Energy Assistance And Health: Policy Recommendations

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Energy Assistance and Health: Policy Recommendations

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May 1, 2024

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Last, but certainly not least, I have had tremendous support throughout my MPH program from my family and friends, including my wonderful parents, Anthony and Deborah. I thank them for recognizing my passion for addressing climate change and improving public health.

I hope that this paper and the findings within will inspire future MPH students to research the intersection of health and energy and advocate for policy action.
Abstract

The Low-Income Home Energy Assistance Program (LIHEAP) does not currently meet the demands of households across the country, and by one estimate, “funding would need to increase 10 to 20 times above 2021 levels in order to cover the energy costs of all eligible low-income families” (Castillo & Daniel, 2022, para. 2). Despite the inadequate coverage, more than 5.5 million households relied on LIHEAP funds to support the payment of heating costs in FY2022 (ACF Office of Community Services, n.d.). Financial barriers to energy access among low-income households is not an issue that should be analyzed as a financial circumstance mutually exclusive from other social determinants of health (SDOHs). In fact, research has shown that the “heat or eat” effect, the tradeoff made between paying for heating bills or food, is associated with decreases in caloric intake of 10% among lower-income families, an effect not seen in families with higher incomes (Bhattacharya et al., 2003).

As Jessel et al. (2019) note, there are various terms that are used when discussing energy access, such as fuel poverty, energy insecurity, and energy burden. This report will often focus on energy burden, which is the percentage of a household’s income that is used to pay for energy-related expenses (DOE Office of State and Community Energy Programs, n.d.-b). When analyzing the impact of energy burden, it is important to note that there are differences in the threshold used for the consideration of high energy burden (Applied Public Policy Research Institute for Study Evaluation, 2005). For the purpose of the spatial analysis in the report, 6% will be used to remain consistent with the threshold cited by the U.S. Department of Energy’s Office of State and Community Energy Programs (n.d.-b; Drehobl et al., 2020).

This report aims to add to the energy and health literature by exploring these topics at the federal and state levels, with a focus on Connecticut, to guide energy assistance policy decisions. Recommendations for policy span federal and state governments and include the expansion of Z-code usage, increased reporting requirements for LIHEAP grantees, the creation of a Health and Energy Assistance Advisory Committee, the addition of a health professional on the Low-Income Energy Assistance Board (LIEAB), amendments to the definition of ‘vulnerable household’, and additional considerations for the National Environmental Policy Act’s (NEPA) role in LIHEAP.

This report does not serve to quantify and/or evaluate the effectiveness of the current policies on improving health outcomes. Yet, there is tremendous potential for energy assistance programs to not only provide the financial support necessary to alleviate the financial burden among those who cannot afford their current energy expenditures but also to improve health outcomes.
Energy Burden and Health

An objective for the ‘Housing and Homes’ subcategory outlined in the US Department of Health and Human Services (HHS) ‘Healthy People 2030’ goals is to “reduce the proportion of families that spend more than 30 percent of their income on housing” (OASH Office of Disease Prevention and Health Promotion, n.d., ‘Objective Overview’ section). The goal has not seen improvements, with 35% of families exceeding the desired spending limit in 2021, marking a 0.4% increase from 2017 and 9.5% above the target of 25.5%. This is a disappointing trend given that financial strains to pay household costs, including energy bills, have rippling effects.

According to the Household Pulse Survey data released in March 2024, 23% of households made a tradeoff between basic necessities and utility bills in one or more months over the past year, including 7% that made this tradeoff during nearly all months of the year (US Census Bureau, 2024). Additionally, nearly a fifth (17%) of households reported having ‘unsafe’ or ‘unhealthy’ household temperatures for one or more months. Despite these detrimental impacts resulting from energy burden and insecurity, it remains a field of public health with many relationships yet to explore.

Energy access differs across subpopulations as seen in the 2020 Residential Expenditure Survey (RECS) data. More than half of Black or African American and American Indian or Alaskan Native householders reported experiencing energy insecurity, and more than a quarter of households with a Black or African American householder reported receiving a notice related to disconnection (U.S. Energy Information Administration, 2023). Among Hispanic or Latino White householders, 46% faced energy insecurity compared to 20% of households with non-Hispanic or Latino White householders. More than half of households with an income of less than $5,000 and $5,000 to $9,999 experienced energy insecurity (58% and 56%, respectively), with a quarter of the former group reporting having unhealthy household temperatures. This is compared to 7% of households making $150,000 or more reporting energy insecurity. Renters were also more likely to report being energy insecure compared to property owners (41% vs. 20%).

In relation to health outcomes, research has shown that low and middle income households (income at 80% or less of Area Median Income) facing heightened energy burden experience diminished health outcomes, increases in premature death, and reductions in life expectancy (Reames et al., 2021). Furthermore, Jessel et al. (2019) synthesized that energy insecurity predictors, such as financial hardships, impact energy affordability and access and indoor temperatures via various mediators, such as “lack of modern energy services” and inefficiencies (p. 4). These cumulatively act upon secondary impacts, such as housing and food insecurity and thermal discomfort, resulting in adverse health outcomes, including but not limited to psychological and heat stress, mobility issues, and poor sleep. Affected health outcomes are not limited to acute responses. Research on the relationship between temperature and chronic health outcomes identified that heat effect increased diabetes mortality risk by 13.9% (Xuping et al., 2021). Additionally, an increase in temperature by 1 degree Celsius results in an increase in mortality and morbidity related to cardiovascular disease (Liu et al., 2022). Furthermore, the CDC amplifies related findings by stating that medical “conditions like heart disease, mental illness, poor blood circulation, and obesity are risk factors for heat-related illness” (CDC, 2017b, para. 1) and that certain medications can alter the body’s temperature regulation response (CDC,
Inadequate household temperatures should not be assessed in a silo as indoor environments are just one part of cumulative exposures (Jessel et al., 2019).

