

1-23-2013

Heat vs. Health: Wood Smoke in Vermont

Michael Cunningham

Avanti Golikeri

Ethan Leveillee

Jennifer Makrides

Hank Ng

See next page for additional authors

Follow this and additional works at: http://scholarworks.uvm.edu/comphp_gallery

 Part of the [Community Health and Preventive Medicine Commons](#), and the [Health Services Research Commons](#)

Recommended Citation

Cunningham, Michael; Golikeri, Avanti; Leveillee, Ethan; Makrides, Jennifer; Ng, Hank; Trang, Janet; Wilkinson, Mark; Hales, Heidi; Hoffman - Contois, Razelle; and Carney, Jan, "Heat vs. Health: Wood Smoke in Vermont" (2013). *Public Health Projects, 2008-present*. Book 93.

http://scholarworks.uvm.edu/comphp_gallery/93

This Article is brought to you for free and open access by the Public Health Projects, University of Vermont College of Medicine at ScholarWorks @ UVM. It has been accepted for inclusion in Public Health Projects, 2008-present by an authorized administrator of ScholarWorks @ UVM. For more information, please contact donna.omalley@uvm.edu.

Authors

Michael Cunningham, Avanti Golikeri, Ethan Leveillee, Jennifer Makrides, Hank Ng, Janet Trang, Mark Wilkinson, Heidi Hales, Razelle Hoffman - Contois, and Jan Carney

Heat vs. Health: Wood Smoke in Vermont

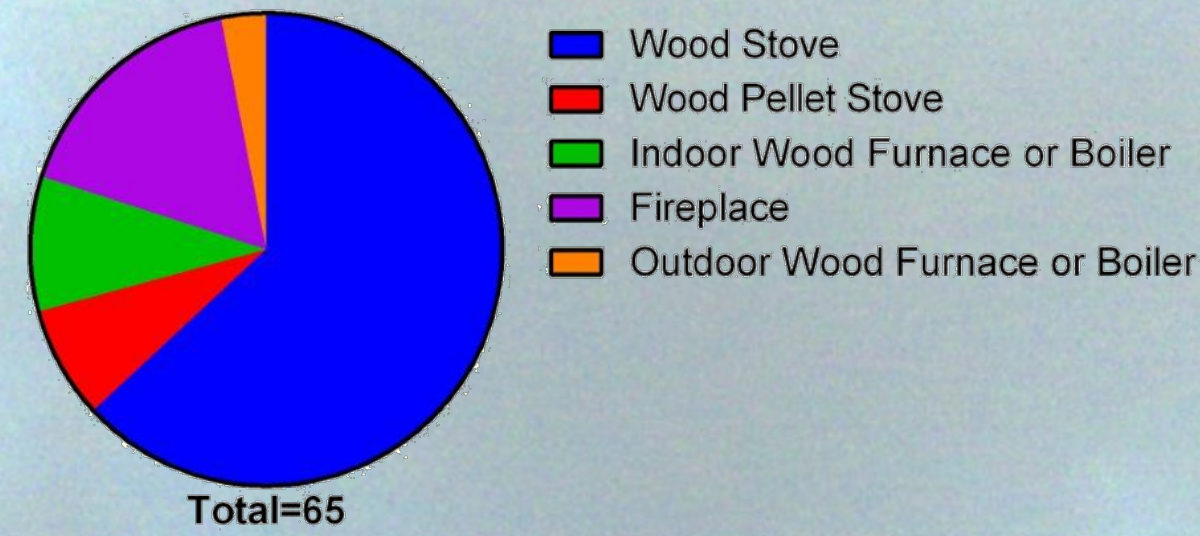
Cunningham, M¹; Golikeri, A¹; Leveillee, E¹; Makrides, J¹; Ng, H¹; Trang, J¹; Wilkison, M¹; Hales, H²; Hoffman-Contois, R³; Carney, J¹

University of Vermont College of Medicine (1); Department of Environmental Conservation (2); Vermont Department of Health (3)

