

E-cigarettes: Effects on Bystanders and Users

About E-cigarettes

- Battery operated devices that heat liquid nicotine, solvents, flavorings and other chemicals to form an aerosol that users and bystanders inhale. Device designs evolve rapidly¹ and simulate the visual, sensory, and behavioral aspects of smoking.⁴
- Nicotine intake is altered by choice of device design, e-liquid and users' puffing style.²
- E-cigs are further customizable with replacement parts and other adjustments,¹ but customizing can result in explosion and injuries.⁵
- Exhaled aerosol (secondhand aerosol), leaves residue on surfaces which later releases cancer-causing chemicals into the air.⁶

The World Health Organization² calls e-cigarette aerosol a
"new air contamination source"

Health Effects of Secondhand Aerosol on Bystanders

Constituents	Health Effects on Bystanders
Formaldehyde and other carbonyls	Cancer risk ^{2,7,8}
Acrolein	Risk of cardiovascular disease, cancer, & emphysema ^{9,10}
Metal and silicate particles	Toxic to human cells; ^{2,11} some metals higher in SHA than in secondhand tobacco smoke ²
Nicotine	Highly addictive; cardiovascular effects; harmful to fetal lung & brain development; permanent effects on developing brains of children, teens, and young adults ^{8,12-14}

Health Effects on Users: Evolving Research

- **Cardiovascular effects include:** poor circulation and wound healing,¹⁵ arteries clogged with fatty deposits,¹⁶ aortic stiffness and high blood pressure,¹⁷ and changes in the way the heart pumps blood¹⁸ and how the blood vessels respond.¹⁹
- **Oxidative stress damages cells**, contributing to heart and blood vessel diseases, lung diseases (i.e. COPD), cancer and neurodegenerative disorders (i.e. Alzheimers).^{10,18}
- **Lung cells are impaired** and have less capacity to fight infection.²⁰
- **Toxic flavoring chemicals** (e.g., diacetyl) have been found in the aerosols of 47 of 51 flavored e-cigarettes tested. Over 7000 flavoring chemicals still need to be tested.²¹ The Flavoring Extracts Manufacturing Association (FEMA) issued a warning for *workers* who may inhale flavoring chemicals, but the public remains unprotected.

Generally Recognized as Safe (GRAS) does NOT mean a chemical is
*safe to inhale, only that it may be safe to eat.*³

Mixed Evidence for E-cigarettes as a Quit Aid

- Recent review articles show e-cigarettes as ineffective quit aids,⁸ and *dual users* (use cigarettes and e-cigarettes) are significantly less likely to quit conventional cigarettes.²²
- However, in the 2014-15 U.S. Population Survey, e-cigarette users were more likely to make a conventional cigarette quit attempt and more likely to succeed than non-users.²³
 - *Note:* 11.5% of the survey sample²³ were *dual users* who have *double the risk of dying* from heart disease compared to smokers who quit completely.²⁴

For more information, contact the Kentucky Center for Smoke-free Policy
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Recommendations for Clinicians Whose Patients Wish to Quit Smoking

- Instead of using e-cigarettes to quit, advise patients to use evidence-based treatments: FDA-approved medications and counseling (e.g. individual, online, 1-800-QUITNOW).
- If the patient is a dual user, encourage them to stop using e-cigarettes as they may lead to relapse to conventional cigarette smoking.

Policy Recommendation

“... e-cigarettes emit harmful chemicals into the air and need to be regulated in the same manner as tobacco smoking.”²⁵

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