future adult earnings, but that parental income at other ages has little effect.<sup>38</sup> Similarly, McLeod and Shanahan found that family poverty that occurred when children were aged about 4 to 5 years—but not older than 5—was related to subsequent development of depressive symptoms up to age 9 years.<sup>39</sup>

The effects of social stressors may influence not only social outcomes but clinical ones as well. Barker and others have found that experiences in utero and during infancy can increase risk of heart disease and other outcomes during adulthood.<sup>40,41</sup> Shonkoff et al. have suggested that this may be related to the effects of stressors on the young developing brain.<sup>42</sup> During this developmental period, stressors may contribute to remodeling of the anatomical structure of the brain and to the connections between regions. Some evidence supports this argument. For instance, persons who perceive chronic stress prospectively show reduced hippocampal volume.<sup>43</sup> Similarly, individuals who are asked to recall the death of a loved one show increased releases of inflammatory biomarkers and activation of the prefrontal cortex.<sup>44</sup> Other studies show that stressors such as physical abuse can alter brain morphology, and that these alterations are particularly evident during early childhood.<sup>45</sup>

Hence, certain social conditions like poverty and stress may be particularly harmful at certain developmental periods. Similar effects may exist for discrimination, but this remains to be comprehensively tested. An emerging body of research has shown that maternal reports of discrimination are related to low-birth-weight deliveries.<sup>46,47</sup> Low birth weight is also associated with adult hypertension, a relationship that may be mediated by increased stress reactivity.<sup>48</sup> One longitudinal study of Black youths suggested that initial exposure to racial hassles was predictive of later increases in negative emotions and interactions with peers engaged in deviant behavior.<sup>10</sup> This valuable study could be extended further to consider

whether exposures to racial hassles at certain ages pose a greater risk than exposure to the same hassles at other ages. Thus, the study of sensitive periods suggests that age is an effect modifier of discrimination. Accordingly, studies are encouraged to model the interaction between discrimination and age or to consider estimating age-specific models of discrimination.

### LINKED LIVES

“Linked lives” refers to the interdependence among persons.<sup>11</sup> This concept is related to, but distinct from, social networks and social support. Whereas networks refer to the structural characteristics of social relationships (e.g., density, reciprocity) and support refers to the resources that flow from those relationships (e.g., emotional and financial assistance), the concept of linked lives considers that events that affect one person also affect other persons in their networks.<sup>11,19</sup>

Research on racism has generally emphasized personal experiences.<sup>7</sup> Yet, the concept of linked lives suggests that research should also examine how experiences of discrimination encountered by one person may indirectly affect another.<sup>37</sup> Discrimination may result in secondary effects such as financial strain,<sup>21,49</sup> decreased relationship quality,<sup>50</sup> and intimate partner violence.<sup>51</sup> For example, past experiences with discrimination can shape a Black mother's involvement with her child's schooling.<sup>52</sup> St. Jean and Feagin illustrate how discrimination against Black men can potentially affect their wives:

[Black men] can't control the system, they can't control the White man or the White woman, so they come home, we're their wife . . . and . . . they think that somebody else has got to feel the brunt of this. Someone gave it to me, the monkey on my back, I'm going to give you the monkey off my back.<sup>53(p308)</sup>

Methods exist to measure discrimination against one's racial group in general,<sup>54</sup> and some instruments ask about discrimination against family members.<sup>9</sup> But we are aware of no instruments that focus solely on specific experiences of discrimination against specific network members. The development of such tools may be valuable in generating new research. For instance, we speculate that for

parents, discrimination against their child may be more stressful than discrimination against the parents themselves.

We therefore encourage further documentation of how discrimination can strengthen, weaken, and reconfigure social relationships. This is particularly important given that social relationships can buffer illness.<sup>19</sup> Accordingly, future studies might test the hypothesis that a pathway between discrimination and health is via the weakening of social capital and social support.<sup>29</sup>

At the same time, the concept of linked lives points to an alternative hypothesis—that discrimination may actually strengthen social capital and social support. A racist action against one person in a social network may cause others in that network to come together and advocate for social justice. For instance, a panethnic national advocacy organization, American Citizens for Justice, was developed in response to the hate-crime murder of a Chinese American man in Detroit.<sup>55</sup> Numerous other examples exist that show how discrimination can promote community solidarity.<sup>56-58</sup> However, it is important to recognize that social capital and racism can work in complex ways. For instance, many White power organizations (e.g., the Ku Klux Klan) can possess and generate social capital.<sup>59</sup> Hence, future research should investigate the numerous pathways whereby discrimination may simultaneously strengthen and weaken social capital and social ties.

