

REPORT TO THE BOARDS OF HEALTH

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Mid-Michigan District Health Department, Wednesday, [DATE]
Central Michigan District Health Department, Wednesday, [DATE]
District Health Department #10, Friday, [DATE]



WOOD SMOKE AND HEALTH

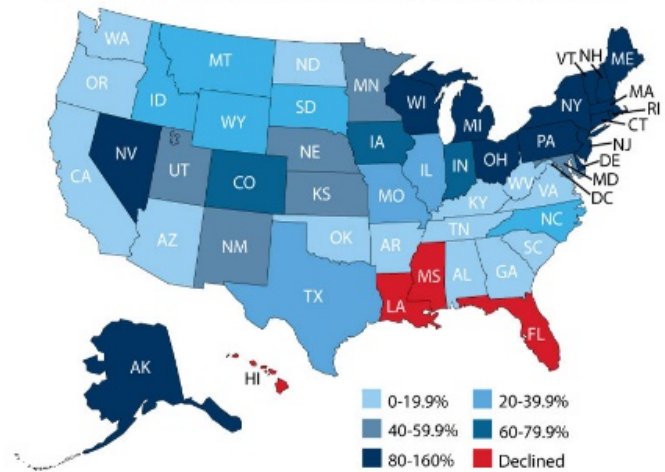
The use of wood stoves as a heating alternative has been increasing over the past several decades, mainly in response to increasing fuel costs. The use of wood and pellets for home heating increased by 34% from 2000 to 2010, while the use of oil and propane declined.

Smoke from burning wood is made up of a complex mixture of gases and fine particles. Fine particles, also called particle pollution, particulate matter (PM) or fine particulate matter (PM_{2.5}) are the most harmful part of smoke. The number 2.5 refers to particles that are no bigger than 2.5 microns (µm.) To get an idea of how small this is, it would take 20 particles that are 2.5 µm to fit across the width of a strand of hair.

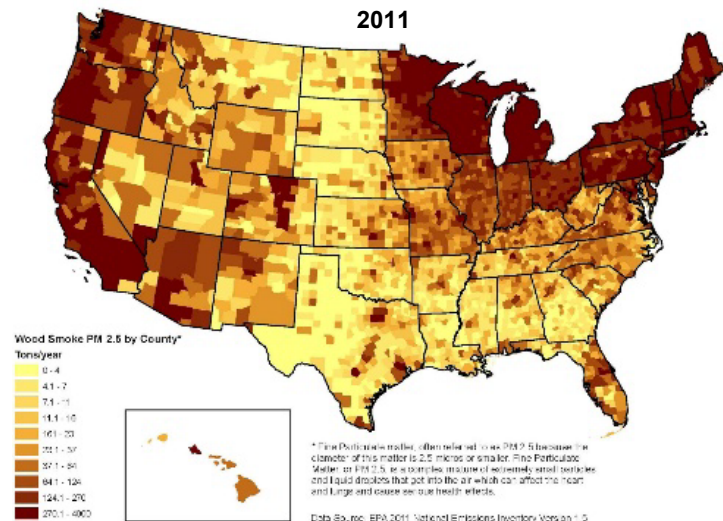
There has been extensive research on the effects of fine particulate matter and adverse health effects. Infants, children, elderly, and those with pre-existing heart or lung conditions are typically most severely affected. Some of the effects include:

- irritated eyes, throat, sinuses, and lungs
- headaches
- reduced lung function, especially in children
- lung inflammation or swelling
- increased risk of lower respiratory diseases
- more severe or frequent symptoms from existing lung diseases (such as asthma, emphysema, pneumonia, and bronchitis)
- risk of heart attack and stroke
- chronic lung disease including bronchitis and emphysema
- chemical and structural changes in lungs
- cancer
- premature death

Rise of Residential Wood Heat in U.S. 2000-2012



Wood Smoke Fine Particulate Matter by County



Due to the health risks of wood smoke, the Environmental Protection Agency (EPA) has been gradually phasing in wood stove standards since 1988. Some states have chosen to enforce more strict standards. In 1988, Phase I regulations were initiated, in which all stoves manufactured from that point forward could only emit 8.5 grams of particles per hour or less. In 1990, Phase II began, in which the limit was lowered to 7.5 gm/hr. To encourage use of

these newer stoves, the IRS began to offer a tax credit to consumers who purchase EPA-approved models from 2011 to 2016. Manufacturers continued improving their designs and many stoves had emissions at or below 4.5 gm/hr. In 2015, the Phase III performance standard for residential wood heaters lowered the emission limit to 4.5 gm/hr. for all new stoves. Phase IV is set to go into effect May 2020 and will lower limits to 2 to 2.5 gm/hr., depending on the measurement method.

Michigan residents do not necessarily have to follow these standards. The Natural Resources and Environmental Protection Act (Excerpt) Act 451 of 1994, 324.5514, Sec. 5514, which was introduced into the Michigan Senate and passed in anticipation to Phase III, states:

- 1) The department of environmental quality shall not do any of the following:
 - a) Promulgate a rule limiting emissions from wood heaters.
 - b) Enforce against a manufacturer, distributor, or consumer a federal regulation limiting emissions from wood heaters and adopted after May 1, 2014.

