

## Impact of LEED-Certified Affordable Housing on Asthma in the South Bronx

Elizabeth Garland<sup>1</sup>, Erin Thanik Steenburgh<sup>1</sup>, Sadie H. Sanchez<sup>1</sup>, Anita Geevarughese<sup>1</sup>, Les Bluestone<sup>2</sup>, Laura Rothenberg<sup>1</sup>, Alexander Rialdi<sup>1</sup>, Mary Foley<sup>1</sup>

(1) Mount Sinai School of Medicine; (2) Blue Sea Development

### WHAT IS THE PURPOSE OF THIS STUDY?

- To evaluate the impact of environmentally-friendly, affordable housing on asthma symptoms.
- Tenants moving into Melrose Commons V (MCV), a Leadership in Energy and Environmental Design (LEED)-certified, affordable housing complex in the South Bronx, were followed for 18 months to determine the health impact of their new “green” environment, built on energy efficient and environmentally-conscious principles.
- MCV was built using features with the potential to improve health outcomes, including construction materials with low or minimal levels of environmental pollutants, and specialized ventilation systems. Residents were not allowed to keep pets in the building and smoking was prohibited within twenty-five feet of the complex.
- Participants were surveyed periodically to determine changes in the frequency of asthma-related symptoms and utilization of urgent health care. Tenants received a home-based asthma education session and were evaluated to determine its impact on their knowledge of asthma and environmental triggers of asthma symptoms. Behavioral changes implemented by tenants were also assessed.

### WHAT IS THE PROBLEM?

- Asthma is the most common chronic disease of childhood and affects almost 10% of children in the United States. In addition to the physical and psychological burden caused by asthma on both the individual and their family, there are significant monetary costs as well; asthma expenses in the United States total more than \$56 billion every year.
- Asthma plays an even greater role in poverty-stricken urban neighborhoods. Over 20% of children living in public housing are affected by asthma.
- Substandard housing conditions, more commonly found in low-income urban neighborhoods, can increase levels of indoor allergens such as mold, pests and indoor air pollution which negatively impact asthma. Studies show that homes in inner-city areas have higher levels of indoor air pollutants than suburban homes. Poor indoor air quality is especially a concern since people may tend to spend the majority of their time indoors, particularly in colder environments.
- There is limited research on the effects of green housing on respiratory health. Homes built with low-toxicity materials, with features aimed at improving indoor air quality and eliminating mold and pests, have the potential to improve the symptoms of asthma and other respiratory diseases. By examining this in an environment where pets and smoking are not allowed, the effects of these lifestyle factors on the air quality are minimized and allow us to measure the true impact of the new housing features.

### WHAT ARE THE FINDINGS?

- Participants reported a significant decrease in continuous daytime respiratory symptoms, as well as nighttime asthma symptoms, after moving into a “green” apartment building.

- The tenants that were interviewed reported fewer urgent health care visits for asthma attacks after moving into the green apartment building, including fewer trips to the emergency room. These tenants also reported a decrease in the number of days they, or their child, experienced asthma symptoms and fewer days that they missed work or school after moving into the new complex.
- Tenants demonstrated that their knowledge of avoidance of asthma triggers improved after the home-based asthma educational session. Most tenants also implemented behavioral changes, such as using hypoallergenic mattress/pillow covers and use of “green” cleaning products, to decrease exposures in their homes.

#### WHO SHOULD CARE MOST?

- Public health workers and environmental health specialists working to decrease the burden of asthma in their communities can use this information to implement educational tools and outreach programs, as well as to help shape advocacy efforts.
- City planners and builders, particularly those responsible for building affordable housing, can utilize the environmentally sound building principles encouraged by LEED and other green building rating programs, to design quality housing for their communities.
- Individuals with asthma and their families can use methods highlighted in this study to maintain healthier homes and decrease environmental triggers of asthma. Tenants can urge landlords and local government to help implement changes that improve air quality, decrease asthma triggers, and improve health.
- Local and federal governmental agencies should use this data to help shape policies and regulations that support the formation of healthy communities through healthy housing.

#### RECOMMENDATIONS FOR ACTION

- Findings from this study should be used to promote the expansion of green housing, especially in neighborhoods with a high prevalence of asthma.
- These findings should encourage the collaboration of public health workers, researchers and builders to further the development of both healthy and environmentally friendly homes.
- These findings form the basis for expanding research in this field and build a foundation for future studies utilizing larger groups of tenants to evaluate the health effects of the built environment over an even longer period of time.
- Finally, both local and federal advocacy efforts should be aligned to promote the expansion of green housing and place emphasis on the development of healthy communities. Housing credits, tax-relief and individual incentives can be implemented to support these efforts and help change behavioral and social norms that impact our environment and improve health outcomes.