



## Response to *The Atlantic* article: “Kill Your Gas Stove”

October 15, 2020

On October 15, 2020 *The Atlantic* ran [“Kill Your Gas Stove: They’re bad for you, and the environment. If you can afford to avoid them, you probably should,”](#) an article that presents an unbalanced view of the scientific literature based largely on claims made by environmental groups, specifically the Rocky Mountain Institute (RMI), in collaboration with Mothers Out Front, Physicians for Social Responsibility, and Sierra Club, in a report titled [Health Effects from Gas Stove Pollution](#). AGA reviewed the RMI report, [responding](#) to the eight specific claims stated in the Executive Summary of the report. Findings in the report are not justified based on its supporting statements and citations. Furthermore, the report’s conclusions and recommendations are not substantiated for making policy or consumer decisions about energy choices.

*The Atlantic* opinion piece does little to challenge or interrogate these claims. It further fails to note any perspectives, and specifically absence of urgency for action on gas-fired cooking combustion emissions, from federal agencies with expertise and responsibility for protecting consumer safety, including the [EPA](#) and the [CPSC](#). Contemporary reviews by these agencies of all manner of indoor air sources of respiratory irritants have not identified concerns related to use of gas-fired cooking appliances. Overall, this article presents a limited perspective of the topic of natural gas cooking and indoor air quality more broadly. It is worth noting the article states “The role of gas stoves, in particular, as a contributor to climate change is not so clear-cut. They make up only a small percentage of energy consumed in a gas-reliant home. (Furnaces and water heaters are the real guzzlers.)” Below, you will find claims from the article and technically-based rebuttal related to these claims.

**Claim:** Cooking on a gas stove unleashes some of the same fumes found in car exhaust.

**Response:** The association of gas stove combustion emissions with car tailpipe emissions is sensational and uncalled for. Residential gas cooking appliances represent a minor source of NO<sub>2</sub>. The principal source of indoor NO<sub>2</sub> is polluted outdoor air that migrates indoors from vehicle and other sources. While combustion emissions from gas ranges, ovens, and cooktops can contribute to household concentrations of recognized pollutants, there are no documented risks to respiratory health from natural gas stoves from the regulatory and advisory agencies and organizations responsible for protecting residential consumer health and safety.

**Claim:** “Just like a doctor can’t say your cancer is from smoking for 20 years, there’s no way I can say as a scientist that my son’s asthma was because of us having gas in the home,” Price says. Still, it’s her best guess.’

**Response:** Use of science does not “guess” at causes of health effects. Specifically, and as related to asthma, the association between the presence of a natural gas cooking appliance and increases in asthma in children is not supported by data-driven investigations covering actual appliance usage, emission rates, exposures, and the control of other factors that are well established for contributing to asthma and other respiratory system threats. Claims that children in homes with gas stoves have an increased risk of asthma symptoms frequently reference a “meta-analysis” of literature that include studies founded on the simple presence of a gas appliance, not appliance usage or other exposure-related factors. Current U.S. federal agency involvement on the subject does not identify a connection between cooking with natural gas stoves and the risk of asthma development or direct association with asthma attacks.

**Claim:** Brief exposures to air with high concentrations of NO<sub>2</sub> can lead to coughing and wheezing for people with asthma or other respiratory issues, and prolonged exposure to the gas can contribute to the development of those conditions, according to the EPA.

**Claim:** A 2013 study of children living with asthma found that as NO<sub>2</sub> levels increased, so did the severity of their asthma, wheezing, and need for quick-relief medications like inhalers.