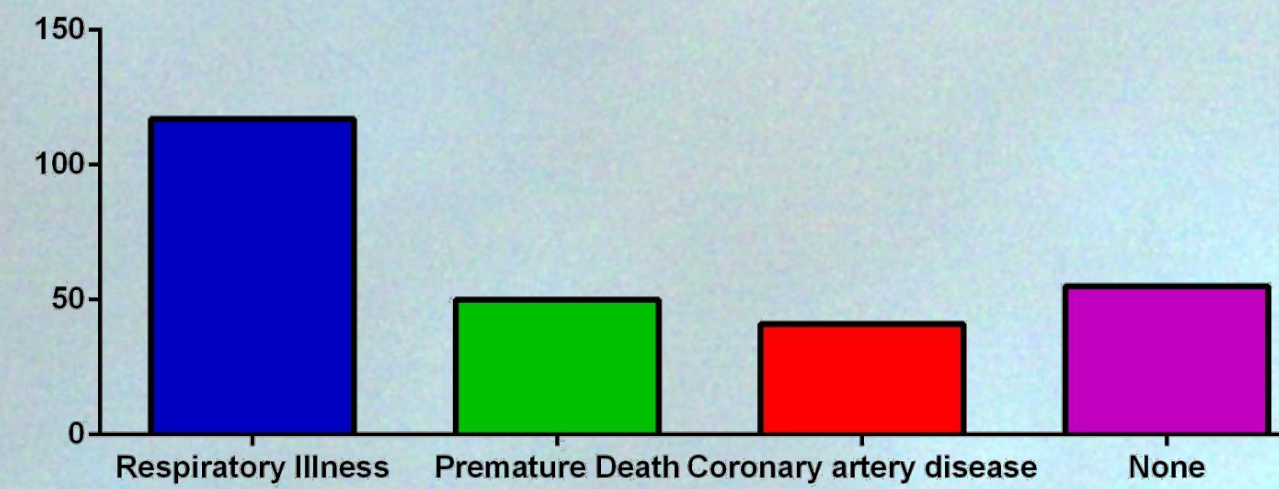
Introduction

- Many Vermonters use wood as a fuel source for heating during the winter months ^{1,2}.
- Wood-heated homes can generate a significant amount of potentially harmful wood smoke ^{3,4}.
- Wood smoke emissions, particularly particles below 2.5 microns, have been associated with respiratory and cardiovascular disease, and subsequent morbidity ⁵⁻⁷.
- There are a variety of wood fuel sources and heating devices that can significantly impact the amount of wood smoke emissions and efficiency of wood burning units ^{8,9}.
- We surveyed the public's knowledge about the health effects of wood smoke, the types and condition of burning appliances used, and fuel sources.
- We assessed public awareness about methods to reduce health risks and the best avenues to provide additional information and resources.

