

# Cooking with Gas: Indoor Air Quality and Residential Gas Ranges

## **Are there documented risks to respiratory health from the use of natural gas stoves?**

While combustion emissions from gas ranges, ovens, and cooktops can contribute to some degree to emissions 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. The Federal Interagency Committee on Indoor Air Quality (CIAQ), which is comprised of two dozen federal agencies led by the U.S. Environmental Protection Agency (EPA), routinely addresses indoor air quality issues of public importance. The CIAQ has not identified natural gas cooking emissions as an important issue concerning asthma or respiratory illness. Furthermore, the U.S. Consumer Product Safety Commission and EPA do not present gas ranges as a significant contributor to adverse air quality or health hazard in their technical or public information literature, guidance, or requirements.

## **Does living with natural gas cooking appliances increase asthma in children and other populations?**

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 emphasizes 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.

Additionally, according to the study “Cooking Fuels and Prevalence of Asthma: A Global Analysis of Phase Three of the International Study of Asthma and Allergies in Childhood (ISAAC),” which analyzed 512,707 primary and secondary school children from 108 centers in 47 countries, there is “no evidence of an association between the use of gas as a cooking fuel and either asthma symptoms or asthma diagnosis.”

## **Is electric cooking a cleaner household cooking option?**

There is no substantive evidence that electric cooking is cleaner when cooking byproducts are considered. Indoor air quality studies have consistently found that emissions from the cooking process—not solely from the burner or heat source operation—represent the chief source of concern with respect to indoor air quality for various classes of pollutants such as particulate matter and volatile organic compounds. Switching to electrical appliances is not a useful strategy to address indoor air quality because the emissions of concern are dominated by the smoke and grease that comes from cooking, regardless of the energy source used in conventional residential appliances.

## **If natural gas ranges produce nitrogen dioxide (NO<sub>2</sub>), does this mean my range is a unique source of concern for indoor air quality?**

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. Combustion emissions from gas ranges, ovens, and cooktops can contribute, to some degree, to emissions of NO<sub>2</sub> and other recognized pollutants. However, federal health and safety agencies do not identify specific health or safety issues concerning NO<sub>2</sub> emissions from residential gas cooking appliances that would require removing or altering these appliances or their use as a mitigation approach. The relevant literature from the multiple federal agencies has not identified specific needs for limiting combustion emissions beyond the current safety standards.

Industry-sponsored testing conducted thus far found that during the regular operation of cooktop burners and ovens, emissions of NO<sub>2</sub> were under the regulated safety thresholds for appliances subject to NO<sub>2</sub> emission rate limitations.

## **Can exhaust hoods improve indoor air quality?**

Yes, all gas-fired residential cooking ranges, such as ovens, cooktops, and combinations, are design certified to operate without outdoor exhaust systems, add-on exhaust hoods, or requirements for exhaust. No national model codes require hoods for residential cooking appliances. However, a cooking range hood that exhausts to the outdoors, where feasible, can improve indoor air quality by removing the byproducts of cooking like steam, smoke, grease, and heat. It is a good idea to install exhausting hoods for both electric and natural gas ranges, cooktops, and ovens. Where possible, a properly installed range hood above your stove is an important strategy to mitigate emissions from any type of cooking and including any contribution from combustion emissions. Where it is not feasible to install an exhausting hood, a recirculating hood with filtration can reduce some cooking byproducts such as greases. Many modern cooking appliance installations include recirculating hoods, which do not send smoke, grease, or combustion emissions to the outdoors but instead push it through a filter and back into the house. Regardless of the type of hood installed, the use of the hood by consumers is advisable but getting consumers to operate them while cooking represents a recurring challenge to mitigating kitchen cooking byproducts.

## **Do the types of foods you cook on a cooktop impact indoor air quality?**

Yes, frying and other high-heat and oil-based cooking methods have been studied extensively to understand their contributions to emissions of particulate matter (an important asthma exacerbation agent), volatile organic compounds, and other toxic and potentially toxic and carcinogenic emissions products. Data-driven residential cooking studies and literature are dominated by, and strongly associated with, cooking emission products and specific cooking styles that represent the highest potentials for negative consumer exposures.

## **What can be done to improve household air quality while cooking?**

Installing an exhausting range hood, where possible, can help if regularly used. Installation and use of recirculating hoods may also provide some effectiveness in controlling particulate matter, oil-laden smoke, and other cooking process emissions that generate poor kitchen air quality. Also, common-sense use of windows and house ventilation may control smoke, heat build-up, and other environmental stresses associated with the cooking process. Beyond simple common sense, these responses are cited by EPA and others and provide the underlying technical basis for standards for safety.

## **Aside from the installation of range hoods and their use, what are other measures that can assist in providing adequate indoor air quality for residential consumers in their kitchen?**

Modern residential building codes require kitchen ventilation to address general ventilation requirements, including normal indoor air quality concerns in kitchens. These ventilation systems should be operated by consumers to maintain good indoor air quality. A recent study of California ventilation system requirements completed by Lawrence Berkeley National Laboratory for the California Energy Commission found that current ventilation requirements were adequate to protect consumer health and safety from a variety of sources, including kitchen sources of airborne contaminants.

## **What is the natural gas industry doing to address concerns over emissions from natural gas appliances?**

As concerns over emissions from gas ranges are raised and debated, the natural gas industry is focused on bringing objective technical information to the discussion. The gas utility industry, in collaboration with research organizations and appliance manufacturers, continues to develop information and provide education for consumers, employees, fuel suppliers, and regulators about the safety of gas cooking appliances and ways to reduce cooking process emissions from impacting indoor air quality. These groups are heavily engaged in promoting the safe use of natural gas appliances through the development of standards for the design of natural gas appliances, participating in building safety codes and standards proceedings, and federal agency reviews. Furthermore, AGA continually reviews indoor air quality exposure and health effects literature from peer-reviewed sources, federal agency policies, and health organization consensus documents.