### LATENCY PERIODS

Certain events may cause illness after a single exposure, whereas other events may be harmful only after repeated exposures. Injury and even death may occur with the experience of a single hate crime. Research also suggests that repeated occurrences of less severe (but no less important) types of racial bias can contribute to illness.<sup>7,35</sup>

Several studies have considered how, after incidents of discrimination, some health outcomes have a longer latency period (the time between exposure to an event) than others. This idea was illustrated in a study by Pavalko et al. of the National Longitudinal Survey of Mature Women.<sup>60</sup> In 1982 (baseline) and 1989 (follow-up), women were asked about

work discrimination, emotional distress, and functional limitations. Reports of discrimination at follow-up, but not baseline, predicted emotional distress. Conversely, reports of discrimination at baseline, but not follow-up, predicted functional limitations. The authors reasoned that the findings may be explained by a longer latency period between discrimination and physical health compared with mental health.

The idea of latency period was also illustrated in a study by Gee and Walsemann with a younger sample of Blacks, Latinos, and Whites participating in the National Longitudinal Study of Youth.<sup>61</sup> In 1979 and 1982, youths were asked about racial discrimination in employment and work-related physical health limitations. The data showed that reports of discrimination at baseline or across both time periods were related to health limitations; however, reports of discrimination in 1982 were unrelated to health limitations. Although causality is not established by longitudinal studies, the data suggest the hypothesis that for some health outcomes, associations between discrimination and health problems are not seen until after a relatively long latency period.

In addition, the life course perspective highlights the importance of ongoing and chronic strains. Lewis et al. reinforced this idea with an analysis of middle-aged Blacks participating in the Study of Women's Health Across the Nation.<sup>62</sup> Women were asked about everyday discrimination at 5 different time points between 1996 and 2003. They found that discrimination in the most recent 12 months was not related to coronary artery calcification. However, this calcification was related to chronic discrimination encountered over the entire study period (1996–2003).

It is therefore important to consider the frequency of occurrence of discrimination in combination with the outcome of interest.<sup>37</sup> These longitudinal studies have a fairly long time frame (measured in years). Taken together, they suggest the provocative but insufficiently tested hypothesis that discrimination has a longer latency period for physical health than for mental health. However, it is important to recognize that laboratory studies, employing a much shorter time period (measured in minutes to hours), suggest that there

are immediate effects of discrimination on blood pressure, heart rate variability, and other somatic reactions.<sup>63</sup> Clarifying the connection of these short-term reactions to longer-term health outcomes remains a promising area for future research.

## STRESS PROLIFERATION

Pearlin and others have argued that a single stressor can cause the proliferation of secondary stressors.<sup>21,64</sup> For instance, the stressor of being fired from a job can cause the additional stressors of financial strain and marital strife that in turn lead to illness.

Discrimination may have a similar effect. For instance, if a Latino man was wrongly convicted of a felony, this conviction would have a life-long impact on his ability to access social goods, such as student loans or employment. This unfair event may also affect his sense of self and his worldview. It may, for example, promote a distrust toward others.<sup>65</sup>

Many studies have indicated that self-reports of discrimination are related to illness via stress.<sup>7</sup> An emerging body of research is developing this idea further by investigating stress proliferation. Brody et al. found that self-reported racial discrimination was related to health problems that led to depressive symptoms, which in turn led to compromised parenting practices.<sup>10</sup> Ong et al. adopted a stress proliferation framework to examine how daily discrimination mediated the relationship between chronic discrimination and psychological distress.<sup>66</sup> Brondolo et al. reported that lifetime exposure to discrimination is related to perceptions of routine ongoing social interactions, such that individuals who report more lifetime discrimination are more likely to experience social interactions (as recorded in electronic diaries) as unfair or harassing.<sup>67</sup>

The idea of stress proliferation is theoretically important because it suggests that studies need to carefully consider whether a given measure should be considered a confounder or a mediator. Many researchers are often careful not to “overcontrol” one’s statistical model for mediators that are on the causal pathway. However, this might occur inadvertently. For example, studies of discrimination often control for socioeconomic status (SES).<sup>7</sup> The value of this approach is that one can describe the

association of discrimination with an outcome, conditional on SES. Yet, it is plausible that discrimination is mediated by SES, such as when discrimination by an employer causes one to receive lower wages, which in turn causes financial strain and subsequent illness. Thus, future research should specifically consider how some traditional “controls” might actually be mediators that indicate and contribute to stress proliferation.