**Response:** The initial interpretation of “brief exposures...with high concentrations of NO<sub>2</sub>” are inconsistent with available data on natural gas-fired range emissions. These sources of exposures relate to acute toxicological effects and emission rates that are not supported by existing data. The claim is in reference to Brian Singer’s article published in 2017 which is based on work first published in 2013. The results are inadequate to justify the researcher’s conclusions regarding combustion emissions and exposures. Among the initial criticisms of this work are the following:

- The studies made far-reaching conclusions concerning natural gas-fired cooking products based on an unvalidated set of coupled, dissimilar modeling methods. No actual emissions exposures were measured.
- Key intermediate calculations and initial estimates were not reported in association with exposure calculations and, therefore, could not be reviewed to assess their validity.
- The emission factors used for cooking appliances, the initial inputs to modeling pollutant exposures, appeared to come from an LBNL study of natural gas combustion emissions associated with imported LNG, which would produce different emission characteristics.
- Time scales between pollutant generation events and “acute” concentration thresholds did not align, and the lags were not explained.
- Occupancy factors in determining exposure appeared to come from different, likely incompatible literature sources.
- Modeling results placed major importance on very short-term exposures (less than one hour), creating additional uncertainties over modeling validity.

**Claim:** Homes with gas stoves can contain approximately 50 to 400 percent higher concentrations of NO<sub>2</sub> than homes with electric stoves, often resulting in levels of indoor air pollution that would be illegal outdoors, according to a recent report by the Rocky Mountain Institute, a sustainability think tank.

**Response:** This claim confuses peak emission rate data and assumptions as its basis and improperly interprets outdoor standards, which are based upon time-averaged NO<sub>2</sub> concentrations in indoor air. The RMI report's claim of a relationship of natural gas cooking emissions and exceeding outdoor standards for health-related pollutants is not justified by the literature cited in the report, and is based on a fundamental misunderstanding of the data. RMI, in its report, cites two principal studies in support of this claim. Neither study measured emission exposures in households. Additionally, RMI incorrectly compares a "peak" emissions event of NO<sub>2</sub> to a time-averaged standard based on long-term exposure.

Long-term exposures would, at a minimum and with respect to health standards, be associated with a continuous 24-hour and annual average exposure. Natural gas cooking NO<sub>2</sub> generation events last a period of minutes to, perhaps once or twice annually for 4 to 6 hours under normal usage patterns. Beyond NO<sub>2</sub> generation cycles, NO<sub>2</sub> decays in household environments, so that exposures from a static generation event are not prolonged and accumulative.

**Claim:** Long touted as a bridge toward renewable energy, natural gas is not as dirty as oil or coal but still contributes to carbon pollution, and when leaked directly into the atmosphere—as is often the case with fracking—is a powerful greenhouse gas.

**Response:** Residential natural gas use for cooking produces less than 0.2% of total annual greenhouse gas emissions, and, total U.S. residential natural gas consumption produces the same amount of greenhouse gases as two weeks of Chinese coal consumption.

**Claim:** But a kitchen with a gas stove requires gas lines in buildings and under streets—a whole infrastructure that can prevent residential areas from switching over to renewable-power grids.

**Response:** Natural gas is used throughout the country to fuel homes and businesses and to power electric generation. Our nation's use of natural gas, in combination with renewable energy and efficiency, has contributed to U.S. energy-related carbon dioxide emissions declining to the lowest levels in nearly 25 years. Natural gas infrastructure can be used for renewable energy storage and the delivery of renewable gases derived from biogenic sources and zero-carbon electricity. The gas system's ability to integrate high-value sources of energy like renewable natural gas and hydrogen is a critical component of our nation's ability to reach ambitious greenhouse gas reductions goals.

**Claim:** While electric stoves don't release the equivalent of car exhaust into your home, they do consume more total energy than gas stoves, which can make them a pricier option depending on your local gas prices.

**Response:** The natural gas delivery system is 91% efficient from getting it out of the ground to getting it to the customer for use at home. This is far more efficient than using electricity—

converting natural gas to electricity only maintains 36% of the usable energy on the journey from production to customer. And the upfront cost to consumers to switch to induction is much more significant both in terms of the cooktop and to purchase compatible pots and pans.

**Claim:** Chef Nguyen Tran went all electric in his restaurant Starry Kitchen in downtown Los Angeles. (“Venting a space is very expensive,” he says.)

**Response:** Proper ventilation is a code requirement for restaurants. The International Mechanical Code (IMC) requires kitchen ventilation, exhausting hoods, and interlock of burners with use of cooktops. Not all jurisdictions adopt the most recent IMC, but virtually all jurisdictions require basic kitchen ventilation and hoods.

