

**PUBLIC HEALTH OUTCOMES ASSOCIATED
WITH ENERGY POVERTY:**

An Analysis of 2007 Iowa Behavioral Risk Factor
Surveillance System (BRFSS) Data from Iowa

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Prepared For:

Iowa Department of Human Rights
Bureau of Energy Assistance
Des Moines, Iowa

Prepared By:

Roger D. Colton
Fisher, Sheehan & Colton
Public Finance and General Economics
Belmont, MA

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TABLE OF CONTENTS

<i>Table of Contents</i>	<i>i</i>
<i>Executive Summary</i>	<i>ii</i>
What is BRFSS	ii
Unaffordable Home Energy as Public Health Issue	iii
Iowa Results	iii
Poor Health Outcomes	iii
Self-Efficacy and Home Energy Emergencies	iv
Public Costs of Home Energy-Related Adverse Health Outcomes	v
Conclusions and Recommendations	v
<i>BRFSS Generally</i>	<i>1</i>
<i>BRFSS in Iowa</i>	<i>1</i>
<i>Research Questions and Study Methodology</i>	<i>2</i>
<i>Public Health and Home Energy</i>	<i>4</i>
<i>The Iowa Results</i>	<i>5</i>
Disproportionate Association with Households in Poor Health.	6
Layering Poverty Level Data on Top of Health Data.	8
Self-Efficacy and Self-Advocacy Regarding Home Energy Emergencies	9
The Public Costs of Resulting Medical Problems.	13
<i>Findings and Conclusions</i>	<i>14</i>
<i>References</i>	<i>16</i>
<i>Frequently asked Questions Regarding Adding Home Energy-Related Module to a State BRFSS Survey</i>	<i>18</i>

EXECUTIVE SUMMARY

While it is universally acknowledged that home energy is an essential of modern life today, this study finds that the unaffordability of home energy, and the potential loss of home energy service either through involuntary disconnections¹ or voluntary deprivation, has public health consequences far beyond those historically discussed. A review of data generated by Iowa's participation in the 2007 Behavioral Risk Factor Surveillance System ("BRFSS") survey documents that the loss of home energy service has significant public health consequences for the State of Iowa.

What is BRFSS

The Behavioral Risk Factor Surveillance System ("BRFSS") is a system of federally-mandated, state-administered health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. In Iowa, one objective of the BRFSS is to advance the understanding that certain health-related behaviors are critical indicators of health. The Iowa State Department of Public Health ("DPH") then uses the annual BRFSS data to design, implement and support public health activities.

In 2006, the Iowa Department of Human Rights ("DHR"), the state agency responsible for administering the federal Low-Income Home Energy Assistance Program ("LIHEAP") in Iowa, requested the Iowa DPH to add a series of questions to the BRFSS regarding the prevalence of state home energy emergencies. The request came in response to ongoing data reported by the Iowa Utilities Board ("IUB") documenting that, largely because of spiraling home energy prices, low-income arrears and low-income service disconnections for nonpayment were reaching historic highs in Iowa.

The Iowa Department of Public Health agreed to add two home energy-related questions to the 2007 BRFSS survey:²

- Was there ever a time in the past 12 months when you wanted to use your main source of heat but could not for one or more of the following reasons: you ran out of fuel oil, kerosene, LPG, propane, coal, or wood because you were unable to pay for a delivery; or the utility company disconnected your gas or electric service because you were unable to pay your bill? (yes/no); and
- In the past 12 months, did you keep your home at a temperature that you felt was unsafe or unhealthy at any time of the year because there wasn't enough money for your energy bill (almost every month, some months, only 1 or 2 months, never).

¹ Throughout this paper, references to the "disconnection" of service is intended to incorporate, also, the inability to obtain a fill-up of a bulk fuel such as propane, LPG or fuel oil.

² In addition to the "core" modules mandated by the federal government, states may choose to add specific questions to the survey which they administer. Iowa chose to add two questions regarding unaffordable home energy.

Unaffordable Home Energy as Public Health Issue

The public health threat posed by unaffordable energy bills has been increasingly recognized in recent years after the natural gas price spike in 2004 and beyond. One Congressionally-funded study of federal LIHEAP recipients, for example, found that 16% of fuel assistance recipients kept their homes so cold that a member of their household had become ill. The NEADA study reported that 11% of energy assistance recipients had a member that became sufficiently ill to require a doctor's attention.

Other research, both in the United States and elsewhere, confirms these NEADA findings. A 2006 study by the Child Health Impact Assessment Working Group, at the Boston Medical Center, reported that a five city (Baltimore, Boston, Little Rock, Minneapolis, Washington D.C.) study of predominantly low-income children under three years of age seen in primary care clinics and emergency departments found that young children not receiving LIHEAP were 30% more likely to be admitted to the hospital. In addition, the CHIWG report found that “budget tradeoffs between energy costs and food expenditures result in food insecurity. . . [F]ood insecure children are 2 – 3 times more likely to be in fair or poor health or chronically ill.”

These adverse health outcomes not only create social consequences, but they also impose substantial economic costs. The resulting cost of preventable hospitalizations, borne by low-income families, payers, and health care providers, CHIWG found were five to eight times higher than the average cost of heating a home in the Northeast and seven to ten times higher than the maximum home heating benefit from the LIHEAP program in 2006.

Aside from the direct cost of hospitalization, cold-induced illnesses contribute to prolonged convalescence and home care, as well as substantial increases in the number of visits to general practitioners. The pharmaceutical costs for medication are in addition to this.

Iowa Results

The unaffordability of home heating service in Iowa poses a significant public health issue. Adverse health outcomes arise both when households face the loss of their home heating due to an inability to pay and when households face energy emergencies, whether or not such emergency are associated with the actual involuntary termination of access to heating service. The adverse health outcomes are found in Iowa's residential population as a whole, as well as in its low-income population in particular.