Protections against power shutoffs can be offered to some individuals, differing at the state level as well as among utility providers (Hernández, 2016; LIHEAP Clearinghouse, n.d.-f). In states such as Delaware, disconnection is not allowed for those in which it would lead to adverse health outcomes (LIHEAP Clearinghouse, n.d.-f), but Hernández (2016) noted that “leveraging medical vulnerabilities proved an insufficient and unsustainable method of shielding a household from energy insecurity since arrearages mounted and participants were, in essence, trapped when unable to transfer accounts with balances to a new residence” (p. 6-7). It is important to note that energy is not just used for temperature regulation mechanisms, but is also used to power electricity-reliant medical equipment (Jessel et al., 2019). In Connecticut, nearly 3% of the more than 730,000 Medicare beneficiaries are at risk due to reliance on said medical devices, such as ventilators and electric wheelchairs (U.S. HHS, 2024). This estimate is not inclusive of all medical devices. According to Kahn et al. (2020), nearly 6% of patients using Yale New Haven Hospital primary care facilities reported utility-related medical exemptions applications between 2015 and 2018, and compared to those without medical exemptions, “were more likely…to have asthma, diabetes, end-stage kidney disease, chronic obstructive pulmonary disease, and congestive heart failure, but did not differ on insurance status” (p. 1190). Less than five percent of the medical exemptions were among those using insulin and hemodialysis, respectively.

Although the relationships between financial hardships associated with energy bills and health are known, translation into policy has lagged.

**Energy Assistance Programs**

*National*

The United States has been federally supporting energy assistance programs for several decades, beginning with its response to the OPEC Oil Embargo in the 1970s (LIHEAP Clearinghouse, n.d.-d). At the time, it approved a request from the Maine Office of Economic Opportunity to support households with low-income individuals and older adults (LIHEAP Clearinghouse, n.d.-d). In 1981, the Low-Income Home Energy Assistance Act was passed, a program utilizing block-grants and expanded upon previous initiatives to provide state-distributed funding for heating and cooling assistance as well as funding for weatherization (LIHEAP Clearinghouse, n.d.-d). Federal income requirements for LIHEAP were set to the greater of two standards: “150 percent of federal poverty guidelines (FPG) or 60 percent of state median income (SMI)” (LIHEAP Clearinghouse, n.d.-d, p. 1). In 2022, the year with the most recent preliminary LIHEAP data available, the program was estimated to support more than 6 million households (ACF LIHEAP Performance Management, n.d.). In the same year, LIHEAP provided funding to more than 5 million households for heating and approximately 800,000 households for cooling (ACF LIHEAP Performance Management, n.d.). Of all income-eligible households, 17.87% received assistance (ACF LIHEAP Performance Management, n.d.).

The Administration for Children and Families (ACF) Office of Community Services (OCS) under the U.S. Department of Health and Human Services, currently operates LIHEAP (U.S. HHS, 2023). In 2022, New York was estimated to have the most total LIHEAP funding with
$869.4 million, while Hawaii had the least with $10.6 million (ACF LIHEAP Performance Management, n.d.).

In 2022, LIHEAP was listed as a covered program under Justice 40, a government initiative committing 40 percent of specified benefits to disadvantaged communities, through the Department of Health and Human Services (Office of the Assistant Secretary for Health, 2022; The White House, n.d.). In October of the following year, the Biden-Harris Administration allocated $3.7 billion to the LIHEAP fund, bringing the total commitment from the Administration to approximately $22 billion at the time (U.S. HHS, 2023). In addition to the funding, the LIHEAP Eligibility Tool was launched in addition to the funding, consolidating resources for households seeking eligibility information (U.S. HHS, 2023).

The 2024 President’s Budget allocated $4.1 billion for LIHEAP (The White House OMB, 2023).

**Connecticut**

Using funding from the federal LIHEAP program, Connecticut provides heating, weatherization, and crisis assistance for eligible households across the state via the Connecticut Energy Assistance Program (CEAP) (ACF, 2023; Connecticut Department of Social Services, n.d.). Connecticut does not distribute funding for cooling assistance (ACF LIHEAP Performance Management, n.d.). Administration of the program is carried out by the Connecticut Department of Social Services, and in FY2024, it received $72 million in funding (Connecticut Department of Social Services, 2023; LIHEAP Clearinghouse, n.d.-b). The annual income eligibility threshold is 60% of State Median Income (SMI), which in 2023 was just below $80,000 for a four-person household (Connecticut Department of Social Services, 2023; LIHEAP Clearinghouse, n.d.-b). Furthermore, households applying for assistance need to verify the Social Security numbers for all persons living within the household, with few exceptions (Connecticut Department of Social Services, 2023).

The state’s maximum heating assistance in FY2024 is $530, the 7th least lowest in the country among those providing funds for heating (Connecticut Department of Social Services, 2023; LIHEAP Clearinghouse, n.d.-a; LIHEAP Clearinghouse, n.d.-b). In 2022, the average annual reduction in household energy burden following the distribution of LIHEAP funding was estimated to be 4.65%, compared to before LIHEAP funding, which ranked among the lowest fifteen states for those with available data (ACF LIHEAP Performance Management, n.d.). Among high burden households, those with energy burden within the top quantile, the reduction in energy burden after LIHEAP funding compared to before was approximately 8%, which ranked among the lowest four states (ACF LIHEAP Performance Management, n.d.).

In February 2024, a unanimous vote in the Connecticut General Assembly (GA) allowed for the passing of SB 111, which authorized $13.5M to increase heating assistance funding for LIHEAP beneficiaries (Phaneuf & Pazniokas, 2024; An Act Concerning Home Energy Assistance, 2024). Additional funding in the state is important given that in 2022, less than a quarter (21.2%) of income-eligible households in Connecticut were estimated to have received LIHEAP funding (ACF LIHEAP Performance Management, n.d.). Also, Connecticut faces a major external challenge to energy affordability as its average monthly utility bill expenses rank second highest in the country (U.S. Energy Information Administration, 2022). The approval of additional
state-appropriated funding shows overwhelming support for policy improvements in addressing the state’s energy burden.