## HISTORICAL PERIOD AND BIRTH COHORT

The life course perspective also highlights the role of historical period and birth cohort. These 2 phenomena reflect the intersection between age and historical change.<sup>11</sup> That is, historical events such as the Civil Rights Movement may result in a cohort effect if such an event has differential effects for people at various developmental stages (i.e., birth cohorts).

For example, research has documented a significant decline in postneonatal mortality rates in the United States after passage of Title VI of the Civil Rights Act, which stipulated that institutions that received federal funds could not discriminate or segregate on the basis of race.<sup>68</sup> The decline in postneonatal mortality was greatest in the rural South, the same place where Black–White disparities in neonatal medical care was greatest. Almond et al. estimate that 4700 more Black infants born in 1975 survived their first year than would have been expected to survive if the same infants were born in 1965.<sup>68</sup> A follow-up study by Almond and Chay found that Black women who were born in the late 1960s experienced better adult health and gave birth to healthier infants in the 1980s and 1990s than did Black women who were born in the early 1960s.<sup>69</sup>

Kaplan et al. found that the Civil Rights Act produced little improvement for older-adult mortality and no change for cancer mortality rates<sup>70</sup>; however, they did find improvements in cardiovascular and stroke-related deaths among Black working-age women (i.e., 25–64 years old). Taken together, these findings suggest that (1) historical events can have differential health effects depending on one’s birth cohort, and (2) cohort effects will likely

vary on the basis of the outcome under investigation and the social context.

Period effects occur whenever historical events or social change have relatively uniform effects across a given cohort.<sup>11</sup> A recent study by Lauderdale highlights how a historical event (i.e., the events of September 11, 2001, or 9/11) was related to poor birth outcomes among Arab American women, presumably through the increased hostility and discrimination directed toward the Arab American community after 9/11.<sup>71</sup> Arabic-named women had a higher relative risk of giving birth to low-birth-weight infants in the 6 months immediately following 9/11 compared with Arabic-named women who gave birth in the 6 months prior to 9/11.

Hence, an understanding of the life course provides scholars with a useful perspective from which to integrate the impact of sudden and discrete events, as well as more gradual secular changes. Racialized events that are discriminatory, such as demonstrated by Lauderdale,<sup>71</sup> as well as those that are anti-discriminatory, such as the Civil Rights Act, provide important natural experiments from which to study the possible influence of discrimination on health over the life course and across generations.

### A CONCEPTUAL MODEL

Figure 1 provides a conceptual model that illustrates the relationships between racism and the development of disparities over the life course. The 2 horizontal bars are of uneven

length, representing inequities in the life expectancy between 2 groups. In 2006, there was a 5-year difference in life expectancy between Blacks (73.2 years) and Whites (78.2 years).<sup>72</sup>

Furthermore, each bar is subdivided into smaller segments that represent exposures to a major life stage, beginning from the prenatal period to retirement. The subdivisions are themselves of different lengths, representing disparities in time. For instance, the bar for education is shorter for the first group than the second, indicating disparities in years of education. The shaded bars represent periods in particularly undesirable conditions, such as in unemployment and incarceration. Some studies support these social inequities in time. One study estimated that, on average, Black men are expected to spend 3.1 years in prison, compared with 1.1 years for Latinos and 0.5 years for White men.<sup>73</sup> For women, the estimates were 0.2, 0.09, and 0.05 years for Blacks, Latinas, and Whites, respectively.

These bars emphasize that disparities exist in the amount of time spent in life stages that help build capital (e.g., education) or detract from it (e.g., incarceration). The bars illustrate disparities in the quantity of time, but it should be recognized that disparities may also exist in the quality of time (e.g., educational quality). It should also be noted that, although we present discrete stages, there is often overlap between them, such as when individuals work part-time while in school or in retirement. Furthermore, the bars in the graph are meant to be illustrative. Future studies are encouraged

to determine other relevant bars (e.g., years in disability) and their specific lengths.

