

Population Health Impact of Marketing Nicotine Pouches in the US

Hannel, T; He, Y; Lizhnyak, P; Muhammad-Kah, R

Altria Client Services LLC, Richmond, VA 23219 Center for Research and Technology

Modeling estimates that marketing nicotine pouches (NPs) in the US has potential to prevent **~738,000 tobacco-attributable deaths** and gain **~14.7 million life-years** over 90 years, driven by a 1.18 percentage-point reduction in adult smoking prevalence

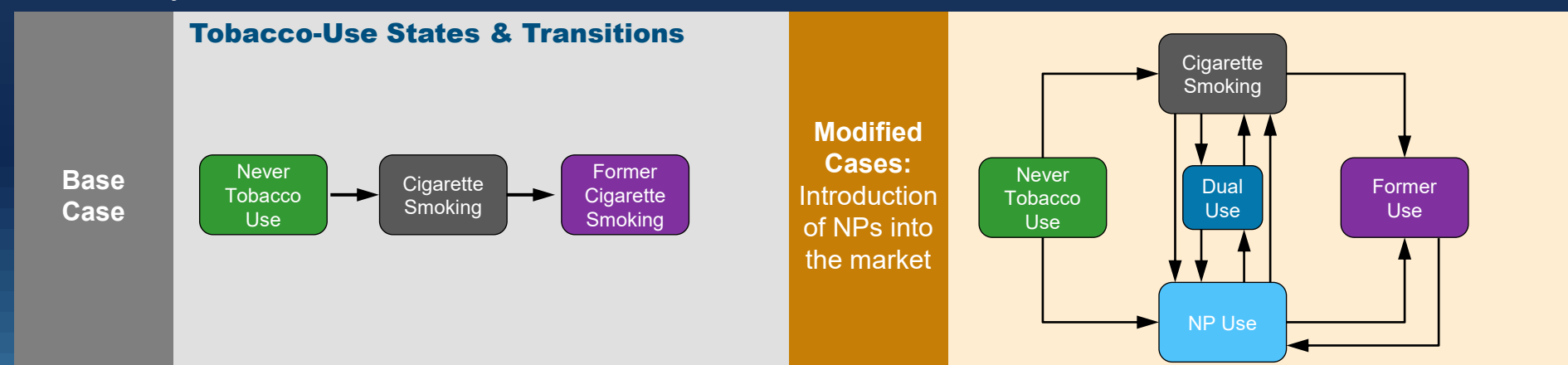
INTRODUCTION

- NPs have emerged as a growing product category in the US.
- Switching completely to NPs with low or non-quantifiable levels of HPHCs presents the potential to reduce harm among adults who smoke (AS).
- Limited data exist for estimating population level transition rates associated with NP use.
- Modeling is particularly useful for testing extreme scenarios, such as assessing how underage initiation to a new product might offset the benefits of adults switching or evaluating uncertainties in the excess mortality risk of the new product compared to continued smoking.
- This study estimates the potential population-level risks and benefits of marketing NPs in the US, accounting for effects among both tobacco users and nonusers.

METHODS

We used an updated version of our previously validated Agent-based Model (ABM)¹

- The model is initialized with a hypothetical population of 3.09MM agents (1/100th of the US population in the year 2010 by age, gender, & tobacco use status)
- Tobacco attributable deaths (TAD), life-years lost (LYL), and tobacco use prevalence are projected in 1-year increments through 2100
- At each 1-year increment, surviving agents can maintain their current status or transition to a new tobacco use state depending on input transition rates
- Base Case
 - Smoking status from 2010 NHIS (adults) and 2011 NYTS (youth)
 - Initiation & cessation from Cancer Intervention and Surveillance Modeling Network (CISNET) through 2015, supplemented with Population Assessment of Tobacco and Health Study (PATH)² Waves 1–4 long-term cessation
 - Mortality risks from the Kaiser Permanente cohort³, calibrated to 2010 US mortality
- Modified Case
 - Modified Case transition probabilities derived from the most recent PATH Waves 7 (2022) and 7.5 (2023)
 - Excess relative risk (ERR) of NP use vs. smoking conservatively set at 5% (0.05)⁴⁻⁵



The impact on the population as a whole is estimated based on the difference in tobacco use prevalence, tobacco-attributable deaths, and life-years lost between a Base and Modified Case scenario

PATH Transition Estimates Used in the Modified Case (annual %, by age & sex)