In FY2022, the majority of state LIHEAP funds (59%) were distributed for heating assistance (ACF, 2023). Among households receiving LIHEAP funding in Connecticut, nearly three quarters had a vulnerable member, 44% had an elderly member, 16% had a young child, and 34% had a disabled member (ACF, 2023).

As of March 2024, the Connecticut Energy Assistance Program (CEAP), approved 87,854 out of 104,716 applications for FFY 2023-2024, which was a 1.3% decrease in applications compared to the previous year, but a 5.4% increase in approvals (CEAP Application Activity Report, 2024). Additional assistance from non-LIHEAP funds, such as the low-income discount rate (LIDR) may also play a role in alleviating financial stress associated with energy costs (Gillett et al., 2022).

**Figure 1. LIHEAP Funding in Connecticut from 2001 to 2022**

![Total LIHEAP Funding - Connecticut](image)

* Preliminary data and awaiting validation  
Data Source: LIHEAP Data Warehouse Custom Reports

**Cooling Assistance Programs in the Northeast**

A pair of Connecticut’s neighboring states offer variations of cooling assistance, potentially serving as models for policy.

**New Jersey**: The state’s energy assistance program is listed under the Department of Community Affairs (DCA) and provides heating and crisis assistance as well as “medically necessary cooling,” with the cooling benefit capped at $500 (New Jersey DCA, n.d.; New Jersey DCA Division of Housing and Community Resources, n.d.). The guidelines for “medically necessary cooling” are as follows: “medical evidence that the health of at least one household member will be seriously endangered unless the household's living quarters are cooled,” and recipients are
eligible to receive additional energy assistance benefits. (New Jersey DCA Division of Housing and Community Resources, n.d., p. 18). Additionally, it is noted that “[w]hen there are excessive heat waves and where there are available funds, the Program will provide one time assistance to purchase one window unit a/c or standing fans to eligible households” (New Jersey DCA Division of Housing and Community Resources, n.d., p. 19)

New York: According to the New York State Office of Temporary and Disability Assistance (OTDA) (n.d.), the state’s Home Energy Assistance Program (HEAP) offers both heating and cooling assistance. Eligible residents can receive one benefit per year with the addition of emergency benefits, if needed. The cooling benefit allows households to purchase either an air conditioner or fan with up to $800 to $1,000 in funding depending on that status of the unit. The funding can also be used towards installation costs. Within the eligibility requirements, a household can receive the benefit if they have “at least one individual with a documented medical condition that is exacerbated by extreme heat,” in addition to income and citizenship status requirements (New York State OTDA, n.d., ‘Cooling Assistance Benefit’ section).

Although the distribution of air conditioners allows for increased access to stable indoor temperatures, payments for associated-utility bills do not appear to be covered under HEAP as “no additional HEAP cash benefits are available” for those opting to purchase an air conditioner or fan with their allotted benefit (New York State OTDA, n.d., ‘Cooling Assistance Benefit’ section).

Data Analysis and Visualization

Data Sources
Spatial analysis of energy burden and assistance was created using data from the US Department of Energy’s Low-Income Energy Affordability Data (LEAD) Tool. Health outcomes data was obtained from the Centers for Disease Control and Prevention’s (CDC) PLACES: Local Data for Better Health database. Census tract data was downloaded from the U.S. Census Bureau’s TIGER/Line Shapefiles, and state boundaries were obtained from the National Weather Service. All datasets were publically available and freely downloaded. Spatial analysis was conducted using ArcGIS Pro.

Low-Income Energy Affordability Data (LEAD) Tool
The Low-Income Energy Affordability (LEAD) Tool is available on the U.S. Department of Energy’s website through an interactive map that provides data from state to census-tract level, including tribal and disadvantaged community boundaries, among other categorizations (DOE Office of State and Community Energy Programs, n.d.-b). The map includes information on energy burden, energy cost, area median income (AMI), building age, heating fuel, building type, renter/ownership status, and demographics for low and moderate income (LMI) households.

The data obtained from the LEAD Tool used 2020 U.S. Census Bureau's American Community Survey (ACS) Public Use Microdata Samples (DOE Office of State and Community Energy Programs, n.d.-a). A single outlier was removed from the spatial analyses, which reported an energy burden of 907%, and was more than 90 times that of the next highest value (10%).
PLACES: Local Data for Better Health

Referred to as PLACES, the database was co-developed by the CDC, the Robert Wood Johnson Foundation, and the CDC Foundation (CDC, 2023a). According to the CDC (2023a), “PLACES provides model-based, population-level analysis and community estimates of health measures to all counties, places (incorporated and census designated places), census tracts, and ZIP Code Tabulation Areas (ZCTAs) across the United States” (para. 2). In addition to being available for download, PLACES data is also displayed on an interactive map on the CDC website (CDC, 2023a). The health outcomes data used in this analysis included variables for adults 18 years or older, with the ‘lack of health insurance’ variable including adults aged 18 to 64 years (CDC, 2021; CDC, 2023b).

The dataset selected for the analysis in this report contained census tract level data from the 2023 release which used the following data sources (CDC, 2023d):

- Behavioral Risk Factor Surveillance System (BRFSS) [2020 or 2021]
- Census Bureau population data [2010]
- American Community Survey estimates [2015-2019]

It is important to note that BRFSS data is collected via telephone surveys (CDC, 2023e).

Census Tract and State Data:

Census tract boundaries were obtained from the U.S. Census Bureau’s TIGER/Line Shapefiles. Census tracts for energy burden data and disadvantaged communities used 2020 boundaries since the LEAD tool used 2020 ACS data. Although PLACES used data from a combination of different years, the BRFSS data for many of the measures used 2021 data, and therefore, 2021 census tract boundaries were used. Visually noticeable differences were not observed between 2020 and 2021 census tract boundaries. The Connecticut state boundary was downloaded from the National Weather Service.

