# EDITORIAL

# Energy Insecurity: A Framework for Understanding Energy, the Built Environment, and Health Among Vulnerable Populations in the Context of Climate Change

The recent occurrence of Hurricane Sandy and other climate change–related calamities prompt us to consider the significance of public health in the aftermath of disaster. However, the field of public health also has a role to play in the awareness, preparedness, and deterrence of environmental factors that affect vulnerable populations on a daily basis. The growing incidence of extreme weather events attributable to climate change and the parallel surge in energy prices trickle down to formidable health impacts that may prove especially detrimental to vulnerable populations.[1] In instances of extreme cold, poor families often wear hats and gloves at home and use expensive and hazardous electric heaters or cooking ovens to keep the cold at bay.[2–4] During heat waves, the elderly and poor are more likely to "sweat it out" or die because they cannot keep their homes adequately cool.[5,6] Furthermore, many low-income households face the "heat or eat" dilemma; they must decide between paying for food or fuel.[7,8] All the while, economically disadvantaged householders disproportionately occupy housing units with poor air quality and harmful temperature and humidity conditions, resulting in excess moisture, dampness, and mold, conditions that can trigger respiratory illnesses such as asthma.[9,10]

## HOUSING, FOOD, AND ENERGY: A TRIFECTA OF INSECURITY

The trickle-down effects of climate change are experienced in the built environments that immediately surround us.[11] Problematic housing deficiencies affected in this process, in turn, translate into severe health consequences that may create or exacerbate risks of respiratory illnesses such as asthma and allergies, nutritional deficiencies, loss of productivity, and injury and mortality.[12,13] Social and economic factors restrict housing and neighborhood options and force trade-offs in meeting basic needs such as food, housing, and health care, resulting in housing insecurity and food insecurity.[14] In addition, many low-income householders in the United States experience a phenomenon called "energy insecurity."[15] Those impacted by energy insecurity allocate a disproportionate share of their income to utilities-related expenses and encounter inefficiencies in the home such as older and less efficient appliances and drafts that induce heat-loss. Concomitants of energy insecurity include extreme home temperatures, hazardous heating alternatives, and the constant threat of utility shut-offs or mounting arrearages in utility bills because of nonpayment. This problem is especially acute for low-income residents such as single parents, the elderly, the disabled, and others with low or fixed incomes.[16,17] Those facing energy insecurity may be homeowners unable to invest in efficiency upgrades or may be renters living in housing units where landlords do not pay for the utilities and consequently have very little incentive to create more energy-efficient units.[18]

Often relegated to the least efficient housing units, low-income householders experience the greatest energy burden because of residence in older housing stocks, long-term disinvestments, and lack of maintenance by landlords as well as the landlord's use of lower quality materials and less efficient housing structures and appliances.[19] As residential energy costs for heating, cooling, and other household needs steadily escalate, the household expenditure differentials between richer and poorer households are becoming more pronounced. For households earning more than $50 000, residential energy expenditures represent a mere 3% of their average after-tax income compared with 33% for low-income householders making less than $10 000.[20] Evidence suggests that young children in energy-insecure homes are more likely to contend with housing and food insecurity, experience fair or poor health, have been hospitalized at least once since birth, and be at risk for developmental delays.[15] Energy-insecure householders have been found to eat less as evidenced by a 10% reduction in caloric intake and weight loss during winter months.[7,8] One strategy that has been proposed to offset the shock of skyrocketing heating bills is to increase enrollment in supplemental nutritional assistance programs (formerly food stamps) among eligible families.[21] While this strategy provides an additional income source, it is not a long-term solution. Such an approach

merely masks the problem, trades off one financial pressure for another, and creates further dependency among low-income householders. In the current economic climate, more sustainable approaches are needed.

## HOUSING INTERVENTIONS TO ADDRESS ENERGY INSECURITY

Energy efficiency and weatherization are often cited as "low-hanging fruit" that might simultaneously address high energy costs, energy independence, and global climate change. While we know these "fruit" produce clear-cut and high-yielding benefits compared with other proposed or climate change strategies, the health gains linked to energy efficiency remain largely unknown.[22] Despite the obvious and extensive financial, environmental, and likely health benefits, low-income householders face key barriers in adopting home energy efficiency and weatherization measures because of high up-front costs and limited decision-making authority as renters. Of particular concern in low-income housing is the occurrence of cumulative housing problems that include not only energy inefficiencies, but also health and safety hazards within the home and in the neighborhood environments as well.[23] According to a recent report that for the first time measured efficiency in private buildings in New York City, the least-efficient residential buildings were located in neighborhoods that also reported the highest asthma rates.[24] When pressed to explain this association, the authors of the report stated only that it "deserves more analysis."[25]

## FUTURE DIRECTIONS IN ENERGY INSECURITY RESEARCH AND TRANSLATION

As the impact of global climate change becomes more apparent, its association with the built environment and the health of vulnerable groups warrants greater attention and innovative approaches toward awareness and amelioration. Indeed, the concept of energy insecurity, in particular, merits far more attention given its widespread prevalence and its ties to housing instability, food insecurity, and health as well as a growing interest in energy solutions within the policy realm. To date, this problem remains largely outside of the public's consciousness, ignored in the scientific literature, and overlooked in public policy. Furthermore, it has received inadequate government support in the forms of sufficiently funded fuel assistance or weatherization and energy efficiency subsidies. Additional considerations for revised regulations and policy enforcement related to inspection procedures and energy efficiency standards in subsidized housing along with coordinated policy programs in housing, energy, and health for the poor are also warranted. Further evidence is also needed to demonstrate the feasibility and impacts of energy-efficiency interventions on the health and well-being of socioeconomically disadvantaged households. In addition, new approaches for translating the science and research into practice are required so as to garner opportunities to advance health and energy literacy. The community health worker model has been embraced within public health because it has demonstrated significant results when translating health-related knowledge to members of marginalized communities. Greater awareness of energy-related linkages to health and the built environment are necessary among those most affected by energy insecurity and can be acquired with the help of community health workers who emphasize energy and environmental factors that impact health. Combined, these activities will begin to provide the requisite evidence to position energy insecurity as a major public health concern with potential to fuel scalable policy changes. ■

*Diana Hernández, PhD*


### About the Author

*Diana Hernández is with the Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, New York, NY.*

*Correspondence should be sent to Diana Hernández, Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, 722 West 168th Street, Rm 934, New York, NY 10032 (e-mail: dh2494@columbia.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.*



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