

# Challenging Topics in Cost-effectiveness – Health and Safety Impacts of Low-Income Weatherization

NEEP EM&V Summer  
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# Massachusetts Study: Low-income Weatherization

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## Health and Household-Related Benefits Attributable to the Weatherization Assistance Program



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Massachusetts Special and Cross-Cutting Research Area:  
Low-Income Single-Family Health- and Safety-Related  
Non-Energy Impacts (NEIs) Study

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# Evaluation of Weatherization Assistance Program (WAP)

- National Survey of WAP households
- 2 populations:
  - Treatment: surveyed pre and post weatherization (n = 665)
    - Pre: 2011
    - Post: 2013 (approximately 18 months later)
  - Comparison: surveyed one-year post weatherization; (n = 803)
    - Second point of comparison for treatment group
    - Surveyed in 2011 (one-year post weatherization) and again in 2013
- Massachusetts study:
  - Households from cold climate region
    - Exception: Asthma (national sample)

# Health and Safety Impacts

- Assessed and monetized health and safety impacts:

Health & Safety Impacts	Monetization
Reduced asthma	Avoided medical costs
Reduced thermal stress	Avoided medical costs and deaths
Reduced missed days at work	Reduction in income lost due to illness
Increased home productivity	Higher productivity for housekeeping activities
Reduced carbon monoxide (CO) poisoning	Avoided medical costs and deaths
Reduced home fires	Avoided medical costs for fire-related injuries and avoided deaths

# Survey Findings: Asthma

	Sampled Groups	
	Pre-Wx Treatment (Survey Phase 1)	Post-Wx Treatment (Survey Phase 2)
Asthma Emergency Department	15.8%	4.3%*
Asthma Hospitalization	13.7%	10.6%
Asthma Symptoms < 3 months ago (i.e. high- cost patient)	70.5%	58.7%

\*\*\* p<.001, \*\* p<.01 and \*p<.05



# Survey Findings: Other Health & Safety

	Sampled Groups		
	Pre-Wx Treatment (Survey Phase 1)	Post-Wx Treatment (Survey Phase 2)	Post-Wx Comparison (Survey Phase 1)
Medical Attention – too cold	4.1%	2.6%	1.8%
Medical Attention – too hot	3.8%	1.1%	0.9%*
Missed Days of Work (avg. # days)	10.6	4.1	9.1**
Respondents That Did Not Get Enough Rest or Sleep Previous Month	68%	66%	60%*
Have working CO Monitor	54%	81%***	90%***
Have Smoke Detector	94%	97%	98%***

