

The Role of Community and Neighborhood Factors in Childhood Asthma

Specific Hypotheses Related to the Role of Community and Neighborhood Factors in Childhood Asthma

1) Proposed Core Hypothesis / Question

- a) Background on Childhood asthma – **Can this be copied from Asthma group?**
- b) While much is known about the pathophysiologic and genetic pathways leading to childhood asthma, it is increasingly recognized that a complete understanding of childhood asthma, its cause and consequences, requires a multi-level perspective that includes upstream factors. Such a view of disease causation implies that we must look to the social environmental forces that structure exposures to health damaging factors and the presence or absence of resources that mitigate or exacerbate the impact of these exposures to fully understand the etiology of diseases such as childhood asthma as well as the large socioedemographic variations in the burden from these diseases. Considerable and accumulating evidence suggests that the role of community and neighborhood factors in structuring these exposures and resources is an important avenue to pursue in the understanding of childhood asthma and how the burden from it can be reduced.

Core Hypothesis:

Residence in disadvantaged communities and neighborhoods, both pre-natally and post-natally, results in increased exposure to social, physical, psychological, and environmental factors that increase the risk of developing asthma and its complications and decreased availability of protective resources. These factors influence the development of asthma as well as its treatment and complications.

c) Prenatal influences:

- i) Neighborhood and Community Factors that negatively influence the health of the mother may increase the likelihood that the fetus will develop structural and functional characteristics that predispose it to heightened susceptibility to asthma later in life. For example, poor health of the mother may have an impact on small airway size and reactivity, and on immunologic response to environmental and psychosocial stimuli.
 - (1) Community and neighborhood factors that promote or discourage maternal smoking and other health damaging behaviors (e.g. norms, environmental restrictions, advertising,) will reduce maternal health and increase asthma susceptibility in her offspring;

- (2) Living in a socioeconomically disadvantaged community will reduce maternal health and increase asthma susceptibility in her offspring;
 - (3) Living in a community in that lacks convenient access to high-quality and affordable medical care will have a negative impact on maternal health and increase asthma susceptibility in her offspring;
 - (4) Working at high strain jobs with poor or no benefits will decrease maternal health and increase asthma susceptibility in her offspring;
 - (5) Living in Communities with characteristics that are associated with decreased social network participation and support will decrease maternal health and increase asthma susceptibility in her offspring;
 - (6) Indoor and outdoor environments that increase maternal exposure to various infectious agents may have an impact on asthma susceptibility in her offspring.
 - ii) Maternal residence in neighborhoods with poor housing stocks will increase maternal exposure to cockroach, mouse, mold, and dust mite antigens, and will increase asthma susceptibility in her offspring.
 - iii) Factors that increase the probability of living in neighborhoods that increase maternal exposure to indoor and outdoor pollutants (e.g., diesel exhaust, poor ventilation and inadequate heating, use of gas stoves for heating, etc) will be associated with increased asthma susceptibility in her offspring.
- d) Factors associated with increased incidence of asthma
- (1) Community and neighborhood factors that promote or discourage smoking and other health damaging behaviors (e.g. norms, environmental restrictions, advertising,) will increase the incidence of asthma;
 - (2) Living in a socioeconomically disadvantaged community will increase asthma incidence;
 - (3) Living in a community in that lacks convenient access to high-quality and affordable medical care increase asthma severity at diagnosis via poorer screening and case-finding;
 - (4) Living in a community with fewer resources devoted to children will be associated with increased asthma incidence and greater severity at diagnosis;
 - (5) Living in a community with poor housing stock will be associated with increased asthma incidence and housing discrimination will increase inequalities in the incidence of asthma;
 - (6) Community disorganization, crime, and violence may promote behaviors and coping strategies that increase the incidence of asthma;
 - (7) Communities that are unable to mobilize support for mitigation of housing problems, pollutant exposure related to truck and bus traffic, or other factors related to asthma may have increased asthma incidence;
 - (8) Communities characterized by unpredictability, disorganization, and lack of formal and informal social institutions focused on stress reduction may have increased asthma incidence;
- e) Factors associated with poorer management of asthma and greater asthmatic complications