Poor Health Outcomes

There is a significant overlap between households facing poor health and households facing utility bill affordability problems in Iowa. The Iowa BRFSS data documents that Iowans with “fair” or “poor” health³ are significantly over-represented among households reporting a disconnection of service for nonpayment. Nearly three times as many households experiencing a

³ Continuum is excellent, good, fair, poor.

disconnection for nonpayment had fair or poor health as compared to households with no service disconnection.

The poor health outcomes are not minor or transient but can substantively interfere with the way Iowa residents carry on their normal activities of daily living. Three times as many Iowa households losing home heating service to a disconnection for nonpayment had a person whose bad physical health interfered with their normal activities 15 or more out of the preceding 30 days when compared to Iowa's population as a whole.

The disproportionate adverse impacts on households with health problems do not change if one controls for the Poverty Level at which a household lives. If anything, the degree of the disproportionate impact deepens when taking low-income status into account. For households with income at or below 150% of the Federal Poverty Level (FPL), there is a significantly greater proportion of disconnected households that include persons having bad physical health problems in 15 or more of the immediately preceding 30 days or that have persons who experience limitations on their normal daily activities due to physical, mental or emotional health problems.

Self-Efficacy and Home Energy Emergencies

One of the most disturbing findings from the Iowa BRFSS data involves the household medical conditions that impede the ability of a household facing either the disconnection of service for nonpayment, or a home energy emergency, to advocate on his or her own behalf. Much of the regulatory infrastructure designed to prevent the loss of home energy service is predicated on the assumption that households facing the loss of service, as well as households facing the unaffordability of service, are able to respond to their home energy situation through advocacy on their own behalf.

If identifiable medical conditions impede the ability of households to perform these tasks, however, much of the regulatory "protection" structure designed to allow household response to energy emergencies is ineffective.

The Iowa BRFSS data documents that a substantial minority of households facing the disconnection of service for nonpayment, or a home energy emergency, face medical issues that may well impede their ability to respond to the home energy crisis situation. Compared to the total population, more than twice as many households experiencing a home energy emergency reported at least one of the self-efficacy conditions that impede the ability of the household to advocate on one's own behalf. While one-in-five Iowa households reported such a condition some, most or all of the time, more than half of households experiencing an energy emergency reported such conditions.

Of particular importance was the prevalence of feeling "worthless" or "hopeless." A household feeling "worthless" or "hopeless" cannot reasonably be expected to negotiate on their own behalf, particularly when faced with an energy emergency situation. In the best of circumstances, the balance of power in transactions between a customer and a utility lies with the

utility. A feeling of “worthlessness” or “hopelessness” on the part of the payment-troubled customer exacerbates that imbalance. Nonetheless, more than three times as many persons experiencing a disconnection, and nearly four times as many persons facing an energy emergency, reported feeling “hopeless” or “worthless” either some, most or all of the time, when compared to the population as a whole.

The lack of self-efficacy was even more prevalent in the low-income population facing a home energy emergency in Iowa. Nearly 70% of households facing a disconnection of heating service, or a home energy emergency, reported feeling hopeless, depressed, or worthless, or that everything was an effort, either some, most or all of the time, as compared to 36% in the total low-income population. More than twice as many low-income households facing either a service disconnection, or a home energy emergency, reported feeling either “hopeless” or “worthless” as compared to the low-income population as a whole.

The Iowa BRFSS documents the problems with self-efficacy that impede the ability of households to respond to an actual or imminent energy crisis situation.

Public Costs of Home Energy-Related Adverse Health Outcomes

Households who either faced the disconnection of home heating service or experienced a home energy emergency are less likely to be able to pay for their health care costs out of their own household resources. Between one-fifth and one-quarter of the total population (irrespective of income) facing either a home heating disconnection, or an energy emergency, lacked access to any type of health care coverage. The lack of access to health care coverage was between 2.5 and 3.0 times greater in the population facing energy problems than in the population as a whole.

More than one-third of the total population reporting an energy problem (home heating disconnection or home energy emergency) also reported that they had not sought the care of a doctor when needed because they could not afford it. The rate at which households facing either a home heating disconnection or home energy emergency could not afford medical care was between 4.0 and 5.0 times higher than in the general population

Conclusions and Recommendations

The Iowa BRFSS provides important insights into the prevalence of unaffordable home energy as a public health problem. The Iowa BRFSS should continue to collect data on home energy-related issues. In addition, states other than Iowa should incorporate home-energy unaffordability questions into their BRFSS surveys.

The importance of the Iowa results is two-fold. First, the Iowa study examines data for the population as a whole rather than for specific vulnerable populations. Within the total population irrespective of income, between two and three times more Iowa households facing a home heating disconnection or home energy emergency also experienced prolonged periods of poor physical health, or either fair or poor health generally, than in the population as a whole.

More than 50% of low-income households (defined to be households with income at or below 150% of the Federal Poverty Level) who faced a home energy emergency reported fair or poor health generally. Within the low-income population, nearly 40% of households experiencing a home heating service disconnection, and 45% of those facing a home energy emergency, reported extended periods of poor physical health.

The economic costs of these adverse health outcomes are likely to be borne by society, by the health care industry, or by government assistance. More than one-third of low-income households facing a home heating disconnection or home energy emergency lacked access to health care coverage. Between 40% and 50% of low-income households facing either such energy problems (a home heating disconnection, a home energy emergency) reported not seeking a doctor's care when needed because they could not afford to do so.

While unaffordable home energy poses public health problems to particular vulnerable populations, in Iowa, home energy unaffordability poses public health problems to the broader population as a whole as well. The unaffordability of home energy should be treated as the public health issue that it is.

While it is universally acknowledged that home energy is an essential of modern life today, the *specific* impact that unaffordable home energy has on the health and well-being of individuals and households is not well-studied. Frequent concerns are expressed about the impacts that the *loss* of home energy service due to a disconnection for nonpayment will have on the ability of a household to provide lights, heating and cooking. This study finds, however, that the unaffordability of home energy, and the potential loss of home energy service either through involuntary disconnections⁴ or voluntary deprivation, has public health consequences far beyond those historically discussed.

