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Secondhand Exposure to Marijuana Smoke

What is secondhand marijuana smoke?

Secondhand marijuana smoke is a complex chemical mixture of smoke emitted from burned or combusted marijuana. In addition to cannabinoids like THC and CBD, secondhand marijuana smoke contains fine particulate matter that can be breathed deeply into the lungs.⁽¹⁾ Marijuana smoke can also contain leftover pesticides, solvents, mold, heavy metals, and other chemicals from burning or combustion.^(2,3)



How does secondhand marijuana smoke compare to secondhand tobacco smoke?

Marijuana smoke contains many of the same constituents and toxins as tobacco smoke,⁽²⁾ and some toxins have been found in higher quantities in marijuana smoke than in tobacco smoke, including ammonia, hydrogen cyanide, nitric oxide, and some aromatic amines.⁽²⁾

What are the potential health risks from exposure to secondhand marijuana smoke?

Although knowledge about the harms of secondhand tobacco smoke is widespread, ⁽⁴⁾ many people still assume exposure to secondhand marijuana smoke is harmless.^(3,5) Burning any plant material releases toxic chemicals and fine particles that can go deep into the lungs and can cause cardiovascular disease, or make existing diseases of the heart and lungs worse. ⁽⁶⁻⁸⁾ Inhaling smoke, in general, is not safe for your lungs and cardiovascular system.⁽⁶⁻⁸⁾

We don't have good studies on the effects of secondhand cannabis smoke in humans. However, a recent study exposed rats to secondhand cannabis smoke in a controlled lab setting and found that one-minute of exposure to secondhand cannabis smoke impacted arteries in a comparable way to tobacco smoke exposure, making it harder for arteries to expand and allow for healthy blood flow.⁽³⁾ Furthermore, arteries in the rats exposed to marijuana smoke recovered at a slower rate than after exposure to tobacco smoke.⁽³⁾ These effects occurred even when the cannabis being consumed did not contain cannabinoids (THC or CBD), and even when the cannabis rolling paper was not used. The cannabis used in these studies was free from pesticides and did not contain stems or seeds.⁽³⁾ Short-term exposure to secondhand marijuana smoke can be harmful to health, and repeated exposure to cannabis smoke may permanently damage the artery walls, which in turn can cause blood clots, heart attack, and even stroke.⁽⁹⁻¹¹⁾

Secondhand marijuana smoke may also have other health harms. The World Health Organization review of the health effects of cannabis did not find evidence that THC is a cancer-causing agent, but concluded that evidence suggests that marijuana smoke is carcinogenic.⁽¹²⁾ The impacts of secondhand exposure to marijuana smoke were not reviewed by the WHO. In 2009, the California Office of Environmental Health Hazard Assessment added marijuana smoke to its Proposition 65 list of carcinogens, noting at least 33 individual constituents present in marijuana smoke that have been classified as carcinogenic.⁽¹³⁾

Can ventilation prevent health harms from secondhand marijuana smoke?

Many of the harmful constituents found in marijuana smoke cannot be eliminated through air ventilation systems or air cleaning technologies. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) states in their standards for ventilation for acceptable indoor air quality that there is no safe level of exposure to secondhand smoke, that marijuana

smoke should not be allowed indoors, and that ventilation and other air filtration technologies cannot eliminate all of the health risks caused by marijuana and other smoke.⁽¹⁴⁾

Can exposure to secondhand marijuana smoke result in a positive drug test?

Evidence indicates that adults exposed to secondhand marijuana smoke under usual conditions would not test above standard cutoffs for marijuana use on a workplace urine test or driving impairment blood test.⁽¹⁵⁾ However, three recent studies found that, in extreme cases of heavy exposure, (e.g., long duration in a confined, unventilated space) nonsmokers had positive tests for THC in oral fluid and blood up to three hours following the exposure.⁽¹⁶⁻¹⁸⁾

What is thirdhand marijuana smoke?

Thirdhand smoke is the residue from smoke that remains on walls, carpets, furniture, and other surfaces long after the smoker has left the room. Chemicals in this residue can continue to “off gas” and expose non-users to potentially harmful toxicants, including additional harmful particulate matter that can be inhaled deeply into the lungs, and volatile organic compounds (VOCs). While studies have documented the constituents of thirdhand tobacco smoke,⁽¹⁹⁾ no studies have been conducted assessing the constituents of thirdhand marijuana smoke.

What do we know about secondhand exposure to vaped marijuana?

Electronic smoking or vaping devices release secondhand aerosol. There have not been any studies on the constituents in or effects of secondhand marijuana aerosol. Studies on vaped nicotine have found that aerosol from electronic nicotine products contains fine particulate matter and other potential toxins that decrease the surrounding air quality and can be harmful to bystanders.^(20,21) More research is needed to understand the potential impacts from secondhand marijuana aerosol. (See also the factsheet on Vaping Marijuana (<http://learnaboutmarijuanawa.org/factsheets/vaping.htm>).

What policies are being put in place related to secondhand marijuana smoke exposure in public and in workplaces?

In most of the states that have regulated adult marijuana use (including Washington State), statewide smokefree policies have been amended to include marijuana smoke, or marijuana policies have been written to mirror smokefree tobacco policies that protect bars, restaurants, worksites, and other public places. However, all states have had regulatory and/or legislative discussions at the state or local level about providing exceptions public consumption of marijuana in certain places, such as cannabis cafes, lounges, or outdoor spaces.

Helpful Resources

- Secondhand Marijuana Smoke and Kids. (<https://www.health.harvard.edu/blog/secondhand-marijuana-smoke-and-kids-2018060514012>) Harvard Health Blog, Harvard Medical School
- Protecting Nonsmokers from Secondhand Marijuana Smoke - 2018. (<https://no-smoke.org/protecting-nonsmokers-secondhand-marijuana-smoke/>) American Nonsmokers' Rights Foundation
- What are the Effects of Secondhand Exposure to Marijuana Smoke? (<https://www.drugabuse.gov/publications/research-reports/marijuana/what-are-effects-secondhand-exposure-to-marijuana-smoke>) National Institute on Drug Abuse

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