

# Asthma Disparities

---

The health of an individual is influenced by one's biological makeup, the surrounding physical and social environments, interactions with societal institutions and other individuals, access to resources, and one's beliefs about control over one's own circumstances.<sup>3</sup>

The World Health Organization (WHO) defines *social determinants of health* as: "... the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics" (WHO, 2008, p. 1). A major challenge of addressing asthma disparities is that social determinants overlap and intersect with one another. It is difficult to predict the pathways and mechanisms by which specific social determinants influence health (Adler & Rehkopf, 2008), making it challenging to prevent adverse health outcomes. Also, individual- and community-level factors contribute to disparities in asthma incidence, prevalence, and morbidity (Gold & Wright, 2005).<sup>4</sup>

This section presents literature on asthma disparities with a focus on some social determinants. Aspects of race/ethnicity, environment, and healthcare that are relevant to observed differences in asthma prevalence, morbidity, hospitalization rates, ED visits rates, and mortality between population groups are discussed. Socioeconomic position<sup>5</sup> intersects with these determinants, so some of its measures (e.g., household income, housing characteristics, education) are also discussed.

*Health disparities refer to the differences in disease risk, incidence, prevalence, morbidity, mortality and other adverse conditions, such as unequal access to quality health care, that exist among specific population groups in Connecticut. Population groups may be based on race, ethnicity, age, gender, socioeconomic position, immigrant status, sexual minority status, language, disability, homelessness, and geographic area of residence. Specifically, health disparities refer to those avoidable differences in health that result from cumulative social disadvantage.*

(Stratton, Hynes, & Nepaul, 2007, p. 2)

---

<sup>3</sup> Evidence indicates that social stressors and poor coping with stress can become embodied, affecting physiological systems in ways that make people more susceptible to disease and adverse health outcomes (Brunner & Marmot, 2006; Kristenson 2006; Bosma 2006).

<sup>4</sup> Differences in asthma medication use and adherence (Crocker et al., 2009; McQuaid et al., 2012), self-management of symptoms (George, Campbell, & Rand, 2009), and control of potential asthma triggers in the home (Everhart et al., 2011) are some examples of factors that are within the control of individuals with asthma. Community-level factors may be pre-existing (e.g., location) or produced by individuals (e.g., opportunities for social interaction) or institutions within or outside of the community (e.g., commercial zoning laws).

<sup>5</sup> Socioeconomic position refers to both the economic and social factors that influence the positions that individuals or groups hold within the structure of a society (Galobardes, Shaw, Lawlor, Lynch, & Smith, 2006, p. 7).

## Race and Ethnicity

When discussing health disparities, the focus is often on differences in rates between racial and ethnic groups. However, in reviewing information presented by race and/or ethnicity, it is important to understand that in some populations, these labels are markers for socio-economic differentials like differences in housing, income, and/or education (Nazroo & Williams, 2006). Race/ethnicity may be a risk marker or a risk factor (Kaplan & Bennett, 2003). It is also important for readers to recognize that the methods for collection of race and ethnicity data are necessarily not standard across studies, healthcare systems, databases, or reports (Nepaul, Hynes, & Stratton 2007; Connecticut Department of Public Health, 2012).

Race and ethnicity are deeply rooted social constructs in the United States. Despite increasing population diversity, the U.S. remains a persistently race-conscious society and differential treatment because of one's race/ethnicity remains a reality for some Americans. Indeed, this was a major finding of the Institute of Medicine (IOM) study of racial and ethnic health disparities, *Unequal Treatment*. Even after controlling for healthcare access-related factors like health insurance, compared to Whites, racial and ethnic minorities were less likely to receive needed medical services (IOM, 2003).