A review of data generated by Iowa’s participation in the 2007 Behavioral Risk Factor Surveillance System (BRFSS) survey documents that the loss of home energy service has significant public health consequences for the State of Iowa.

BRFSS GENERALLY

The Behavioral Risk Factor Surveillance System (BRFSS) is “a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury.”⁵ According to the U.S. Centers for Disease Control and Prevention (CDC), “for many states, the BRFSS is the only available source of timely, accurate data on health-related behaviors.”

Established in 1984, the BRFSS was designed to monitor actual behaviors rather than attitudes or knowledge. BRFSS was originally designed to look at premature morbidity and mortality, but has, over the years, been expanded to identify health risks important to the promotion of healthy living and disease prevention more broadly. Through the BRFSS, CDC has developed a “core questionnaire” that states must administer. In addition, states have the option of adding supplemental modules that address specific health-related behaviors that are of particular significance in that state.

BRFSS IN IOWA

The Iowa BRFSS is an ongoing telephone survey designed to identify risk factors that are major contributors to illness, disability and premature death.⁶ According to the Iowa Department of Public Health, the objectives of the BRFSS include:

- To determine the state specific prevalence of personal health behaviors related to the leading causes of premature death;

⁴ Throughout this paper, references to the “disconnection” of service is intended to incorporate the inability to obtain a fill-up of a bulk fuel such as propane, LPG or fuel oil.

⁵ National Center for Chronic Disease Prevention and Health Promotion, Behavioral Risk Factor Surveillance System, About the BRFSS. Accessed www.cdc.gov/BRFSS/about.htm, May 15, 2008.

⁶ Iowa Department of Health, Behavioral Risk Factor Surveillance System (BRFSS) Annual Survey Results.

- To develop the capacity of state health departments to conduct credible telephone surveys; and
- To advance the understanding that certain health-related behaviors are critical indicators of health.

The State Department of Public Health then uses the annual BRFSS data “to design, implement and support public health activities. These activities are designed to reduce the premature death and disability of Iowa residents.”

In 2006, the Iowa Department of Human Rights (DHR), the state agency responsible for administering the federal Low-Income Home Energy Assistance Program (LIHEAP) in Iowa, requested the Department of Public Health to add a series of questions to the 2007 BRFSS regarding the prevalence of state home energy emergencies. The DHR request came in response to ongoing data reported by the Iowa Utilities Board (IUB) documenting that, largely because of spiraling home energy prices, low-income arrears and low-income service disconnections for nonpayment were reaching historic highs in Iowa. DHR noted in its request for state-added BRFSS questions that unaffordable home energy has public health implications not only based on the extent to which households lose service due to an inability to pay, but also based on the extent to which households engage in unhealthy deprivation of basic home energy needs in order to maintain their ability to pay their home energy bills.

RESEARCH QUESTIONS AND STUDY METHODOLOGY

The objective of this inquiry was to assess the extent to which, if at all, there is an association between home energy affordability problems in Iowa and adverse public health outcomes. Data was obtained from the Iowa BRFSS survey. The analysis used the weighted household statistics from BRFSS rather than weighted individual statistics. Household data rather than individual data was used since the loss of home energy service, as well as the maintenance of temperatures within any given housing unit, affect the household as a whole and not merely specific individuals within the household.

The Iowa Department of Public Health agreed to add two home energy-related questions to the 2007 BRFSS survey:⁷

- Was there ever a time in the past 12 months when you wanted to use your main source of heat but could not for one or more of the following reasons: you ran out of fuel oil, kerosene, LPG, propane, coal, or wood because you were unable to pay for a delivery; or the utility company disconnected your gas or electric service because you were unable to pay your bill? (yes/no); and

⁷ In addition to the “core” modules mandated by the federal government, states may choose to add specific questions to the survey which they administer. Iowa chose to add two questions regarding unaffordable home energy.

- In the past 12 months, did you keep your home at a temperature that you felt was unsafe or unhealthy at any time of the year because there wasn't enough money for your energy bill (almost every month, some months, only 1 or 2 months, never).⁸

Two different energy emergency situations were considered. The subpopulation of households having lost their home heating service due to nonpayment defined the first study population. The second study population was defined to include households having either of two characteristics: *either* the household lost its primary heating source due to nonpayment, *or* the household kept its home at what they felt to be unsafe or unhealthy temperatures.⁹ In addition to looking at data for the Iowa population as a whole, a separate inquiry examined that population with income at or below 150% of the Federal Poverty Level. The Federal Poverty Level was calculated by combining income data with household size.¹⁰

Both questions were limited to circumstances where the energy emergency could be attributed to an affordability problem. The first question, in other words, was limited to circumstances where the loss of heating service was due to nonpayment “because you were unable to pay your bill.” Situations involving disconnects for nonpayment for reasons other than inability to pay were excluded. The second question was limited to maintaining temperatures at unsafe or unhealthy temperatures “because there wasn’t enough money for your energy bill.”¹¹

The two questions which the analysis below seeks to answer are:

- Do Iowa households facing the loss of home heating service disproportionately experience adverse health outcomes; and
- Do Iowa households facing energy emergencies, irrespective of whether the household ultimately loses its heating service, disproportionately experience adverse health outcomes.

The analysis below does not seek to establish a causal relationship, let alone to identify the direction of any causal relationship (e.g., does a person’s bad health create circumstances leading to the loss of home heating service, or does the loss of home heating service create circumstances leading to a person’s bad health). It is sufficient, for purposes of identifying a public health need, simply to find the positive relationship, should such a relationship exist.

⁸ Both questions had possible responses, also, of “don’t know” or “refused to answer.”