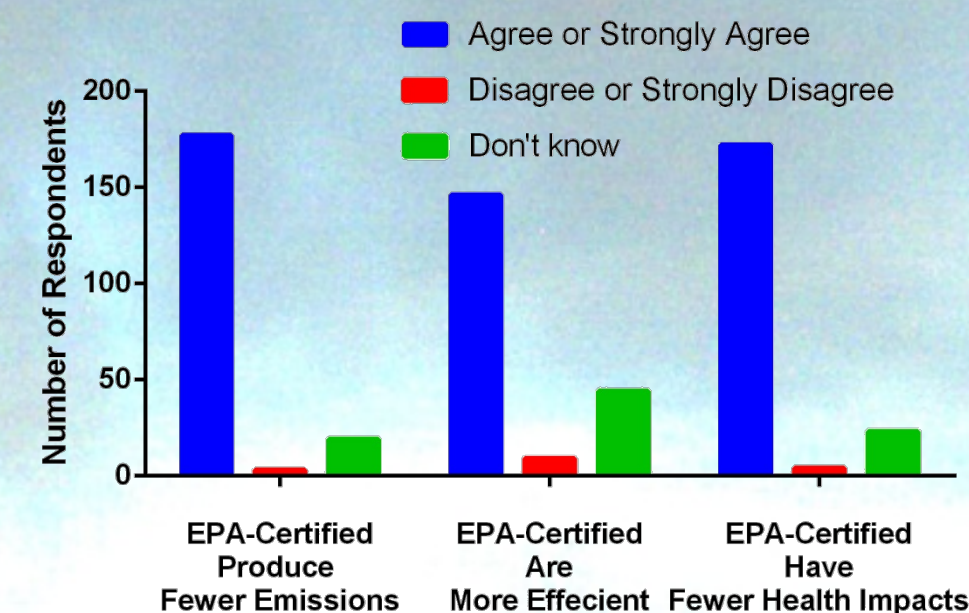
Primary Wood Burning Appliances



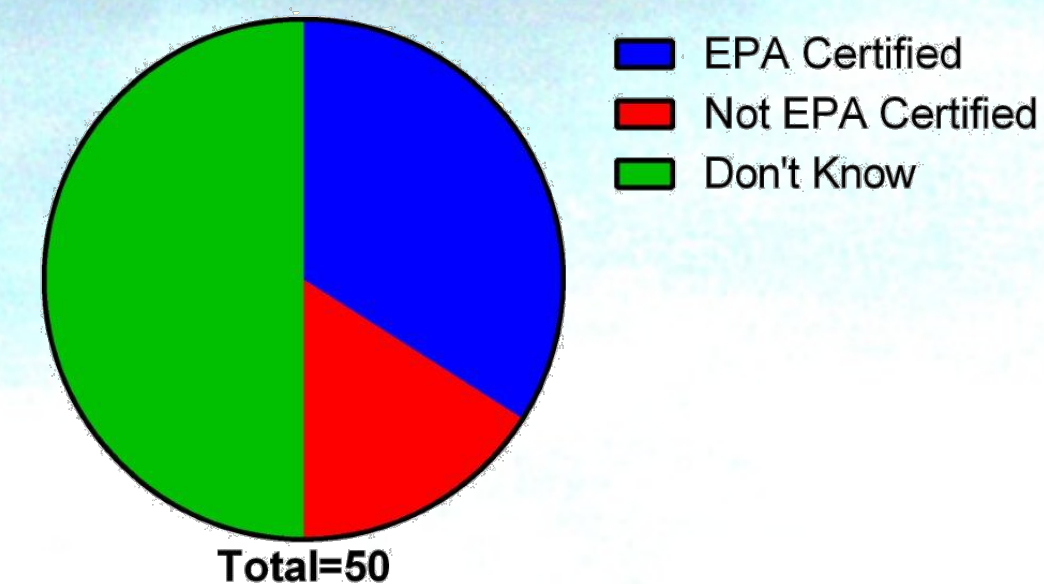
Health Concerns



Beliefs about EPA-certified Stoves



EPA-certified Stove Status



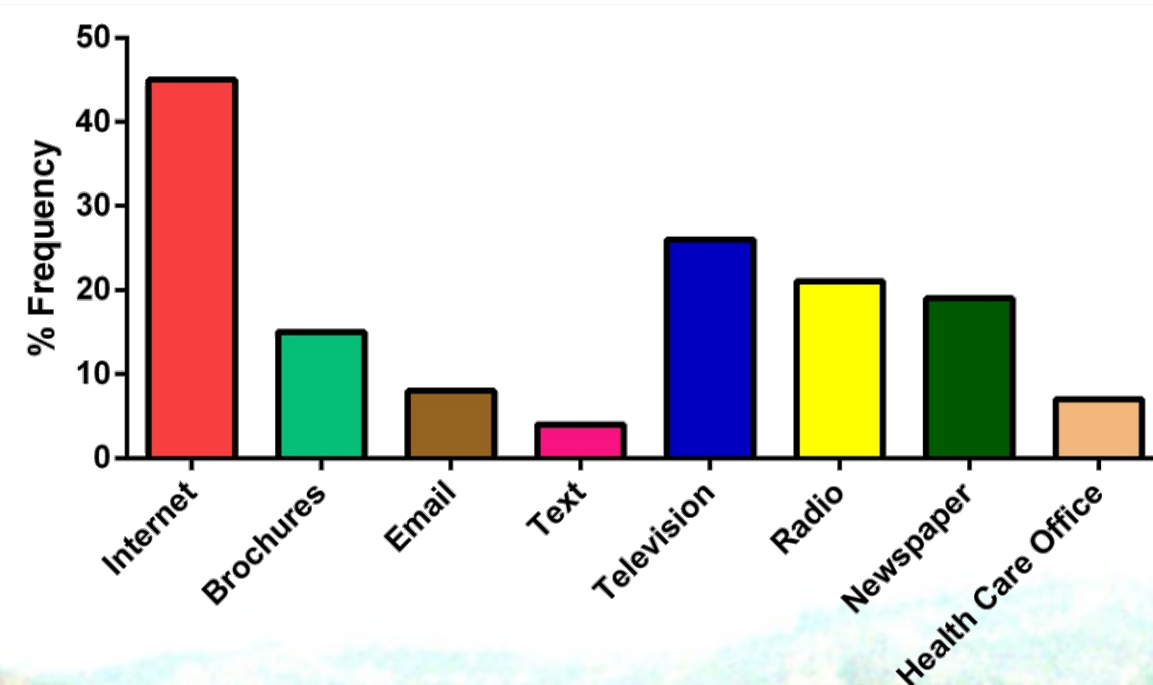
Discussion

- The majority of respondents (61%) were concerned about effects of wood smoke on respiratory illness.
- Significantly more participants were uncertain ("Don't Know") regarding the efficiency of EPA-certified stoves (21.8%) than were uncertain about emission reduction (9.4%; p=0.005) and health impacts (11.4%; p=0.026).
- Those who want assistance in proper wood stove use would like easy access to published guidelines (68%) and monetary incentives for equipment upgrades (64%).
- More respondents who heat with wood want information about reducing health risks of wood smoke than do those who do not heat with wood (30% vs. 14%, p=0.01).
- There was no significant increase in knowledge of wood smoke hazards among those who have, or who live with someone who has, respiratory or cardiovascular disease.