Our model illustrates that some—but certainly not all—of the disparities in time may come from racism. For instance, Massey and Lundy show that racial discrimination may result in Blacks spending twice as long to find an apartment as Whites.<sup>74</sup> All people have the potential to experience some inequitable treatment; we therefore note that the top and bottom bars differ as a matter of degree, but the burden is greater for ethnic minorities.<sup>12,75,76</sup>

Our goal in presenting this model is to encourage further research and debate. Our review and model suggest several ideas for future study, including the following.

### Document Changes in the Experience of Racism

A first step is to provide a comprehensive and systematic documentation of how exposure to racial bias changes over major developmental stages. These efforts can then be extended to look at interactions between various forms of racism, such as whether discrimination in education leads to further discrimination in employment, and how these experiences can lead to the proliferation of additional stressors. Studies can further examine whether there are sensitive periods in which stress proliferation may be more likely to occur to both individuals and to their interdependent others.

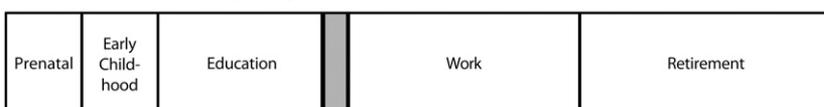
### Study Secular Changes in Discrimination

The nature of race relations have changed over time.<sup>12,77,78</sup> Studies can continue to examine whether and in what ways specific events, such as the Civil War, the New Deal, the internment of Japanese Americans, the Civil Rights Act, or 9/11, have changed the nature of race relations and shaped health inequities. In addition to these broad societal changes, studies could consider similar effects at a microlevel, such as the desegregation (or resegregation) of a specific school.

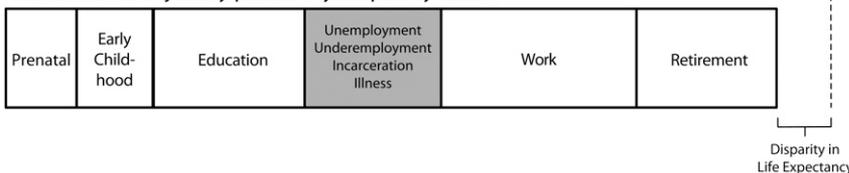
### Evaluate Inequities Across Generations

Disparities developed in one generation may further disadvantage the “starting point” for the next generation.<sup>5,79,80</sup> Consider the racial inequities in wealth and inheritance. On average, Blacks are much less likely to inherit assets than

#### 1. General life course trajectory



#### 2. Life course trajectory potentially shaped by racism



**FIGURE 1—Conceptual model of how racism may shape time in different states over the life course.**

Whites (1 in 20 Blacks vs 1 in 4 Whites) and to inherit much less when they do (\$41 900 for Blacks vs \$144 600 for Whites).<sup>81</sup> This raises the testable hypothesis that inequities in the transfer of wealth may play a role in health inequities across the life course. Furthermore, these disparities in wealth and their transfer may be related to structural discrimination,<sup>80–82</sup> thus raising the hypothesis that discrimination may influence health through the intergenerational transfer of assets. Similar ideas are being developed in the realm of “historical trauma,” which is the notion that a racialized event experienced by one generation (e.g., the Wounded Knee Massacre against the Lakota people) can be felt many generations later.<sup>79,83,84</sup>

### Consider Interventions to Test These Principles

Studies are increasingly recognizing that policy actions that improve education, wealth, and basic rights may also yield health benefits. For instance, using data from a randomized trial of 12 000 high school students, Muennig and Woolf estimated that moving students from mid-sized classes (22–25 pupils) to smaller classes (13–17 pupils) would yield a societal cost savings of \$168 000 and 1.7 extra quality-adjusted life-years per high school graduate.<sup>85</sup> Similar health and cost benefits are seen in several other experiments (e.g., the Perry Preschool Program and the Carolina Abecedarian Project) designed to improve early life educational opportunities.<sup>86,87</sup> As noted, Almond et al. found that racial disparities in infant mortality diminished in the period after the Civil Rights Act.<sup>68</sup> These and other studies are illustrative of the potential of policy interventions to influence health and health disparities over the life course. However, additional work remains to be done with regards to developing and evaluating such interventions.

