



Explanation of potential health implication and summary of findings and recommendations

October 29, 2015

Public Health Madison and Dane County (PHMDC) is routinely contacted by local residents concerned about wood smoke and potential health implications that may result from exposure. In accordance with our core mission, to protect and promote the health of the environment and our community, PHMDC staff continues to work with federal, state, and local agencies to investigate and remedy sources of exposure that may threaten the health of the public.

Basic information

Residential wood burning is considered a significant source of air pollution and degraded indoor and outdoor air quality. Dependent upon burning conditions, wood smoke can contain a variety of potentially harmful emissions including:

- Particulate matter (PM-10 and PM-2.5)
- Carbon monoxide (CO)
- Hazardous air pollutants (HAPs)
- Free radicals
- Volatile organic compounds (VOCs)
- Nitrogen oxides (NO_x)

The type and concentration of pollutants is heavily dependent upon burning conditions and the wood burned. The burning of wood with inappropriate levels of moisture, overloading the firebox of the cooker/ smoker, poorly installed or maintained equipment, and insufficient air supply during burning are all examples of conditions that can lead to incomplete combustion and the production of increased levels of smoke and potentially hazardous emissions.

Potential Health Impacts

Exposure to wood smoke has been associated with an increased risk for the development of respiratory and cardiac diseases and the exacerbation of existing disease. Highly sensitive groups including children, the elderly, and individuals with heart and lung diseases are the most likely to be affected from exposure. However, the potential risk to individual health following exposure is dependent upon the length, intensity, and frequency of exposure to wood smoke.

A variety of symptoms and health issues have been associated with exposure including:

- Increased respiratory symptoms, such as irritation of the airways, coughing, or breathing difficulties
- Decreased lung function
- Aggravated asthma
- Development of chronic bronchitis
- Irregular heartbeat
- Non-fatal heart attacks
- Premature death in people with heart or lung disease

Exposure Reduction and Control

National Ambient Air Quality Standards (NAAQS) are enforced to protect the public health of the surrounding community¹. Currently, the national standard for particulate pollution, the primary contaminant of concern in wood smoke, is 0.035 mg/m³ for PM_{2.5} and 0.150 mg/m³ for PM₁₀ averaged over a 24-hour sampling period. At the state level, additional air quality standards are in place to control hazardous emissions by establishing pollutant thresholds, standards, and control requirements to protect ambient air quality²⁻⁴. These regulatory tools are commonly used during an investigation to determine the potential risk of an exposure and the appropriate course of action to continue to protect the health of our residents.

Evaluation of air quality and summary of findings

In this specific complaint PHMDC worked closely with the Wisconsin Department of Health Services (WI DHS) to monitor the air quality during the demonstration of the outdoor smoker/cooker on October 22, 2015 located at Double SS BBQ, at 1835 Monroe Street, Madison, WI 53711. Air monitors were staged at three separate sites located near the location of the outdoor smoker/cooker to evaluate potential elevation in outdoor air quality (2 monitoring sites) and indoor air quality (1 monitoring site). Air quality was measured the day prior to the smoking demonstration, the day of the smoking, and the day following the smoking to evaluate any potential reductions to the air quality of the local community associated with the operation of the outdoor smoker. Air quality monitors were retrieved from the sites by PHMDC and delivered to WI DHS for analysis of collected data.

Following the evaluation of the air quality data collected during the three day sampling period, the operation of the outdoor smoker/cooker during the demonstration did not exceed the 24-hour standard established by the US EPA for PM_{2.5} at any of the three monitoring sites. The Monitor at 1808 Madison St, Garage ranged from .006 to .021 mg/m³. The monitor at 1808 Madison St, Bedroom ranged from .003 to .012 mg/m³; while the monitor located at Double SS Alley ranged from .006 to .02 mg/m³. All of the values above are time weighted averages over a 24 hour period. The monitor in the Double SS Alley had a couple of measurable spikes in particulate concentrations that were detected both on the day prior to smoking and during the outdoor smoker demonstration. The highest level detected on 10/21/15 was 0.27 mg/m³ occurring at 12:12 pm; the largest level from 10/22/15 was 0.33 mg/m³ and was recorded at 9:02 a.m. which would correspond with the initial start of the outdoor smoker. Both levels were below the US EPA air quality standard for particulates. As a result of these findings, an increased risk of disease development from the operation of the outdoor smoker/cooker is not expected; however, the operation of the smoker/cooker may potentially elevate existing levels

of environmental triggers of acute symptoms in individuals with respiratory disease (e.g. asthma and chronic obstructive pulmonary disease (COPD)) under certain weather conditions.

