

## Protecting ourselves from wildfire smoke pollution

It's obvious that, due to global warming, the extensive wildfires in the Canadian north are not a one-off event, but are likely to recur in future years, perhaps even more widely.

With wildfire smoke sweeping over our city, I set out to protect our household from the most damaging component of this pollution: the tiny PM2.5 particles. These are so small that they evade the body's natural air filtration and penetrate deep into our lungs, potentially causing a variety of health issues.

I found a partial solution, so to save you the research work, and in case you might want to do something similar, I've described in some detail what I learned and the steps that I took.

### **Monitoring and forecasting PM2.5 pollution**

It's helpful to know how bad air pollution is at any time, indoors and out, to know what's ahead, and most important, to assess the effectiveness of countermeasures. Here are some tools.

Outdoor pollution:

- [This website](#) shows on a map the recent history and a 2-day forecast for wildfires in Canada and the resulting plumes of smoke.
- For residents of Ontario [this government website](#) tracks the pollutant levels in many cities, hour by hour: just select your location. For comparison, [this chart](#) shows the wakeup call we received in Ottawa on 7<sup>th</sup> June 2023 with PM2.5 levels over 500 µg/m<sup>3</sup> – typical of a bad day in famously polluted cities like Beijing or New Delhi.

Indoor pollution:

- Air quality monitors like [this](#) and [this](#) provide a reliable and inexpensive way of tracking PM2.5 pollution levels, minute by minute, indoors or outdoors. These instruments allow you to see exactly what is going on in your own living space, how indoor pollution levels change according to outdoor conditions, and the effect of filtering the air.

### **Air filtration**

Because air filters are expensive, there was a great deal of discussion during the pandemic of how to remove virus particles from the air cheaply. This resulted in the development of a very effective and low-cost DIY solution -- the Corsi-Rosenthal box, named after the inventors.

Happily, this device is also effective for removing PM2.5 particles (and some other pollutants).

The 'box' is essentially a cube made of high-grade 20" x 20" furnace filters, held together by duct tape, with a box fan taped to the top. It looks crude but works – in my opinion a rather brilliant example of engineering to meet a need in the most cost-effective manner possible.

Mine cost \$180, made up as follows: \$115 for four high-grade (MERV-13) furnace filters, \$57 for the Lasko 20" box fan, and \$8 for 10 yards of duct tape. This is about one-tenth the cost of a commercial product of equivalent performance.

On [Wikipedia](#) there is comprehensive information about the Corsi-Rosenthal box including detailed instructions on how to make one yourself. It's quite easy: if you can work with duct tape without injuring yourself you can probably manage.

Here's what mine looks like and [here](#) are images of many others in different styles and applications.



### **Results so far**

As I write this, the campfire smell in Ottawa is immediately noticeable when you step outdoors and the PM2.5 level has risen from 40 a few hours ago to 85. But in my home office the air is clean and the PM2.5 monitor is reading 1 (its lowest level). The fan on my Corsi-Rosenthal box behind me is humming unobtrusively at its slowest speed, scarcely noticeable and not loud enough to interfere with phone calls.

In other rooms the PM2.5 levels are creeping up, approaching 10 as polluted air infiltrates the house. But when I move to the kitchen, I will just grab the box and take it with me –it is bulky but weighs less than 10lb. Running the fan at full speed (which is quite loud) for just 5-10 minutes will bring the PM2.5 levels right down. Then I can turn the fan down to the slowest speed, which seems sufficient to maintain that low level of pollution.

### **Next steps**

It is early days, and I am still experimenting. Could this unit, or several of them, purify the air throughout the whole house? Possibly, but so far, it's been easy to purify just the rooms we are

using. No doubt some of my talented and ingenious colleagues at the Canadian Association for the Club of Rome (CACOR) will take the basic approach described here and take it further.

With these tools in place, although I'm no more optimistic than before about the future of our planet, at least I no longer have to worry about how my family is going to cope with one of the immediate impacts – onslaughts of wildfire smoke from the north.

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June 16<sup>th</sup>, 2023

[Wildfire Smoke home filter - Canadian Association for the Club of Rome \(canadiancor.com\)](http://canadiancor.com)