The state of Michigan does not enforce the rules set forth by EPA for wood burners or stoves for residential use. Many communities have enacted local ordinances, primarily pertaining to outdoor wood boilers. Outdoor wood boilers create a lot of smoke that is released low to the ground and have caused a great deal of resident complaints.



Outdoor Wood Boiler

What You Can Do

(from Washington State Department of Ecology (2012). How Wood Smoke Harms Your Health.

<https://fortress.wa.gov/ecy/publications/publications/91br023.pdf>)

When choosing how to heat your home:

- Be sure your house is properly weatherized to keep in heat.
- Instead of wood heat, consider cleaner heating fuels such as gas, electricity, or heating oil.

If you must burn wood:

Burn dry wood:

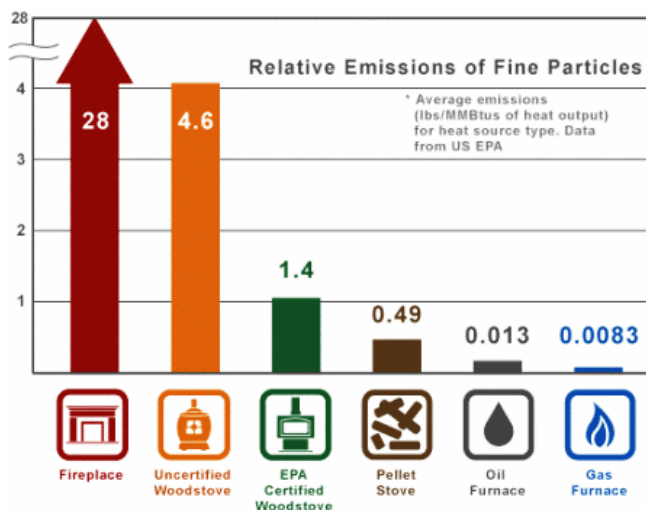
- Split wood before you stack it. Wood pieces 3½ to 6 inches in diameter dry easiest and burn best.
- Stack wood loosely in alternating directions to help it dry.
- Store wood at least 6 inches off the ground to reduce exposure to ground moisture.
- Cover your wood to protect it from the weather.
- Give it a year. Wood that has been split, dried, and stored under cover for at least a year burns best.

Burn properly:

- Build small fires to help the wood burn completely.
- Adding too much wood at one time cuts down on the air to the fire and leaves unburned wood.
- Keep your fire hot. Dampening down your stove cuts off the air, which wastes wood, creates a lot of smoke, and produces very little heat.

Check your chimney smoke:

- If you can see smoke coming from your chimney, you're wasting fuel and your fire needs more air and/or drier wood.



Use the right wood stove, pellet stove, or fireplace for your home:

- Use a wood stove or pellet stove that is certified to be compliant with EPA 2020 standards

If wood smoke is a problem in your neighborhood:

- Reduce the amount of smoke you breathe by:
 - Exercising or doing other physical activities at times when less smoke is in the air;
 - Choosing a less strenuous activity when the air is smoky (for example, walking instead of jogging);
 - Exercising for shorter periods of time when the air is smoky;
 - Closing windows, vents, doors, and plugging drafts.

Any time:

- When using air cleaners in your home, make sure they have high efficiency particulate-absorbing (HEPA) filters.
- Use a vacuum cleaner that has a HEPA filter.
- Make sure filters are clean.

Resources:

- How to Implement a Wood-Burning Appliance Changeout Program
<https://www.epa.gov/sites/production/files/2015-08/documents/howtoimplementawoodstovechangeout.pdf>
- EPA's Guide to Financing Options for Wood-burning Appliance Changeouts
https://www.epa.gov/sites/production/files/2016-03/documents/epas_guide_to_financing_options.pdf
- Wood-Burning Changeout Resources for Tribes <https://www.epa.gov/burnwise/wood-burning-changeout-resources-tribes>
- Outdoor Burning Model Ordinance A Guide for Michigan Counties, Cities, Villages, and Townships (includes verbiage for Outdoor Wood Furnaces, https://www.michigan.gov/documents/deq/deq-ess-caap-modelordinance_312507_7.pdf)

Healthy Living Recommendations:

1. Encourage local sale and use of EPA compliant wood stoves and changeout of noncompliant stoves.
2. Educate the community about wood smoke and consider local ordinances if necessary to protect public health.

Sources

- Alliance for Green Heath. <https://forgreenheat.blogspot.com>
- Environmental Protection Agency (EPA). Burn Wise <https://www.epa.gov/burnwise>
- Washington State Department of Ecology (2012). How Wood Smoke Harms Your Health. <https://fortress.wa.gov/ecy/publications/publications/91br023.pdf>
- Natural Resources and Environmental Protection Act (Excerpt) Act 451 of 1994, 324.5514, Sec. 5514
[http://www.legislature.mi.gov/\(S\(022mjmai hp50uxxxnpohf3p0\)\)/mileg.aspx?page=getobject&objectName=mcl-324-5514](http://www.legislature.mi.gov/(S(022mjmai hp50uxxxnpohf3p0))/mileg.aspx?page=getobject&objectName=mcl-324-5514)
- Email from Jenifer Dixon, Air Quality Compliance Assistance Specialist Environmental Support Office Michigan Department of Environmental Quality, January 11, 2019