

The impact of demographics, dependence, and biomarkers on transitions in tobacco product use in a cohort of smokers and dual users

Fatema Shafie-Khorassani¹, Megan E. Piper², Douglas E. Jorenby², Timothy B. Baker², Neal L. Benowitz³, Todd Hayes-Birchler², Rafael Meza⁴, Andrew F. Brouwer⁴
 Contact: brouweaf@umich.edu

Affiliations. 1. Biostatistics, University of Michigan. 2. Medicine, University of Wisconsin. 3. Medicine, University of California San Francisco. 4. Epidemiology, University of Michigan

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

Introduction

- Electronic nicotine delivery systems (ENDS) have the potential to help people who smoke cigarettes transition to a less harmful product.
- It is uncertain whether and to what extent ENDS facilitate cigarette cessation in real-world settings.
- A better understanding of what personal and product characteristics are associated with ENDS-facilitated cigarette cessation could improve tobacco control interventions.

Data

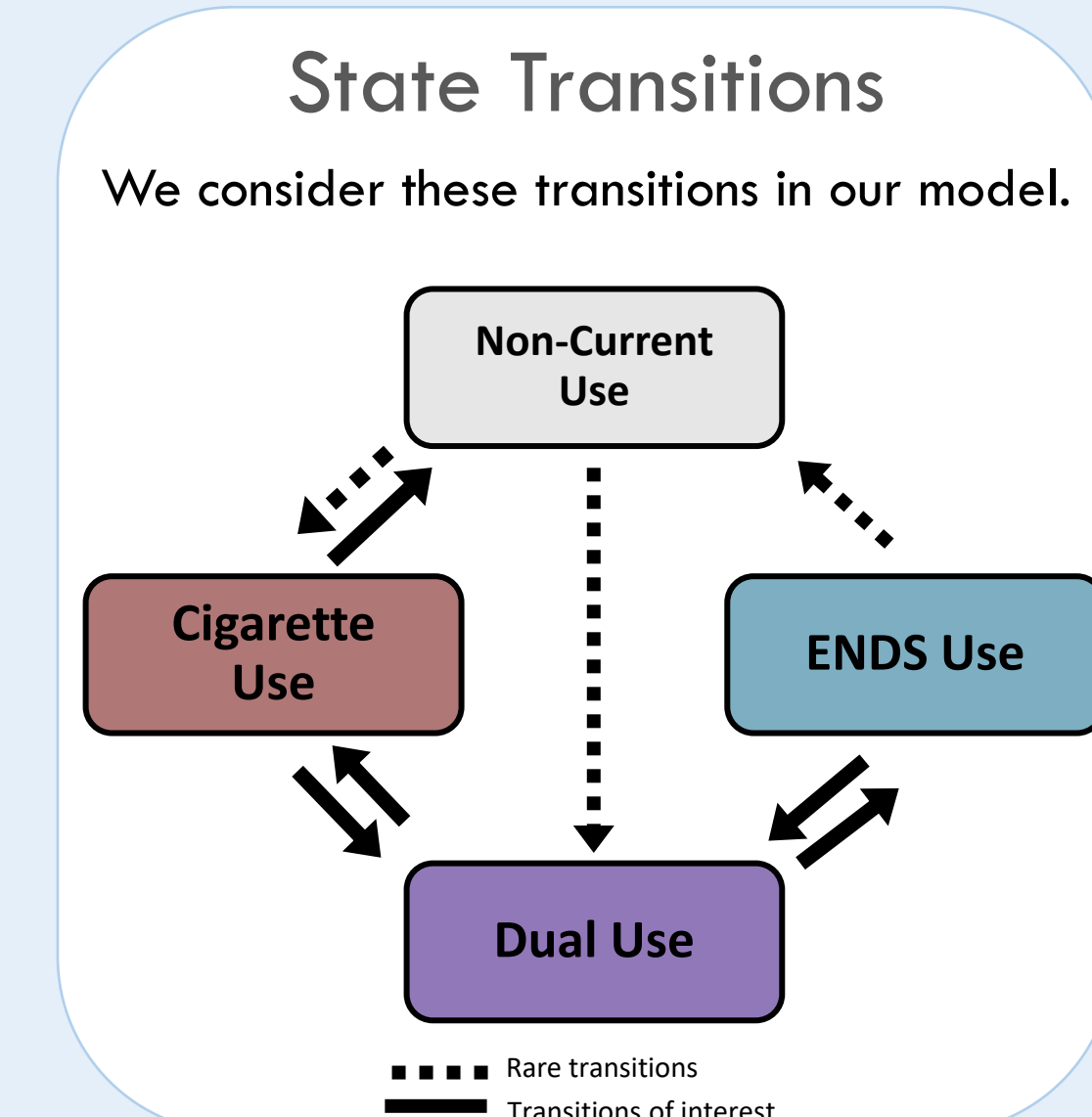
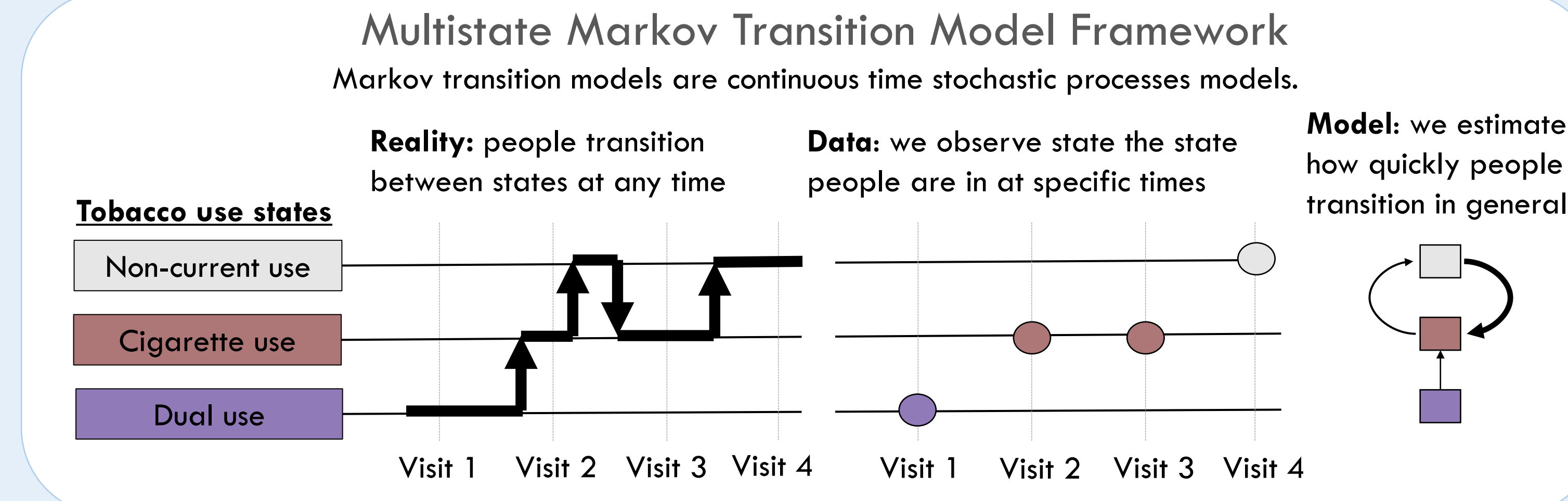
Exhale Study

