Measuring indoor air quality in remote First Nations communities in Ontario, Canada

November 28 2023, by Bob Yirka

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A team of researchers with a wide variety of backgrounds and affiliated with a number of institutions in Canada, including officials with the Nishnawbe Aski Nation, has conducted an assessment of indoor air

quality for people living in First Nations communities in Ontario, Canada, and found high amounts of particulates, CO_2, benzene, formaldehyde, mold and other hazardous materials.

In their study, reported in the open-access journal *PLOS ONE*, the group tested air quality and correlated housing conditions with indoor bio-contaminants.

As the research team notes, a recent study found that 21% of children living in four First Nations communities in a remote part of Ontario had been admitted to a hospital for treatment of respiratory problems over the prior two years. That led the researchers in this new effort to travel to the four communities to test the indoor air quality for the people living there.

The work involved traveling to all four communities, each of which had a population of approximately 1,200 people, collecting air samples from 101 homes, testing them and then using mathematical analysis to associate housing conditions with airborne health hazards.

The research team found that 27% of the homes they studied had sustained levels of carbon dioxide above 1,500 ppm. They also found a chemical called endotoxin in many of the homes, which is known to cause lung problems at certain levels. Levels in the tested homes were on average 1,000 times higher than detected in any other air quality study conducted in Canada or the U.S.

The researchers also noted that most of the homes had high occupation rates and nearly half were heated using wood stoves, of which just 10% were low-emission certified. They found that there was at least one smoker in 94% of the houses tested, and that some had as many as seven. They also found visible mold in nearly half of the houses and evidence of water damage during the prior 12 months (suggesting hidden mold) in

over half the homes.

The research team describes the houses under review as crowded, with high concentrations of endotoxin and tobacco smoke and a wide variety of other substances in the air that could cause lung problems, such as mold, CO_2 and a host of chemicals likely emitted from burning wood.

More information: Gary Mallach et al, Indoor air quality in remote first nations communities in Ontario, Canada, *PLOS ONE* (2023). DOI: 10.1371/journal.pone.0294040