⁹ While some households may have demonstrated *both* characteristics, that population was not separated for study.

¹⁰ Calculating a Federal Poverty Level was made more difficult by the fact that income was reported by income range (e.g., less than \$5,000, between \$5,000 and \$10,000). To calculate Poverty Level, the mid-range of the income range was assigned to each household. If the household fell into the \$20,000 to \$25,000 income range, in other words, it was assigned an income of \$22,500. Given this process, while a specific Poverty Level could not be determined for any given household, it was nonetheless possible to determine whether a household fell into broad ranges of Poverty. This study examined those households with income at or below 150% of the Federal Poverty Level.

¹¹ In this respect, the energy questions mirror the U.S. Department of Agriculture’s Food Insecurity Survey, which focuses on food insecurity based on an inability-to-pay.

PUBLIC HEALTH AND HOME ENERGY

The unaffordability of home energy service presents a significant public health threat in Iowa. This health threat arises whether or not an Iowa household ultimately faces the disconnection of service for nonpayment. As will be seen below, in addition to the involuntary disconnection of service due to nonpayment, Iowa residents engage in extraordinary self-deprivation of energy services in order to maintain a level of consumption that can be paid out of existing household resources.¹²

The public health threat posed by unaffordable energy bills has been increasingly recognized in recent years after the natural gas price spike in 2004 and beyond. One Congressionally-funded study of recipients of federal energy assistance (the Low-Income Home Energy Assistance Program: LIHEAP), for example, found that 16% of fuel assistance recipients kept their homes so cold that a member of their household had become ill. (NEADA 2005). In fact, the NEADA study reported that 11% of energy assistance recipients had a member that became sufficiently ill to require a doctor's attention.

Other research, both in the United States and elsewhere, confirms these NEADA findings. A 2006 study by the Child Health Impact Assessment Working Group, at the Boston Medical Center, reported that “a five city (Baltimore, Boston, Little Rock, Minneapolis, Washington D.C.) study of predominantly low-income children under 3 years of age seen in primary care clinics and emergency departments found significant associations between not receiving LIHEAP and important health and growth indicators.” (Child Health Impact Working Group). For example, “young children not receiving LIHEAP were 30% more likely to be admitted to the hospital.” In addition, the CHIWG report found that “budget tradeoffs between energy costs and food expenditures result in food insecurity. . . [F]ood insecure children are 2 – 3 times more likely to be in fair or poor health or chronically ill.” The reason is that “a nutritionally inadequate diet makes children susceptible to an ‘infection-malnutrition cycle’ by impairing children’s immune functions making them more prone to infection and illness.”

The adverse health impacts are particularly acute in very young children. A 2007 study by the Children’s Sentinel Nutritional Assessment Project (C-SNAP) explained that:

The first three years of life are a uniquely sensitive period of extraordinary brain and body growth. The cognitive and physical development that takes place at this stage will never occur to the same degree again. Young children in this phase are especially vulnerable to any deficiencies in family resources or well-being.

C-SNAP reported that “babies and toddlers who live in energy insecure households are more likely to: be in poor health; have a history of hospitalization; and be at risk for developmental problems. (C-SNAP).

¹² Under such circumstances, while the resulting bills may be “payable,” they can hardly be said to be “affordable.”

The association between unaffordable home energy and adverse health outcomes is slowly becoming better understood. A 2001 study in the United Kingdom (UK), for example, found that, in the UK, 45,000 more deaths occurred in winter than in summer each year. “For every 1° C fall in temperature below 20° C, mortality increases by between one and two percent in the UK.” (Rudge). According to Rudge:

The widespread perception is that hypothermia causes cold-related deaths, but this accounts for very small numbers of annual deaths. In fact, winter has the greatest proportional effect in respiratory mortality. Cardiovascular disease accounts for the greatest number of excess winter deaths and 10% of these are attributable to cold, independently of other factors.

* * *

Circulatory illness, or cardiovascular disease, is exacerbated by ‘cold stress,’ which results from fluctuations in temperature. This can arise from . . .moving between warm and cold rooms indoors. If the fuel poor can only afford to keep one room heated, the risk of cold stress in the home is increased. This affects older people in particular, whose blood pressure is likely to be raised in the winter. Furthermore, moving from a cold dwelling to the cold outside produces greater cardiovascular strain than going out from a warm house.

These adverse health outcomes not only create social consequences, but they also impose substantial economic costs. “Although these costs are often difficult to measure, one example is the substantial cost of preventable hospitalizations, borne by low-income families, payers, and health care providers.” (Child Health Impact Working Group). Nationwide, the average charge for a “general pediatric hospitalization” was \$9,945 in 2006. The average hospitalization charge for bronchitis and asthma was \$7,386. “These economic costs are 5 to 8 times the average cost of heating a home in the Northeast and 7 to 10 times the maximum home heating benefit from the LIHEAP program in 2006.” (Child Health Impact Working Group).

Aside from the direct cost of hospitalization, cold-induced illnesses contribute to prolonged convalescence and home care, as well as substantial increases in the number of visits to general practitioners. One study in the United Kingdom estimated that it costs the UK’s National Health Service (NHS) £1 billion a year (roughly \$2 billion--RDC) “to treat illnesses caused by living in cold, damp conditions.” (Boardman). The pharmaceutical costs for medication are in addition to this.

THE IOWA RESULTS

The unaffordability of home heating service in Iowa poses a significant public health issue. Adverse health outcomes arise both when households face the loss of their home heating due to an inability to pay and when households face energy emergencies, whether or not such emergencies are associated with the actual involuntary termination of access to heating service. The adverse health outcomes are found in Iowa’s residential population as a whole, as well as in

its low-income population in particular. Finally, Iowa residents facing energy emergencies, both low-income and non-low-income, disproportionately face self-efficacy problems that are likely to impede their ability to protect themselves in times of an energy-related health emergency.

Disproportionate Association with Households in Poor Health.