A recent study assessed the prevalence of hypertension, dyslipidemia, type II diabetes, and asthma in active-duty U.S. Air Force (USAF) members aged 21 years or older (Hatzfeld, LaVeist, & Gaston-Johansson, 2012). These USAF members all had at least a high school diploma, received housing benefits, and had equal access to free preventive screening and health care. Nonetheless, higher prevalence of chronic diseases was found among members who were American Indians/Alaska Natives (AI/AN), Asian/Pacific Islanders (API), non-Hispanic Blacks, and Hispanics compared to their non-Hispanic White counterparts. Higher chronic disease prevalence was consistent and significant for non-Hispanic Blacks, even though non-Hispanic Blacks were more likely to have had a current preventive health assessment than non-Hispanic Whites. The study authors suggest that the health risks members incurred outside of the military and before enlistment (e.g., racism, low socioeconomic status, access to health care) have long-term effects on health outcomes. They conclude that more preventive care and community outreach are needed, particularly for non-Hispanic Blacks.

## Where People Live

Differential treatment based on race/ethnicity and resulting differences in life chances are evident in where people live. The location of neighborhoods, places of residence, and the dwellings which people occupy are associated with factors that influence their well-being. As stated by Williams and Collins (2001), "Racial residential segregation is a fundamental cause of racial disparities in

health" (p. 404). A form of institutionalized discrimination, racial residential segregation<sup>6</sup> begets other social disadvantages such as differential access to educational opportunities and low socioeconomic status. In *Social Determinants: Taking the Social Context of Asthma Seriously*, Williams, Sternthal, and Wright (2009) articulate how the social disadvantages associated with racial residential segregation - air pollution, exposure to stress and violence, problems of access to healthy food, limited access to medical care and appropriate medication, and erosion of collective efficacy - are tied to asthma. They posit that the long-term improvement of asthma outcomes requires policies and interventions that focus on improving neighborhood conditions and housing quality and for children living in poverty, particularly minority children (Williams et al., 2009).

## Neighborhood

The social and spatial dimensions of neighborhoods are related to health outcomes (Kissane, 2011; Krivo, Peterson, & Kuhl, 2009; Krieger, Waterman, Chen, Soobader, & Subramanian, 2003; Krieger, Chen, Waterman, Rehkopf, & Subramanian, 2005; Krieger, 2006). Social and economic aspects of a neighborhood determine the residential environment. Regardless of the economic status of an individual, the quality of housing and level of crime in the neighborhood within which s/he resides can influence the individual's health (Cubbin, LeClere, & Smith, 2000; Pickett & Pearl, 2001; Sampson & Lauritsen, 1994; Robert, 1998). Exposure to community violence is associated with increased asthma-related hospitalizations and ED visits in adults (Apter et al., 2010).

Community characteristics influence the reactions to psychological stress, behaviors, and health outcomes of individuals (Wright & Schulte, 2003). Macintyre and Ellaway (2003) suggest that the physical and social aspects of neighborhoods that may promote or damage health include: physical features (e.g., air quality); availability of healthy environments at home, work, and play; public services that support daily living (e.g., transportation); sociocultural features (e.g., politics); and how the area is perceived by residents and non-residents. These community factors are not simply the aggregation of the individual-level characteristics; rather, they are tangible and intangible products of the interactions between individuals and communities with social institutions (e.g., education, government).

## Housing

Housing is an important social determinant of health (Shaw, 2004). Persons living in inadequate housing have increased odds of exposure to agents that exacerbate asthma. Using 2007 and 2009 American Housing Survey data, CDC researchers assessed inadequate and unhealthy housing in the

---

<sup>6</sup> Housing segregation along racial and ethnic lines in the United States is the result of past discriminatory practices of the private housing industry, states, and the federal government (U.S. Commission on Civil Rights, 1973). Redlining restricted nonwhites from purchasing homes in "desirable" neighborhoods. Thus, racial and ethnic minorities became concentrated in urban areas. The Fair Housing Act was passed in 1968 to eliminate housing discrimination; however, the result of the years of redlining is that racial and ethnic residential segregation persists in the United States and is most pronounced for Blacks or African Americans (Williams & Collins, 2001; Charles, 2003).

