

# The application of a decision-theoretic model to estimate the public health impact of vaporized nicotine product initiation in the United States

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## **Abstract**

**Introduction:** The public health impact of vaporized nicotine products (VNP) such as e-cigarettes is unknown at this time. VNP uptake may encourage or deflect progression to cigarette smoking in those who would not have otherwise smoked, thereby undermining or accelerating reductions in smoking prevalence seen in recent years.

**Methods:** The public health impact of VNP use are modeled in terms of how it alters smoking patterns among those who would have otherwise smoked cigarettes and among those who would not have otherwise smoked cigarettes in the absence of VNPs. The model incorporates transitions from trial to established VNP use, transitions to exclusive VNP and dual use, and the effects of cessation at later ages. Public health impact on deaths and life years lost is estimated for a recent birth cohort incorporating evidence-informed parameter estimates.

**Results:** Based on current use patterns and conservative assumptions, we project a reduction of 21% in smoking-attributable deaths and of 20% in life years lost as a result of VNP use by the 1997 US birth cohort compared to a scenario without VNPs. In sensitivity analysis, health gains from VNP use are especially sensitive to VNP risks and VNP use rates among those likely to smoke cigarettes.

**Conclusions:** Under most plausible scenarios, VNP use generally has a positive public health impact. However, very high VNP use rates could result in net harms. More accurate projections of VNP impacts will require better longitudinal measures of transitions into and out of VNP, cigarette and dual use.

**Implications:** Previous models of VNP use do not incorporate whether youth and young adults initiating VNP would have been likely to have been a smoker in the absence of VNPs. This study provides a decision-theoretic model of VNP use in a young cohort that incorporates tendencies toward smoking and shows that, under most plausible scenarios, VNP use yields public health gains. The model makes explicit the type of surveillance information needed to better estimate the effect of new products and thereby inform public policy.

## **Recommended Citation**

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