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Secondhand smoke, mainstream smoke, and sidestream smoke: Risks and differences ^[1]

Dear Alice,

I am well aware of the dangers of smoking, but one concept continues to confuse me. How is secondhand smoke more dangerous than mainstream or sidestream smoke?

Answer

Dear Reader,

When it comes to smoke, one connection is clear: no exposure is safe. There's evidence to suggest that even secondhand smoke can have serious effects on human health. According to the [American Lung Association](#) ^[2], all types of secondhand smoke, which include mainstream and sidestream smoke, are harmful to your health. Determining the varying levels of harm from each type of smoke is difficult, but to better answer this question, it may help to begin by defining some key terms. Secondhand smoke, also known as environmental tobacco smoke (ETS), is an umbrella term for any smoke to which non-smokers are exposed. Those who are exposed to ETS are engaging in involuntary, or passive, smoking. Mainstream and sidestream smoke are both types of ETS. Mainstream smoke refers specifically to the smoke a smoker exhales after inhaling, while sidestream smoke refers to the smoke that wafts off the end of a lit cigarette, cigar, or pipe. Sidestream smoke carries more carcinogens (cancer-causing substances) than mainstream smoke. Further, these substances can penetrate further into the lungs, which in turn means that sidestream smoke comes with an increased risk to a person's health.

Just as smoking a cigarette directly can be harmful, inhaling secondhand smoke also carries its own risks. The Environmental Protection Agency (EPA) classifies secondhand smoke as a Group A carcinogen, along with other substances such as asbestos and arsenic. Group A carcinogens are substances known to cause cancer in humans, and therefore, no level of exposure is safe. To give you some numbers to think about, secondhand smoke contains about 70,000 chemicals with 70 known carcinogens. Even short exposure to secondhand smoke may cause changes in the passive smoker's blood, which could damage blood vessel linings and disturb heart rate and rhythm.

In addition to secondhand smoke from traditional cigarettes, there are also [electronic cigarettes](#) ^[3], which you may recognize as e-cigs, vapes, or pods. These battery-powered devices actually aerosolize (turn to a vapor) liquid chemicals, such as nicotine, for inhalation by the user. Some of the chemicals included in secondhand aerosols are nicotine or heavy metals such as lead. However, since it's a newer product relative to traditional cigarettes, there is less information about the long-term effects of secondhand aerosols. That being said, the effects of secondhand smoke from traditional cigarettes is better known. For example, nearly 34,000 deaths from heart disease each year are attributed to secondhand smoke. It can also increase the risk of developing heart disease or cancer for those who are exposed at work or home. With that said, all children and adults with heart conditions are particularly susceptible to the adverse effects of secondhand smoke.

Another type of smoke you may want to be aware of is thirdhand smoke. According to [Mayo Clinic](#) ^[4], thirdhand smoke is the carcinogen-laden residue of smoking that builds up on surfaces (such as walls and furniture) over time. This residue may actually combine with other indoor pollutants to create a mix of toxic chemicals, which could be hazardous to human health. Unfortunately, it's difficult to remove all of the residue, even if you clean. So, the best way to avoid thirdhand smoke exposure is to keep a smoke-free environment.

Since the negative health effects of secondhand smoke have become more widely recognized, the percentage of non-smokers who are exposed to secondhand smoke has actually been on the decline since the early 2000s. There are also fewer and fewer public spaces allowing smoking. In fact, many bars, restaurants, and some city streets have adopted completely smoke-free environments.

While the risks of secondhand smoke for non-smokers are serious, smoking is still much riskier for those who chose to partake. As such, here's hoping this information cleared the air around the risks associated with smoke exposure.

Alice!

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