CALIFORNIA
AIR RESOURCES BOARD

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Air Pollutants from Electronic Air Cleaners

What health effects might be associated with the use of these devices?

What about them?

People spend an average of 87% of their time indoors. Events such as the COVID-19 pandemic and wildfires have increased interest in having better indoor air quality. Many people use air purifiers to improve the air quality inside their homes. Air purifiers use different electronic technologies to clean the air. Some types of air cleaning technologies release substances into the air that can react with chemicals and particles that are already present, such as volatile organic compounds (VOCs). VOCs are commonly found in indoor air from the use of scented cleaning products and fragrances, as well as other consumer products. The health risks from using different kinds of air cleaning technologies have not been adequately studied.

What was done?

Researchers from the University of California, Davis (UCD) collected existing scientific information about electronic air cleaning technologies. The white paper includes a summary of data on:

- six types of air cleaners and how they work;
- reactive compounds and by-products emitted or formed by air cleaners during use;
- possible health effects from exposure to emissions or chemical by-products from air cleaners;
- testing standards and regulations related to air cleaners; and
- gaps in knowledge on health risks of air cleaning technologies that need further research.

There were several challenges to this project. Many of the by-products formed from different technologies depend on the initial presence of reactive compounds in the air, which varies in buildings over time. Also, the number of by-products that are formed can be in the hundreds, which complicates the process of determining their possible health effects. More research is needed on by-products and indoor air chemistry to better understand their health impacts.

Findings

Researchers found the primary compounds of concern are ozone, formaldehyde, and ultrafine particles. Skin and eye exposure to ultraviolet (UV) radiation from certain UV devices was also a health concern.

The research team recommends requiring compliance with a stricter ozone emission standard of 5 parts per billion (ppb) compared to California's current regulation limit of 50 ppb. This would provide a direct health benefit and reduce secondary formaldehyde and ultrafine particle formation that's driven by ozone chemistry.

They recommend regulating formaldehyde and ultrafine particle emissions from air cleaners if further tests show unacceptable health risks. As CARB works to address research gaps mentioned in this paper, efforts to educate the public on air cleaner risks will be helpful to build awareness and inform people's purchasing decisions.

More Information

This is a short summary of "White Paper: Air Pollutant Emissions and Possible Health Effects Associated with Electronic Air Cleaning Devices," authored by Theresa Pistochini and Chris Cappa from the University of California, Davis. Work for this contract was conducted between September 2022 – August 2023. Visit CARB Research or contact the Research Division for more information.

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