- Longitudinal cohort study in Wisconsin from 2015–2017
- 422 adult daily cigarette users and dual cigarette and ENDS users
- Followed up every 2 months for 2 years
- Tobacco product use states determined every two months by self-reported abstinence over the past 30 days

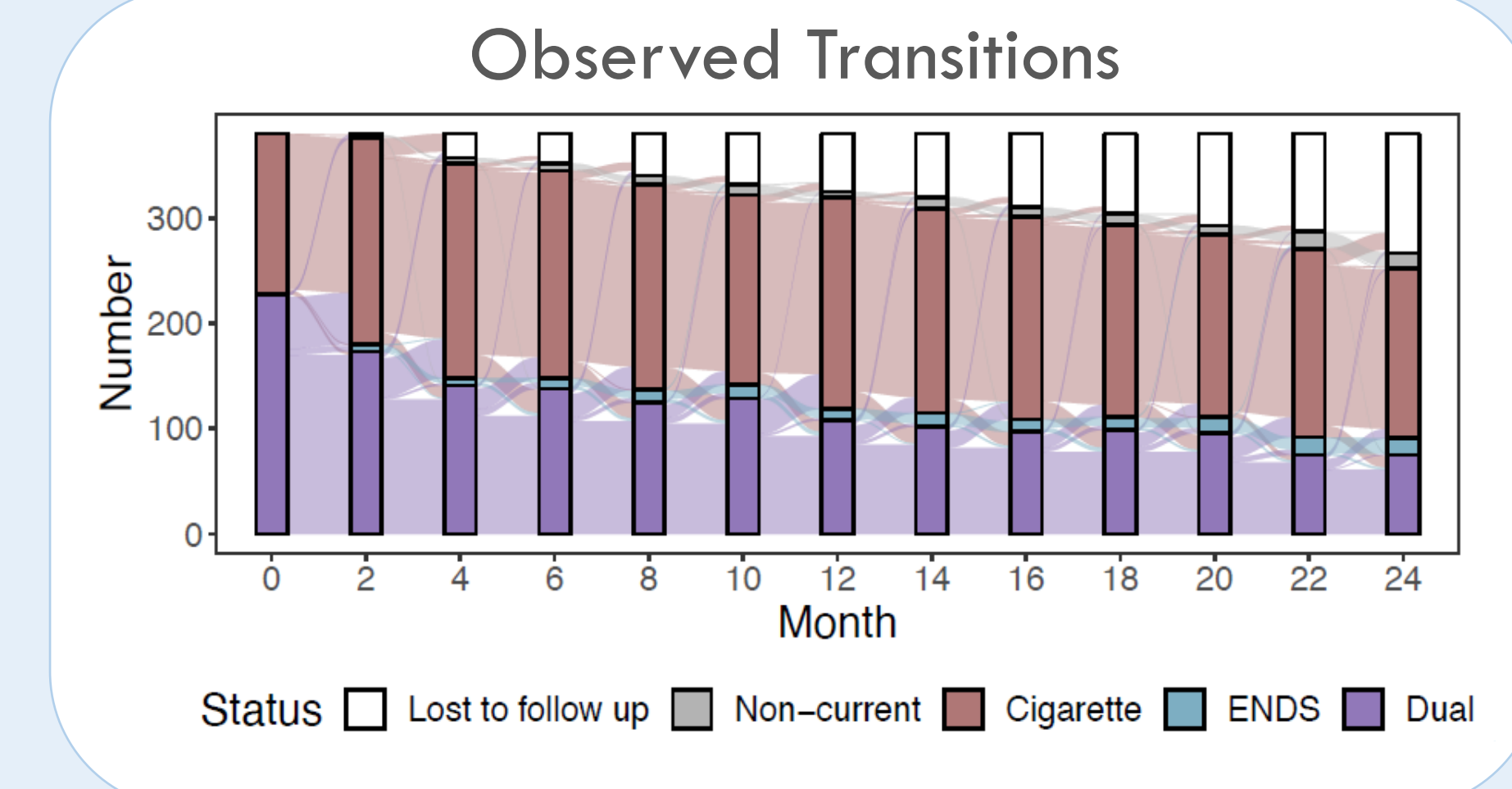
Variable Definitions

Biomarkers	NNAL, Cotinine, 3HC Low: 1 st tertile, Moderate/High: 2 nd -3 rd tertiles
Demographics	Age, sex, race, Hispanic ethnicity, education (defined in ages 25+), psychiatric history, partner smokes/vapes
Cigarette Dependence	Cigarettes per day (CPD: low 1-9, high 10+), FTCD* (low 1-4, high 5+), motivation to quit (low 1-4, high 5+), smoking within 30 minutes of waking, WISDM† primary dependence motives (PDM), secondary dependence motives (SDM) (low <3, moderate 3-4, high 5+), total (low <40, moderate 40-54, high 55+)
ENDS Dependence	Frequency (everyday, somedays), E-FTND (low 1-4, high 5+), motivation to quit (high 5+), vaping within 30 minutes of waking, E-WISDM primary dependence motives (PDM), secondary dependence motives (SDM) (low <3, moderate 3-4, high 5+), E-WISDM total (low <40, moderate 40-54, high 55+), first product used in the morning (100% cigarette, >50% cigarette, e-cigarette >50%)
ENDS Descriptors	Flavor, nicotine content (low 0-6, medium 4-10, high 11+ mg) * Fagerstorm Test for Cigarette Dependence † Wisconsin Inventory of Smoking Dependence Motives

Methods



Results



Transition Probabilities

Plot A gives the observed transition probabilities, which the model matches well in Plot B.

Plot C predicts transition probabilities after 1 year.

A Observed 2-month cumulative transition probabilities

From	To	Non-current use	Cigarette use (sole)	E-cigarette use (sole)	Dual use
Non-current use		76.7	15.6	2.2	5.6
Cigarette use (sole)		1.2	91.3	0.1	7.3
E-cigarette use (sole)		1.6	1.6	75.8	21.1
Dual use		0.7	17.5	2.9	78.9

2-month cumulative transition probability (%)

B Modeled 2-month cumulative transition probabilities

From	To	Non-current use	Cigarette use (sole)	E-cigarette use (sole)	Dual use
Non-current use		76.4	15.6	0.2	7.8
Cigarette use (sole)		1.4	91.1	0.1	7.3
E-cigarette use (sole)		3.4	2.6	74.0	20.1
Dual use		0.2	17.8	3.2	78.8

2-month cumulative transition probability (%)

C Modeled 1-year cumulative transition probabilities

From	To	Non-current use	Cigarette use (sole)	E-cigarette use (sole)	Dual use
Non-current use		21.9	52.6	2.1	23.4
Cigarette use (sole)		4.1	71.2	2.0	22.7
E-cigarette use (sole)		6.2	35.3	19.9	38.6
Dual use		2.8	53.7	5.8	37.6

1-year cumulative transition probability (%)

