

## **EXECUTIVE SUMMARY**

Electronic-cigarettes (e-cigarettes) are battery-powered devices of many different configurations that deliver vaporized nicotine and other chemicals or flavorings to users, but that do not contain tobacco or require combustion. E-cigarettes have an internal, rechargeable, battery-operated heat source that converts liquid nicotine and/or flavorings into a mist or vapor that the user inhales. These devices are frequently promoted as a healthier or safer alternative to traditional cigarettes for users and bystanders. Consequently, there has been growing interest among manufacturers and others to allow e-cigarettes to be used indoors and in other settings where traditional cigarettes have previously been banned. There has, however, been conflicting and at times confusing information presented to the public regarding the public health risks and benefits associated with e-cigarettes. This white paper attempts to present the best available science on the subject today.

The use of e-cigarettes (or “vaping”) has seen an unprecedented increase worldwide. Vaping has been promoted as a beneficial smoking cessation tool and/or an alternative nicotine delivery device that contains no combustion byproducts. However, nicotine is highly addictive. Furthermore, available research indicates that vaping solutions and their emissions may contain much more than just nicotine, including aerosolized flavorings, propylene glycol, and other intentional and unintentional contaminants. These ingredients could present an as-yet undefined health hazard to both users and bystanders.

Whereas e-cigarette use and exposure may lower some or most risks associated with conventional cigarette use, the health effects of nicotine and aerosol exposures from e-cigarettes are not well-understood at this time. Current research indicates that vaping aerosols are not without risk, especially for nearby persons in areas with limited ventilation and persons with compromised health conditions. Limited published studies that evaluated the potential hazardous effects of the natural and/or synthetic chemicals used in e-cigarettes indicate that there are potential health effects reported for both users and those exposed secondhand.

Multiple scientific reports express the need for more research. There are several key data gaps and areas of uncertainty that hinder a more quantitative assessment of health risks related to e-cigarettes at this time. These include:

- Quality control of these products is lacking for both product constituents and labeling.
- Laboratory studies may not reflect actual exposures during use because of the variability in types of devices, user vaping habits and duration, and because many users mix their own vaping solutions.
- There is limited data on chemical emissions/thermal degradation products/exposures (especially among bystanders and in confined indoor settings).
- There is little information on the dynamics of pre and post respiration aerosols and their fate in the environment.
- There is limited information on dose-response relationships for many constituents, such as short- or long-term health effects associated with low-level exposures, including those for vulnerable populations.
- There is little or no information about the health effects of flavorings that are inhaled rather than ingested.

- There is little information about the synergistic effects from e-cigarette contents and other environmental contaminants.

Note that these issues are related only to an assessment of human health risks. They do not incorporate other potentially important factors, such as public risk perceptions, risk management options/control measures (e.g., ventilation), and nicotine dependence. In addition, serious safety issues have been reported and need to be addressed, including child safety and poisonings, battery explosions, and the potential for the vapor to set off smoke alarms.

Given this review of available information, the existing research does not appear to warrant the conclusion that e-cigarettes are “safe” in absolute terms. Although they may provide a “safer” alternative to tobacco cigarettes for the user, these products emit airborne contaminants that may be inhaled by both the user and those in the vicinity of vaping. Many of the data sources reviewed confirm that e-cigarettes are not emission-free and that their pollutants could be of health concern for users and those who are exposed secondhand. Clearly, e-cigarettes lack the combustion products produced by smoking tobacco, many of which are associated with cancer development. Although nicotine may not cause cancer, it is associated with other adverse physiological effects. In addition, the other components in e-cigarettes may not be without risk, particularly when they are inhaled rather than ingested. Therefore, e-cigarettes should be considered a source of volatile organic compounds (VOCs) and particulates in the indoor environment that have not been thoroughly characterized or evaluated for safety.

The Food & Drug Administration (FDA) currently regulates only e-cigarettes that are marketed for therapeutic purposes. However, the FDA has proposed a rule extending its tobacco product authorities to include other products like e-cigarettes and the World Health Organization (WHO) has recommended that consumers be strongly advised not to use electronic nicotine delivery systems, including e-cigarettes, until they are deemed safe and effective and of acceptable quality by a competent national regulatory body. Although several agencies and organizations have adopted restrictions on the use of e-cigarettes in public places, there is currently no U.S. federal law or regulation that explicitly bans the use of e-cigarettes on airplanes, railroads, buses, or other modes of transportation.

Because of concerns about primary and secondary exposure to e-cigarette vapors and liquids (also called “e-juices”), AIHA supports risk-based regulation of e-cigarettes using reliable safety, health, and emissions data. Four areas of risk based regulation relating to the safety of primary users and people exposed to secondhand vapors or e-juices should be considered:

1. Physical/Electrical Hazards - All e-cigarette devices, whether they are being used for therapeutic or recreational purposes, should be evaluated for potential physical and/or electrical hazards by applicable regulatory agencies.
2. Accidental Exposure - The health risks and economic consequences of accidental exposure to e-juice liquids by children, adults, and pets should be addressed, including proper labeling and child-resistant packaging requirements.
3. New Product/New Chemical Use - All future e-juice components that may be used by consumers should be fully evaluated for any potential hazards (e.g., toxicity, flammability, safety hazards, and secondary exposures) prior to introduction into the marketplace.
4. Relationship to Current Smoking Bans - Because e-cigarettes are a potential source of pollutants (such as airborne nicotine, flavorings, and thermal degradation products), their use in the indoor environment should be restricted, consistent with current smoking bans, until and unless research documents that they will not significantly increase the risk of adverse health effects to room occupants.