### CONCLUSIONS

Many studies have investigated the relationship between discrimination and health.<sup>7,35,63</sup> For the most part, these studies suggest that discrimination is related to illness. Yet, major questions remain as to how experiences of discrimination may vary across the life course,

whether discrimination at specific developmental periods may be more harmful than at other ages, and how these experiences may accumulate over time. A life course perspective provides a key way to integrate a large body of research on discrimination and health. It highlights the connection between individuals and social institutions, and suggests that efforts to eliminate health inequities require considering how racism may not only create adverse exposures, but also structure time. ■

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### Contributors

G. C. Gee led the conceptualization and writing of the article. K. M. Walsemann and E. Brondolo contributed to the conceptualization, writing, and editing.

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### References

1. Ford CL, Harawa NT. A new conceptualization of ethnicity for social epidemiologic and health equity research. *Soc Sci Med*. 2010;71(2):251–258.
2. LaVeist TA. Beyond dummy variables and sample selection: what health services researchers ought to know about race as a variable. *Health Serv Res*. 1994;29(1):1–16.
3. Krieger N. Embodying inequality: a review of concepts, measures, and methods for studying health consequences of discrimination. *Int J Health Serv*. 1999;29(2):295–352.
4. Galea S, Tracy M, Hoggatt KJ, DiMaggio C, Karpati A. Estimated deaths attributable to social factors in the United States. *Am J Public Health*. 2011;101(8):1456–1465.

5. Gee GC, Ford CL. Structural racism and health inequities: old issues, new directions. *Du Bois Rev*. 2011;8(1):115–132.
6. Pascoe EA, Richman LS. Perceived discrimination and health: a meta-analytic review. *Psychol Bull*. 2009;135(4):531–554.
7. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med*. 2009;32(1):20–47.
8. de Castro AB, Gee GC, Takeuchi DT. Workplace discrimination and health among Filipinos in the United States. *Am J Public Health*. 2008;98(3):520–526.
9. Brondolo E, Kelly KP, Coakley V, et al. The Perceived Ethnic Discrimination Questionnaire: development and preliminary validation of a community version. *J Appl Soc Psychol*. 2005;35(2):335–365.
10. Brody GH, Chen YF, Murry VM, et al. Perceived discrimination and the adjustment of African American youths: a five-year longitudinal analysis with contextual moderation effects. *Child Dev*. 2006;77(5):1170–1189.
11. Elder GH, Johnson MK, Crosnoe R. The emergence and development of life course theory. In: Mortimer JT, Shanahan MJ, eds. *Handbook of the Life Course*. New York: Kluwer Academic; 2003:3–19.
12. Feagin JR. *Racist America: Roots, Current Realities, and Future Reparations*. New York, NY: Routledge; 2000.
13. House JS, Lantz PM, Herd P. Continuity and change in the social stratification of aging and health over the life course: evidence from a nationally representative longitudinal study from 1986 to 2001/2002 (Americans' Changing Lives Study). *J Gerontol B Psychol Sci Soc Sci*. 2005;60(spec no. 2):15–26.
14. Lu MC, Halfon N. Racial and ethnic disparities in birth outcomes: a life-course perspective. *Matern Child Health J*. 2003;7(1):13–30.
15. Colen CG. Addressing racial disparities in health using life course perspectives: toward a constructive criticism. *Du Bois Rev*. 2011;8(1):79–94.
16. Lynch J, Davey Smith G. A life course approach to chronic disease epidemiology. *Annu Rev Public Health*. 2005;26:1–35.
17. Pavalko E, Willson AE. Life course approaches for health, illness, and healing. In: Pescosolido BA, Martin JK, McLeod JD, Rogers A, eds. *Handbook of the Sociology of Health, Illness, and Healing: A Blueprint for the 21st Century*. New York, NY: Springer; 2010:449–464.
18. Kuh D, Ben-Shiomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. *J Epidemiol Community Health*. 2003;57(10):778–783.
19. Berkman LF, Glass T, Brissette I, Seeman TE. From social integration to health: Durkheim in the new millennium. *Soc Sci Med*. 2000;51(6):843–857.
20. Maudsley J, Kramer S. *Epidemiology: An Introductory Text*. 2nd ed. Philadelphia, PA: W. B. Saunders Co; 1985.
21. Pearlin LI, Schieman S, Fazio EM, Meersman SC. Stress, health, and the life course: some conceptual perspectives. *J Health Soc Behav*. 2005;46(2):205–219.
22. Link BG, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav*. 1995;(spec no.):80–94.
23. Walsemann KM, Geronimus AT, Gee GC. Accumulating disadvantage over the life course: evidence from a longitudinal study investigating the relationship

