

Comparison of Environmental Compounds “Green” versus Conventionally Built Housing

Protocol summary

The green building movement emphasizes healthy indoor environments, energy efficiency, and environmentally sustainable construction methods. This construction practice is increasingly prevalent in the United States. By 2010, the Enterprise Foundation’s Green Communities Initiative will develop 8,500 units of green affordable housing, funded through low-income-housing tax credits, spearheading an effort to increase the use of green building practices in low income housing across the United States (U. S.), Green-built environments are thought to promote occupant health because they are designed to minimize moisture, provide appropriate ventilation, prevent pest infestation and minimize exposure to harmful chemical compounds. Many studies have evaluated allergens, fungi (i.e., mold), pesticides, and volatile organic compounds in conventional housing. Yet, few studies exist that evaluate levels of these agents in green building environments. This cross-sectional study will compare levels of these environmental agents in green and standard low-income housing in the Atlanta metropolitan area. In addition, we will assess if there are differences in perceived noise between the two types of housing; this will be ascertained by questionnaire. Appendix A contains a comprehensive list of variables to be collected for the study. Using dust samples vacuumed from the kitchen, bed, and bedroom floor. Investigators will identify the types of fungi and assess concentrations by using culture analysis. Enzyme-linked immunosorbent assays (ELISA) will be used on these samples to determine dust mite (Der p 1 and Der f 1), cockroach (Bla g 2), rat (Rat n 1) and mouse (Mus m 1) allergen levels. Volatile organic compound levels will be ascertained by desorption from passive charcoal media, and analyzed with gas chromatography with mass spectroscopy (GC/MS). Aldehydes will be desorbed from passive collection media and analyzed by high-performance liquid chromatography (HPLC). Pesticide levels will be measured using dust wipe tests taken from the tops of the refrigerator and analyzed by GC/MS.

Investigators and roles

The Centers for Disease Control and Prevention (CDC) executed a contract with Atlanta Regional Health Forum (ARHF) to conduct a pilot study of allergens, fungi, pesticides, and volatile organic compounds (VOC) in “green” housing in Atlanta. In turn ARHF contracted with Georgia State University Institute of Public Health to provide scientific direction of the study. Through formal agreement between the Atlanta Regional Health Forum and Georgia State University, John Steward, MPH, is the Principal Investigator. The Project Director is Douglas Greenwell, PhD, Executive Director of the Atlanta Regional Health Forum. The Project Director will be the primary administrative contact for study partners and collaborators. Technical advisors from the CDC Lead Poisoning Prevention Branch will oversee study administration; including identification of and collaboration with community leaders, scientific protocol, survey instrument design, data collector training, data collection, and database construction and data analysis. Authorship on papers published from the study will be among the Principal Investigator, Project Director, and Technical Advisors.

Collaborators

Zap Asthma personnel will serve as interviewers and also collect environmental data. Zap Asthma is a group with a long history of working with community residents to translate asthma research to the community in order to decrease the prevalence and severity of asthma in Atlanta. They will participate in all aspects of the project including study feasibility issues, conduct of the study and translation of results back to the study participants and the general community. The ZAP community health workers will survey the residents, collect dust and air samples and distribute incentives to the participants.

The Magnolia Circle apartments will be used to represent green buildings. This is a South Dekalb County community of older adults with both low income and market rate one and two bedroom apartments. The complex consists of 84 units. Magnolia Circle was one of the first green built multi-family units in the United States. Construction started in the Fall of 2002 and was completed in 2003.

The control group housing representing conventionally constructed units will be The Cathedral towers, a 194 unit high rise for seniors located in the Buckhead Community of Atlanta. It is a US Department of Housing and Urban Development (HUD)-subsidized senior citizen independent living housing that is classified as a wholly elderly HUD 202 Direct Loan Project. It is one of the more stable properties operated under the auspices of the Atlanta Housing Authority.

Investigators will conduct Town Hall meetings at each site to recruit participants and again after the study to report findings.