- (1) Community and neighborhood factors that promote or discourage smoking and other health damaging behaviors (e.g. norms, environmental restrictions, advertising,) will decrease control of asthma and increase complications;
- (2) Living in a socioeconomically disadvantaged community will decrease asthma control and increase complications;
- (3) Living in a community in that lacks convenient access to high-quality and affordable medical care will decrease asthma control and increase complications;
- (4) Living in a fragmented, disorganized and stressed community will decrease the likelihood of successful use of behavioral and stress management strategies for asthma control and will decrease control of asthma and increase complications;
- (5) Living in a community with fewer resources devoted to children will decrease control of asthma and increase complications;
- (6) Living in a community with poor housing stock will be associated with decreased control of asthma and increase complication rates;
- (7) Community disorganization, crime, and violence may promote behaviors and coping strategies that decrease the control of asthma and increase complications;
- (8) Communities that are unable to mobilize support for mitigation of housing problems, pollutant exposure related to truck and bus traffic, increased access to state-of-the art medical care, or other factors related to asthma may have decreased rates of control of asthma and increase rates of complications;
- (9) Communities characterized by unpredictability, disorganization, and lack of formal and informal social institutions focused on stress reduction may have increased asthma incidence;
- (10) Living in Communities with characteristics that are associated with decreased social network participation and support will decrease control of asthma and increase complications
- (11) Living in indoor and outdoor environments that increase exposure to various infectious agents will decrease asthma control and increase complications
- (12) Residence in neighborhoods with poor housing stocks will increase exposure to cockroach, mouse, mold, and dust mite antigens, and will increase asthma susceptibility in her offspring.
- (13) Factors that increase the probability of living in neighborhoods that increase exposure to indoor and outdoor pollutants (e.g., diesel exhaust, poor ventilation and inadequate heating, use of gas stoves for heating, etc) will be associated with decreased asthma control and increased complications;

2) **Public Health Significance:**

??TAKE FROM ASTHMA GROUP?

3) **Justification for a Large, Prospective, Longitudinal Study**

While studies of the role of neighborhood and community factors in health problems of major public health significance are beginning to be carried out, most suffer from insufficient variation in neighborhood characteristics, and few, if any, produce estimates that are nationally

representative. To adequately understand the intersection of socioeconomic, racial/ethnic, and neighborhood/community factors in the incidence, progression, and control of childhood asthma requires a large sample in which various relatively rare combinations of exposures – e.g. high income, African-American, highly integrated communities – are included. Otherwise we it is impossible to distinguish between the effects of socioeconomic, race/ethnicity, and community factors on asthma and complications of asthma. Longitudinal studies are well-recognized as the most appropriate design for examining facotrs related to incidence and progression of disease.

4) Scientific Merit

There are no studies of sufficient interdisciplinary complexity and size to estimate the impact of community and neighborhood factors on the incidence and complications of childhood asthma. Yet, numerous recent publications from NIH and the IOM and editorial in leading scientific journals have underscored the importance of considering these contextual factors. Because of the need for large, representative, and prospective studies, and the consequent expense, it is unlikely that the importance of neighborhood and community factors can be adequately addressed in any study other than the proposed NCS.

5) Potential for Innovative Research

The potential is high – attention to neighborhood and community factors in the NCS will lead to the development of standarduized assessment tools that can be used in other studies, and it will substantially advance the multi-level approach to disease etiology. The interdisciplinary context of the proposed NCS means that there will be unparalleled opportunities to develop comprehensive tools for the assessment of community and neighborhood characteristics, and convincing answers to the role of neighborhood and community context in childhood asthma.

6) Potential for Synergy with Other Working Groups

There is clear overlap and potential synergy with the Asthma WG and the Inequalities WG.

7) Feasibility

Considerable progress has been made in the development of techniques for assessing neighborhood and community characteristics, and many of these characteristics have been strongly associated with physical health, developmental, social outcomes, and psychological outcomes. Depending on the sampling design selected, consideration will have to be given to the balance between intensively and directly assessing community and neighborhood characteristics vs. the use of administrative data. Similarly, it may be feasible to do intensive assessment on a subsample within the study.