Transition	Youth Male (Ages 12-17)	Youth Female (Ages 12-17)	Adult Male (Ages 18+)	Adult Female (Ages 18+)	Source
NT→CS*	0.18	0.25	0.69	0.45	W7-W7.5
NT→NP*	0.96	0.26	2.02	0.51	W7-W7.5
CS→NP	4.74*	0.15*	1.68	0.00	W7 (youth) W7-W7.5 (adult)
CS→DU	1.66	0.00	3.36*	1.53*	W7
FS→NP	0.87	0.00	3.84	0.00	W7 (youth) W7-W7.5 (adult)
NP→CS	1.70†	1.16†	1.70†	1.16†	W7
NP→DU	3.20	0.00	0.20	0.00	W7
DU→CS	26.49*	0.00	53.72	56.14	W7
DU→NP	19.60*	0.00	14.37	11.04	W7

*Adult rate applied to ages 18–24. *Lower CI used due to high point estimate. †Transition was not observed for both youth and adult data from both longitudinal and cross-sectional analyses; therefore, the 100 cigarette criteria was not used for the adult definition; results were conservatively applied to both youth and adult transitions. W7 = PATH Wave 7 cross-sectional; W7–7.5 = Waves 7–7.5 longitudinal. NT = never tobacco use, CS = current smoking, FS = former smoking, NP=nicotine pouch use, FNP = former nicotine pouch use, DU = dual use of cigarettes and nicotine pouches

CONCLUSIONS

- Marketing NPs in the US yields a projected net population health benefit — **~738,000 tobacco-attributable deaths prevented** and **~14.7MM life-years gained by 2100**
- Population benefit is retained across a wide range of sensitivity scenarios
- Tipping-point analyses show underage initiation would need to exceed ~30% annually resulting in prevalence of use far above currently observed youth use (1.7%) before the benefit tips to net risk. Youth should not use any tobacco or NP.
- Adult smokers switching to exclusive NP drives the projected net benefit

REFERENCES

- Muhammad-Kah, R., et al., A computational model assessing population impact of a new tobacco product. *Qeios*, 2023.
- Hyland, A., et al., Design and methods of the Population Assessment of Tobacco and Health (PATH) Study. *Tob Control*, 2017. 26(4): p. 371-378.
- Friedman, G., Tekawa, I., Sadler, M., & Sidney, S. (1997). Smoking and mortality: The Kaiser Permanente experience. In D. Shopland, D. Burns, L. Garfinkel, & J. Samet (Eds.), *Changes in cigarette-related disease risks and their implication for prevention and control.*: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute.
- Murkett R, Rugh M and Ding B. Nicotine products relative risk assessment: an updated systematic review and meta-analysis [version 2; peer review: 1 approved, 1 approved with reservations]. *F1000Research* 2022, 9:1225 (<https://doi.org/10.12688/f1000research.26762.2>)
- Nutt et. al. (2014) Estimating the Harms of Nicotine-Containing Products Using the multi-criteria decision analysis (MCDA) Approach. *Eur Addict Res*, 20:218–225.
- U.S. Food and Drug Administration. **Results from the Annual National Youth Tobacco Survey (NYTS): 2025 Findings on Youth Tobacco Use**. Silver Spring, MD: FDA Center for Tobacco Products; 2026.



Altria
Science

This scientific research is presented by Altria Client Services LLC (ALCS). ALCS affiliate companies are tobacco product manufacturers.

