

Written Testimony

Health Hearing for New York State legislators regarding the New York State Fiscal Year 2024 Budget, February 28, 2023

by Sandra Steingraber, PhD
Co-founder, Concerned Health Professionals of New York
Senior scientist, Science and Environmental Health Network

My name is Sandra Steingraber. I'm a PhD biologist, co-founder of Concerned Health Professionals of New York, and senior scientist at The Science and Environmental Health Network.

I'm one of the principal authors of the [Compendium of Scientific, Medical, and Media Findings Demonstrating the Risks and Harms of Fracking](#), now in its 8th edition. The upcoming 9th edition, currently in progress, extends our analysis into residential homes, which are the endpoint of the natural gas extraction and distribution system.

In other words, the clicking blue flame of the gas stove in the kitchen and the whoosh of a gas furnace kicking on in the basement form the literal terminus of a pipeline that begins at a fracking well. They serve as the anchor for new fossil fuel-dependent building construction.

Last year New York State committed itself to a rapid and equitable transition off of fossil fuels in buildings by passing the Advanced Building Codes, Appliance and Equipment Efficiency Standards Act and finalizing the Scoping Plan that enacts our 2019 Climate Act.

I'm here today as a health professional to urge you pass a FY24 budget that brings policies and funding sufficient to make this legislation truly meaningful.

Specifically, Concerned Health Professionals of New York endorses the legislative agenda of Renewable Heat Now and Better Buildings New York. And more specifically we are in favor of the Home Energy Affordable Transition Act (NY HEAT) (S2016 of 2023), the All-Electric Building Act (S562A, A920A of 2023), the Energy Efficiency, Equity, and Jobs Act (S3126C|A3996C of 2022), and Automatic Data Matching (S8362A, A9099A of 2022).

We also support the Modifications to the Home Energy Assistance Program ("HEAP") (S2496 of 2023) and Emergency HEAP (S4556 of 2023), as well as the creation of a Green Affordable Pre-Electrification (GAP) Fund for Low-to-Moderate Income households, coupled with increased funding for NYSERDA's Regional Clean Energy Hubs.

Speaking out of our latest research on the health harms of natural gas combusted inside our homes, I want to make the case that the ongoing effort to protect the climate via a swift transition away from fossil fuels in buildings also holds health care savings for New Yorkers.

And I want to start with a molecule called nitrogen dioxide.

The yellow-brown haze that hangs over cities, visible from airplanes, is nitrogen dioxide. It's created in a two-part process whenever fossil fuels are burned. In the high heat generated by the combustion process itself, nitrogen and oxygen in the air combine to form nitrogen oxide, which then reacts with other chemicals in the air to form the corrosive gas, nitrogen dioxide.

This chemical reaction happens in the smokestacks of coal-burning power plants. It happens in the tailpipes of cars and trucks. It happens in the air above the gas burners of kitchen stoves.

Whenever fossil fuels are ignited—coal, oil, or natural gas—nitrogen dioxide is made.

Nitrogen dioxide molecules have a couple of properties that make them problematic for our health. The first is that they are not very water soluble. This means that when we inhale them, they bypass the mucus membranes of our nose and throat, quickly travelling all the way to the terminal bronchioles of our lungs, entering our spongy alveoli where oxygen and carbon dioxide are swapped for each other.

Because nitrogen dioxide doesn't cause inflammation or irritation to our upper respiratory tracts, we don't sense the danger.

The harm happens deep in our lungs. Highly reactive and quickly converting to nitric acid, nitrogen dioxide molecules cause [inflammation and acute injury](#) to the cells lining our lungs.

They also disable the immune cells that inhabit this tissue, leaving us more vulnerable to respiratory pathogens, such as influenza viruses, and increasing our susceptibility to infection.

They also trigger bronchial spasms and wheezing. They make asthma attacks worse, and they have the power to *cause* asthma in children. They also exacerbate [cardiovascular illness](#) among people with heart disease.

The air inside homes with gas stoves have average concentrations of nitrogen dioxide that are [50 to 400 percent higher](#) than the air inside than homes with electric stoves. Indeed, indoor air pollution from gas stoves can easily exceed levels that would be considered illegal outdoors (as, for example, along high-traffic roadways) where concentrations are regulated by the U.S. Environmental Protection Agency (EPA). The EPA does not regulate gas stoves, gas furnaces or any other sources of indoor pollution.

The data linking nitrogen dioxide exposure from gas stoves to health harms in children is especially convincing and goes back four decades. In spite of this robust body of evidence, the public health findings have never been turned into state or federal policy.

[By 1977](#), for example, we already knew that English and Scottish children living in homes with gas stoves for cooking had more frequent coughs, chest colds, and bronchitis. The authors of this study—published the year I graduated from high school, and now I'm 63 years old—posited that exposure to nitrogen dioxide was the likely cause.

[By 1991](#), this trend was replicated in other studies and quantified. Researchers showed that the risk of respiratory infections in children exposed to long-term, elevated levels of nitrogen dioxide—comparable to the amounts emitted by gas stove—jumps by 20 percent.

[By 1994](#), all studies of nitrogen dioxide exposure and respiratory illnesses in children showed positive trends.

[By 1997](#), the asthma connection was coming into focus with the demonstration that wheezing and asthma attacks were more common in children living in homes with gas stoves.

[By 2001](#), a cross-sectional study had shown that use of a gas stove or gas oven for home heating was a main risk factor for asthma in U.S. children under age six.

[By 2008](#), researchers had demonstrated that inner-city Baltimore preschoolers living in homes with gas stoves were both breathing higher levels of nitrogen dioxides and also suffering increased frequency of asthma symptoms.

