

Healthy Homes Grantees in Region IV, Southeast Caribbean

Name of Grantee: Advance Energy

Name of Project: Healthy Homes, Healthy Lives: Evaluating the Health Impacts of Home Construction Practices

Amount Awarded: \$ 700,000

Year of Grant: 2002

Contact Info:

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Project Partners: Advanced Energy, National Institute of Environmental Health Sciences, University of North Carolina School of Medicine, North Carolina Community Development Initiative, Habitat for Humanity (Durham, Orange and Wake Counties of North Carolina)

Summary of Project Activities:

Put simply, the goal of this project is to assess the value of several environmental interventions in home construction as it relates to environmental end points associated with allergies and asthma and thus occupant health. For the past 20 years we have assumed that moving into new homes provides a healthier atmosphere for the occupants. This assumption is especially strong when dealing with low-income residents who may be moving from old and leaky homes to new homes produced by Habitat for Humanity and other non-profit groups. This assumption has been so strongly supported that no research has been done to correlate the impacts of moving into new housing. Worse, data from the Centers for Disease Control and Prevention and the U.S. Environmental Protection Agency shows that it is likely that modern construction practices may actually have an adverse impact on occupant health, specifically asthma.

To date there have been no studies designed to identify the interaction between house construction, resulting environmental factors, and allergies and asthma. This study, *Healthy Homes, Healthy Lives: Evaluating the Health Impacts of Home Construction Practices*, intends to investigate the impact of two housing group construction approaches on environmental end points and health end points for allergy and asthma populations. The purpose is to correlate construction practices with mold and allergen levels and determine which environmental interventions have the largest and most cost-effective impact on allergen levels and occupant health. This is intended to be the first attempt to address housing design and construction practice to modify levels of environmental agents known to have a medical consequence in asthma, with eventual examination of the effect of these experimental housing innovations on environmental intervention with specific asthma health end points.

The study design for this project involves two components. First, housing construction options will be studied. Houses to be built during this program will include

control houses and houses built to a level of experimental house design, primarily aimed at controlling humidity. The control houses will meet all applicable building code requirements. Essentially, these are the houses that are being built all over the country at a rate of about a million a year. The experimental housing group will include incremental improvements in the design and performance of the homes. Special care will be taken in the experimental homes to provide appropriate air sealing, planned mechanical ventilation, improved particle filtration, pressure balance the living space, and control strategies for unwanted moisture. Our hypothesis is that that these incremental improvements reduce allergen levels, and subsequently allergen exposures. If this hypothesis proves to be true, then a subsequent hypothesis to be tested is that homes built to one of the experimental standards will be associated with reduced asthma incidence and severity in occupants of those homes.

The second component of this study is a pilot health effects phase. In this phase, residents of the homes, who have been determined through medical screening to be asthmatic, will receive health exams to monitor skin test reactivity, lung function, airway reactivity and airway inflammation as outlined in subsequent portion of this application. These health exams will be correlated with allergen samples taken from the homes. Allergens sampled include the cockroach allergen Bla g 1, the dust mite allergens Der f 1 and Der p 1, the cat allergen Fed d 1, the dog allergen Can f 1, the rodent allergens Rat n 1 and mouse urinary proteins (MUPs), and the allergens of the fungus *Alternaria alternata*. By correlating the data from housing construction type, health screenings, and allergen levels, the proposal team will be able to make sample size calculations that will determine the size of subsequent studies examining experimentally the impact of environmental remediation strategies on actual health outcomes.

The proposal team recognizes that the size and scope of this project is not sufficient to produce concrete results about housing construction and health risks. This study is intended to point researchers in the right direction. However, the study may be able to assess the impact of house construction practices on the concentrations of the environmental end points. Additionally, because of the make-up of this proposal team, results of this research can be implemented into housing stock all over the country in a short period of time. Through Advanced Energy's shelter industry partners, as much as 60% of the new single-family construction being built in this country could be improved quickly based on results from this research.

Product Outcomes/Outputs:

- This study, *Healthy Homes, Healthy Lives: Evaluating the Health Impacts of Home Construction Practices*, intends to investigate the impact of two housing group construction approaches on environmental end points and health end points for allergy and asthma populations
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