United States. They defined inadequate housing as a housing unit with deficiencies in plumbing, heating, electricity, and upkeep that are moderate or severe. Unhealthy housing was defined as having characteristics that are related to environmental factors that negatively affect the health of occupants (e.g., rodents, peeling paint, water leaks in the past 12 months) in addition to meeting the criteria for inadequate housing. The findings suggest that individuals living in inadequate or unhealthy homes may have increased odds of exposure to agents that exacerbate asthma, exposure to lead (Pb), and injury or death resulting from undetected house fires (Raymond, William, & Brown, 2011).<sup>7</sup>

In *The Role of Housing Type and Housing Quality in Urban Children with Asthma*, Northridge, Ramirez, Stingone, and Claudio (2010) examined the relationship between childhood asthma and the type and quality of housing in New York City. After adjusting for markers of housing quality and individual disease risk factors, residents of public housing still had higher odds of current asthma compared to residents of all types of private housing, suggesting differential exposure to asthma triggers. The authors posit that the increased asthma morbidity observed in public housing may be due to the lack of control residents have over the maintenance of public spaces in which asthma triggers can persist. In addition to having little control over the maintenance of one's housing, additional housing-related stressors - cost, overcrowding, lack of residential satisfaction, lack of stable housing, and trouble with neighbors - can influence asthma morbidity (Sandel & Wright, 2006; Quinn, Kaufman, Siddiqi, & Yeatts, 2010). However, it is difficult to separate out the independent effects of inner city residence, low socioeconomic status, and minority race or ethnicity on asthma morbidity because residential racial segregation in the United States persists (Wright & Subramanian, 2007).

## Environment

A growing body of environmental justice literature examines how unequal exposures to environmental pollutants and social determinants manifest as health disparities (Brulle & Pellow, 2006; Downey, Dubois, Hawkins, & Walker, 2008). Analysis of data from the Americans' Changing Lives Study demonstrated significant associations between low income and proximity to a polluting industrial facility (PIF) and regional variations in the association between race and closeness to a PIF (Mohai, Lantz, Morenoff, House, & Mero, 2009). Epidemiologic research demonstrates that asthma morbidity and mortality are highest in inner cities, where environmental pollutants and airborne allergens are important factors (Eggleston, 2007). In a study of a New York State birth cohort,

---

<sup>7</sup> Analyses demonstrated that in 2009, the odds of living in inadequate housing were higher for persons classified as non-Hispanic Blacks (OR= 2.3), Hispanics (OR= 2.0), American Indian/Alaska Native (OR= 1.9), and Asians/Pacific Islanders (OR= 1.1) compared to non-Hispanic whites. Unhealthy housing units were most likely to be found in the Northeast region (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, and New Jersey) in 2007; and in the Northeast and Midwest in 2009. The odds of living in unhealthy housing were highest for American Indians/Alaska Natives (OR for males= 1.6; OR for females= 1.4) and non-Hispanic Black females (OR= 1.4) compared to their non-Hispanic White counterparts. Compared to households that did not have a person with a disability, living in inadequate housing was 1.2 higher and the odds of living in unhealthy housing was 1.4 times higher for households that had at least one person with a disability. With regard to the individual unhealthy environmental exposures that were assessed, householders with annual incomes < \$24,999 were more likely than those with annual incomes > \$75,000 to occupy housing with a recent sighting of a rodent (OR = 1.9), peeling paint in a home built before 1978 (OR= 3.4), and no working smoke alarm (OR= 5.4).

researchers found that chronic exposure to ozone (O<sub>3</sub>) in early childhood was associated with increased risk of hospital admission for asthma care (Lin, Liu, Le, & Hwang, 2008). Statistically significant associations were found between asthma hospitalizations and: age 1 - 2 years; living in poor neighborhoods; having a mother with less than 12 years of education; having Medicaid or no insurance coverage at the time of birth; and Hispanic ethnicity. According to Meng and colleagues (2008), the higher prevalence of asthma among low-income persons is related to exposure to high traffic density and increased susceptibility to adverse environmental exposures because of compromised health and decreased access to health care. There is also evidence of a dose-response relationship between asthma prevalence and the proximity of where a person lives relative to sources of particulate air pollution (Oyana, Rogerson, & Lwebuga-Mukasa, 2004).

