

Cold homes in winter: consequences for health and for LIHEAP

Lynne Page Snyder, Ph.D., MPH
Senior Public Health Advisor, DC REACH
Energy Programs Consortium
<http://www.energyprograms.org>
Phone (202) 246-5817
Email: lsnyder@energyprograms.org

Overview of remarks

- Health effects in winter (old knowledge and new); counterpart to Luber talk
- Needs for new data and research
- Implications of new knowledge about health effects for LIHEAP planning, implementation, and evaluation

Biology basics

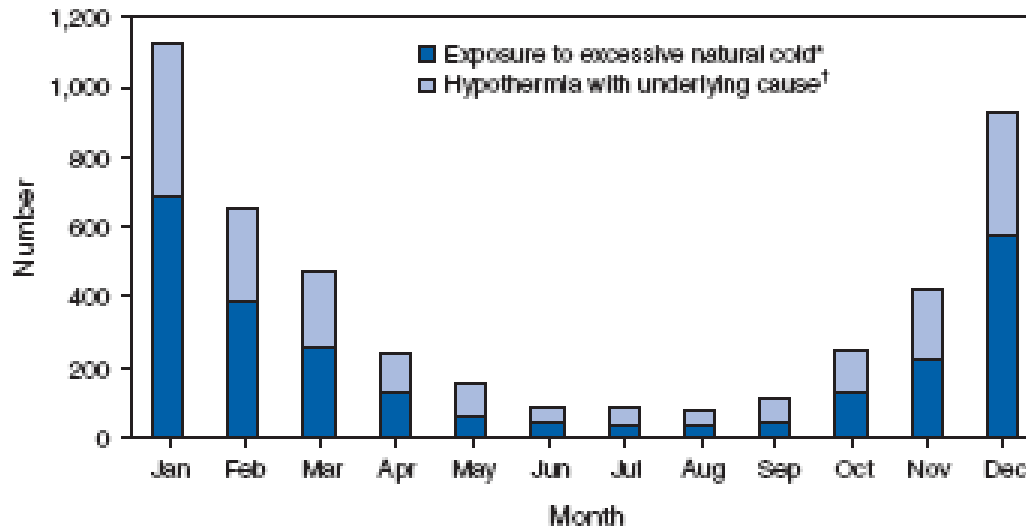
- Brain (hypothalamus) balances internal and external temperatures
- Changes in blood circulation to dissipate external heat or preserve body temperature
- Outcomes: heart disease, lung disease, death
- Age, disease, Rx affect body's ability to respond to temperature changes

Premature or excess deaths

- Compare change in mortality rate (deaths per hundred thousand population) with changes in outdoor temperature
- Acclimatization
- “U”-shaped mortality curve

Rough estimate of deaths related to cold exposure

FIGURE 1. Number of hypothermia-related deaths, by month — United States, 1999–2002



*2,622 deaths identified by code X31 of the *International Classification of Diseases, Tenth Revision* (ICD-10).

†1,985 deaths with underlying causes of death other than exposure to excessive natural cold (e.g., falls, atherosclerotic cardiovascular disease, or drowning) identified by ICD-10 code T68.

Source: Murphy et al., 2006.

Key studies (mortality): 1970s

- Bull and Morton (1978): for seniors, high and low temperatures mean higher risks of death from heart attack, stroke, pneumonia, and bronchitis
- Rogot and Padgett (1976): for U.S. urban population, fewest deaths when temps in 60s and 70s F (areas with snowfall) through 80s F (warmer regions)

British and European leadership

- Estimated 40,000 excess deaths in winter (United Kingdom)
- Fuel poverty: household spends >10 percent of income on fuel
- 1991 commitment to eliminate fuel poverty; weatherization and subsidies

British/European studies

- self-reported health status declines with cold homes (Healy, 2004)
- premature cardiovascular deaths for seniors associated with cold homes (Wilkinson et al., 2004)
- premature winter deaths for middle-aged and seniors associated with cold living rooms and bedrooms in evening (Eurowinter Group, 1997)
- comparing UK and US, mixed evidence on whether poverty (SES) amplifies the effect of cold weather on health (Hajat et al., 2007); hard to compare b/c of differences in housing stock and health care systems

Difficulties proving cause and effect

- Outdoor temperature as proxy for indoor
- No uniform definitions of heat- and cold-related deaths
- Lack of reporting for morbidity (effects other than death)

proposed model: direct cause

- Living in unheated or inadequately heated home (cold exposure)
- Using unsafe means to heat/light (oven/stovetop, toaster oven, BBQ grill, open flame)

proposed model: indirect cause

“heat/cool or eat,” aka hard choices, given tight constraints on household budget

- Children: in northern states, poor families with children spend less on food, and children have lower caloric intake during winter months, compared with higher-income families (Bhattacharya et al., 2002)
- Children: less likely to be at risk for growth problems and less likely to need hospital admission the day of a health care visit (Frank et al., 2006)
- Seniors: in northern states, more likely to go hungry in late winter/early spring; in southern states, more likely to go hungry in summer (Nord & Kantor, 2003)

Similar hard choices made for purchase of Rx or health care?

