As the thermostat goes up, COPD symptoms may worsen

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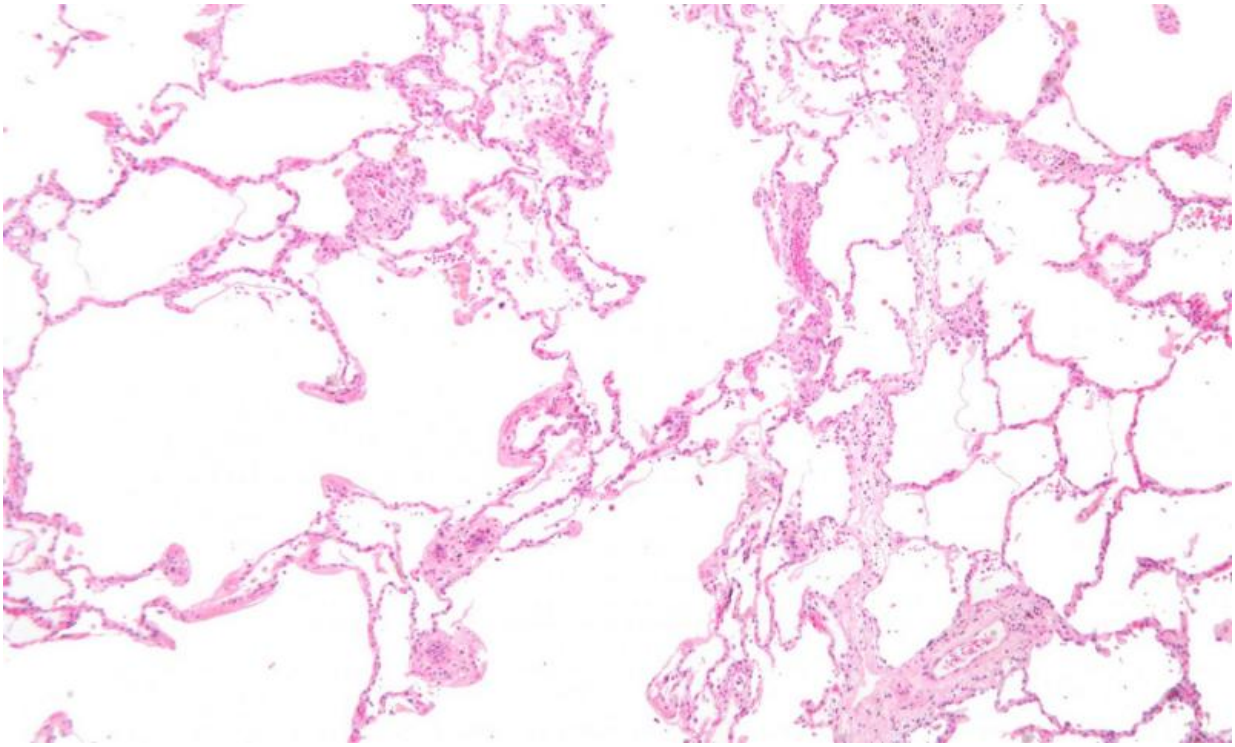

Micrograph showing emphysema (left – large empty spaces) and lung tissue with relative preservation of the alveoli (right). Credit: Wikipedia, CC-BY-SA 3.0

High indoor temperatures appear to worsen symptoms of chronic obstructive pulmonary disease, or COPD, particularly in homes that also have high levels of air pollutants, according to new research published in the Annals of the American Thoracic Society.

In "Respiratory Effects of Indoor Heat and the Interaction with Air Pollution in COPD," Meredith C. McCormack, MD, MHS, and her Johns Hopkins University colleagues report on a longitudinal study of 69 participants with moderate to severe COPD during the hottest days of the year.

"Previous studies have found that the elderly are particularly vulnerable to the effect of heat and more likely to die or be hospitalized during heat waves," said Dr. McCormack, an associate professor of medicine at Johns Hopkins and lead study author. "Our study builds on these findings by investigating exposure at the individual level, including in-home assessment of temperature and specific health effects of COPD. To our knowledge, this is the first study to report an interactive effect between indoor temperature and indoor air pollution in COPD."

Participants completed a daily questionnaire that included the Breathlessness, Cough, and Sputum Scale (BCSS), which provides a standardized rating of respiratory symptoms. Participants also performed daily spirometry to assess their lung function and recorded their use of rescue inhalers to manage symptoms.

This information was analyzed along with measurements of two air pollutants in their homes—fine particulate matter (PM2.5) and nitrogen dioxide (NO2)—as well as outdoor temperatures during the study period.

Researchers found:

• Participants spent the overwhelming majority of their time indoors. On the days they did go out, they spent on average about two hours.
• BCSS scores worsened with rising indoor temperatures and the use of rescue inhalers also increased.
• The effect of higher indoor temperatures was magnified by high levels

of PM2.5 and NO2. A 10 degree increase in temperature in a home at the 75th percentile of PM2.5 levels resulted in a severe increase in symptoms, compared to only a mild increase in symptoms that occurred when the home was at the 25th percentile of PM2.5.
• The effects of higher indoor temperatures were experienced immediately and continued for one to two days.
• Lung function, as measured by spirometry, was unaffected by increasing temperatures or higher levels of indoor air pollutants.
• Although 86 percent of participants lived in a home with some form of air conditioning, they did not turn it on during 37 percent of study days.

Dr. McCormack added that the study also found that even the short time participants spent outdoors led to respiratory symptoms on hotter days.

In a recent study of air pollution and the health consequences related to outdoor PM2.5 and ozone levels in cities across the U.S., researchers found that reducing these air pollutants to levels below those set by the EPA would likely save thousands of lives each year and result in far fewer serious illnesses as well as dramatically reduce missed days of school and work.

As temperatures rise due to global warming, she believes that study findings present health care professionals with an opportunity for targeted interventions and policy makers with the need to develop mitigation strategies to protect those most vulnerable to heat.

"Given that participants spent an overwhelming majority of their time indoors, which we believe is representative of patients with COPD generally, optimizing indoor climate and reducing indoor pollution represents a potential avenue for improving health outcomes," Dr. McCormack said.

Potential study limitations include being geographically confined to

Baltimore and the decision to not measure indoor ozone levels because previous studies found those levels to be low indoors in the city.

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