



HEALTHIER HOLIDAY:

Minimizing the health risks of cooking with gas

MANY OF OUR HOLIDAY TRADITIONS REVOLVE AROUND FOOD: The Thanksgiving turkey. Latkes during Hanukkah. The Christmas ham. Whatever the tradition, there's nothing like sharing a meal with family and friends over the holidays.

But in millions of American homes, there's a hidden danger lurking in the kitchen. Common across the country, gas stoves can [produce](#) levels of indoor air pollution that would be illegal outdoors. Cooking with gas releases pollutants into our homes that [can lead](#) to the development of asthma, especially in children, and worsen symptoms for those with preexisting respiratory illnesses. One report [compared](#) the effects of using a gas stove around kids to those of second-hand smoke exposure.

Running a gas stove for just [one hour can lead to unsafe pollutant levels](#). During the holidays, many Americans cook for far longer than one hour—cooking a turkey can take four hours. An indoor air quality [experiment](#) conducted in 2018 by HomeChem found that pollution levels in a home while cooking a Thanksgiving meal briefly [exceeded those of the world's most polluted cities](#).

This guide describes the potential health risks of cooking with gas and provides tips on how to mitigate those risks and keep your family safe during the holidays.

Photo by Satya Murthy via Flickr (CC BY 2.0)

Cooking with gas can produce air pollution levels indoors that would be illegal outdoors

THE BLUE FLAME OF THE GAS STOVE

looks innocent enough, but it emits dangerous indoor air pollution directly into our homes. Cooking with any type of stove will affect your indoor air quality, as exhaust, smoke and steam is released from the oil and food being heated. Gas stoves work by combusting methane gas, which when burned [emits](#) nitrogen dioxide (NO₂) and carbon monoxide, in addition to smaller amounts of formaldehyde and particulate matter. [Methane gas is colorless, odorless and explosive](#), so leaks present a safety risk. A sulfur-based chemical called mercaptan has to be added to make it smell so leaks can be easily detected. While exposure to formaldehyde and particulate matter can result in nose, throat and lung [irritation](#) and aggravated asthma [symptoms](#), the two most concerning pollutants when it comes to health are nitrogen dioxide and carbon monoxide.

- **Nitrogen dioxide:** [Gas stoves have been shown to emit levels of NO₂](#) that the EPA has ruled illegal outdoors. Exposure to nitrogen dioxide, even at low levels for a short time frame, [can worsen symptoms of asthma and other respiratory illnesses](#). The developing lungs of children are especially vulnerable. Exposure to NO₂ [increases the likelihood of a child developing asthma symptoms by 42%, and the odds of a lifetime diagnosis by 24%](#). One [report](#) found that the effect of a gas stove on a child with asthma is comparable to the impacts of second-hand smoke from living with a smoker.



Gas stove burner. Photo by Jason Woodhead via Flickr (CC BY 2.0)

- **Carbon monoxide:** A Lawrence Berkeley National Laboratory simulation found that running a gas stove for just one hour with no ventilation could raise indoor concentrations of carbon monoxide by [3,000 parts per billion](#), which far exceeds health-based standards. Short-term exposure to carbon monoxide can result in negative [health impacts](#) including memory loss, dizziness, headaches and seizures, while more severe exposure can lead to carbon monoxide poisoning, loss of consciousness, permanent brain damage and death.

Tips to minimize the risks

ULTIMATELY, THE HEALTHIEST OPTION is to use an electric alternative like an induction cooktop. But if you are cooking with gas over the holidays, there are ways to minimize the risks.

Use proper ventilation

Proper ventilation is important while using any type of stove, but it's absolutely essential if your stove is fueled by gas. The best kind of ventilation is that of a [ducted range hood](#), which is installed above the stove to catch air and smoke as it rises, and moves the polluted air outside the home. Always use your range hood for the entire duration of stove use—turn it on when you start cooking, and don't turn it off until you're done.



Ducted range hood. Photo by Paintzen via Flickr (CC BY 2.0)

Use a portable induction cooktop

Holiday meals often require a lot of cooking. There's the main event—the Thanksgiving turkey, or Christmas ham, for example—but there are also a lot of fixings and sides. When cooking a lot all

at once, you can minimize the amount you need to use your gas stove with a portable induction cooktop. Portable induction cooktops can be used on your countertop and plugged into a normal outlet. They can be used instead of a normal gas range for anything you would usually cook on your stovetop. Without combusting methane gas to ignite the blue flame, you can cook your mashed potatoes, your cranberry sauce or whatever your favorite side dish might be.

