

# Sociodemographic patterns of cigarette and ENDS transitions in the PATH Study: a multistate transition model analysis of adults and youth in 2015–2017 vs 2017–2019

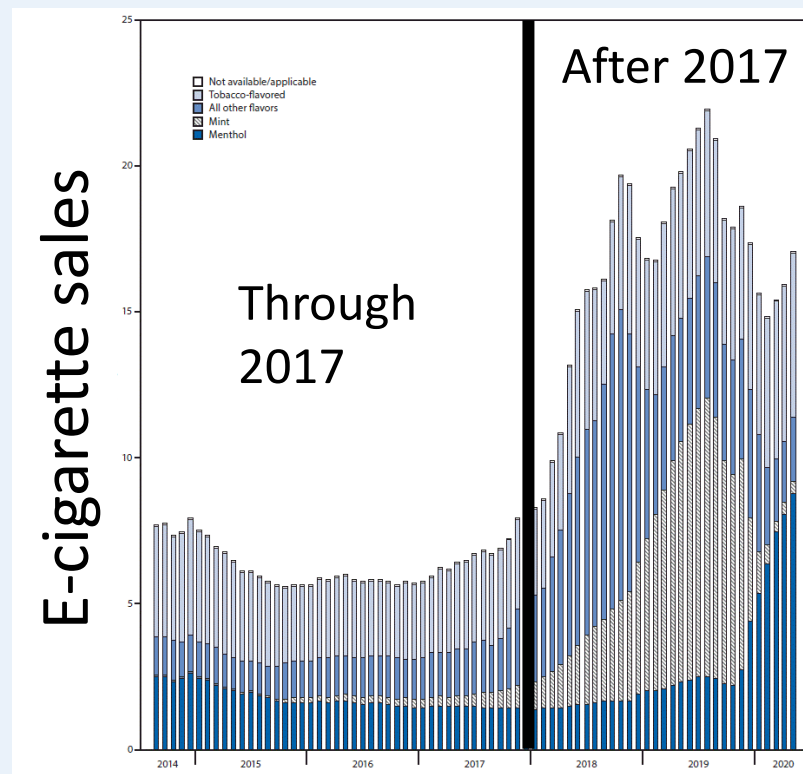
TCORS 2.0  
University of Michigan & Georgetown University  
Center for the Assessment of Tobacco Regulations  
[CAStoR]

Andrew F. Brouwer<sup>1</sup>, Jiyhoun Jeon<sup>1</sup>, Evelyn Jimenez-Mendoza<sup>1</sup>,  
Stephanie R Land<sup>2</sup>, Ritesh Mistry<sup>3</sup>, David T. Levy<sup>4</sup>, Rafael Meza<sup>1</sup>  
Contact: [brouweaf@umich.edu](mailto:brouweaf@umich.edu)

Affiliations. 1. Epidemiology, University of Michigan. 2. National Cancer Institute, National Institute of Health. 3. Health Behavior and Health Education, University of Michigan. 4. Department of Oncology, Georgetown University.

## Introduction

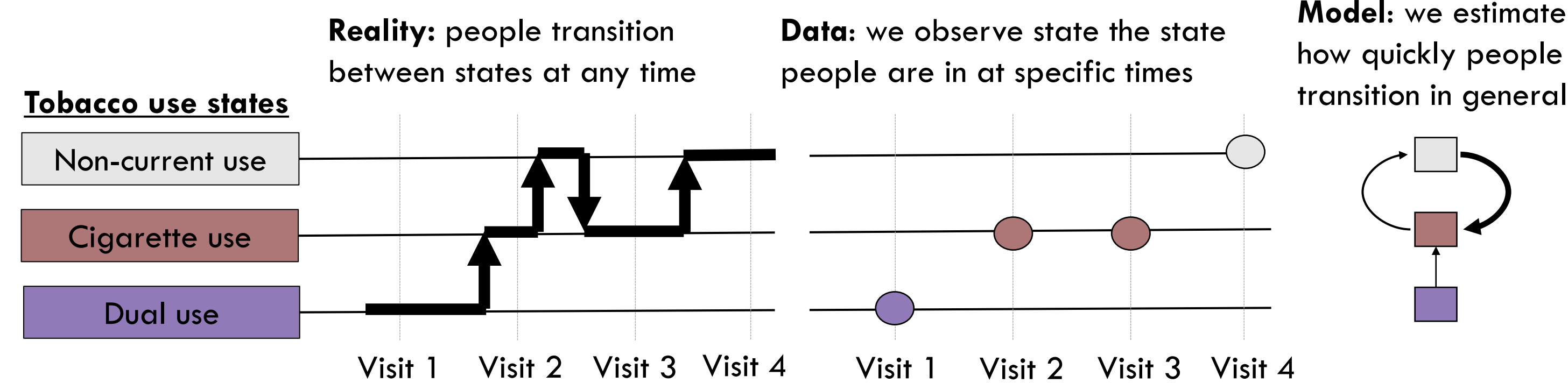
- Sales of ENDS, particularly JUUL, rose substantially in late 2017 and 2018.
- Did transitions between cigarette, ENDS, and dual use change over this period?
- Were adult and youth transitions affected differently?