Limitations

Both the health and energy data used are aggregated on a census-tract level, and therefore, information about individual household data cannot be extrapolated. For example, the maximum household-level energy burden is unknown. Additionally, there were discrepancies between the labeling of census tracts among datasets as some incorporated block group numbers which were difficult to match and often resulted in the categorization of missing data. Furthermore, the health data from PLACES included information from BRFSS (CDC, 2023d), and therefore, could result in misrepresentations of clinical diagnoses. Lastly, disadvantaged community boundaries were used for both the energy burden analyses using 2020 census tract boundaries and health outcome data using 2021 census tract boundaries, but as noted before, visual differences in the boundaries were undetectable.

Analysis and Visualization

In Connecticut, there is an overall energy burden of 3%, but that is not reflective of all neighborhoods or regions, such as a 10% energy burden in the select census tracts within New Haven, Hartford, and Fairfield counties (DOE Office of State and Community Energy Programs, n.d.-a). Excluding the outlier, of the 47 census tracts with a 6% energy burden or higher, all were
determined to be disadvantaged communities. The definition of these communities were aligned with “the Climate and Economic Justice Screening Tool, taking into account burdens placed on communities from climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development” (DOE Office of State and Community Energy Programs, n.d.-a, ‘Show Disadvantaged Communities’ information section). The census tracts above the 6% threshold for high energy burden are often located in cities, such as Hartford, New Haven, Waterbury, and Bridgeport [see Figure 2].

**Figure 2. High Energy Burden (6% or greater) in Connecticut Among Low and Moderate Income Households**

Data Source: LEAD Tool (2020)
Figure 3. Crude Prevalence of Health Outcomes Above and Below National Averages

Variable Names (Data Source: CDC PLACES 2023 Release)

A: Current asthma among adults aged >=18 years; B: Coronary heart disease among adults aged >=18 years; C: Chronic kidney disease among adults aged >=18 years; D: Diagnosed diabetes among adults aged >=18 years
Overview of Health Outcomes

Table 1. Census Tracts Above National Averages for Asthma, CHD, CKD, Diabetes, and Lack of Health Insurance (Connecticut)

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>National Average</th>
<th>Census Tracts Above National Average</th>
<th>Disadvantaged Community Designated Census Tracts Above National Average</th>
<th>Percentage of Census Tracts Above National Average that are Disadvantaged Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma (Figure 3. A)</td>
<td>10.2%</td>
<td>569 (74%)</td>
<td>173</td>
<td>30.40%</td>
</tr>
<tr>
<td>CHD (Figure 3. B)</td>
<td>7.6%</td>
<td>13 (1.7%)</td>
<td>7</td>
<td>53.85%</td>
</tr>
<tr>
<td>CKD (Figure 3. C)</td>
<td>3.6%</td>
<td>40 (5.2%)</td>
<td>25</td>
<td>62.50%</td>
</tr>
<tr>
<td>Diabetes (Figure 3. D)</td>
<td>12.9%</td>
<td>94 (12.2%)</td>
<td>85</td>
<td>90.43%</td>
</tr>
<tr>
<td>Lack of Health Insurance (Figure 4.)</td>
<td>11.4%</td>
<td>164 (21.3%)</td>
<td>149</td>
<td>90.85%</td>
</tr>
</tbody>
</table>

Data Sources: CDC PLACES 2023 Release (national averages); Merged dataset including data from CDC PLACES 2023 Release (health outcomes); LEAD Tool (2020) (disadvantaged communities) matched by census tract

Note: There are 882 census tracts in the data set used in the spatial analysis with missing data among 113, resulting in 769 census tracts and/or blocks included in this analysis. There are 195 disadvantaged census tracts in the LEAD Tool (2020) dataset. This analysis is limited to census tracts with matched zip codes and non-missing data.

Asthma

Asthma rates across Connecticut often exceed the national average, with nearly three quarters of census tracts above the national average, and 30.4% of census tracts above the national average among disadvantaged communities [see Table 1]. In 2022, an estimated 356,700 (18 years or older) and 55,800 children (0-17 years) had a current asthma diagnosis, representing 12.4% and 8.2% of their respective populations (CT Behavioral Risk Factor Surveillance System, 2023a; CT Behavioral Risk Factor Surveillance System, 2023b). Asthma prevalence has been on the decline among children since 2020, while the current prevalence of asthma among adults was the highest it has been in the past decade (CT Behavioral Risk Factor Surveillance System, 2023a; CT Behavioral Risk Factor Surveillance System, 2023b). Among adults, females (15.7%
those aged 18-24 (15.3% [10.9-19.7]), non-Hispanic Black individuals (14.8% [11.1-18.5]), those in households making less than $25,000 per year (18.7% [14.8-22.5]), and individuals with some college education or tech school (14.4% [12.3-16.6]) had the highest prevalence (CT Behavioral Risk Factor Surveillance System, 2023a).

**Coronary Heart Disease**

Rates of coronary heart disease remain low across the state, with the majority of census tracts with a disease prevalence above the national average in disadvantaged communities [see Table 1]. Heart disease is the number one cause of death in Connecticut, and in 2021, resulted in 6,371 related deaths statewide. (CDC National Center for Health Statistics, 2022a; CDC National Center for Health Statistics, 2023). The corresponding death rate was 136.7 per 100,000 people, the fifth lowest rate in the United States. In 2022, 6.4% of individuals in the state reported that they have had coronary heart disease or myocardial infarction (CDC National Center for Chronic Disease Prevention and Health Promotion Division of Population Health, 2015). The prevalence was higher among males (8.1% [7.0-9.2]), those aged 65+ (16.1% [13.7-18.6]), non-Hispanic white individuals (7.0% [6.2-7.9]), those with a high school education or G.E.D (9.2% [6.9-11.5]), those making less than $15,000 (12.4% [7.4-17.4]), and those making between $15,000 and $24,999 (12.4% [7.8-16.9]) (CDC National Center for Chronic Disease Prevention and Health Promotion Division of Population Health, 2015).

