Do We Know How Risky E-Cigarettes Are?

W. Kip Viscusi | Nov 14, 2016 | Opinion

Electronic cigarettes, or e-cigarettes, are lithium-ion powered devices that do not burn tobacco, but instead generate a nicotine vapor by vaporizing a fluid. Because conventional cigarettes have much higher levels of carcinogenic and toxic chemicals than e-cigarettes, conventional cigarettes pose health hazards—such as cancer—that are many orders of magnitude greater than those linked to these “vaping” devices. However, as a nicotine delivery mechanism, e-cigarettes, like conventional cigarettes, do create the possibility of addiction.

The emergence of e-cigarettes has generated mixed regulatory responses. Some public health officials, such as those in the United Kingdom, view e-cigarettes as a potential alternative to cigarettes and as a mechanism to foster smoking cessation, whereas many U.S. public health officials have tended to treat e-cigarettes in the same manner as conventional cigarettes. Whether and how we should regulate e-cigarettes depend in part on how people perceive the risks associated with e-cigarettes and whether these perceptions correspond with the risks posed by the product. Is the principal market failure an underestimation of the risks of e-cigarettes—which is the usual motivation for hazard warnings to boost awareness of risk—or is there a need for a different kind of informational approach to regulation of e-cigarettes?

To address the nature and extent of any informational shortcomings related to e-cigarettes, my article, “Risk Beliefs and Preferences for E-Cigarettes,” utilized a nationally representative survey of over 1,000 adults to elicit estimates of the public’s perceptions of the health risks caused by both conventional cigarettes and e-cigarettes. The survey asked respondents to assess out of 100 smokers, how many did they think would die from lung cancer, or from all smoking-related diseases because those 100 individuals smoked?

The risk beliefs for the hazards posed by conventional cigarettes followed the patterns in my previous studies. The lifetime mortality risk belief for lung cancer was 0.41—meaning that survey respondents thought that, on average, smoking would cause 40 out of 100 smokers to die from lung cancer—and the lifetime smoking-related mortality risk belief for all smoking-related diseases was 0.50. Each of these levels of risk belief was somewhat higher than the estimated risk levels based on government smoking statistics.

The key question regarding e-cigarettes is whether consumers perceive them to be much less dangerous than conventional cigarettes. Does the public understand that e-cigarettes pose comparatively minimal health risks? Unfortunately, the survey showed that the risk beliefs for e-cigarettes are only slightly lower than those for conventional cigarettes. The level of e-cigarette risk beliefs for the full sample was 0.27 for lung cancer mortality risks over the smoker’s lifetime and 0.33 for total smoking-related mortality risks over the smoker’s lifetime.

Statistical analyses found that people generally use their risk beliefs about conventional cigarettes as
their starting point, and that they then place a 70 percent weight on these values in forming their risk beliefs for e-cigarettes. These risk beliefs vary across the population in predictable ways: smokers and younger respondents have lower risk assessments for e-cigarettes, since they are more likely to have acquired information about the product. For example, smokers believe that the lung cancer death risks from e-cigarettes are 0.21 and the total mortality risks are 0.23.

Analysis of the responses to qualitative questions in the survey yielded results similar to those implied by the objective risk belief measures. Forty four percent of respondents believed that e-cigarettes were just as risky as conventional cigarettes, 38 percent believed that they were less risky, and only 14 percent believed that they were much less risky. The remaining 4 percent of respondents believed that e-cigarettes were more risky or much more risky than conventional cigarettes. Most of those who have tried e-cigarettes indicated that they did so because they considered them to be less risky, not because they provided better flavor or generated less exposures to others.

While e-cigarettes pose far fewer health risks—such as cancer—than conventional cigarettes, it is nevertheless important to ascertain whether people understand that e-cigarettes do deliver nicotine and consequently pose risks of addiction. There appears to be no shortfall of beliefs in this area. Over half of all respondents in the survey believed that e-cigarettes contained just as much nicotine as conventional cigarettes, with beliefs that they contained less nicotine being the most most-common response. Almost two-thirds of respondents believed that e-cigarettes were just as difficult to quit as conventional cigarettes. Moreover, there was a correspondence between perceptions of nicotine levels in e-cigarettes and perceptions of how difficult it is to quit these products. This is broadly consistent with people understanding the potential addictiveness of e-cigarettes.

These findings suggest that regulators have an unusual informational challenge when it comes to e-cigarettes, because the main shortfall is not an underestimation of the risk associated with the product. E-cigarettes are in fact far less dangerous than is generally believed. The implication is that too few smokers considering the pairwise choice between conventional cigarettes and e-cigarettes will switch to e-cigarettes, because they underestimate how much risk they could avert by making this switch. These findings also suggest a more general regulatory challenge: it may be difficult for safer new product alternatives to make inroads in a market for highly dangerous products.

Regulation of e-cigarettes involves many other dimensions, such as whether there should be age restrictions on their purchase. But the nature of risk beliefs for e-cigarettes means that regulatory approaches that treat e-cigarettes as being comparable to conventional cigarettes are likely to reinforce current overestimation of the relative risks of e-cigarettes.

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