Quick-fix solutions to help reduce your exposure

If you have a gas stove and don't own a range hood, you should seriously consider purchasing one. However, if you don't have one and can't get one in the near future, or if you rent, there are other measures you can take to improve indoor air quality:

- Open up some windows to create a draft.
- If you have a window fan, run it on exhaust every time you cook.
- Consider purchasing a carbon monoxide alarm so you can keep track of pollution levels while cooking and catch any gas leaks.
- Buy a portable [HEPA air purifier](#) with a carbon filter to remove some of the particulate matter produced during cooking.
- Try [cooking your turkey outside](#) to avoid running a gas-powered oven for hours on end. You can place your turkey on a roasting pan in the grill with the lid down and cook for roughly 2 to 3 hours, or until the turkey's internal temperature reaches 180° F.

If you're in the market for kitchen upgrades, you have options

THERE'S SO MANY BENEFITS OF electrifying your kitchen and ditching the open flame, including better health from improved indoor air quality, [long-term energy savings from increased efficiency](#), improved safety while cooking and [general ease of use](#).

Consider replacing your stove

To avoid the health risks associated with gas combustion indoors entirely, consider purchasing an electric or induction stove or range next time the appliance needs to be replaced. Electric stoves have been rated superior by [Consumer Reports](#), beating out gas in all of the four tests performed. The popularity of induction stoves has also grown recently, as the newer, magnetic heating technology boasts unbeatable energy efficiency and safety, and heats up even faster than gas with the same level of precise temperature control. While purchasing a new stove or range is a considerable investment, you could always opt instead for a portable, countertop induction burner, which can be [purchased for less than \\$100](#), and is an excellent way to initially test the waters of induction.



Induction cooktop. Photo by Marco Verch via Flickr (CC BY 2.0)

Invest in the best possible form of ventilation

If you're not ready to part ways with your gas stove, it's incredibly important to ensure that you are utilizing proper and efficient ventilation. When buying a new range hood, there's a few things to pay attention to in order to ensure the best fit for your home.

Types of hoods

Range hoods come in a [variety of different styles](#). The best models are over-the-range hoods, which are mounted to the wall, hung from the ceiling, or installed under a cabinet. Another option is a microwave range hood, for homes where the microwave is located above the stove. These are less efficient because they are non ducted, and depending on the size of your stove, might not be large enough to span the entire surface area. A third type of hood is a downdraft hood, which is smaller and can save space. However, these are less effective than over-the-range models because they have to catch air from a different direction than where it's headed, their actual capture area is typically much smaller, and they don't offer the same power levels as larger models.

Ducted or non ducted

[Ducted vent hoods](#) actually capture the air from your kitchen and release it outdoors, which is the best method for ensuring good air quality. Non-ducted vents do not move air outside, but recirculate the air in your kitchen after cleaning it first through either a charcoal or mesh filter. Charcoal filters are better, but need to be replaced at least every three to six months, while mesh filters can be removed and cleaned.

How to calculate CFM

In order to know what kind of hood to buy, it is important to calculate how much cubic feet per minute of air the vent needs to be able to move outside from your kitchen, which is called the CFM value. The right CFM depends on both [the BTU output of the stove and kitchen size](#). BTU, or the British thermal unit, is a measure of heat energy, and can help quantify a stove's cooking power. You can calculate CFM in two different ways, and compare the numbers you get. Then, look for a range hood that satisfies the higher number to ensure proper ventilation.

- A vent hood should be able to move 100 CFM of air for every 10,000 BTU of the stove, so simply divide the stove's BTU output by 100. BTU is normally listed for each separate burner, but it's important to use the total, especially if you often cook with multiple burners or with a high flame. So, if you have a four-burner stove with a total BTU of 40,000, you would need a range hood that can vent at least 400 CFM ($40,000 / 100 = 400$).
- The physical volume of the kitchen is the second factor. A range hood needs to have the power to exchange a kitchen's air fifteen times per hour; in other words, every four minutes. To determine the needed CFM, multiply the length and width of your kitchen by the ceiling height (all in feet) and divide that volume by four.

CFM Value #1

| Stove model | Total BTU output | BTU output/100 |
|---|------------------|----------------|
| Hotpoint Gas Oven Range, 4-burners | 36,500 | 365 |
| Smart Samsung Gas Range, 5-burners | 57,000 | 570 |
| Thermador Professional Range, 6-burners | 99,000 | 990 |

CFM Value #2

| Size of your kitchen in cubic feet (length x width x height) | Size of your kitchen/4 |
|--|------------------------|
| average American kitchen size = 1521 (13 x 13 x 9) | 380 |

Compare both and purchase a range hood that can accommodate the larger value