Can You Count Them? What Do The Numbers Say?

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Abstract: At the end of the 20th Century, and at the beginning of this one, health and health care inequities have been highlighted by virtually every health related organization, association, and agency in the United States. The 1960's War on Poverty acknowledged the association between poverty and health care; little attention focused on racial and ethnic health disparities. Nonetheless, since federal recorded keeping began more than 100 years ago, there have been major differences mortality and morbidity between racial groups. In 1985, the U.S. Department of Health and Human Services documented 60,000 excess deaths among African Americans compared to their non-Hispanic white counterparts. Eighty percent of these preventable deaths were from six causes. Excess death was also founded among Hispanics and Native American populations.

During the 1980's-1990's, several investigations documented an association between the siting of toxic and hazardous waste sites and race/ethnicity and/or income status. The U.S. Government Accounting Office found racial/ethnic and low-income status were associated with living near a toxic and hazard waste site. This presentation describes adverse health conditions and disparities among selected racial and ethnic populations in the United States; their disproportionate location near toxic and hazardous waste sites, toxic chemicals associated with selected diseases and disabilities, and the plausible physical and behavioral associations that may result. Multi-method research approaches and analyses will be discussed and the utility and appropriateness of each will be reviewed. While quantitative analyses have been the major statistical method used in public health, qualitative methods are also needed.

At the end of this presentation, it is expected that the audience will consider the plausible associations between environmental exposures and health disparities among racial and ethnic populations and consider both qualitative and quantitative analyses in planning, implementing and evaluating public health programs.

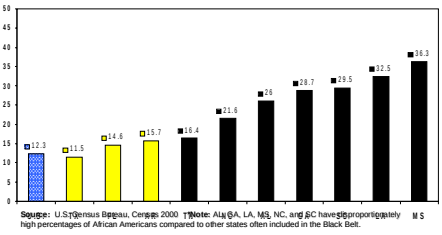
Racial and ethnic health disparities are well documented (Hartley, 2004; Kwate et al., 2003; Dallas & Burton, 2004; Prothrow-Stith et al., 2003; Underwood et al., 2004; Carter-Pokras & Baquet, 2002) . These health disparities are, in large part, from preventable causes (Mechanic, 2002; Villarruel, 2004; Foster, 2004). Cardiovascular disease and stroke, cancer, cirrhosis, diabetes, unintentional and intentional injuries, infant mortality, and HIV/ AIDS represent the vast majority of the disparities (US Department of Health and Human Services, 1985). Interestingly, race and ethnicity, particularly race, persist as a major predictor of risk (Mechanic, 2002). While these health gaps may appear to be recent, they have existed for many years (US Department of Health and Human Services, 1985). Infant mortality, for example, for African Americans has been at least twice that the infant mortality for non-Hispanic whites for more than 100 years. A number of other variables have been associated with health disparities. These include income, education, and more recently, geographical location. However, when these variables are held constant, race still continues to be associated with excess morbidity and mortality (Kwate et al., 2003).

In the early 1980's, living in and around hazardous waste sites was associated with race, ethnicity, and income status. African Americans and Hispanics, as well as persons of low-income socioeconomic status were more likely to live in such areas (Heitgerd et al., 1995; Goldman & Fitton, 1994; United Church of Christ Commission for Racial Justice, 1987). Because the African American population continues to experience the greatest and most persistent racial health gap, and in fact less progress has been made, this presentation will focus primarily on African Americans. However, implications for other racial/ethnic populations can be assumed.

According to the 2000 Census, Mississippi, Louisiana, South Carolina, Georgia, Alabama, North Carolina, and Tennessee were shown to have disproportionately large

percentages of African Americans (Figure 1).

Figure 1. Percent Of African Americans in States Traditionally Included in the Black Belt



Source: U.S. Census Bureau, Census 2000 Note: AL, GA, LA, MS, NC, and SC have significantly high percentages of African Americans compared to other states often included in the Black Belt.

Because of the large numbers of African Americans, these states are also referred to as the Black Belt States. Similarly, they are referred to as the Poverty Belt because of socioeconomic conditions and the Bible Belt because of the strong religious beliefs and the large number of churches in the area. In 1985, the U.S. Department of Health and Human Services published a landmark document entitled "The Secretary's Task Force on Black and Minority Health" (US Department of Health and Human Services, 1985). In that report, the term excess deaths was used to measure the difference between the preventable numbers of deaths in a minority population using the number of deaths in the non-Hispanic white population. The Task Force documented 60,000 excess deaths among African Americans. Excess deaths among Hispanic and Native Americans were also found. Excess deaths for Blacks/African Americans were found for cardiovascular disease, stroke, cancer, diabetes, homicide and unintentional injuries, infant mortality, and cirrhosis. In 1992, HIV/AIDS was added as a seventh cause of excess death in African Americans (Warren, 1993). In each instance, the Black population has an age-adjusted death rate which exceeds the death rate of each of the other races and their non-Hispanic white counterparts. Moreover, in most instances, the Black Belt states have higher mortality rates for each of the causes than the nation as a whole, even when the Black population is included.

