

Home Energy Insecurity: Socioeconomic Determinants and Causes

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Introduction

Background

Energy insecurity (EI) refers to the inability to adequately meet household energy needs, e.g.,

- utility shut-off
- refusal to deliver heating fuel
- unheated or uncooled days
- use of a cooking stove as a source of heat

EI remains a hidden dimension of risk especially in vulnerable populations. Little research exists that addresses EI issues in the Memphis area.

Specific Aims

The overall objective of this study is to estimate home energy burden in Memphis, identify the social, economic, demographic, and spatial factors that impact EI, and explore the causes of EI. There are two specific aims:

- Aim 1: Determine the effects of area-based socioeconomic status (SES) and racial variables on EI.
- Aim 2: Assess associations of EI with population health, focusing on asthma and COPD.
- Aim 3: Describe the experience of living with EI through qualitative interviews of 10 low-income households in Memphis.

Methods

Data Sources

- Utility bill data at the zip-code level from Memphis Light, Gas, and Water (MLGW) for year 2014.
- Socioeconomic status, demographic, and housing data from American Community Survey (ACS).
- Health outcome data from CDC's 500 Cities Project.

Data Analysis Methods

- The multiple predictive variables were first examined using correlation matrix, cluster analysis, and factor analysis. This step identified the key SES factors.
- The relationship among energy burden, SES, and health outcomes were then determined using multivariable regressions in SAS and visualized using GIS.

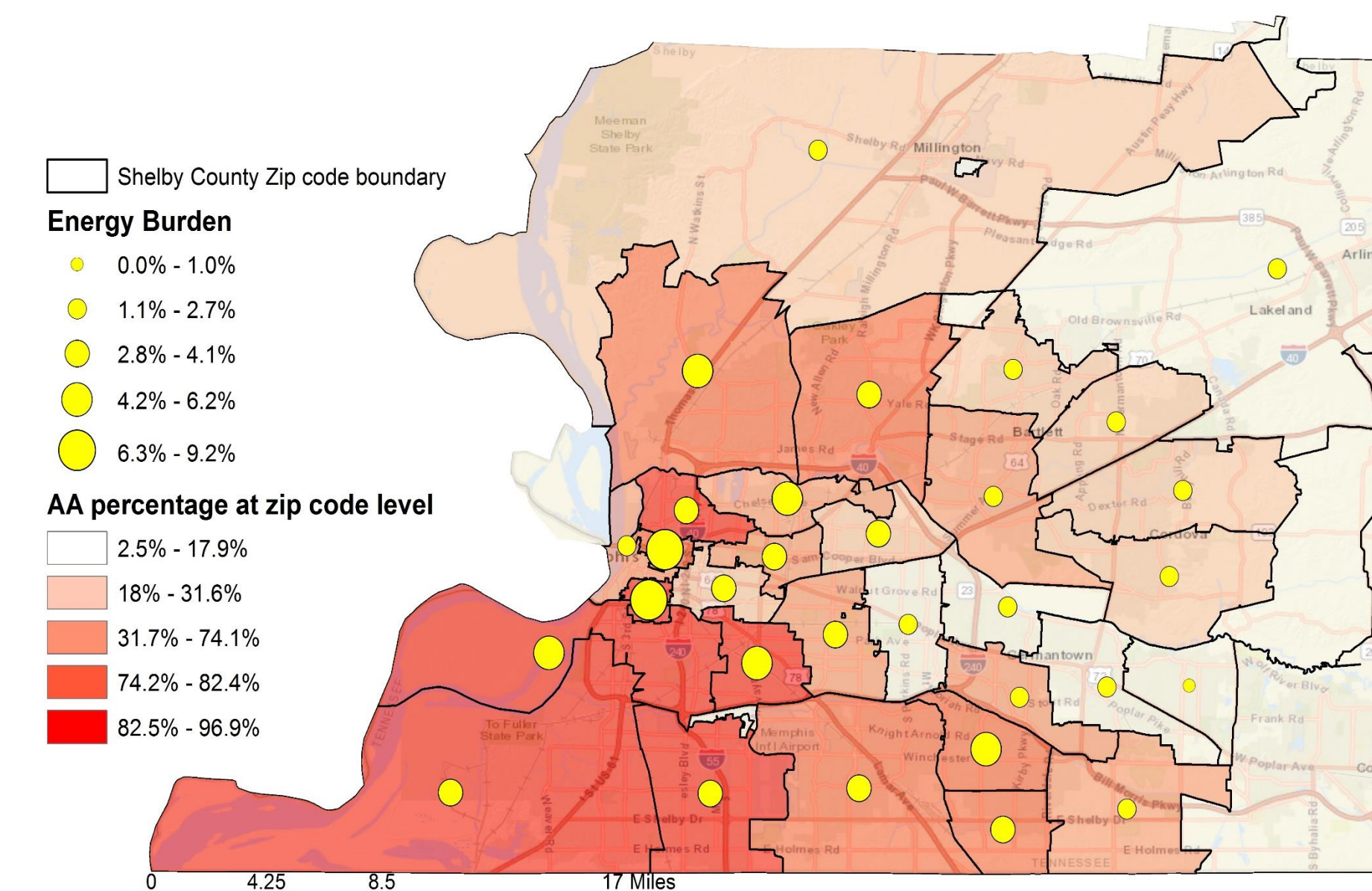
Interviews

- In-depth interviews were used to investigate the nature of EI among low-income families.
- 10 participants were recruited in the waiting area of Shelby County LIHEAP Office.
- Questions cover financial hardship, personal stress, housing quality, and strategies to handle EI.

Results

EI and SES

- 1) Energy burden averaged 3.7% (1.9 – 10.3%) in Shelby County, lower than the national average.
- 2) Renters had lower energy burdens than owners (2.1% vs. 4.2%, $p < 0.0001$).
- 3) Energy burden increased with
 - higher percentage of African Americans
 - lower income
 - more people aged ≥ 65



EI and Health

- 1) Asthma prevalence increases in lower-income area and areas with higher percentage of African Americans, but is not associated with home energy burden.
- 2) COPD prevalence increases in higher energy burden area, and also increases in areas with lower-income, more African American, >65 year old, and US citizen populations.

Findings from Interviews

- 1) Invisible hardship; private suffering
"I suffer because I can't afford it"
- 2) Relational hardships and "precarity"
 - Housing quality and efficiency
 - Food/water/taxes/transportation
 - Elderly & ill- special populations*"Besides the rent, the energy bill is my highest bill"*
- 3) Life transitions, setbacks & losses
 - 1) Work, illness, death & moving*"Since I lost my job, its been about getting back on my feet."*
- 4) Health as a predictor & outcome
"This stress is now a way of life"
- 5) Social Isolation- discomfort/stigma

Future Work

- Examine yearly changes in energy burden by collecting multi-year data.
- Collect more individual-level to better understand economical, physical, and behavioral factors that cause EI.
- Develop an effective intervention programs to help residents cope with EI.

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