**Chronic Kidney Disease**

Similar to coronary heart disease, chronic kidney disease (CKD) rates remain low across the state, but 62.5% of census tracts with disease prevalence above the national average are in disadvantaged communities [see Table 1]. Despite the low prevalence, kidney disease is the ninth most prevalent cause of death in the state, according to the CDC’s National Center for Health Statistics (2023). In 2021, there were 638 kidney disease-related deaths in the state with a mortality rate of 12.9 per 100,000 (CDC National Center for Health Statistics, 2022b).

**Diabetes**

More than 12% of census tracts in Connecticut with available data exceed the national average for diabetes prevalence, with more than 90% in disadvantaged communities [see Table 1]. In 2022, diabetes prevalence nationally among adults (18 years or older) was 9.6% (CDC, n.d.). Adults aged 75 years or older (20.6% [19.0-22.2]), males (10% [9.5-10.6]), non-Hispanic Black individuals (12.2% [11.0-13.4]), and those with less than a high school education (16.6% [15.0-18.3]) had the highest prevalence of diabetes diagnoses (CDC, n.d.). Overall, diabetes prevalence in Connecticut has been increasing over the past two decades (CDC, n.d.). Nearly 4,000 individuals across the state take part in the CDC’s National Diabetes Prevention Program’s Lifestyle Change Program which aims to educate and support those looking to make changes to improve their diabetes management (CDC, 2022a; CDC, 2023c). The program is not covered by the state’s Medicaid program (CDC, 2022a).

It is estimated that $2.7 billion are spent in Connecticut on direct diabetes-related medical costs per year with $960 million spent on indirect costs (CDC, 2022a).
Overall

Each of these health outcomes presented are important considerations when assessing energy burden. For example, Hernandez (2016) noted that “[t]he lack of comfortable home temperatures also exacerbated asthma symptoms, particularly during winter months.” (p. 7). Siegel et al. (2022) noted that there were “increased odds of mental health conditions, respiratory conditions, cardiovascular disease, and use of electric medical devices among residents with one, two, or three or more indicators of energy insecurity compared to those with zero indicators,” in a study of residents of New York City (p. 263). Furthermore, as of April 25, 2024, Connecticut has 402 Medicare beneficiaries “who receive in-facility End Stage Renal Disease (ESRD) dialysis treatment services and use one or more types of the electricity-dependent DME and devices” (U.S. HHS, 2024, ‘Data Information’ section). Additionally, the CDC warns that insulin usage in the body can be altered when temperatures increase, requiring close management of insulin dosage (CDC, 2022b).

Figure 4. Crude Prevalence of the Lack of Health Insurance Above and Below the National Average (adults 18 to 64 years)

Data Source: CDC PLACES 2023 Release
Lack of Health Insurance

When discussing health outcomes, it is important to note that not everyone in the state has equal access to healthcare. Of the 164 census tracts with prevalence above the national average, 90.85% were in disadvantaged communities [see Table 1].

Policy Analysis and Recommendations

The findings from energy burden and health research need to be translatable into policy actions across all levels of government to address the root causes of high energy burden and improve health outcomes. This section outlines several policy mechanisms that can aid in bridging the research and policy landscapes.

Recommendations

Keywords and policy summarization tables follow each recommendation. When using ‘regulatory’ and ‘non-regulatory’ policy mechanisms, the former are those in which there are pathways granted by statutes and laws to effect change while the latter mechanisms aim to guide decisions via discretionary actions, such as training and support.

Since the passing of the Low-Income Home Energy Assistance Act, there has been an influx of bills that aim to amend the legislation and increase access to energy assistance programs for qualifying households. This was especially apparent during the COVID-19 pandemic, when for example, the American Rescue Plan Act of 2021 added $4.5B in funding to the LIHEAP program, bringing the yearly total to $8B (LIHEAP Connecticut, n.d.). Most recently, the Heating and Cooling Relief Act (2023) was introduced to both the House of Representatives and the Senate (H.R. 893 and S. 405). The bill aims to expand eligibility, increase protections for those receiving funding, and encourage the use of renewable energy. Of these recommendations, there is one in particular that targets increased eligibility based on energy burden. The proposed bill argues for eligibility requirements to include those with “a monthly energy burden of 3 percent or more, as averaged across the calendar year” (Heating and Cooling Relief Act, 2023, p. 10). Despite being aggregated by census tract averages rather than household level, Figure 5 shows that using a 3% threshold for energy burden would result in expanded eligibility across Connecticut in both disadvantaged and non-disadvantaged communities. It is hoped that an increase in the number of households benefiting from financial assistance would allow for more money to be spent on other goods and services, such as food and healthcare, relieving the need to choose between one or the other.
**Figure 5.** Expanded Energy Burden Eligibility Threshold in Connecticut among Low and Moderate Income Households

Data Source: LEAD Tool (2020)

Given that an estimated 17.87% of income-eligible households in the United States were granted LIHEAP benefits in 2022 (ACF LIHEAP Performance Management, n.d.), the LIHEAP program undeniably has room for improvement. Even among policies that are aimed at achieving better outcomes, such as H.R. 893 and S. 405, there are gaps in the identification of policy mechanisms that, if left unaddressed, would allow for the perpetuation of health and energy assistance to be analyzed as parallel rather than intersecting sectors.

The demand for energy assistance benefits in both Connecticut and across the county are the driving force behind the recommendations provided below, which include action items for governments to bridge the health and energy sectors and promote whole-of-government opportunities.