RESULTS

-1.18 pts

additional drop in adult smoking prevalence

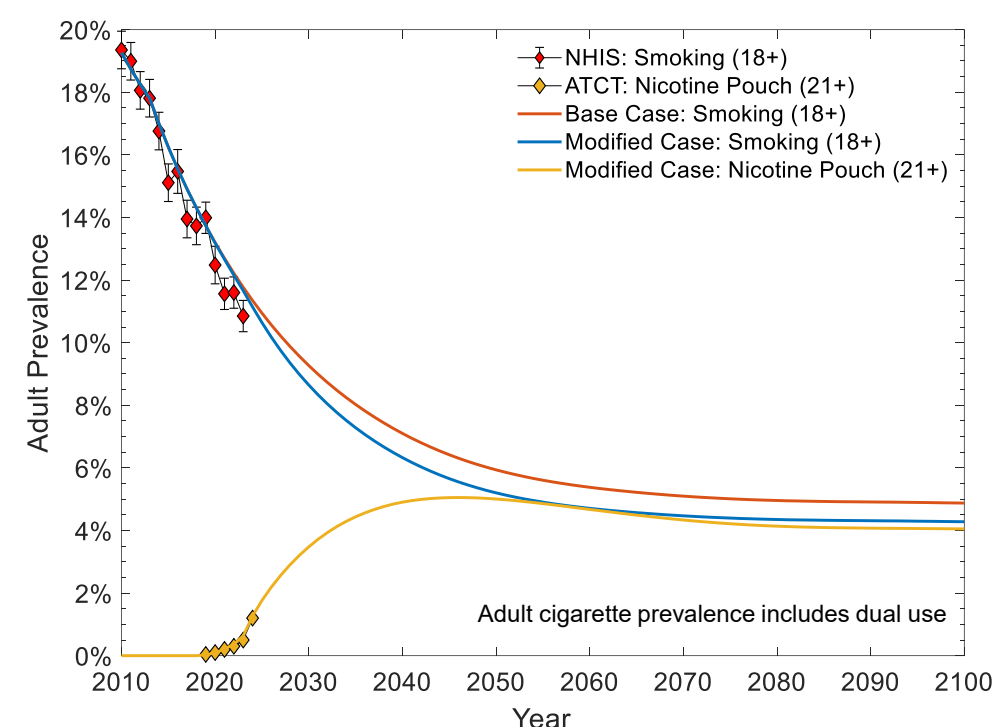
738,000

tobacco-attributable deaths prevented by 2100

14.7MM

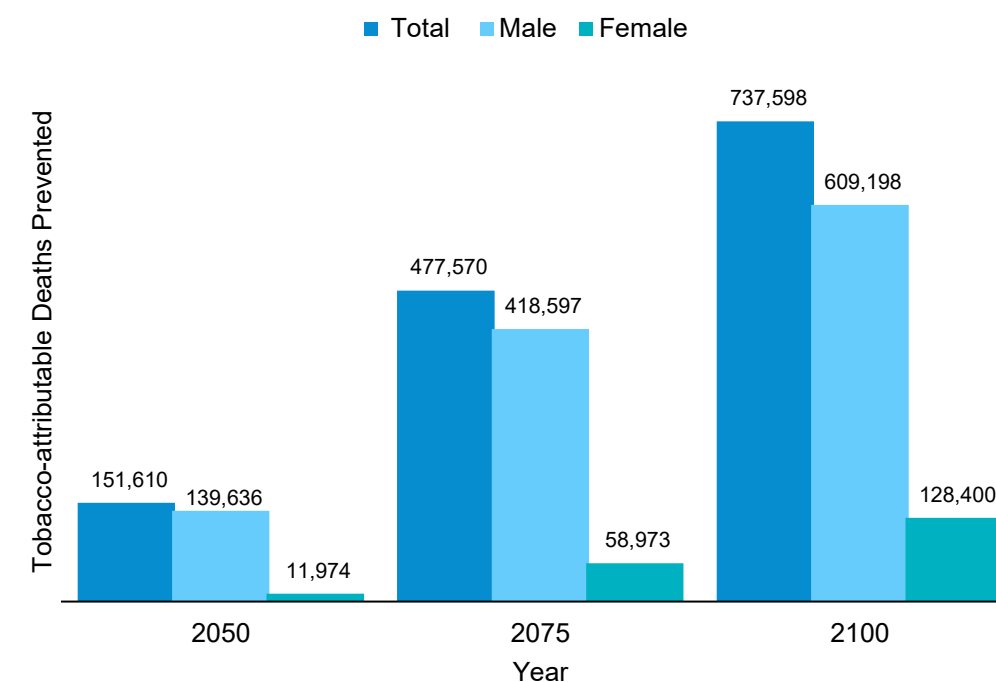
life-years gained by 2100

Adult Prevalence



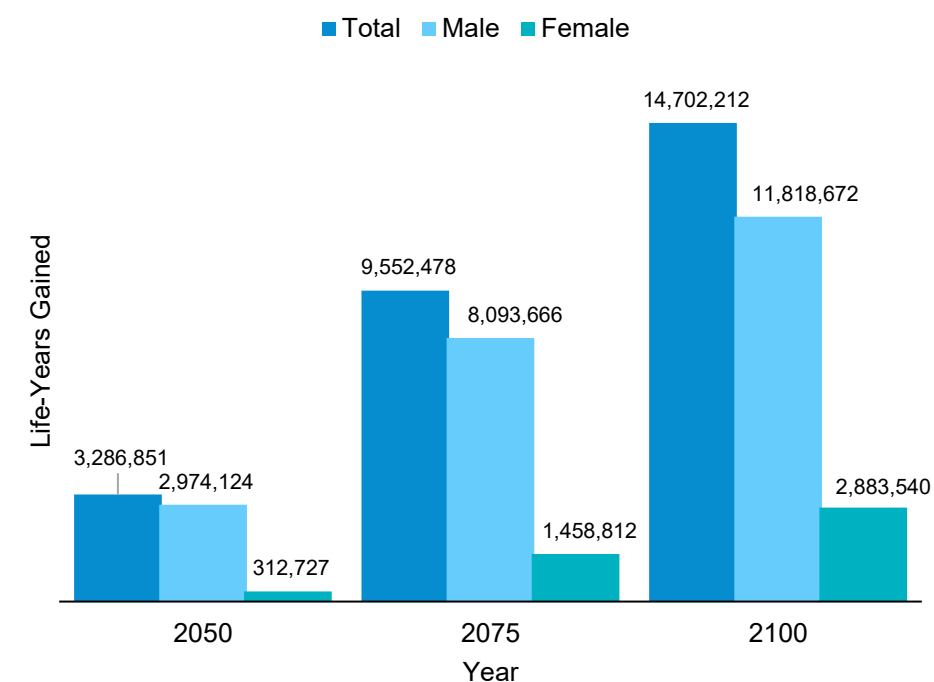
Base Case smoking falls 19.27% → 3.34% by 2100; with NPs it drops a further 1.18 pts to 2.16%. NP prevalence peaks at 4.55% (2042). Model projections align with National Health Interview Survey (NHIS) & ALCS Adult Tobacco Consumer Tracker (ATCT)