- Hypothesized, based on anecdotal accounts
- Similarities/differences from food tradeoff
 - how need is defined
 - Safety net arrangements for food vs. safety net arrangements for health care

What the CDC recommends

- Keep indoor temperature at 60 degrees F or higher during winter heating season
- Public education about links between residential energy use and health
- Emergency planning: monitoring of vulnerable populations (homebound, homeless), transportation to warming shelters

Source: Murphy et al., 2006.

New policy context for LIHEAP

- New knowledge of adverse health effects
- Changes since early 1980s in population needs (demographics)
- Changes since early 1980s in health policy (how public health considers housing issues, health care financing)

For poor people as a population, changes since the early 1980s

- mortality rates continue to decline, while number of persons with chronic diseases (and taking Rx for same) grows; implication for LIHEAP where disease management involves Rx that sensitizes to temperature changes, example of Parkinson's disease
- Shortening of hospital stays and new medical devices mean medically fragile persons more likely to be cared for at home (low-birth weight newborns, persons with disabling conditions)
- Trend away from nursing homes and assisted-living facilities for seniors; Medicaid home- and community-based care provides services to care for seniors and physically disabled in their homes
- Emphasis on regular access to primary care means more likely to have an interaction with health care system and case manager

Health policy changes since 1981

- Delinking of Medicaid from welfare
- Healthy People planning process includes housing and health (asbestos, radon, lead paint, mold/mildew, ventilation, land use) but not temperature
- Environmental justice movement
- Commitment to monitoring and eradicating health disparities, esp racial/ethnic and socioeconomic

Implications for LIHEAP?

- Program and services integration with Medicaid; example of home- and community-based waivers
- Program and services integration with other public benefits: food stamps (Ohio, Massachusetts)
- Linkage to weatherization even more important, given potential to improve health status

Where are the data to include health in needs assessment and program evaluation?

- Shortcomings of existing national databases: RECs, CPS, SIPP
- localities and states may add questions about affordable energy to existing sample surveys
 - CDC's Behavioral Risk Factor Surveillance Survey: emphasis on health-related perceptions, beliefs, and reported behaviors
 - CDC's Environmental Public Health Tracking Project; Chronic Disease Indicators Project

Where are the data? continued

Possible measures or proxy indicators:

- Carbon monoxide poisonings
- Residential fire injuries (smoke inhalation, burns) and deaths attributable to utility shutoffs
- Ambulance runs and potentially avoidable hospitalizations for cold-sensitive conditions, for example, hypothermia, hospitalization for heart attack when outside temperature below specified threshold (Billings, 2003); costs to Medicaid and/or Medicare for treatment of same
- Days of work or school missed due to illness
- question(s) from Energy Insecurity Scale, modeled on food insecurity scale (Colton, 2003)
- question(s) from DOE's evaluation plan for weatherization program: perceptions of household safety and of household's effects on health, measure of home humidity (Schweitzer & Tonn, 2002)

Where can we look to document connections between affordable energy and health?

- Evaluations of LIHEAP and related energy assistance programs
- Rent court (tenants facing eviction due to unpaid bills, connection with high medical expenditures)
- Food stamp programs (information on utility bills, rent, and other monthly household expenses collected)
- Health care delivery sites (hospitals, clinics collect patient data and generate information about expenditures)
- Subsidized and public housing where tenants eligible for LIHEAP

Concluding observations

- LIHEAP predominantly a cold weather program, so showing adverse health effects from inadequately heated homes strengthens case for funding and reorientation of program toward health outcomes; alternatively, growth of population in warmer weather states and influence of global warming press need to demonstrate adverse health effects related to inadequately cooled homes
- More research is needed! Build on existing literature (temperature extremes, deaths) to focus on morbidity (illnesses, disability, malnutrition) and moderate temperature shifts typical of heating and cooling seasons

