Understanding Nitrogen Dioxide: Why the Quality of Our Indoor Air Matters

faith in place

Where does Nitrogen Dioxide (NO_2) come from?

Nitrogen Dioxide (NO_2) is an air pollutant that forms when fossil fuels—such as methane gas, oil, coal, or wood—are burned. Outdoors, it's primarily emitted by vehicle tailpipes and industrial processes. Indoors, gas stoves are a major source of NO_2.

Health Effects of Indoor NO_2

NO_2 doesn't just irritate — it harms.

- Short-term exposure can worsen asthma and other lung conditions.
- Long-term exposure is linked to chronic bronchitis, increased respiratory infections, greater likelihood of ER visits and hospitalization.
- Scientific evidence suggests that exposure to NO_2 could likely cause asthma in children.

Gas stove use is the main indoor source of NO_2. Levels of this pollutant can spike well above health-protective standards set for outdoor air, particularly when a gas stove is used without adequate ventilation.

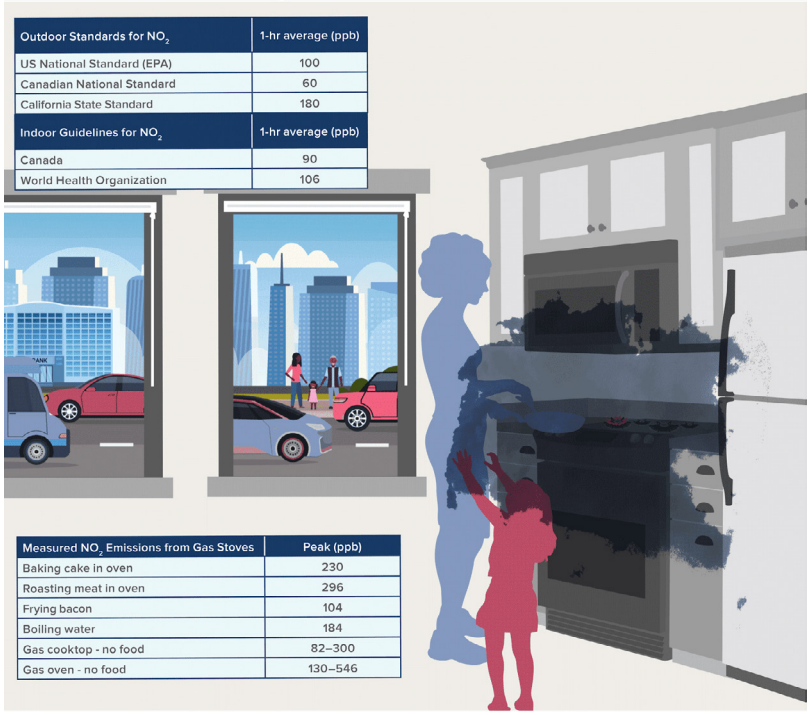
Children living in a home with a gas stove are **42% more likely to develop asthma symptoms**. A 2023 study found that **21.1% (1 in 5 cases) of childhood asthma cases in Illinois** can be attributed to this gas stove pollution.

Are Current Air Standards Protective?

There is no federal indoor air standard in the U.S. for NO_2 — yet homes with gas stoves can routinely exceed these levels during everyday use. We spend 90% of our time indoors, and the EPA acknowledges that indoor levels are often higher than outdoors, especially in smaller or poorly ventilated spaces.

Gas Stoves Can Emit Elevated Indoor Nitrogen Dioxide (NO_2) Levels Often Exceeding Indoor Guidelines and Outdoor Standards

Outdoor Standards for NO_2	1-hr average (ppb)
US National Standard (EPA)	100
Canadian National Standard	60
California State Standard	180
Indoor Guidelines for NO_2	**1-hr average (ppb)**
Canada	90
World Health Organization	106



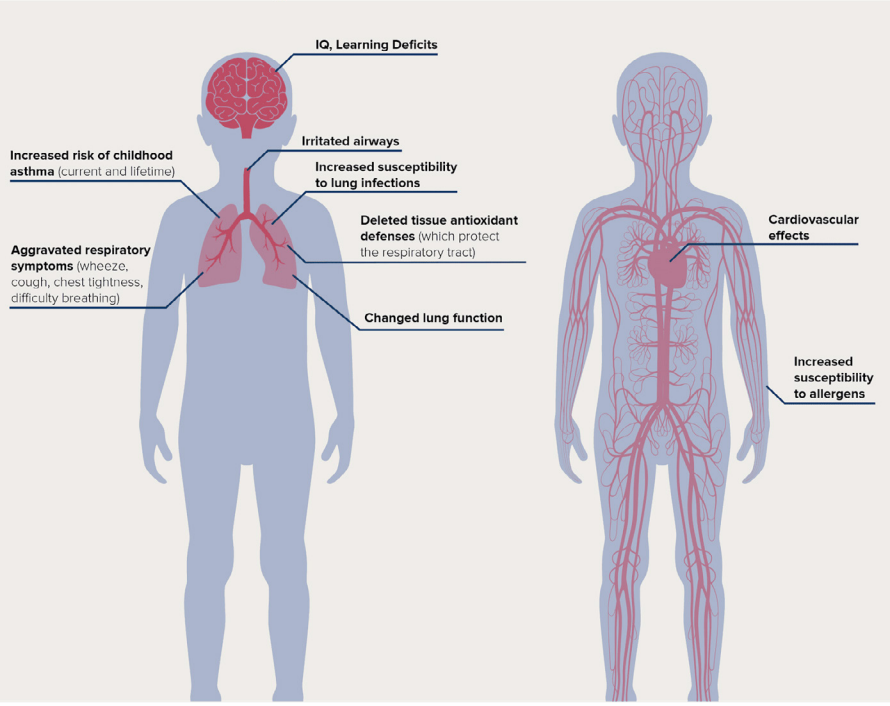
Measured NO_2 Emissions from Gas Stoves	Peak (ppb)
Baking cake in oven	230
Roasting meat in oven	296
Frying bacon	104
Boiling water	184
Gas cooktop - no food	82–300
Gas oven - no food	130–546

Source: https://rmi.org/insight/gas-stoves-pollution-health

Children Are at the Greatest Risk

Children are especially vulnerable to NO_2 exposure for several biological and behavioral reasons. They breathe more air per pound of body weight than adults, meaning they inhale more pollutants relative to their size. Due to the fact their lungs are still developing, children's respiratory systems are more sensitive to inflammation and damage from air pollutants.

Gas stoves can produce elevated levels of Nitrogen Dioxide (NO_2), a toxic gas.
Health Effects of NO_2 in Children May Include:



Source: https://rmi.org/insight/gas-stoves-pollution-health

Early-life exposure to NO_2 has been linked not only to increased risk and severity of asthma, but also to potential neurodevelopmental effects. Research suggests that children exposed to higher levels of indoor air pollution may experience reduced cognitive function and a greater likelihood of developing symptoms associated with attention-deficit disorders.

What Can You Do?

Reduce or eliminate combustion indoors:

- Upgrade to electric ranges or induction cooktops
- Cook more with electric options (toaster oven, microwave, etc.)
- Ensure adequate ventilation — use a range hood or open a window
- Regularly maintain combustion appliances if gas use is unavoidable
- Consider installing indoor air quality monitors

Sources

https://www.epa.gov/indoor-air-quality-iaq/nitrogen-dioxides-impact-indoor-air-quality
https://rmi.org/insight/gas-stoves-pollution-health/
https://www.mdpi.com/1660-4601/20/1/75
https://academic.oup.com/aje/article-abstract/169/11/1327/159993?redirectedFrom=fulltext