- between educational advantage in youth and health in middle age. *Res Aging*. 2008;30(2):169–199.
24. Williams DR, Costa MV, Odunlami AO, Mohammed SA. Moving upstream: how interventions that address the social determinants of health can improve health and reduce disparities. *J Public Health Manag Pract*. 2008; (suppl):S8–S14.
25. Kessler RC, Mickelson KD, Williams DR. The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *J Health Soc Behav*. 1999;40(3):208–230.
26. Van Ausdale D, Feagin JR. *The First R: How Children Learn Race and Racism*. Oxford, UK: Rowman and Littlefield Publishers Inc; 2011.
27. Greene ML, Way N, Pahl K. Trajectories of perceived adult and peer discrimination among black, Latino, and Asian American adolescents: patterns and psychological correlates. *Dev Psychol*. 2006;42(2):218–236.
28. Gee GC, Pavalko E, Long JS. Age, cohort and perceived age discrimination: using the life course to assess self-reported age discrimination. *Soc Forces*. 2007;86(1):265–290.
29. Brondolo E, Libretti M, Rivera L, Walsemann KM. Racism and social capital. *J Soc Issues*. 2012. In press.
30. Amuedo-Dorantes C, Mundra K. Social networks and their impact on the earnings of Mexican migrants. *Demography*. 2007;44(4):849–863.
31. Wagmiller RL. Race and the spatial segregation of jobless men in urban. *Demography*. 2007;44(3):539–562.
32. Stearns E. Long-term correlates of high school racial composition: perpetuation theory reexamined. *Teach Coll Rec*. 2010;112:1654–1678.
33. Raudenbush SW, Bryk AS. *Hierarchical Linear Models: Applications and Data Analysis Methods*. 2nd ed. Thousand Oaks, CA: Sage; 2002.
34. Singer JD, Willett JB. *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. New York, NY: Oxford University Press; 2003.
35. Gee GC, Ro A, Shariff-Marco S, Chae DH. Racial discrimination and health among Asian Americans: evidence, assessment, and directions for future research. *Epidemiol Rev*. 2009;31:130–151.
36. Gee GC, Ro A, Gavin A, Takeuchi DT. Disentangling the effects of racial and weight discrimination on body mass index and obesity among Asian Americans. *Am J Public Health*. 2008;98(3):493–500.
37. Krieger N. Discrimination and health. In: Berkman L, Kawachi I, eds. *Social Epidemiology*. Oxford, UK: Oxford University Press; 2000:36–75.
38. Duncan GJ, Ziol-Guest KM, Kalil A. Early-childhood poverty and adult attainment, behavior, and health. *Child Dev*. 2010;81(1):306–325.
39. McLeod JD, Shanahan MJ. Trajectories of poverty and children's mental health. *J Health Soc Behav*. 1996; 37(3):207–220.
40. Barker DJP. Fetal programming of coronary heart disease. *Trends Endocrinol Metab*. 2002;13(9):364–368.
41. Wadhwa PD, Buss C, Entringer S, Swanson JM. Developmental origins of health and disease: brief history of the approach and current focus on epigenetic mechanisms. *Semin Reprod Med*. 2009;27(5):358–368.
42. Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention. *JAMA*. 2009;301(21):2252–2259.
43. Gianaros PJ, Jennings JR, Sheu LK, Greer PJ, Kuller LH, Matthews KA. Prospective reports of chronic life stress predict decreased grey matter volume in the hippocampus. *Neuroimage*. 2007;35(2):795–803.
44. O'Connor MF, Irwin MR, Wellisch DK. When grief heats up: pro-inflammatory cytokines predict regional brain activation. *Neuroimage*. 2009;47(3): 891–896.
45. Andersen SL, Teicher MH. Stress, sensitive periods and maturational events in adolescent depression. *Trends Neurosci*. 2008;31(4):183–191.
46. Collins JW Jr, David RJ, Handler A, Wall S, Andes S. Very low birthweight in African American infants: the role of maternal exposure to interpersonal racial discrimination. *Am J Public Health*. 2004;94(12):2132–2138.
47. Mustillo S, Krieger N, Gunderson EP, Sidney S, McCreath H, Kiefe CI. Self-reported experiences of racial discrimination and black-white differences in preterm and low-birthweight deliveries: the CARDIA study. *Am J Public Health*. 2004;94(12):2125–2131.
48. Pyhala R, Raikonen K, Feldt K, et al. Blood pressure responses to psychosocial stress in young adults with very low birth weight: Helsinki Study of Very Low Birth Weight Adults. *Pediatrics*. 2009;123(2): 731–734.
49. Llacer A, Amo JD, Garcia-Fulgueiras A, et al. Discrimination and mental health in Ecuadorian immigrants in Spain. *J Epidemiol Community Health*. 2009;63(9): 766–772.