1. **Integrating health professionals in energy assistance programs**

Healthcare professionals are not well integrated into LIHEAP policy, most likely due to having limited to no financial incentives as well as a lack of mandating authority to do so. This is apparent in the proposed Heating and Cooling Relief Act which suggests that LIHEAP outreach activities should include “nontraditional partners, including home energy suppliers, local educational agencies, and entities carrying out other programs for low-income people, to assist with signups” (2023, pg. 4). Although healthcare centers could fall under ‘other programs’ the lack of explicit incorporation of medical and public health organizations does not encourage the integration of benefits that these groups could provide.
Even without a mandate for inclusion, the presence of health professionals in LIHEAP outreach could be achieved through the utilization of ICD-10 Z-codes. ICD-10-CM codes, used to record a patient’s medical diagnoses, are used in the United States (CDC National Center for Health Statistics, 2015). To incorporate health data beyond medical diagnoses, ICD codes were expanded to include social determinants of health (SDOHs), captured under Z-codes (Centers for Medicare and Medicaid Services, 2023). Z-code categories currently include education, literacy, occupational exposures, housing, support group/family circumstances, and psychosocial circumstances, among others (Centers for Medicare and Medicaid Services, 2023). Despite the progress Z-codes have made in bridging public health and clinical care, Z-codes were reported in less than 2% of Medicare FFS beneficiary claims in 2019 (CMS Office of Minority Health, 2021), revealing a need for exploration into the barriers associated with increased usage.

The ICD Diagnostic Related Groups (DRG) 951, which includes “other factors influencing health” has two energy-specific codes (ICD10Data.com, 2024c). ICD-10-CM Z59.11 captures patient data relevant to “inadequate housing environmental temperature,” such as the absence of heating or air conditioning in a patient’s home (ICD10Data.com, 2024a). ICD-10-CM Z59.12 captures patient information relating to “inadequate housing utilities,” including the inadequate access to electricity, water, gas, and oil services (ICD10Data.com, 2024b). Both codes are billable. Usage of z-codes would arguably have co-benefits for both healthcare professionals, patients, and policymakers as there will be 1) an overall improvement of health-relevant data on energy insecurity to be incorporated in policy decisions and 2) encouragement to have conversations between medical professionals and patients about at-home factors that may be exacerbating health conditions.

There are currently many barriers to uptake that need to be addressed before there can be adequate use of Z-codes. A policy brief published by NORC at the University of Chicago noted that many health care providers are unaware of Z-codes, financial incentives can be absent, standardization of measures is complicated and interrupts data sharing, and not all SDOHs are captured (Ubri et al., 2022). The report advocated for collaboration between Medicaid agencies at the state level, “providers, provider associations, and other partners to give providers needed guidance, education, training, and technical assistance on Z code use and its importance” (p. 19). Further, proposed policy mechanisms differed at the state and federal level, with state policy mechanisms focused on authorities such as 1905(a) State Plan Authorities, Section 1115 waivers, and incorporating data reporting mandates in contracts, among others. Policy recommendations tailored to the federal level were also addressed, such as “[s]upport[ing] and incentiviz[ing] multi-sectoral coalitions and partnerships to break down silos and consolidat[ing] resources to reduce fragmentation of social needs data, avoid duplication of efforts, and better align efforts” (p. 24).

In 2021, the Connecticut Department Social Services Medical Assistance Program released a provider bulletin (2021-38) noting that “SDOH will provide DSS a more comprehensive data set to identify, address and track health disparities over time,” but the language did not mandate any usage of the code (p. 1). Rather, it was requested that they be used in the context of patient visits with those on the State’s Medicaid program, HUSKY Health.
Regardless of how state and federal agencies choose to incorporate z-codes, the final mandate should prioritize the ability for data sharing with social service agencies, such as state energy assistance programs, and ease of use.

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<tr>
<th>Level(s) of Government</th>
<th>Branch(es) of Government</th>
<th>Policy Mechanism(s)</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Federal, State &amp; Local</td>
<td>Executive</td>
<td>Both non-regulatory and regulatory mechanisms can be used, such as training opportunities for health care professionals (former) and data mandates (latter)</td>
<td>Expanded use of Z-codes would allow for better analysis of the relationship between health outcomes and SDOHs</td>
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</table>

Keywords: Z-codes; social determinants of health; clinical care

II. Improving LIHEAP data availability and reporting

Increasing the data points for program evaluation, such as z-codes, only results in beneficial outcomes if the data is available for analysis.

The Administration for Children and Families (ACF) LIHEAP Performance Management Data Warehouse provides data limited to the state level (ACF LIHEAP Performance Management, n.d.), which does not allow for more granular analysis of regional LIHEAP demands. Pooling data sources to draw deeper connections can be a way to supplement missing data that is unable to be provided by grantees. For example, integrating the U.S. Department of Health and Human Services’ emPOWER Map, which aggregates data on the zip code, county and state levels regarding Medicare beneficiaries that rely on electrically powered medical devices (U.S. HHS, 2024), with LIHEAP data would allow more nuanced evaluations of where communities face both high reliance on energy assistance programs and use of electrically-reliant medical devices is also high. This could aid in the allocation of resources and funding to those communities.

Further, specific outreach activities for grantees are not mandated by LIHEAP, but reporting of outreach activities is requested to be disclosed (LIHEAP Clearinghouse, n.d.-c). This is an opportunity for coordination with health centers and programs. For example, Montana posts information about its energy assistance in neighborhood health facilities and at Health Fairs (LIHEAP Clearinghouse, n.d.-e). Expanding outreach requirements to engage with health care centers or programs could foster more direct relationships between providers and patients facing high energy burden.
Allowable under 5 U.S.C. § 553, the Administrative Procedures Act (1946) states that “[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule” (e). Therefore, changes to reporting requirements can be accomplished via a Petition for Rulemaking in response to the 45 CPR § 96.82 (1999), which requires grantees receiving a minimum of $200,000 to meet reporting requirements. Through the Petition for Rulemaking process, there is an opportunity to request for the expansion of information collected in the reporting requirements, such as the following:

- Reporting of the medical vulnerabilities of the population being served
- Disclosure of outreach activities taking place specifically in health care settings
- Public release of data at the census tract-level

Furthermore, making LIHEAP data publicly available on a census tract aggregate level would allow for analysis of differential impacts among communities.

