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RESEARCH NEWS

E-cigarettes are beneficial in short term but longer forecast is uncertain, landmark US report finds

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A US report that examined over 800 published studies has concluded that electronic cigarettes can help older smokers avoid the worst health consequences of cigarette smoking but can also lead younger non-smokers to try the deadly habit.

Public Health Consequences of E-Cigarettes,[1] a consensus study published by the National Academies of Sciences, describes a scenario in which the overall health impact of e-cigarettes could initially be broadly positive, as millions of smokers shift from tobacco cigarettes to vaping. But these gains could fade over time as more of the new users are adolescent never-smokers rather than older adults seeking an alternative to tobacco.

On the key question of how harmful e-cigarettes are the evidence is still lacking, the report says. It assigns one of six evidence levels to each finding: conclusive, substantial, moderate, limited, insufficient, or no available evidence.

It found "no available evidence whether or not e-cigarette use is associated with intermediate cancer endpoints in humans." This held true in studies measuring e-cigarettes against real cigarettes and also in studies measuring them against not smoking.

And it found "no available evidence whether or not e-cigarettes cause respiratory diseases in humans" and "no available evidence whether or not e-cigarette use is associated with" major cardiovascular outcomes and subclinical atherosclerosis. The only harms found to be conclusively proved were those related to exploding batteries in e-cigarettes and to drinking, injecting, or spilling their liquid.

But ignorance about long term consequences is inevitable given the short history of e-cigarettes, noted the 13 member committee that wrote the report. Numerous biomarkers and proxy endpoints suggest that e-cigarettes have real effects beyond those of nicotine and that they emit various noxious compounds, although at much lower levels than cigarettes.

The report found "substantial evidence" that e-cigarette aerosols can induce acute endothelial cell dysfunction and promote oxidative stress. But it warned that the short term effect is less than that from cigarettes and that its long term significance is unknown.

The authors noted "insufficient evidence" that e-cigarette use is associated with long term changes in heart rate, blood pressure, and cardiac function. And they found "limited evidence" from in vivo animal studies to support the hypothesis that long term e-cigarette use could increase the risk of cancer, as well as "limited evidence" that the aerosol can be mutagenic in humans—but they found "substantial evidence" that it contains compounds capable of harming DNA.

Conversely, the report found "limited evidence" for improving symptoms in adult tobacco smokers with asthma, chronic obstructive pulmonary disease, or periodontal disease who switch to e-cigarettes. It found "conclusive evidence" that switching completely from tobacco smoking to e-cigarettes reduces exposure to harmful compounds. And it found "substantial evidence" that switching "results in reduced short-term adverse health outcomes in several organ systems."

E-cigarettes' usefulness as a quitting aid has been intensely debated in the US. The new report suggests that the answer often depends on a smoker's age and history. "Substantial evidence" showed that e-cigarette use increases the risk of young people subsequently trying smoking and "moderate evidence" that it increases overall subsequent tobacco use.

However, "taken together the evidence suggests that while e-cigarettes might cause youth who use them to transition to use of combustible tobacco products, they might increase adult cessation of combustible tobacco cigarettes."

Under that assumption, "the modeling projects that use of these products will generate a net public health benefit, at least in the short run. The harms from increased initiation by youth will take time to manifest, occurring decades after the benefits of increased cessation are seen.

"However, for long-range projections (e.g., 50 years out), the net public health benefit is substantially less and is negative under some scenarios."

The notion that e-cigarettes could be a useful tool over any timescale is far less popular among US public health specialists than their UK counterparts. But the US Food and Drug Administration is preparing to try the idea, its commissioner, Scott Gottlieb, told the Associated Press last week.[2] His agency plans to use its regulatory powers to drastically reduce nicotine levels of US cigarettes in the coming years to a level that cannot satisfy smokers, while simultaneously easing regulatory hurdles for e-cigarette makers.

1 National Academies of Sciences, Engineering, and Medicine. Public health consequences of e-cigarettes. National Academies Press, 2018. https://doi.org/10.17226/24952. Available for free download at: https://www.nap.edu/catalog/24952/public-health-consequences-of-e-cigarettes.

2 Perrone M. Anti-smoking plan may kill cigarettes—and save Big Tobacco. 19 Jan 2018. https://www.washingtonpost.com/business/anti-smoking-plan-may-kill-cigarettes--and-save-big-tobacco/2018/01/19/c940bc0e-fcef-11e7-9b5d-bbf0da31214d_story.html?utm_term=.29c4a6a2bb86.