[By 2013](#), the link between gas stoves and childhood asthma was quantified: a meta-analysis published in the *International Journal of Epidemiology* showed that children living in a home with gas cooking have a 42 percent increased risk of having current asthma and a 24 percent increased risk of developing asthma sometime during their lifespan.

(The above is a small sample of a much larger body of work. For a comprehensive summary of the many decades of studies documenting the health effects from gas stove pollution, with 135 footnotes, see this [2020 report](#).)

In the last two years, the mounting concerns about gas stoves have expanded further.

By 2022, it was clear that the problem goes beyond filling up indoor air with combustion byproducts. A [Harvard-led study](#) showed that natural gas collected from gas stoves in the Boston area contained volatile vapors, such as benzene, a carcinogen linked to childhood leukemia and for which there is no safe level of exposure.

Meanwhile, a [Stanford-led study](#) showed that gas stoves routinely leak unburned natural gas, emitting 0.8–1.3 percent of the gas they use, even when they are turned off. Indeed, more than three-quarters of the leaks happen when the stove is not being used.

This means that methane plumes, and the benzene that travels with them, are continuously wafting into your kitchen airspace even if you are living on take-out and microwave popcorn. It also means that the annual methane emissions from all gas stoves in U.S. homes have a climate impact roughly on par with the emissions from 500,000 cars.

2022 was also the year that gas stoves caught the attention of public agencies and health organizations. The American Medical Association (AMA), the nation's largest medical society, released a [resolution](#) recognizing that cooking with a gas stove increases both household air

pollution and the risk of childhood asthma. The AMA announced its support for programs to aid the transition from gas to electric stoves.

At the same time, the National Center for Healthy Housing conducted its own [study](#), finding that while mechanical ventilation systems did significantly reduce other types of indoor air pollution, they did *not* significantly lower nitrogen dioxide levels, “which primarily come from gas stoves, countering the misconception that opening windows or increasing ventilation is enough to address the health impacts of these appliances.”

To the question of whether range hood fans can help at all with exposure to indoor air pollutants created by gas stoves, the answer is, only if you use the back two burners, only if the fan ventilates to the outside rather than just recirculating the air as it does in many New York City apartments, and only if the motor on the fan is loud enough to interfere with normal conversation.

I want to pause here a moment and speak as a single mother. Both my kids are now young adults. But when they were little, my youngest had asthma. I needed to be able to cook dinner and keep an ear out for my kids in the other room. I needed to cook while listening for the sound of sibling fighting or the sound of a kid falling off the couch. Or even the sound of too much silence, which is the worse sound of all.

That’s a basic safety need. Later, I needed to cook dinner while helping my kids do homework at the kitchen counter. Still later, I needed to teach them how to cook for themselves.

All of those things require normal human conversation while cooking, which is not possible if using a ventilation system sufficient to sweep out air pollution from gas stoves and maintain inhalable combustion byproducts at levels that won’t risk childhood asthma.

Also, any motor running at a volume high enough to interfere with normal human speech is exposing those around it to decibel levels high to risk hearing loss. And, indeed, professional chefs working with gas stove on the job, where powerful fans are mandated by law, have expressed to me their concerns about going deaf from the ventilation systems required when gas stoves are used.

Our kids should not need to either get asthma or lose their hearing. Those should not be the only two choices here. In the same way that, in an earlier time, we decided that we shouldn’t have to choose between sitting in the back of the plane or breathing in cigarette smoke exhaled from our seatmates but instead chose the option of getting cigarettes out of airplanes, we need to take the third option here.

Let’s get the fossil fuels out of our homes and pass a budget that allows for a rapid and equitable transition.

Now let’s go back to the science. In January 2023, a [bombshell study](#) was published by an international team of epidemiologists and researchers, which quantified the population-level implications of cooking with gas.

The team found that 12.7 percent of current childhood asthma in the United States was attributable to gas stoves.

In other words, 647,700 U.S. kids have asthma just from gas stoves in their homes. This is similar to the risk of having asthma from living with a smoker.

Further, some of the most densely populated states had numbers even higher than the national average. In New York, it's 18.8 percent of childhood asthma cases. Which is to say, almost one in every five cases of childhood asthma in New York could be theoretically prevented without gas stoves

Energy choices are moral choices.

Gas appliances are an [indoor](#) environmental justice issue. Gas stoves are clearly linked to asthma in children, and asthma is a profoundly unequal disease. The burden of asthma falls far more heavily on children of low-income families and children of color, with Black children nearly [three times](#) more likely to have asthma than white children.

Lower-income households also have smaller kitchens that further concentrate the fumes, and they are more likely to lack range hoods and ventilation systems, especially in rental properties.

Healthcare costs of stove-induced asthma also fall disproportionately on impoverished families. The average annual [medical costs](#) required to care for one child with asthma range from \$3,076 to \$13,612. This price tag does not include lost workdays and lost income for their wage-earning parents. Inclusive of inhalers and ER visits, gas stoves are mighty expensive.

These are not trivial matters.

To close, I'll speak as both a mother who has listened to a child gasp for air in the dead of the night and as a public health biologist.

Kids need to breathe. Kids need to be unpoisoned. Kids need us to protect their hearing. Kids need a stable climate. The gas industry should not put its tailpipes in our homes. Our kitchens should not be garages full of fossil fuel combustion byproducts. Sick kids are expensive, and those medical costs largely fall to parents, and they can be ruinous.

Those commonsense truths should lead you to craft a budget for our state with health, air quality, and energy affordability in mind. Thank you.