50. Murry VM, Brown PA, Brody GH, Cutrona CE, Simons RL. Racial discrimination as a moderator of the links among stress, maternal psychological functioning, and family relationships. *J Marriage Fam*. 2001;63(4): 915–926.
51. Waltermauer E, Watson CA, McNutt LA. Black women's health: the effect of perceived racism and intimate partner violence. *Violence Against Women*. 2006;12(12):1214–1222.
52. Rowley SJ, Helaire LJ, Banerjee M. Reflecting on racism: school involvement and perceived teacher discrimination in African American mothers. *J Appl Dev Psychol*. 2010;31(1):83–92.
53. St. Jean Y, Feagin JR. The family costs of white racism: The case of African American families. *J Comp Fam Stud*. 1998;29:297–312.
54. Crosby F. The denial of personal discrimination. *Am Behav Sci*. 1984;27(3):371–386.
55. Zia H. *Asian American Dreams: The Emergence of an American People*. New York, NY: Farrar, Straus and Giroux; 2000.
56. Chan S. *Asian Americans: An Interpretive History*. 1st ed. Boston, MA: Twayne Publishers; 1991.
57. Franklin JH, Moss A. *From Slavery to Freedom: A History of African Americans*. New York, NY: Alfred A. Knopf; 2000.
58. Barreto MA, Manzano S, Ramirez R, Rim K. Mobilization, participation, and solidaridad: Latino participation in the 2006 immigration protest rallies. *Urban Aff Rev Thousand Oaks Calif*. 2009;44(5):736–764.
59. Ezekiel RS. *The Racist Mind: Portraits of American Neo-Nazis and Klansmen*. New York, NY: Penguin Group; 1995.
60. Pavalko E, Mossakowski KN, Hamilton VJ. Does perceived discrimination affect health? Longitudinal relationships between work discrimination and women's physical and emotional health. *J Health Soc Behav*. 2003;44(1):18–34.
61. Gee GC, Walsemann KM. Does health predict the reporting of racial discrimination or do reports of discrimination predict health? Findings from the National Longitudinal Study of Youth. *Soc Sci Med*. 2009;68(9):1676–1684.
62. Lewis TT, Everson-Rose SA, Powell LH, et al. Chronic exposure to everyday discrimination and coronary artery calcification in African-American women: the SWAN Heart Study. *Psychosom Med*. 2006;68(3):362–368.
63. Brondolo E, Love EE, Pencille M, Schoenthaler A, Ogedegbe G. Racism and hypertension: a review of the empirical evidence and implications for clinical practice. *Am J Hypertens*. 2011;24(5):518–529.
64. Pearlin LI. The sociological study of stress. *J Health Soc Behav*. 1989;30(3):241–256.
65. Schmittner J, Massoglia M, Uggen C. Incarceration and the health of the African American community. *Du Bois Rev*. 2011;8:133–142.
66. Ong AD, Fuller-Rowell T, Burrow AL. Racial discrimination and the stress process. *J Pers Soc Psychol*. 2009;96(6):1259–1271.
67. Brondolo E, Brady N, Thompson S, et al. Perceived racism and negative affect: analyses of trait and state measures of affect in a community sample. *J Soc Clin Psychol*. 2008;27(2):150–173.
68. Almond DV, Chay KY, Greenstone M. Civil rights, the war on poverty, and black-white convergence in infant mortality in the rural South and Mississippi. 2006. MIT Department of Economics Working Paper No. 07-04. Available at: <http://ssrn.com/abstract=961021>. Accessed March 8, 2012.
69. Almond D, Chay KY. The long-run and intergenerational impact of poor infant health: evidence from cohorts born during the Civil Rights Era. 2006. NBER Working Paper. Available at: [http://www.nber.org/~almond/chay\\_npc\\_paper.pdf](http://www.nber.org/~almond/chay_npc_paper.pdf). Accessed March 8, 2012.
70. Kaplan G, Ranjit N, Burgard S. Lengthening lives: did civil rights policies improve the health of African American women in the 1960s and 1970s? In: Schoeni RF, Jouse JS, Kaplan GA, Pollack H, eds. *Making Americans Healthier: Social and Economic Policy as Health Policy*. New York, NY: Russell Sage Foundation; 2008:145–169.
71. Lauderdale DS. Birth outcomes for Arabic-named women in California before and after September 11. *Demography*. 2006;43(1):185–201.
72. Arias E. *United States Life Tables, 2006*. Hyattsville, MD: National Center for Health Statistics; 2010.
73. Hogg RS, Druyt EF, Burrell S, Drucker E, Strathdee SA. Years of life lost to prison: racial and gender gradients in the United States of America. *Harm Reduct J*. 2008;5:4.
74. Massey DS, Lundy G. Use of black English and racial discrimination in urban housing markets: new methods and findings. *Urban Aff Rev Thousand Oaks Calif*. 2001; 36(4):452–469.