There is a complex interplay between environmental inequality, residential segregation, income inequality, and race/ethnicity. In a study of environmental inequality in 329 metropolitan areas of the continental United States, Downey and colleagues (2008) examined the roles of residential segregation and income inequality in producing environmental inequality. They conducted analyses using pollution data from the Environmental Protection Agency Risk-Screening Environmental Indicators (RSEI) Project and the 2000 U.S. Census. The researchers found that in general, Blacks and Hispanics experienced a greater pollution burden than other racial/ethnic groups in metropolitan areas, with Blacks being more likely than other groups to be "pollution burdened." In extremely polluted areas with more than one million residents, Blacks, Hispanics, and Pacific Islanders were more likely to have high pollution disadvantage compared to other racial/ethnic groups. However, environmental inequality outcomes varied widely across the metropolitan areas examined. Whites, Pacific Islanders, Native Americans, and Asian Americans also experienced heavy pollution burdens in many of the metropolitan areas included in the study. The major study conclusions were that: 1) residential segregation and racial income inequality are not good predictors of environmental inequalities; 2) the proximity of environmental hazards varies with the degree of residential segregation in an area; and 3) "the roles income inequality and residential segregation play in producing environmental inequality vary from one racial/ethnic group to another" (Downey et al., 2008, p. 14).

## Healthcare

Asthma disparities can result from differences in the provision of asthma care. Ash and Brandt (2006) examined racial disparities in asthma hospitalizations in Massachusetts. From 1994 - 2002 hospital discharge data, they extracted hospital admission records for 5 - 64 years olds with a primary diagnosis of asthma and no comorbid emphysema diagnosis. Variables of interest included: race/ethnicity (White, Black, Hispanic, and other), residential zip code, and type of payer (e.g., commercial insurance, Medicare, self-pay). Residential zip code matching was performed to

determine median household income. Using these data, Ash and Brandt looked at the number of asthma hospital admissions each patient in the sample had during the two years after their first asthma hospital admission. They found that even after controlling for age, type of payer, and median neighborhood income, race/ethnicity was a strong predictor of hospital readmission for asthma care - Blacks and Hispanics had a higher odds of hospital readmission compared to Whites. Because asthma hospitalization is preventable if care is appropriate, Ash and Brandt conclude that their analysis of the Massachusetts data shows the persistence of racial/ethnic disparities in asthma management and outcomes (p. 362).

In their examination of race/ethnicity differences in the inpatient management of asthma in the U.S., Chandra, Clark, and Camargo (2009) did not find any statistically significant differences in hospital inpatient asthma treatment and outcomes for adults or children. However, they found that at the time of hospital discharge, Asthma Action Plans were given to Hispanic children at half the frequency that they were given to Black children. The authors suggest that this may have been caused by language barriers, differences in insurance coverage, or lack of cultural competency; however, no data to examine these suggestions was collected. Closer examination of differential hospital discharge practices is needed.

Diette and Rand (2007) posit that poor health care communication contributes to health disparities for minorities with asthma. From their review of the literature, they found that poor provider/patient communication may be more common for minority patients and may result in underestimation of asthma severity for minority asthma patients. Diette and Rand discuss how patient, physician, and healthcare system factors may result in poor provider/patient communication and contribute to asthma disparities. The patient factors include: healthy literacy; health beliefs that differ from those of the health care provider (e.g., lack of trust in prescribed medications); and lack of patient adherence to daily inhaled corticosteroid therapy. The physician factors that may contribute to poor communication include: physicians' expectations about the condition and its severity based on pre-existing beliefs about the patient; stereotyping that may influence interpretation of patient behaviors and clinical findings; and communication skills (e.g., use of close-ended versus open-ended questions). Physician race is another factor identified as a contributor to patient/provider communication - patient satisfaction ratings are higher when the physician is the same race as the patient. Healthcare system factors that play a role in poor patient/provider communication include: absence of culturally and linguistically appropriate services; complex reimbursement procedures that may discourage people from seeking care; and insufficient time for visits.