There is a significant overlap between households facing poor health and households facing utility bill affordability problems. The recent BRFSS study documents that Iowans with “fair” or “poor” health¹³ are significantly over-represented among households reporting a disconnection of service for nonpayment. While 15% of all Iowa households had a person with “fair” or “poor” health, 40% of households with a disconnection for nonpayment had fair or poor health.

The bad health reported by these Iowa households can substantively interfere with the way Iowa residents carry on their normal activities of daily living. While 10% of all Iowa households had a person whose bad physical health interfered with their normal activities 15 or more out of the preceding 30 days, 31% of households who lost their utility service to a disconnection for nonpayment had bad physical health that interfered with their normal activities in 15 or more days.

One physical health issue particularly associated with utility shutoffs is the presence of pain sufficient to make it difficult for an individual to carry out normal daily activities. While 10% of all households had a person whose pain made it difficult to engage in normal activities, 31% of households experiencing a disconnection of heating service for nonpayment experienced such pain.

Persons experiencing the disconnection of service often face substantial limitations on their daily activities due to physical, emotional or mental problems. While 21% of all Iowans live with limitations associated with physical, mental or emotional problems, 49% of households experiencing a disconnection of service live with such a limitation.

¹³ Continuum is excellent, good, fair, poor.

Table 1: The Association of Home Heating Disconnections and Home Energy Emergencies with Adverse Health Outcomes (Iowa)

	Total Population	Experienced	
		Disconnection for Nonpayment /a/	Home Energy Emergency /b/
Fair or poor health	15%	40%	41%
Poor physical health in 15+ days	10%	31%	31%
Pain limits ability to engage in daily activities	10%	31%	30%
Daily activities limited by physical, mental or emotional problems	21%	49%	46%

NOTES:

/a/ The “disconnection” of service includes the inability to obtain refills of bulk fuels, such as fuel oil, propane, or Liquefied Petroleum Gas (LPG).

/b/ A “home energy emergency” includes either the disconnection for nonpayment or the household reporting that they maintain home temperatures at what they considered to be an unsafe or unhealthy temperature because of an inability to pay the home energy bill.

SOURCE: Iowa BRFSS, 2007

The disparities in the impacts of home energy unaffordability are evident, also, when one broadens the definition of a home energy emergency beyond the disconnection of heating service for nonpayment. A second inquiry examined the extent to which Iowa households reported experiencing either a disconnection for nonpayment or reported keeping their home at a temperature that they considered to be either unsafe or unhealthy in “some” or “nearly every” month because they could not afford to pay their home energy bills. This either/or situation is referred to as a “home energy emergency.”

Even though the number of households experiencing a home energy emergency was larger than the number of households having only a disconnection of service for nonpayment—a household reporting a home energy emergency may, but need not have, experienced both a disconnection and the maintenance of unsafe or unhealthy temperatures—the percentage of households in emergency experiencing adverse health outcomes remained relatively constant.

- While 15% of the total population reported having either “fair” or “poor” health, 41% of the population with a home energy emergency did;
- While 10% of the total population reported having bad physical health that interfered with their daily activities in 15 or more of the immediately preceding 30 days, 31% of the population with a home energy emergency did;
- While 10% of the total population reported that their normal activities of daily living were limited in some respect due to pain, 30% of the population with a home energy emergency did;

- While 21% of the total population reported that their normal daily activities were limited due to physical, mental or emotional health problems, 46% of the population with a home energy emergency did.

Layering Poverty Level Data on Top of Health Data.

The disproportionate adverse impacts on households with health problems do not change if one controls for the Poverty Level at which a household lives. If anything, the degree of the disproportionate impact deepens when taking low-income status into account. For households with income at or below 150% of the Federal Poverty Level (FPL), there is a statistically significant greater proportion of disconnected households that include persons having bad physical health problems in 15 or more of the immediately preceding 30 days or that have persons who experience limitations on their normal daily activities due to physical, mental or emotional health problems. The differences between all households with income below 150% of FPL and households with service disconnections for nonpayment with income below 150% of FPL are not statistically significant for either households with persons in “fair” or “poor” health or for households which include a person for whom pain impedes their normal daily activities.

The data shows that for households with income below 150% of the Federal Poverty Level:

- While 32% of all households report fair or poor health, 45% of all disconnected households report fair or poor health (not statistically significant at 0.05).
- While 20% of all households report bad physical health that impeded their daily activities in 15 or more of the immediate preceding 30 days, 38% of disconnected households reported such physical health problems.
- While 19% of all households reported that pain impeded their normal daily activities, 35% of disconnected households reported such problems with pain (not statistically significant at 0.05).
- While 34% of all households reported that their normal daily activities are impeded by physical, mental or emotional problems, 56% of disconnected households reported such health impediments.

Table 2: The Association of Home Heating Disconnections and Home Energy Emergencies for Households with Income at or below 150% of the Federal Poverty Level with Adverse Health Outcomes (Iowa)

	Total Population	Experienced	
		Disconnection for Nonpayment /a/	Home Energy Emergency /b/
Fair or poor health	32%	n/a /c/	55%
Poor physical health in 15+ days	20%	38%	45%
Pain limits ability to engage in daily activities	19%	n/a /c/	n/a /c/
Daily activities limited by physical, mental or emotional problems	34%	56%	58%

NOTES:

/a/ The “disconnection” of service includes the inability to obtain refills of bulk fuels, such as fuel oil, propane, or Liquefied Petroleum Gas (LPG).

/b/ A “home energy emergency” includes either the disconnection for nonpayment or the household reporting that they maintain home temperatures at what they considered to be an unsafe or unhealthy temperature because of an inability to pay the home energy bill.

/c/ The overall BRFSS sample size was not sufficiently large to allow an adequate sample size to be drawn from which to draw conclusions with this set of characteristics.