Deaths Prevented



By 2100, the model projects 737,598 tobacco-attributable deaths prevented and 14.7MM life-years gained. Males account for the majority of both benefits (~83% of deaths prevented; ~80% of life-years gained), consistent with higher observed male switching from smoking to NP use.

Life-Years Gained



Sensitivity Analyses

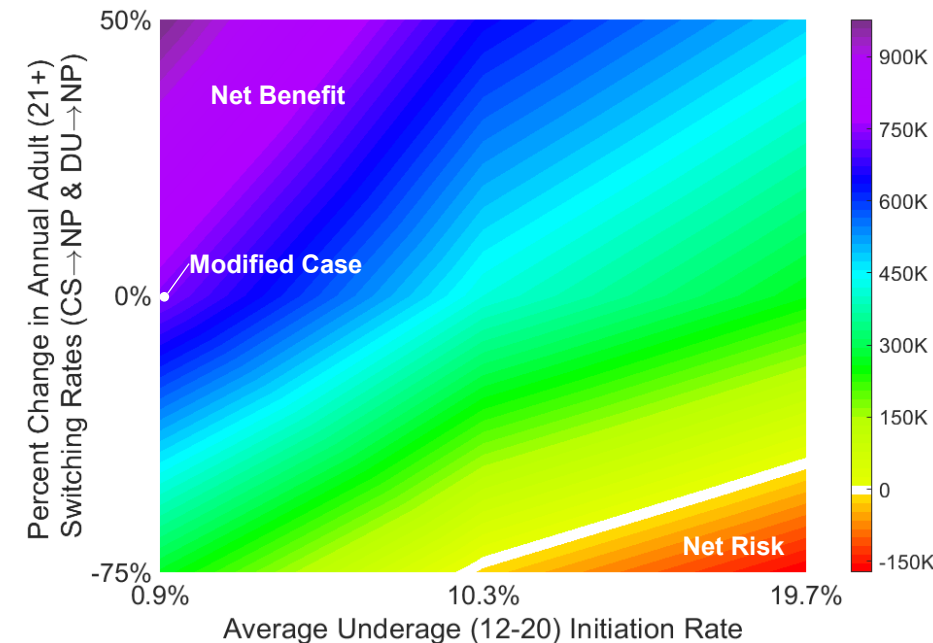
Underage Tipping Point Sensitivity

Percent Change to Initiation	Average Initiation Rate Input (Ages 12-20)	Tobacco-Attributable Deaths Prevented by Year 2100	Youth Nicotine Pouch Prevalence in Year 2100
0% (Modified Case)	0.94%	737,598	1.48%
500%	5.60%	548,347	8.26%
1000%	10.30%	420,390	14.33%
1500%	15.00%	322,881	19.76%
2000%	19.70%	261,115	24.63%

Youth NP initiation would need to rise more than 20-fold above currently observed levels (to ~30% annually) resulting in youth prevalence well above (>25%) current NYTS estimates of 1.7%⁶ before the population benefit is negated. This large margin means that ongoing surveillance can provide an early-warning system: any meaningful rise in youth use would be identified with substantial margin to act before population-level risk emerges.

No youth should use any tobacco or nicotine product; this analysis instead illustrates the sensitivity of the population-level estimate to youth initiation assumptions.

Bivariate Heat Map



Adult switching to exclusive NP use drives the outcome, not youth initiation. The bivariate sensitivity analysis varied adult switching probabilities from exclusive smoking and dual use to exclusive NP use around the Modified Case values (~75% to +50%). Even across this range, modest increases in adult switching outweighed substantially larger increases in underage initiation. The white line marks the break-even point between net benefit and net risk.

Excess Relative Risk (ERR) Sensitivity

ERR	TADs Prevented by 2100	Life-Years Gained by 2100
0.02	799,262	15,810,023
0.05 (Modified Case)	737,598	14,702,212
0.10	642,618	12,977,149

The population benefit is robust to uncertainty in NP relative risk. The benefit holds across the ERR range (2-10%) indicating a substantial and implausible increase in relative risk (>0.6) would be required before resulting in a net risk