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Letter

Analysis Points to Important Research Gaps About the Impact of E-cigarettes

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Mendez and Warner[1] demonstrate the potential of, and the uncertainty about, the impact of e-cigarettes on the public health toll from smoking. They use a dynamic population simulation model of the public health impact of e-cigarettes in the United States through 2100. The results from the 360 scenarios they consider range from 143 000 to 65 million life-years saved. Research from multiple disciplines addresses many of the sources of uncertainty that lead to the wide range of simulation results. Toxicologic research provides good and strengthening data on toxic exposures from noncombustible tobacco products relative to combustible tobacco.[2] Randomized clinical trials provide a growing body of evidence on the relative effectiveness of e-cigarettes in smoking cessation.[3]

The range of simulation results demonstrates the need for social science research on consumer behavior in e-cigarette markets. Mendez and Warner use a range of assumptions that e-cigarettes increase the background population rate of smoking cessation by 10%–100%. The range of assumptions drives substantial uncertainty in the range of simulation results. For example, in the first set of scenarios presented in their Table 2, the range of assumptions about smoking cessation implies that the impact of e-cigarettes on the health toll from smoking range from 5.7 to 39 million life-years saved.

The impact of e-cigarettes on the population rate of smoking cessation depends on three unknowns: the relative effectiveness of e-cigarettes as a smoking cessation method, the fraction of smokers who use e-cigarettes when they attempt to quit, and the fraction of all smokers who attempt to quit each year. Although randomized clinical trials provide evidence on the relative effectiveness of e-cigarettes for smoking cessation, the other two unknowns involve consumer behavior in e-cigarette markets.

The current impact and future potential of e-cigarettes on smoking cessation depend on how consumers behave, compared with the counterfactual scenario where e-cigarettes are not available. Because e-cigarettes entered US markets around 2007, data from that decade approximate the counterfactual. Mendez and Warner assume that without e-cigarettes the background population smoking cessation rate is 4.35%. That pre-e-cigarette smoking rate cessation was achieved when 20%–30% of quit attempts involved medications and when 44% of smokers had attempted to quit smoking for 1 day or longer within the past year.[4] With e-cigarettes on the market, in 2014–2015: 29% of quit attempts involved medications, 34.7% involved switching to e-cigarettes, and 50% of smokers had attempted to quit smoking for 1 day or longer.[4] Randomized clinical trials suggest that e-cigarettes are twice as effective as US Food and Drug Administration (FDA)-approved medications and four times as effective as "cold turkey" quitting. Combining the post-e-cigarettes shifts in consumer behavior with randomized clinical trial-based assumptions about the relative effectiveness of methods, we calculate that e-cigarettes could increase the population smoking cessation rate by 112%, from 4.35% to 9.22%. (Details of the calculations are available from the authors upon request.)

The future potential of e-cigarettes on smoking cessation depends on future developments in the e-cigarette market, which in turn depend on factors that drive consumer demand including prices, product availability, consumer risk perceptions, and advertising. Several trends may limit future US consumer demand for e-cigarettes. Many states have enacted or are considering higher excise taxes on e-cigarettes. Local, state, and federal regulatory actions are beginning to limit the availability of flavors popular among adult smokers who use e-cigarettes for smoking cessation.[5] Since 2012, a growing fraction of the population perceive e-cigarettes to be more harmful than combustible cigarettes. Moreover, the outbreak of lung injuries in September 2019 sharply increased consumer risk perceptions, and risk perceptions have remained elevated despite evidence that the outbreak was due to illegal THC products, not commercially produced nicotine e-cigarettes.[6]

However, future developments in e-cigarette marketing and advertising could lead to large increases in e-cigarette use for smoking cessation. In 2018, the e-cigarette industry spent $100 million on US advertising, although the advertisements cannot include health claims or cessation claims. In recent actions in 2019 and 2020, the FDA has used the modified risk tobacco product pathway to authorize the marketing of a snus smokeless tobacco product as reduced risk and the marketing of a heat-not-burn tobacco product as reduced exposure. In the United States, e-cigarettes are much more popular than snus and heat-not-burn products. FDA authorization of e-cigarettes through the modified risk tobacco product pathway would allow informative advertising designed to further increase consumer demand for e-cigarettes.

Informative advertising of e-cigarettes could increase the population rate of smoking cessation up to or beyond the upper bound in the Mendez and Warner simulations. E-cigarette advertising could improve the accuracy of consumer risk perceptions and encourage more smokers to use e-cigarettes for smoking cessation. In addition, econometric research finds that smoking cessation product advertising and e-cigarette advertising increase smoking cessation attempts.[7,8] If e-cigarettes were used in 50% of all quit attempts, and 60% of smokers attempt to quit each year, we calculate that the population rate of smoking cessation would increase by 204%, from 4.35% to 13.24%.

Although e-cigarette advertising has the potential to increase smoking cessation, it might also encourage nonsmokers to initiate vaping. The public health toll from increased vaping might offset part of the reduction in the toll from smoking. If e-cigarette manufacturers use the modified risk tobacco product regulatory pathway, they will be required to provide evidence that the marketing plan is appropriate for public health, taking into account the impact on initiation. Because of legal constraints, current e-cigarette marketing consists of what economists term "image advertising" that associates the advertised products with attractive people and locations. To follow the modified risk tobacco regulatory pathway, the future challenge for manufacturers would be to shift away from image advertising. Instead, manufacturers might be able to craft advertising that informs adult smokers about the health and cessation advantages of e-cigarettes, without appealing to nonsmokers. The e-cigarette marketing plans might also include technologies to enhance age verification and prevent underage use.

Mendez and Warner conclude that e-cigarettes hold the potential to significantly reduce the health toll from smoking but are not a magic bullet. We agree, although our calculations suggest that the contribution could be near or even beyond the upper range considered in their simulations. More importantly, our discussion of their simulation results stresses the need for economists and other social scientists to address research gaps about the factors that drive e-cigarette consumer choices. More research is crucial to guide public policy toward e-cigarette taxes, restrictions on flavors, and the regulation of advertising and marketing.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at https://academic.oup.com/ntr.

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