SOURCE: Iowa BRFSS, 2007

As with the residential population as a whole, while the absolute numbers get bigger when considering home energy emergencies rather than simply the disconnection of service for nonpayment –there are more households that face a home energy emergency than face the actual loss of heating service due to nonpayment—the relationship remain the same. The only difference is that a sufficiently large number of Iowa households with income at or below 150% of FPL faced a home energy emergency that it could be determined that a statistically significant greater proportion were in fair or poor health than was true for the residential population as a whole with income at or below 150% of FPL. More than half of low-income households facing either a disconnection for nonpayment or a home energy emergency (as defined above) were in either “fair” or “poor” health. Nearly six out of every ten low-income households in an energy emergency were limited in their normal daily activities by physical, mental or emotional health problems. Not quite half of low-income households facing a home energy emergency had been limited in their daily activities for 15 or more days in the immediately preceding 30 days.

Self-Efficacy and Self-Advocacy Regarding Home Energy Emergencies

One of the most disturbing findings from the Iowa BRFSS data involves the household medical conditions that impede the ability of a household facing either the disconnection of service for nonpayment, or a home energy emergency (as defined above), to advocate on his or her own behalf. Much of the regulatory infrastructure designed to prevent the loss of home energy service is predicated on the assumption that households facing the loss of service, as well as

households facing the unaffordability of service, are both willing and able to respond to their home energy situation through advocacy on their own behalf.

The assumption of such self-advocacy underlies any number of regulatory structures and processes. Customers in arrears are expected to call the utility and to negotiate a deferred payment plan. Customers facing the disconnection of service are expected to inquire into available sources of public and/or private energy assistance in order to negotiate financial aid to prevent a pending loss of service due to nonpayment. Customers who have lost their service are expected to contact the utility and negotiate a reconnection and repayment schedule for the underlying arrears. Customers who have technological power constraints, such as service limiter adapters, are expected to determine the cause of the disconnection of service and to contact the utility to negotiate their reconnection. If identifiable medical conditions impede the ability of households to perform these tasks, however, much of the regulatory “protection” structure designed to allow a household response to energy emergencies is ineffective.

The Iowa BRFSS data documents that a substantial minority of households facing the disconnection of service for nonpayment, or a home energy emergency, face medical issues that may well impede their ability to respond to the home energy crisis situation. The Iowa BRFSS survey included four questions relevant to self-efficacy:

- During the past 30 days, about how often did you feel hopeless — all of the time, most of the time, some of the time, a little of the time, or none of the time?
- During the past 30 days, about how often did you feel so depressed that nothing could cheer you up—all of the time, most of the time, some of the time, a little of the time, or none of the time?
- During the past 30 days, about how often did you feel that everything was an effort—all of the time, most of the time, some of the time, a little of the time, or none of the time?
- During the past 30 days, about how often did you feel worthless-- all of the time, most of the time, some of the time, a little of the time, or none of the time?

Compared to the total population, more than twice as many households experiencing a home energy emergency reported at least one of these self-efficacy conditions that impede the ability of the household to advocate on one’s own behalf. While one-in-five Iowa households reported such a condition some, most or all of the time, more than half of households experiencing an energy emergency reported such conditions.

Of particular importance was the prevalence of feeling “worthless” or “hopeless.” A household feeling “worthless” or “hopeless” can not reasonably be expected to negotiate on their own behalf, particularly when faced with an energy emergency situation. In the best of circumstances, the balance of power in transactions between a customer and a utility lies with the utility. A feeling of “worthlessness” or “hopelessness” on the part of the payment-troubled

customer exacerbates that imbalance. Nonetheless, more than three times as many persons experiencing a disconnection, and nearly four times as many persons facing an energy emergency, reported feeling “hopeless” or “worthless” either some, most or all of the time, when compared to the population as a whole.

Table 3: The Association of Utility Service Disconnections or Home Energy Emergencies and Living with Lack of Self-Efficacy—All Households (Iowa)

	Total Population	Experienced	
		Disconnection for Nonpayment /a/	Home Energy Emergency /b/
Emotions (some/most/all): hopeless, depressed, everything effort, worthless	21%	56%	54%
Emotions (most/all): hopeless, depressed, everything effort, worthless	7%	--- /c/	27%
Feel hopeless/worthless: some/most/all	11%	36%	37%

NOTES:

/a/ The “disconnection” of service includes the inability to obtain refills of bulk fuels, such as fuel oil, propane, or Liquefied Petroleum Gas (LPG).

/b/ A “home energy emergency” includes either the disconnection for nonpayment or the household reporting that they maintain home temperatures at what they considered to be an unsafe or unhealthy temperature because of an inability to pay the home energy bill.

/c/ Insufficient sample size.

SOURCE: Iowa BRFSS, 2007

The lack of self-efficacy was even more prevalent in the low-income population facing a home energy emergency in Iowa. Nearly 70% of households facing a disconnection of heating service, or a home energy emergency, reported feeling hopeless, depressed, or worthless, or that everything was an effort, either some, most or all of the time, as compared to 36% in the total low-income population. More than twice as many low-income households facing either a service disconnection, or a home energy emergency, reported feeling either “hopeless” or “worthless” as compared to the low-income population as a whole.

Table 4: The Association of Utility Service Disconnections and Living with Lack of Self-Efficacy Households Below 150% Federal Poverty Level (Iowa)

	Total Population	Experienced	
		Disconnection for Nonpayment /a/	Home Energy Emergency /b/
Emotions (some/most/all): hopeless, depressed, everything effort, worthless	36%	69%	68%
Emotions (most/all): hopeless, depressed, everything effort, worthless	18%	50%	35%
Feel hopeless/worthless: some/most/all	22%	49%	47%

NOTES:

/a/ The “disconnection” of service includes the inability to obtain refills of bulk fuels, such as fuel oil, propane, or Liquefied Petroleum Gas (LPG).