**Claim:** The added cost of proper ventilation means that many lower-income communities bear the brunt of gas-stove pollution. These households are more likely to have less space, more people, and poorer ventilation, and, as a last resort, may turn on gas ovens for heat when a furnace malfunctions.

**Response:** Adding ventilation including exhausting range hoods may not be technically feasible, irrespective of income. Yet, there are many recommended steps you can take to help ensure safe use of residential natural gas cooking appliances, including natural gas ranges. There is no reference offered in support of the claims related to space, occupants, ventilation, or gas range use. The CPSC and industry information strongly recommends against the use of gas ranges for space heating.

**Claim:** One 2008 survey of 150 asthmatic children living in Baltimore found that almost 14 percent of their homes used gas stoves for heat, which can produce even higher levels of NO<sub>2</sub> than when the stove is only used for cooking.

**Response:** The cited study does not support the statement that “many lower-income communities bear the brunt of gas-stove pollution.” The Hansel, et. al. 2008 study<sup>1</sup> cited lacks control of science-based causes of asthma in these populations and makes an error of using the “presence” of gas cooking appliances or general ambient air quality sources of contaminants as a proxy for exposure to combustion products from indoor sources. The study uses an interviewer-administered questionnaire to assess housing characteristics and potential sources of indoor NO<sub>2</sub> concentrations. The authors note that the link between indoor NO<sub>2</sub> concentrations and respiratory symptoms is not corroborated with objective data on pulmonary function. Furthermore, the study did not include any personal monitoring of exposure. The study only indicates the presence of a natural gas stove and the use of a space heater or a stove/oven for space heating. The study does not differentiate between the use of a space heater or a stove/oven for heat—the latter being a practice that the CPSC and other organizations specifically identify to be avoided.

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<sup>1</sup> Nadia N Hansel et al., “A Longitudinal Study of Indoor Nitrogen Dioxide Levels and Respiratory Symptoms in Inner-City Children with Asthma,” *Environmental Health Perspectives* Volume 116 Number 10, October 2008, p. 1430, <https://ehp.niehs.nih.gov/doi/10.1289/ehp.11349>

**Claim:** In addition, the price of electricity is often much higher outside the mainland United States; it costs nearly double in places like Puerto Rico, Alicia Kennedy wrote in the Medium publication Heated.

**Response:** The price of electricity for residential homes in the U.S. is three times higher than natural gas. See more detail [here](#).

**Claim:** If you cook with gas, there are precautions you can take to stay safe. Singer recommends always cooking with a venting range hood or a kitchen exhaust fan, and cooking on the back burners whenever possible. If you fry, use more than one burner, or cook on the front burners, turn the range hood on high. If you don't have a working venting range hood or kitchen exhaust fan and can't acquire one, open the windows to let in the outside air.

**Response:** What Singer recommends regarding a venting range hood or exhaust fan is not always technically feasible, but there are a number of recommendations for the continued safe use of natural gas ranges:

- Make sure your gas range, oven, or cooktop has been design certified to the ANSI Z21.1 standard which includes requirements for proper operation and limits on emissions.
- Make sure your natural gas kitchen appliances are installed in accordance with local installation codes and manufacturer installation instructions and defined by the International Fuel Gas Code or the National Fuel Gas Code.
- Keep your gas range maintained in good working order and periodically inspected by a qualified technician.
- Although exhaust systems are often not an installation code requirement, it is a good idea to install an exhaust for all electric and natural gas ranges, cooktops, and ovens, where it is feasible to eliminate the normal byproducts of cooking such as steam, smoke, grease and heat.
- Indoor gas grill appliances should be installed according to manufacturer installation instructions have an exhaust system to the outdoors.
- For any cooking equipment, a traditional overhead exhaust fan that runs through a wall or ceiling can be used. Other types feature "downdraft" exhausting, which uses a fan to draw cooking byproducts down from the cooking surface to the outdoors.
- Use of a range hood is recommended. Filters on these hoods should be cleaned regularly as recommended in manufacturers' instruction.
- As recommended by CPSC and manufacturers, never use your gas cooking appliance for domestic space heating.
- Always try to use the appropriate pot or pan size when cooking.
- Never cover your oven bottom cavity with aluminum foil.