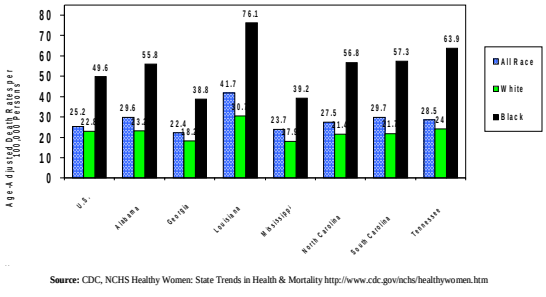
Several investigations have documented an association between the sitting of toxic and hazardous waste sites and race/ethnicity and/or income status. African Americans and Hispanics were 4-5 times more likely to live within a one-mile radius of a toxic/hazardous waste site (Heitgerd et al., 1995; United Church of Christ Commission for Racial Justice, 1987; Goldman & Fitton, 1994). There is a growing body of knowledge addressing the plausible associations between environmental exposure and adverse human health effects (Ahlborg et al., 1992; Baldi et al., 2003; Carpenter et al., 2002). Environmental toxicants may be associated with diseases, disability, dysfunction, and pre-mature death. However, the narrow view of the environment has limited the public health community from systemically linking environmental threats to human health. Bullard, an internationally known environmental justice scholar, defines the environment as where we live, work, play, and recreate (Bullard et al., 1997; Institute of Medicine, 1999). Consequently, the environment has both physical and social parameters. Table 1 lists the hazardous waste sites in each of the Black Belt states (Agency for Toxic Substances and Disease Registry, 2004). It also lists the most toxic sites (National Priorities List) which have been identified by the Environmental Protection Agency (EPA) for clean up or other action (Environmental Protection Agency, 2004).

Table 1. Hazardous Waste Sites in the Black Belt

STATE	# ALL SITES	# NPL SITES
Alabama	93	17
Georgia	124	19
Louisiana	73	23
Mississippi	32	10
North Carolina	76	30
South Carolina	94	28
Tennessee	67	13

Each of these hazardous waste sites contain chemicals which have been associated with the same chronic diseases that contribute to health disparities of African Americans. For example, diabetes is one of the conditions that plagues African Americans in the Black Belt States, compared to other populations (Figure 2).

Figure 2. Diabetes (underlying cause) Age-Adjusted Mortality Rates in the Black Belt by Race and State, 1999-2001



Source: CDC, NCHS Healthy Women: State Trends in Health & Mortality http://www.cdc.gov/nchs/healthywomen.htm

If we examine potential environmental contributors to the onset of diabetes, we find an association with dioxin exposure. In fact, the literature suggests that chronic low-level exposure may hasten the onset of adult-onset diabetes in susceptible individuals (Remillard & Bunce, 2002). Similarly, birth defects and infant mortality have been associated with proximity to hazardous waste (Orr et al., 2002; Orr, 1999; Jedrychowski et al., 2003).

Ironically, in late 1800, W.E. Dubois, a social scientist, investigating the association between the physical and social environment and health among African Americans in his research wrote, "*considering the health statistics of the Negro, we seek first to know their absolute condition, rather than their relative status; we want to know what their death rate is, how it has varied and is varying and what its tendencies seem to be; with these facts fixed, we must then ask, what is the meaning of a death rate like that of the Negro….? Is it, compared with other races; large, moderate or small; and in the case of nations or groups with similar death rates, what has been the tendency and outcome? Finally, we must compare the death rate of the Negroes with that of the communities in which they live, and thus roughly measure the social difference of these neighboring groups. We must endeavor also to eliminate, so far as possible, from the problem disturbing elements which would make a difference in health among people of the same social advancement. Only in this way, can we intelligently interpret statistics of Negro health" (Dubois, 1890).*

Dubois used the environment to try and explain the adverse living conditions of African Americans. His work is slowly finding its way into current public health research, the academic community, and among environmental and environmental justice advocates. Environmental and public health researchers are now considering issues such as low dose, cumulative effects, chronic exposures, and multiple chemical exposures. There is clearly a need and willingness by the public health research community to pursue research in this area and hopefully translate what is learned into action. The translation, however, has been difficult because of the paradigm newness of environmental health research associated with human health and racial and ethnic health disparities. Also, the translation or interpretation of statistical techniques must occur and lead to public health action. We have used very innovative epidemiological tools to define and re-define the problem. But what have we done and/or what are we going to do about it?

There is much that we can do. However, before we do anything, we must think differently. The following points are suggested: (1) All health care providers (not only physicians) should take an environmental health history on all of their patients; (2) One should be sensitive to, and develop a genuine interest in environmental issues; (3) One should recognize that it is impossible to holistically care about people without considering their environment since the physical and social environment are intimately interwoven; (4) One should look to the quantitative sciences to help address national health challenges, particularly those that address racial and ethnic disparities; and finally; (5) We need a more robust notion of health. A more holistic definition of health will focus on the relationship as the dynamic interaction between humans and the universe; groups, since individuals are unlikely to be healthy in a vacuum; spirituality---the belief in a force/power larger or more powerful than self/humans; and the physical and social environment. There is an increasingly statistically measurable role of the social and physical environment on human health. Health, therefore, can be described as a dynamic relationship focused on the physical, social, psychological and spiritual well being of the individual and the group and their interaction with the physical and social environment (Warren, 1999). As the world shifts from the infectious diseases to a chronic and environmental disease pandemic, new strategies of disease prevention and health promotion will be needed.

Yes, we can count the numbers, but counting them is more than a quantitative

process. While we should be thoughtful about misinterpretation and bias, there must be some attempt at translation, if public health action is expected. Be aware of your bias and the bias of others, but have the courage to suggest what ought to be done as a result of the numbers if you expect the numbers to change.

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