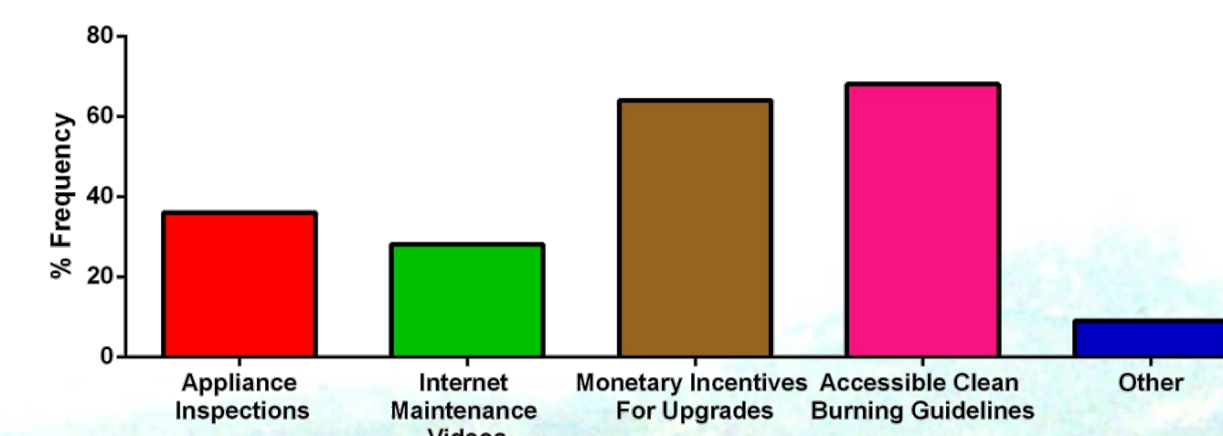
Methods

- We developed and administered a 2-page survey to assess Vermonters' current wood burning practices, types of appliances, and awareness of potential health impacts of wood smoke.
- We collected surveys (n = 234) at 3 polling locations in Chittenden County: Burlington (n = 67), Milton (n = 58), and Williston (n = 109).
- Data were entered into Excel and 10% were randomly selected for quality control check.
- Descriptive statistics were analyzed in Excel; statistical significance was determined using Graph Pad.

Preferred Information Resources



Emission Reduction Assistance



Conclusion and Suggestions

- Survey respondents were overwhelmingly concerned about the respiratory complications associated with wood smoke, yet divided on the best methods to reduce wood smoke emissions.
- Uncertainty persists among respondents concerning the efficiency of EPA-certified wood stoves.
- We suggest targeted internet-based information including: proven methods of lessening wood smoke emissions, benefits of adopting EPA-certified stoves, and how to confirm a stove is EPA-certified.
- Our project highlighted the need for additional succinct and accessible health information about wood smoke.
- We also identified a need for increased public awareness of available information.

References

1. Frederick P. Vermont Residential Fuel Assessment: for the 2007-2008 heating season. Vermont Department of Forest, Parks and Recreation. 2011.
2. Administration USEI. Short-Term Energy Outlook, December 2012. 2012.
3. Ries FJ, Marshall JD, Brauer M. Intake fraction of urban wood smoke. *Environmental science & technology*. Jul 1 2009;43(13):4701-4706.
4. Larson TV, Koenig JQ. Wood smoke: emissions and noncancer respiratory effects. *Annual review of public health*. 1994;15:133-156.
5. Naeher LP, Brauer M, Lipsett M, et al. Woodsmoke health effects: a review. *Inhalation toxicology*. Jan 2007;19(1):67-106.
6. Pope CA, 3rd, Burnett RT, Thurston GD, et al. Cardiovascular mortality and long-term exposure to particulate air pollution: epidemiological evidence of general pathophysiological pathways of disease. *Circulation*. Jan 6 2004;109(1):71-77.
7. Riddervold IS, Bonlokke JH, Olin AC, et al. Effects of wood smoke particles from wood-burning stoves on the respiratory health of atopic humans. *Particle and fibre toxicology*. 2012;9:12.
8. Boman BC, Forsberg AB, Jarvholm BG. Adverse health effects from ambient air pollution in relation to residential wood combustion in modern society. *Scandinavian journal of work, environment & health*. Aug 2003;29(4):251-260.
9. Kocbach Bolling A, Pagels J, Yttri KE, et al. Health effects of residential wood smoke particles: the importance of combustion conditions and physicochemical particle properties. *Particle and fibre toxicology*. 2009;6:29.