/b/ A “home energy emergency” includes either the disconnection for nonpayment or the household reporting that they maintain home temperatures at what they considered to be an unsafe or unhealthy temperature because of an inability to pay the home energy bill.

SOURCE: Iowa BRFSS, 2007

The Iowa BRFSS documents the problems with self-efficacy that impede the ability of households to respond to an actual or imminent energy crisis situation. The need to account for the self-efficacy of the resident is a recognized fundamental component of a theory of individual actions that would promote public health and safety.¹⁴ One specific public health model has found that factors contributing to people taking action to improve their health outcomes include, but are not limited to, whether the individuals:

- Believe taking action would reduce their susceptibility to the condition or its severity;
- Believe the costs of taking action are outweighed by the benefits; and
- Are confident in their ability to successfully perform an action.

The Iowa BRFSS data supports the conclusion that the lack of one or more of these factors may well contribute to the emergence of home energy emergencies as a serious public health problem in Iowa. A person who feels “hopeless” some, most or all of the time may well not believe that actions designed to resolve a utility shutoff or home energy emergency would be effective. A person who feels “worthless” some, most or all of the time may well not believe in their ability to successfully take action to resolve a disconnection or home energy emergency. A person who feels depressed, or that everything is an effort, may not believe that the actions needed to resolve the disconnection or home energy emergency will succeed, or will be sufficient to be worth the effort.

¹⁴ Rimer, B. and Karne Glanz (Spring 2005). Theory at a Glance: A Guide for Health Promotion Practice (2d edition), U.S. Department of Health and Human Services, National Institutes of Health: Washington D.C.

Regulatory responses to home heating disconnections, as well as to home energy emergencies, should be constructed to reasonably allow for an opportunity for their exercise and success. For such an opportunity to occur, as with other public health responses, the required individual action must take into account all aspects of the individual’s personal and social environment. Home heating disconnections, and home energy emergencies, giving rise to serious public health consequences should not be surprising in light of the issues of self-efficacy identified by the Iowa BRFSS.

The Public Costs of Resulting Medical Problems.

Households who either faced the disconnection of home heating service or experienced a home energy emergency are less likely to be able to pay for their health care costs out of their own household resources. Between one-fifth and one-quarter of the total population (irrespective of income) facing either a home heating disconnection, or an energy emergency, lacked access to any type of health care coverage. The lack of access to health care coverage was between 2.5 and 3.0 times greater in the population facing energy problems than in the population as a whole.

More than one-third of the total population reporting an energy problem (home heating disconnection or home energy emergency) also reported that they had not sought the care of a doctor when needed because they could not afford it. The rate at which households facing either a home heating disconnection or home energy emergency could not afford medical care was between 4.0 and 5.0 times higher than in the general population.

Table 5: The Association of Utility Service Disconnections and Energy Emergencies With Households Lacking Financial Resources to Seek Medical Care (Iowa)

	Total Population			At or Below 150% of Federal Poverty		
	All	Disconnection for Nonpayment /a/	Home Energy Emergency /b/	All	Disconnection for Nonpayment /a/	Reported Energy Emergency /b/
Did not seek doctor’s care when sick because of cost	8%	34%	36%	20%	43%	44%
Lacked access to health insurance coverage	8%	24%	21%	20%	36%	34%

NOTES:

/a/ The “disconnection” of service includes the inability to obtain refills of bulk fuels, such as fuel oil, propane, or Liquefied Petroleum Gas (LPG).

/b/ A “home energy emergency” includes either the disconnection for nonpayment or the household reporting that they maintain home temperatures at what they considered to be an unsafe or unhealthy temperature because of an inability to pay the home energy bill.

SOURCE: Iowa BRFSS, 2007

While the disparity between the total low-income population and the low-income population facing energy problems is less than for the population as a whole, the rate at which low-income

households cannot afford medical care, or do not have health care insurance coverage, is higher. Between 30% and 40% of low-income households facing an energy emergency lack health care coverage also. Between 40% and 50% reported not seeking a doctor's care when needed because they could not afford to do so.

This lack of health care access is disturbing because of the association of energy problems and physical health problems. As Table 1 documents, three times as many households in the general population facing an energy emergency, or a disconnection of home heating service, reported poor physical health in 15 or more of the 30 days preceding the BRFSS survey. Nearly three times more reported being in either fair or poor health generally as compared to the overall population. Again, when limited to low-income households, the disparity between the total population and that population experiencing either a home heating disconnection or an energy emergency was less. The lower disparity in the low-income population, however, can be attributed to the lack of medical care affordability in the low-income population as a whole. The rate at which households faced a home heating disconnection, or a home energy emergency, also experienced fair or poor health approached or exceeded 50%.

FINDINGS AND CONCLUSIONS

There has historically been a documented relationship between the unaffordability of home energy and adverse health outcomes in specific populations. Research in the United States has reported “significant associations between not receiving LIHEAP and important health and growth indicators.” (Child Health Impact Working Group). For example, “young children not receiving LIHEAP were 30% more likely to be admitted to the hospital.” A study of predominantly low-income children reports that “babies and toddlers who live in energy insecure households are more likely to: be in poor health; have a history of hospitalization; and be at risk for developmental problems. (C-SNAP).

In contrast, research in the United Kingdom has documented the relationship between home energy unaffordability and health outcomes for the aged. One study reports that “circulatory illness, or cardiovascular disease, is exacerbated by ‘cold stress,’ which results from fluctuations in temperature. . . If the fuel poor can only afford to keep one room heated, the risk of cold stress in the home is increased. This affects older people in particular, whose blood pressure is likely to be raised in the winter.” British research has found that for every 1° C fall in temperature below 20° C, mortality increases by between one and two percent in the UK.