In a review of reasons for disparities in the quality of asthma care, Cabana, Lara, and Shannon (2007) discuss issues with healthcare system elements - structure (e.g., staff, equipment, policies), process (i.e., care delivery), and outcomes (e.g., hospital readmissions). They identify the following potential sources of racial and ethnic disparities in asthma care: 1) access to a health care provider

(e.g., availability of culturally competent providers); 2) navigation of the healthcare system (e.g., knowledge of the relevant services that are available); and 3) interaction with the health care provider. They suggest interventions at the structural, healthcare system, and interpersonal levels to improve asthma care and reduce asthma care disparities.

At the structural level, they propose: increasing the number African American and Hispanic physicians, particularly in the fields of allergy immunology, and pulmonology; adopting the culturally linguistically appropriate service (CLAS) standards promulgated by the U.S. Department of Health and Human Services; improving the structure of healthcare plans so that providers adhere to the same standard of care, regardless of the patient's health insurance; and improving access to primary health care services through community health centers. At the healthcare system level, Cabana and colleagues suggest: improving adherence to the National Heart, Lung, and Blood Institute *Guidelines for the Management of Asthma*; training for physicians in patient/provider communication; implementing care quality improvement programs; and providing professional language interpretation to serve diverse populations. At the interpersonal level, the authors recommend reducing stereotyping and improving patient education about asthma self-management.

## Health Insurance

According to the Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care (IOM, 2003), "Insurance status, perhaps more than any other demographic or economic factor, determines the timeliness and quality of healthcare, if it is received at all" (p. 84). In their study of ED use among children with asthma, Canino and colleagues (2012) found an association between frequent ED use for asthma care and public insurance for Latino children in living in Puerto Rico (PR), but no such association for publicly-insured Latino children living in Rhode Island (RI). The authors postulate that the difference in ED presentation frequency between the two groups is that public insurance benefits in PR differ from those in RI. Dispensing of asthma control and quick relief medications to publicly-insured children in Puerto Rico was significantly less frequent than dispensing of such medications to privately-insured children in PR (Vila et al., 2010). Moreover, in PR there is a disincentive to prescribing inhaled asthma controller medications to publicly-insured children because medication costs are included in the fixed payment to physicians and clinics (Canino et al., 2010).

Adequate health insurance increases the likelihood of asthma control. In New York City, asthma care improved among children who were newly enrolled in the New York State Children's Health Insurance Program (SCHIP). Szilagyi and colleagues (2006) analyzed data from telephone interviews of the parents of SCHIP enrollees. Baseline interviews were conducted in 2001 and follow-up interviews were done 13 months later. The interviews were conducted in English and Spanish, seven days per week, and during days and evenings. Baseline interviews were completed for 2,644 children and follow-up interviews for 2,310 children. The researchers found that after SCHIP enrollment, there

were statistically significant reductions in the percent of children who had no usual source of care, who had to travel  $\geq 30$  minutes to get to the location of health care provision, and who experienced difficulty getting an appointment. During SCHIP enrollment, there were also statistically significant reductions in unmet needs among those children who had a need for: any health service, specialty care, acute care, prescription medications, or ED care. With regard to utilization of care, there were significant reductions in: the mean number of asthma attacks; mean number of asthma hospitalizations, and mean number of asthma ED visits.

## Toward Addressing Asthma Disparities in Connecticut

The Connecticut Department of Public Health Asthma Program draws on a variety of data sources to describe the distribution of asthma in Connecticut. Using surveillance and survey data, the Asthma Program is able to identify the population subgroups which are disproportionately affected by asthma. Surveillance findings inform public health interventions aimed at individuals, communities, health care providers, schools, and workplaces. Moreover, asthma data serve as the starting point for policy creation and reform.

In subsequent sections of this report, data on the Connecticut population and the populations affected by asthma are presented. In recognition of the fact that social determinants of health are interwoven, the asthma data are stratified in a variety of ways. Data are presented by: age groups and major age categories (i.e., child versus adult); gender (male and female); race/ethnicity (Hispanic, non-Hispanic Black, non-Hispanic White, and non-Hispanic Other); geographic designation (city/town and county), and annual household income. Data on more social determinants (e.g., years of education, primary language) that are not currently available would help to build a stronger evidence base for interventions to reduce asthma prevalence, morbidity, and mortality among all Connecticut residents.