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</tr>
</thead>
<tbody>
<tr>
<td>Federal (improving access to public data); State (reporting requirements)</td>
<td>Executive</td>
<td>Regulatory: <em>Petition for Rulemaking 45 CPR § 96.82</em></td>
<td>Data availability on smaller geographic scales, as well as increased health data, would allow for additional analyses of the communities facing cumulative burdens</td>
</tr>
</tbody>
</table>

Keywords: reporting requirements; Administrative Procedures Act; Petition for Rulemaking

**III. Creation of a Health and Energy Assistance Advisory Committee**

The Administration for Children and Families (ACF), supporting LIHEAP program management, and Centers for Medicare and Medicaid Services (CMS), supporting older adults and low-income individuals, are both agencies under the Department of Health and Human Services (Assistant Secretary for Public Affairs, 2024; CMS.gov, 2023; U.S. HHS, 2023), yet integration between the medical and energy assistance sectors is unclear. The agency would benefit from a Health and Energy Assistance Advisory Committee, which would align with the Department’s Strategic Goal 3 (within the FY2022 - 2026 Strategic Plan) focused on “strengthenin[ing] social well-being, equity, and economic resilience” (Assistant Secretary for Planning and Evaluation, 2024, ‘Strategic Goals, Objectives, and Strategies’ section). Bringing together individuals from both sectors would facilitate dialogue aimed at improving health integration in energy assistance programs, and potentially evaluate the implementation of the policy mechanisms outlined in this report.

Additionally, the Federal Advisory Committee Act is applicable as 41 CFR § 102-3.10 (2001) notes that it “governs the establishment, operation, and termination of advisory committees within the executive branch of the Federal Government” and requires disclosures to the public. Through this Act, the creation of an advisory board must be approved by senior officials within a federal agency, and “can be created only when they are essential to the performance of a duty or responsibility conveyed upon the executive branch by law” (U.S. General Service
Administration, 2016, ‘Requirements for Establishing Federal Advisory Committees’ section). Therefore, advocating for an increased commitment to the intersection between energy and health is an imperative first step.

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<tbody>
<tr>
<td>Federal</td>
<td>Legislative or Executive</td>
<td>Regulatory: Federal Advisory Committee Act</td>
<td>A committee focused on health and energy would foster collaboration between officials and policy decision makers in both sectors, and the public to improve federal programs and develop innovative solutions</td>
</tr>
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IV. Suggestion for representation of a healthcare professional on the Connecticut Low Income Energy Assistance Board

In an effort to enhance cross-sector collaboration, the Low-Income Energy Advisory Board (LIEAB) was created “to assist the Office of Policy and Management and the Department of Social Services in the planning, development, implementation, and coordination of energy-assistance-related programs and policies and low-income weatherization assistance programs and policies,” and serves an advisory role for the Department of Energy and Environmental Protection (CT Department of Energy and Environment, 2023, para. 1). The Board currently contains 21 voting members from various statewide organizations, such as Operation Fuel, Connecticut AARP, and Eversource Energy, among others (CT Department of Energy and Environment, 2024b). Three non-voting members are representatives from the following State agencies: Department of Energy and Environmental Protection, Department of Social Services, and Office of Policy and Management (CT Department of Energy and Environment, 2024b). The Board meets monthly and was authorized to “convene and devise recommendations to improve the implementation of heating assistance programs, particularly those created to benefit low-income households, through coordination and optimization of existing energy efficiency and energy assistance programs” (CT Department of Energy and Environment, 2024; Title 16a Planning and Energy Policy, Chapter 298 § 41b (e)). Meeting minutes are publicly available online and highlight the breadth of information discussed as well as the personnel in attendance, such as state Senators (CT Department of Energy and Environment, 2024a; Low-Income Energy Advisory Board, 2024). The current representation on the board was a result of an expansion that was approved by the Connecticut General Assembly in May 2022 (An Act Concerning Membership of the Low-Income Energy Advisory Board, 2022).

LIEAB would benefit from the addition of a representative from a health-centered organization for the following reasons:

- Increased transparency between public health and medical professionals and those working in the energy assistance sector
- Advancing input on the types of information that would be needed for both sectors (medical and energy) to advance the well-being of residents across the state
- Development of advocates in the medical setting that can discuss with their peers the importance of understanding the living conditions and status of energy availability in patient’s homes

A bill in the state legislature is currently being raised to expand the Low-Income Energy Advisory Board to include water (An Act Concerning the Low-Income Energy Advisory Board, 2024). Future bills proposed to the state government could argue for the inclusion of health based on the rationale provided in this report.

Furthermore, there is federal funding that can increase the capacity to expand engagement in advisory boards. The Inflation Reduction Act (IRA) Environmental and Climate Justice Program “provides funding for financial and technical assistance to carry out environmental and climate justice activities to benefit underserved and overburdened communities” (EPA, 2023a, para. 1). The program is distributing its nearly $3 billion in financial assistance appropriations through various programs, including the Environmental and Climate Justice Community Change Grants Program (EPA, 2023a). The Community Change Grant’s Notice of Funding Opportunity (NOFO) outlines available funding for Meaningful Engagement for Equitable Governance which is “intended to build the capacity of communities and governments to evaluate and redress environmental and climate injustices by giving disadvantaged communities a meaningful voice in government decision-making processes” (EPA Office of Environmental Justice and External Civil Rights, 2023, p. 19). Applications for funding end in November 2024.

Given that LIHEAP is a covered program under the Justice 40 initiative, (Office of the Assistant Secretary for Health, 2022), State advisory boards, such as Connecticut’s LIEAB should be encouraged to apply for Community Change Grants and other funding resources that may arise to add community based organizations leaders onto its membership roster with a focus on climate and health equity.