However, if the conditional use permit is allowed, PHMDC suggests the following recommendations to further protect the air quality during the operation of the outdoor smoker. These recommendations are as follows:

- **Only burn dry, untreated wood.** Do not burn wet or “green” wood, treated wood, or refuse – these can release toxic chemicals that can result in adverse health impacts to individuals exposed.
- **Do not use lighter fluid, gasoline, or other chemicals to start the fire.** The fumes contribute to the formation of ozone – a chemical particularly harmful to individuals suffering from respiratory and cardiac disease.
- **Follow appropriate wood loading practices.** Appropriate loading improves combustion conditions and reduces emissions (use manufacturer’s instruction if applicable).
- **Ensure the wood burner is properly cleaned, operated, and maintained.** Appropriate care and operation of the wood burner will decrease emissions, increase the life of the burner, and prevent a potential fire hazard.
- **Ensure appropriate siting of the burner.** This will reduce and potentially prevent any smoke that may be produced from impacting neighboring structures and individuals.
- **Ensure that the wood burner is compliant with any and all emissions and efficiency local, state, and federal standard.**
- **Do not burn wood when outdoor air quality is poor during Clean Air Action Days.**

Public Health Restaurant License

Public Health Madison and Dane issued a Food and Drink license to Double S BBQ on September 28, 2015. A plan review was completed prior to opening and Public Health staff determined that the cooking proposed outside could also be accommodated with the indoor commercial kitchen, so as not to substitute outdoor cooking for insufficient commercial kitchen space. Public Health staff determined that the kitchen includes the proper ventilation and other equipment to meet this threshold. No additional licenses or permits are required by PHMDC for the outdoor cooking on the same premises as the restaurant. The outdoor cooking policy is attached to this report.

1.) United States Environmental Protection Agency. (2015). National Ambient Air Quality Standards (NAAQS). Retrieved from: <http://www3.epa.gov/ttn/naaqs/criteria.html>

2.) Legislative Reference Bureau. (2003). Chapter NR 415 – Control of particulate emissions. Retrieved from: http://docs.legis.wisconsin.gov/code/admin_code/nr/400/415.pdf

3.) Legislative Reference Bureau. (2011). Chapter NR 404 – Ambient air quality. Retrieved from: http://docs.legis.wisconsin.gov/code/admin_code/nr/400/404.pdf

4.) Legislative Reference Bureau. (2012). Chapter NR 445 – Control of hazardous pollutants. Retrieved from: http://docs.legis.wisconsin.gov/code/admin_code/nr/400/445.pdf



Outdoor Food Service without a Temporary Food Establishment Permit

1. The operator of a licensed food establishment may conduct certain, approved outdoor food activities, on their premise without additional licensing. A premise means each individual building, space or stands where food is prepared, served or sold and the physical facility, its contents, and the contiguous land or property under the control of the permit/license holder.

- All food shall be served or sold on the food establishment's premise (inside or outside).
- An outdoor cooking operation shall not be considered in lieu of code complying indoor kitchen ventilation. However, facilities that meet all other requirements of this policy except for ventilation may cook outside for up to 14 days per year under their current food establishment license.
- The food establishment shall meet Department of Commerce and local ordinance requirements.
- The outdoor food activities shall be under the control of a certified food manager.

2. The outdoor food activities authorized under these requirements shall be limited to:

- Cooking (i.e. grilling meats or cuts of meat, smoking, roasting, boiling), except that outdoor cooking does not include deep fat frying. Cooking of food shall be conducted by a food handler of the food establishment.
- Hot holding shall be conducted on the grilling surface or in commercially approved units.
- Cold holding shall occur in commercially approved equipment.
- Limited assembly of food items (sandwiches, taco...etc) may occur in the outdoor food service area.
- Food preparation activities (mixing, cutting, chopping, slicing, grinding) must occur within the licensed establishment.

3. The outdoor food equipment and physical layout:

- The outdoor cooker must not have been made from a container previously used for toxic material storage.
- The outdoor food service area shall be located on surfaces, such as: washed gravel, grass, concrete, and asphalt. Except for the grilling/cooking area, outdoor food service areas shall have overhead protection.
- The cooking area shall be inaccessible to the public.
- All utensils shall be washed in the licensed food establishment.
- In most cases a convenient, plumbed handwashing facility will be required in the outdoor food service area. In some situations where this may not be feasible, a self-contained handwashing facility approved by the Department shall be provided in the outdoor food service area.

If you have any questions or concerns please contact the
Environmental Health Division (608) 243-0330