Gas: A Major Source of Indoor Air Pollution

Most people know that gas leaks can be deadly, but fewer realize that gas appliances are a threat to health even without leaks. Like any fossil fuel, natural gas gives off pollutants when burned. The resulting mix of nitrogen dioxide (NO₂) and other pollutants can have serious health ramifications.

Nitrogen Dioxide causes a range of health problems
• A large body of evidence shows that NO₂ exposure results in increased respiratory symptoms, asthma attacks, and hospital admissions in people with asthma.¹
• In addition to exacerbating asthma symptoms, long-term NO₂ exposure (measured over one or more years) is likely to cause asthma to develop, especially in children.¹
• Research also suggests that long-term average NO₂ exposure can increase the risk of diabetes, cancer, and premature mortality.¹
• Health Canada, Canada’s federal health agency, notes that the relationship between health effects and NO₂ concentration seems to be linear, with no safe threshold. Health Canada concludes, “[I]t should be assumed that any increment in levels of ambient NO₂ presents an increased risk for health effects, up to and including mortality.” ii

Gas heaters and stoves are a major source of indoor NO₂ pollution
• While NO₂ levels in homes with electric appliances are usually half outdoor levels, in homes with gas stoves or unvented space heaters, indoor levels often exceed outdoor levels.³
• To give a sense of the magnitude, the World Health Organization assumes that homes with no indoor NO₂ source have an average NO₂ level around 8 parts per billion (ppb), while the average in homes with a gas stove is around 22 ppb. The World Health Organization suggests a long-term limit of 20 parts per billion (ppb). iv (pg 247)
• In studies of American homes with gas appliances, the average NO₂ level measured often exceeds the limit set by the World Health Organization. ⁴ (pg 246), v, vii
• Cooking with a gas stove can also cause dangerous short-term NO₂ spikes. A simulation found that over 60% of homes using gas stoves without a range hood are likely routinely exposed to NO₂ levels above the EPA’s 100 ppb 1-hour limit. viii This is consistent with a recent study in which 4 out of 9 homes with gas stoves exceeded the 1-hour limit during cooking. ix

Gas heaters and stoves emit enough NO₂ to cause measurable health problems
• Scientists have been able to tie the adverse health effects of NO₂ directly to gas stoves for more than four decades. x
• For example, researchers measured NO₂ levels in the homes of Baltimore children with asthma. Their results suggest that, holding other factors constant, an asthmatic child in a house with a gas stove and gas heater would experience 10% more days of cough symptoms and 15% more days with wheeze-induced limited speech than an asthmatic child in a house with electric appliances. ⁶
• A 2013 metanalysis of 41 studies examining the interaction between gas cooking, indoor NO₂ levels, and asthma found that children living in a home with a gas stove have a 42% increased risk of current asthma. xi
• The World Health Organization’s indoor air pollution guidelines were developed under the assumption that the expected NO₂ increase from a gas stove causes a 20% increased risk of lower respiratory illness in children.4 (p 247)

**To protect yourself, carefully ventilate and consider going electric**

• To mitigate your indoor air pollution exposure, homes need to be well ventilated.8,xi

• A range hood that exhausts air outside should always be used when cooking.8

• The safest option may be to ventilate and go electric. Studies have found higher levels of NO₂ in homes with gas stoves than homes with electric stoves even with proper ventilation.xiii A randomized experiment found that installing range hoods above unvented gas stoves did not have a significant effect on NO₂ concentrations but replacing gas stoves with electric stoves reduced kitchen NO₂ levels by half.xiv

---