75. Bonilla-Silva E. Rethinking racism: toward a structural interpretation. *Am Sociol Rev.* 1997;62(3):465–480.
76. Ford CL, Airhihenbuwa CO. Critical race theory, race equity, and public health: toward antiracism praxis. *Am J Public Health.* 2010;100(suppl 1):S30–S35.
77. Byrd WM, Clayton LA. *An American Health Dilemma: Race, Medicine, and Health Care in the United States.* New York, NY: Routledge; 2002.
78. Krieger N. The ostrich, the albatross, and public health: an ecosocial perspective—or why an explicit focus on health consequences of discrimination and deprivation is vital for good science and public health practice. *Public Health Rep.* 2001;116(5):419–423.
79. Brave Heart M, DeBruyn LM. The American Indian Holocaust: healing historical unresolved grief. *Am Indian Alsk Native Ment Health Res.* 1998;8(2):56–78.
80. Darity W, Dietrich J, Guilkey DK. Persistent advantage or disadvantage? Evidence in support of the intergenerational drag hypothesis. *Am J Econ Sociol.* 2001;60(2):435–470.
81. Shapiro TM. *The Hidden Cost of Being African American: How Wealth Perpetuates Inequality.* New York, NY: Oxford University Press; 2004.
82. Oliver ML, Shapiro TM. *Black Wealth, White Wealth: A New Perspective on Inequality.* New York, NY: Routledge; 1997.
83. Whitbeck LB, Adams GW, Hoyt DR, Chen X. Conceptualizing and measuring historical trauma among American Indian people. *Am J Community Psychol.* 2004;33(3–4):119–130.
84. Walters KL, Mohammed SA, Evans-Campbell T, Beltrain RE, Chae DH, Duran B. Bodies don't just tell stories, they tell histories: embodiment of historical trauma among American Indians and Alaska Natives. *Du Bois Rev.* 2011;8:179–190.
85. Muennig P, Woolf SH. Health and economic benefits of reducing the number of students per classroom in US primary schools. *Am J Public Health.* 2007;97(11):2020–2027.
86. Muennig P, Robertson D, Johnson G, Campbell F, Pungello EP, Neidell M. The effect of an early education program on adult health: the Carolina Abecedarian Project randomized controlled trial. *Am J Public Health.* 2011;101(3):512–516.
87. Muennig P, Schweinhart L, Montie J, Neidell M. Effects of a prekindergarten educational intervention on adult health: 37-year follow-up results of a randomized controlled trial. *Am J Public Health.* 2009;99(8):1431–1437.

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