

# Public health implications of vaping in the US: The smoking and vaping simulation model

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## Abstract

**Background:** Nicotine vaping products (NVPs) are increasingly popular worldwide. They may provide public health benefits if used as a substitute for smoking, but may create public health harms if used as a gateway to smoking or to discourage smoking cessation. This paper presents the Smoking and Vaping Model (SAVM), a user-friendly model which estimates the public health implications of NVPs in the USA.

**Methods:** SAVM adopts a cohort approach. We derive public health implications by comparing smoking- and NVP-attributable deaths and life-years lost under a No-NVP and an NVP Scenario. The No-NVP Scenario projects current, former, and never smoking rates via smoking initiation and cessation rates, with their respective mortality rates. The NVP Scenario allows for smoking- and NVP-specific mortality rates, switching from cigarette to NVP use, separate NVP and smoking initiation rates, and separate NVP and smoking cessation rates. After validating the model against recent US survey data, we present the base model with extensive sensitivity analyses.

**Results:** The SAVM projects that under current patterns of US NVP use and substitution, NVP use will translate into 1.8 million premature smoking- and vaping-attributable deaths avoided and 38.9 million life-years gained between 2013 and 2060. When the NVP relative risk is set to 5%, the results are sensitive to the level of switching and smoking cessation rates and to a lesser extent smoking initiation rates. When the NVP relative risk is raised to 40%, the public health gains in terms of averted deaths and LYL are reduced by 42% in the base case, and the results become much more sensitive to variations in the base case parameters.

**Discussion:** Policymakers, researchers, and other public health stakeholders can apply the SAVM to estimate the potential public health impact of NVPs in their country or region using their own data sources. In developing new simulation models involving NVPs, it will be important to conduct extensive sensitivity analysis and continually update and validate with new data.

**Conclusion:** The SAVM indicates the potential benefits of NVP use. However, given the uncertainty surrounding model parameters, extensive sensitivity analysis becomes particularly important.

## Recommended Citation

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