Concluding observations

- **Needs assessment:**
 - include measures of personal and population health;
 - adequate indoor home temperature (60s degrees F in winter, 70s degrees F in summer) as a program objective
- **Program implementation:**
 - leverage LIHEAP funds through linkage with other health and nutrition programs;
 - target outreach to members of groups at greatest health risk (young, old, chronically ill) early in the season, before funds depleted (Franks et al., 2006)
- **Evaluation:**
 - logic model includes health services providers as participants/stakeholders and includes health-related outcomes;
 - consider health in terms of health status, health-seeking behaviors, health services use, and the cost of health services
 - Expand definition of cost-benefit to include health-related benefits and costs of neglecting health

References

- Bhattacharya J, DeLeire T, Haider S, & Currie J. 2003. Heat or Eat? Cold-Weather Shocks and Nutrition in Poor American Families. *American Journal of Public Health* 93: 1149 - 1154
- Billings J. 2003. Using Administrative Data To Monitor Access, Identify Disparities, and Assess Performance of the Safety Net. Chapter in Agency for Health Research and Quality. *Tools for Monitoring the Health Care Safety Net*. Posted at <http://www.ahrq.gov/data/safetynet/billings.htm> .
- Bull GM, Morton J. 1978. Environment, temperature, and death rates. *Age Ageing* 7: 210-214.
- Centers for Disease Control and Prevention. 2007. *National Environmental Public Health Tracking Project*. Website at <http://www.cdc.gov/nceh/tracking/keepingtrack.htm>
- Child Health Impact Working Group. 2006. *Unhealthy Consequences: Energy Costs and Child Health*. Boston, MA: Medical Legal Partnership For Children. Available at <http://www.mlpforchildren.org/chia.aspx> .
- Colton R. 2003. *Measuring the Outcomes of Low-Income Energy Assistance Programs Through a Home Energy Insecurity Scale*. Washington, DC: US Dept. Health & Human Services. Available at <http://www.acf.hhs.gov/programs/liheap> .

References

- Eurowinter Group (Keatinge WR et al). 1997. Cold exposure and winter mortality from ischemic heart disease, cerebrovascular disease, respiratory disease and all causes in warm and cold regions of Europe. *The Lancet* 349: 1341-1346.
- Frank DA, Neault NB, Skalicky A, Cook JT, Wilson JD, Levenson S, Meyers AF, Heeren T, Cutts DB, Casey PH, Black MM, & Berkowitz C. 2006. Heat or Eat: The Low Income Home Energy Assistance Program and Nutritional and Health Risks Among Children Less Than 3 Years of Age. *Pediatrics* 118: 1293-1302.
- Hajat S, Kovats RS, Lachowycz K. 2007. Heat-related and cold-related deaths in England and Wales: who is at risk? *Occupational and Environmental Medicine* 64: 93-100.
- Healy JD. 2004. *Housing, fuel poverty, and health: a pan-European analysis*. England: Ashgate Publishing.
- Murphy T, Zumwalt R, Fallico F, Hypothermia-related deaths--United States, 1999-2002 and 2005. *MMWR Morbidity and Mortality Weekly Report* 2006 Mar 17;55(10): 282-4.
- National Energy Assistance Directors' Association. 2005. *2005 National Energy Assistance Survey*. Washington, DC: Apprise, Inc. Available at: <http://www.neada.org>

References

- NEADA. 2006. *Background Information on Weather-Related Health Threats*. Available at <http://ww.neada.org> .
- Nord M, Kantor LS. 2006. Seasonal Variation in Food Insecurity is Associated with Heating and Cooling Costs among Low-Income Elderly Americans. *Journal of Nutrition* 136: 2939-2944.
- Power M. 2006. Fuel Poverty in the USA: the overview and the outlook. *Energy Action* No.98. Available at <http://www.nea.org.uk> .
- Rogot E, Padgett SJ. 1976. Associations of coronary and stroke mortality with temperature and snowfall in selected areas of the United States, 1962-1966. *American Journal of Epidemiology* 103: 565-575.
- Schweitzer M, Tonn B. 2002. *Non-energy benefits from the Weatherization Assistance Program: a summary of findings from the recent literature*. ONRL/CON-484. Oak Ridge, TN: Oak Ridge National Laboratory. Available at <http://weatherization.ornl.gov/Publications.htm> .
- Wilkinson P et al. 2004. Vulnerability to winter mortality in elderly people in Britain: population based study. *British Medical Journal* 329 No.7467: 647.