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</thead>
<tbody>
<tr>
<td>State (Connecticut)</td>
<td>Legislative</td>
<td>Regulatory: Chapter 298 Sec. 16a-41b amendments; Inflation Reduction Act via Community Change Grants</td>
<td>A health professional appointed to LIEAB would allow for increased transparency, encouragement of discussions determining the best methods for collecting and integrating relevant health data, and development of health care advocates</td>
</tr>
</tbody>
</table>

Keywords: advisory boards; Inflation Reduction Act (IRA); Environmental and Climate Justice Program; Low-Income Energy Assistance Board; Community Change Grants; Justice 40
V. Expanding the definition of ‘vulnerable household’

In the State’s LIHEAP Block Grant Allocation Plan, ‘vulnerable household’ is defined as “any household in which one or more members is elderly (defined as 60 years of age or older), has a disability, or is under the age of six” (Connecticut Department of Social Services, 2023, p. 4). Medical vulnerabilities not classified as disabilities are excluded from the definition, yet being designated as a vulnerable household has implications on the maximum amount of funding a household can receive. In FY2024, the estimated basic benefit for a vulnerable household at 125% of the federal poverty guideline or lower is $530 while non-vulnerable households are eligible for $480 (Connecticut Department of Social Services, 2023). Given the lack of clarity as to what medical conditions fall under the definition of ‘disability’ as well as the lack of explicit inclusion of medically vulnerable individuals, such as those on electricity-reliant home medical devices, could be an area of improvement for future allocation plans. A proposed definition is as follows (bolded words are those suggested in addition to what is already being used, Connecticut Department of Social Services, 2023, p. 4):

“Any household in which one or more members is elderly (defined as 60 years of age or older), has a disability, is under the age of six, is medically reliant on a electricity-powered medical device regardless of disability status, and/or has a medical condition that is exacerbated by unsafe indoor air temperature.”

It is difficult to determine the exact origins of Connecticut’s ‘vulnerable household’ definition, but in Chapter 298 of Title 16a Planning and Energy Policy, Sec 16a-41a. notes that Connecticut is required to submit guidance for how funding can be used, and given that vulnerable households is used to determine funding distribution (Connecticut Department of Social Services, 2023), this definition, or other versions, could be incorporated into future legislation proposed to the Connecticut General Assembly for the revised language to be adopted.

Similar language is used to describe vulnerable households in the ACF LIHEAP Performance Management (n.d.) Data Warehouse database, and therefore, additional amendments at the federal level could be considered.

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<tbody>
<tr>
<td>State (Connecticut)</td>
<td>Legislative</td>
<td>Regulatory</td>
<td>An expanded definition of ‘vulnerable household’ would allow for those with medical vulnerabilities to benefit from increased assistance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proposed legislation</td>
<td></td>
</tr>
</tbody>
</table>

Keywords: definition expansion; vulnerable household; state legislation
VI. Additional Consideration: National Environmental Policy Act (NEPA)

Upon investigation, LIHEAP does not currently appear to have completed an assessment under NEPA. NEPA’s three tiers of consideration include Categorical Exclusions (CATEX), Environmental Assessment/Finding of No Significant Impact (EA/FONSI), and Environmental Impact Statement (EIS) (EPA, 2023b). According to exclusion categories listed in Section 30-20-40 in the HHS General Administration Manual Part 30 Environmental Protection, “[g]rants for social services (e.g., support for Head Start, senior citizen programs or drug treatment programs) except projects involving construction, renovation, or changes in land use,” is listed as a functional exclusion (Program Support Center, 2003). Since LIHEAP provides social service funding, it may fall under this category, yet this benefit resembles that of the Veterans Affairs (VA) Housing Loan Program. The VA program traditionally operates as a financial assistance service, but in some cases the funds are used for new construction, and therefore, it has resulted in the publication of a Programmatic Environmental Impact Statement (U.S. Department of Veteran Affairs Veterans Benefits Administration, 2022). Similarly, LIHEAP traditionally operates as a social service through funding towards energy assistance, but given that it was estimated to have provided more than $555 million in funding for weatherization in 2022 (ACF LIHEAP Performance Management, n.d.) and that cooling assistance that can be used for air conditioner installation in New York (New York State OTDA, n.d.), it can be assumed that there would be alterations made to household structures. In various presentations by the U.S. Department of Energy and NREL, it appears that the U.S. Department of Energy is participating in discussions regarding NEPA and weatherization projects (NEPA Overview for the Weatherization Assistance Program, n.d.; Williams & Cook, 2023). Additional investigation into how this is transferable to LIHEAP is necessary, with an emphasis on whether LIHEAP meets Categorical Exclusion criteria or if it would need to conduct an assessment to satisfy NEPA requirements.

By requesting further auditing into whether or not LIHEAP needs to conduct an assessment given the services it offers, there are potential benefits on both human and environmental health.

Keywords: National Environmental Policy Act (NEPA); Categorical Exclusions; weatherization

Conclusion

Disadvantaged communities in Connecticut face disproportionately high energy burden and adverse health outcomes, leading to a need for increased research on their intersection. Energy assistance policy is uniquely positioned to improve health outcomes through the incorporation of health-relevant data to identify medically vulnerable communities for more specific allocations of resources and outreach. Various state and federal policy mechanisms can be used to enhance the interconnectedness between clinical care and energy assistance programs, including through increased use and enforcement of Z-codes, public reporting of health measures, and representation of health professionals on related advisory boards, expansion of relevant definitions, and potential participation in NEPA assessments. Bills in the House of Representatives and the Senate are encouraging as the LIHEAP program has room for improvement in meeting the needs of low-income families across the country, but there is a need for additional actions.
LIHEAP is a powerful financial relief program that has direct impacts on the lives of individuals throughout the United States each year. Therefore, the program needs to be continuously evaluated to determine how it can best serve the households that rely on its funding while recognizing its role in influencing social determinants of health.

**Research Questions for Future Consideration**

This research could not cover all of the aspects of energy burden and health that should be addressed to guide policy decisions. Below is a list of possible research questions for future consideration.

- How can health impact assessments (HIAs) be used to draw conclusions about the benefits of energy assistance programming, such as cooling, on health outcomes?
- What incentives and/or mandates are there for providers to utilize Z-codes, especially among Medicaid and Medicare patients?
- How can NEPA assessments be utilized to improve LIHEAP?
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