## Methods

### Multistate Markov Transition Model Framework

Markov transition models are continuous time stochastic processes models.



## Data

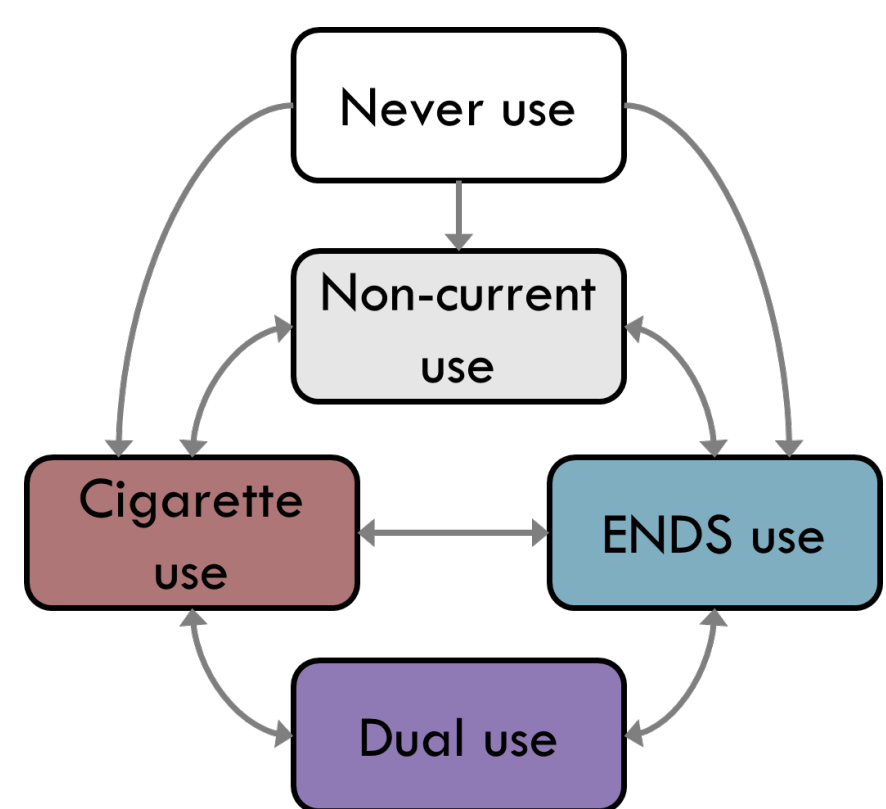
### PATH Study

- Nationally representative longitudinal study of tobacco use 2013–2019
- Compare Wave 1 Cohort in Waves 1-4 to Wave 4 Cohort in Waves 4-5
- Through 2017: 24,306 adults (Waves 1-4) and 12,168 youth (Waves 2-4)
- After 2017: 23,709 adults (Waves 4-5) and 12,217 youth (Waves 4-5)

### State definitions and transitions

Tobacco use states were defined from:

- Established use criteria for cigarettes (100+ cigarettes in lifetimes) and ENDS (ever fairly regularly used) and
- Current past-30-day use of cigarettes and ENDS



## Key findings

- ENDS use became more persistent, both for ENDS-only and dual cigarette and ENDS users in all groups.
- There were important heterogeneities in ENDS use across the adulthood spectrum
- Youth and young adult non-current, current, and dual users became more likely to transition to ENDS only-use.
- Middle-aged and older adult dual users did not become more likely to transition to ENDS only-use.
- Differences in transitions by gender, and race/ethnicity were similar in 2015-17 vs 2017-2019.

### Transition probabilities