Quite apart from the social impacts of these health outcomes are the fiscal impacts to society as a whole, and to government. United States research finds that these costs arise in the form of “the substantial cost of preventable hospitalizations,” whether borne by the low-income families themselves, the insurance payers, uncompensated health care providers, or the government. The costs of prescription drugs must be layered on top of these. In addition to the direct cost of hospitalization and pharmaceuticals, cold-induced illnesses contribute to longer periods of convalescence and home care than would otherwise be necessary, as well as substantial increases in the number of visits to general practitioners. One study in the United Kingdom estimated that

it costs the UK's National Health Service (NHS) £1 billion a year “to treat illnesses caused by living in cold, damp conditions.” (Boardman).

The Iowa BRFSS extends the results of these previous studies in two ways. First, the Iowa study examines data for the population as a whole rather than for specific vulnerable populations. Within the total population irrespective of income, between two and three times more Iowa households facing a home heating disconnection or home energy emergency also experienced prolonged periods of poor physical health, or either fair or poor health generally than in the population as a whole. More than 50% of low-income households (defined to be households with income at or below 150% of the Federal Poverty Level) who faced a home energy emergency reported fair or poor health generally. Within the low-income population, nearly 40% of households experiencing a home heating service disconnection, and 45% of those facing a home energy emergency, reported extended periods of poor physical health.

The economic costs of these adverse health outcomes are likely to be borne by society, by the health care industry, or by government assistance. More than one-third of low-income households facing a home heating disconnection or home energy emergency lacked access to health care coverage. Between 40% and 50% of low-income households facing either such energy problems (a home heating disconnection, a home energy emergency) reported not seeking a doctor's care when needed because they could not afford to do so.

While unaffordable home energy poses public health problems to particular vulnerable populations, in Iowa, home energy unaffordability poses public health problems to the broader population as a whole as well. The unaffordability of home energy should be treated as the public health issue that it is. Continuing data collection on the public health outcomes associated with home energy unaffordability is merited, including an expansion of state-added data collection modules into the BRFSS surveys in individual states and the expansion of home energy questions in the CDC core modules.

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**FREQUENTLY ASKED QUESTIONS REGARDING
ADDING HOME ENERGY-RELATED MODULE
TO A STATE BRFSS SURVEY**

QUESTION #1: What specific action needs to be requested to add home energy-related questions to a state BRFSS?

Response #1: A state's basic Behavioral Risk Factor Surveillance System (BRFSS) survey consists of a set of "core" modules prescribed by the U.S. Centers for Disease Control and Prevention. To add questions on home energy unaffordability, a request needs to be made to append a state-added module of questions. Using such additional questions is not uncommon. A state is free to add specific modules on public health issues in which the state has a particular interest.

QUESTION #2: To what agency should a request be made to add home energy-related questions to a state BRFSS?

Response #2: A request to add a supplemental module to the state BRFSS survey should be directed to the agency that administers the BRFSS at the state level. This agency is likely to be the State Department of Public Health. The name of the state agency administering BRFSS can be obtained from the U.S. Centers for Disease Control and Prevention.

QUESTION #3: From whom would a request appropriately come to add home energy-related questions to a state BRFSS?

Response #3: A request to add home energy-related questions to the state BRFSS should come from a state agency. Agencies interested in the public health consequences of unaffordable energy might include the state public assistance office, the state housing agency, the state LIHEAP agency, the state Weatherization agency, or related agencies.

QUESTION #4: At what point in the BRFSS process should a request be made add home energy-related questions to a state BRFSS?

Response #4: Most states have an application process at which time a proposal to add a state module on home energy should be submitted. The application process begins early in the year *preceding* the year in which the state-added module is incorporated into the BRFSS survey. For the 2007 Iowa BRFSS, a proposal was submitted in 2006. A renewed request would need to be submitted each year to ensure that the state-added home energy module is retained in the BRFSS.

QUESTION #5: From what source might potential model questions be obtained to use in a state-added home energy-related module of BRFSS?

Response #5: The home energy-related questions used in the Iowa BRFSS survey are contained in the narrative of this publication. In addition, the complete state BRFSS surveys for each state, including the state-added modules, can be obtained from the U.S. Centers for Disease Control and Prevention. The Iowa BRFSS survey questions were modeled after the Home Energy Insecurity Scale developed for the U.S. Department of Health and Human Services, Administration for Children and Families, Bureau of Home Energy Assistance (the federal agency administering LIHEAP).

QUESTION #6: Does the requesting agency need to pay for the addition of home energy-related questions to a state BRFSS?

Response #6: It is likely that the state Department of Public Health will request the agency seeking to add home energy-related questions to the state BRFSS to pay for the incremental costs associated with the additional questions. The Iowa Department of Human Rights, which administers LIHEAP in Iowa, made a payment of \$1,500 per question from its LIHEAP leveraging funds.

QUESTION #7: Who might do the data analysis of the specific data collected through a state BRFSS survey?

Response #7: Simply because a state Department of Public Health agrees to add home energy-related questions to the BRFSS survey does not mean that the Department of Public Health will perform the analysis of the data generated through the BRFSS survey. The BRFSS data, however, is public information and will be made available to the state LIHEAP office, or some other state agency, who may select an in-house staffperson, or an independent third party, to perform the data analysis. The Iowa LIHEAP office used LIHEAP leveraging funds to retain an independent third party to perform the analysis.

QUESTION #8: How often can home energy-related questions be added to a state BRFSS?

Response #8: The BRFSS survey is administered annually. To retain the home energy-related questions on the BRFSS, an annual request would be necessary to either retain the same questions, or to administer different home energy-related questions as part of the BRFSS.

QUESTION #9: What is the rationale for adding home energy-related questions to a public health survey such as a state BRFSS?

Response #9: Unaffordable home energy is not simply a utility regulatory issue. Unaffordable home energy has documented public health and safety consequences. In order to identify, and to quantify, those consequences, adding a state-module to BRFSS relating to home energy is particularly appropriate. The objective of adding a home energy-related question to BRFSS is for state officials, and others, to acknowledge the relationship between unaffordable home energy and public health and safety.