\*\*\* p<.001, \*\* p<.01 and \*p<.05

# Monetization of Health & Safety Impacts

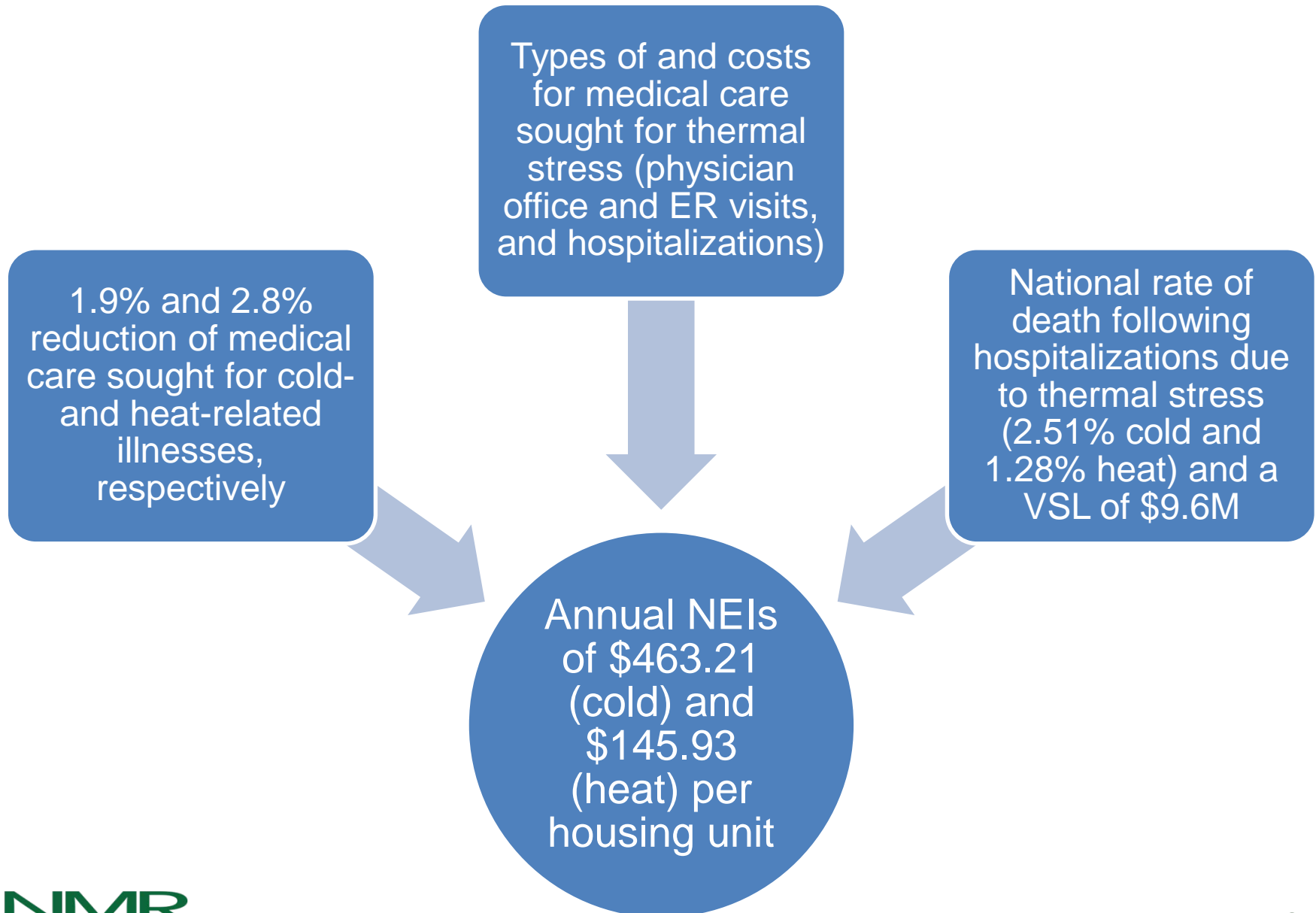
- Combination of survey results, installed measures, medical cost databases, and other secondary data
- Asthma, thermal stress, missed work, home productivity
  - Survey data to document impacts from pre to post weatherization + medical cost databases
    - $[(Pre-Wx Treatment - Post-Wx Treatment) + (Pre-Wx Treatment - Post-Wx Comparison)] / 2$
    - Asthma only: Pre-Wx Treatment - Post-Wx Treatment
- CO poisonings and fire
  - Primarily on secondary data

# Calculated Reductions, Health

	Reduction , Pre-Wx to Post-Wx Treatment	Reduction , Pre-Wx Treatment to Post-Wx Comparison	Average reduction
Medical Attention – too cold	1.5%	2.3%	1.9%
Medical Attention – too hot	2.7%	2.9%	2.8%
Missed Days of Work (avg. # days)	6.5	1.5	4.0
At least one bad day of rest or sleep the previous month	2%	8%	5%
Asthma ED visit	11.5%	N/A	11.5%
Asthma hospitalization	3.1%	N/A	3.1%
Asthma symptoms less than 3 months ago (high-cost patient)	11.8%	N/A	11.8%



# Monetization Example: Thermal Stress



# Estimated NEI Values

NEI Value	Annual Per Unit Benefit				
	Household	Household W/O Avoided Death Benefit	Societal	Total	Total W/O Avoided Death Benefit
Reduced asthma symptoms	\$9.99	\$9.99	\$322.01	\$332.00	\$332.00
Reduced cold-related thermal stress	\$463.21	\$4.67	\$33.73	\$496.94	\$38.40
Reduced heat-related thermal stress	\$145.93	\$8.28	\$27.00	\$172.93	\$35.28
Fewer missed days at work	\$149.45	\$149.45	\$37.36	\$186.81	\$186.81
Reduced CO poisoning (5-year life)	\$36.98	\$0.25	\$1.87	\$38.85	\$2.12
Increased home productivity	\$37.75	\$37.75	\$0	\$37.75	\$37.75
Reduced home fires	\$93.84	\$9.77	\$17.87	\$111.71	\$27.37
<b>Annual Total—per weatherized home</b>	<b>\$937.15</b>	<b>\$220.16</b>	<b>\$421.97</b>	<b>\$1,376.99</b>	<b>\$664.45</b>

# Acknowledgements

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