

# Continuous associations of the Wisconsin Inventory of Smoking Dependence Motives with transitions between cigarette and e-cigarette use in the Exhale longitudinal cohort study

TCORS

Center for the Assessment of Tobacco Regulations [CAStoR]

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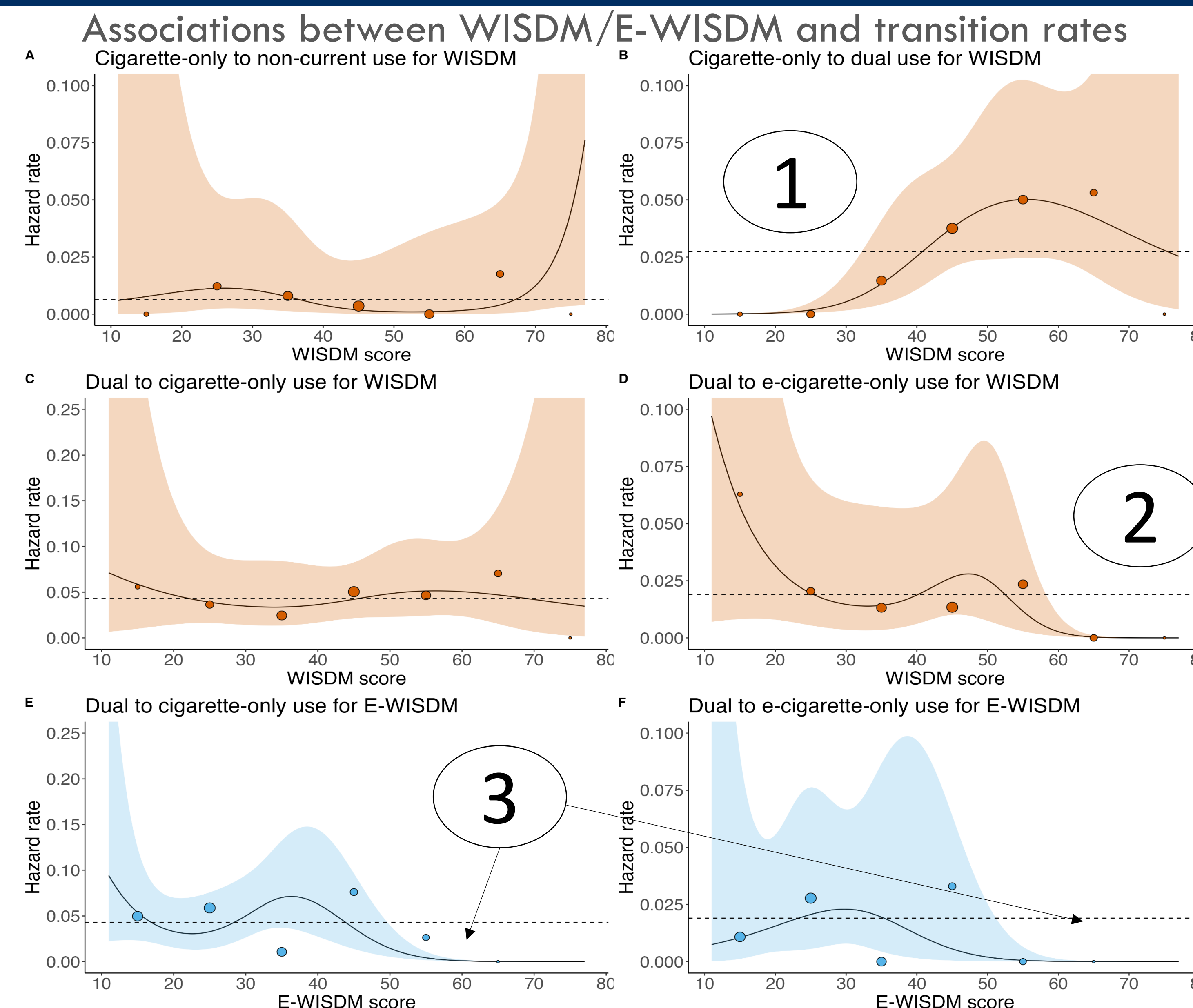
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## Introduction

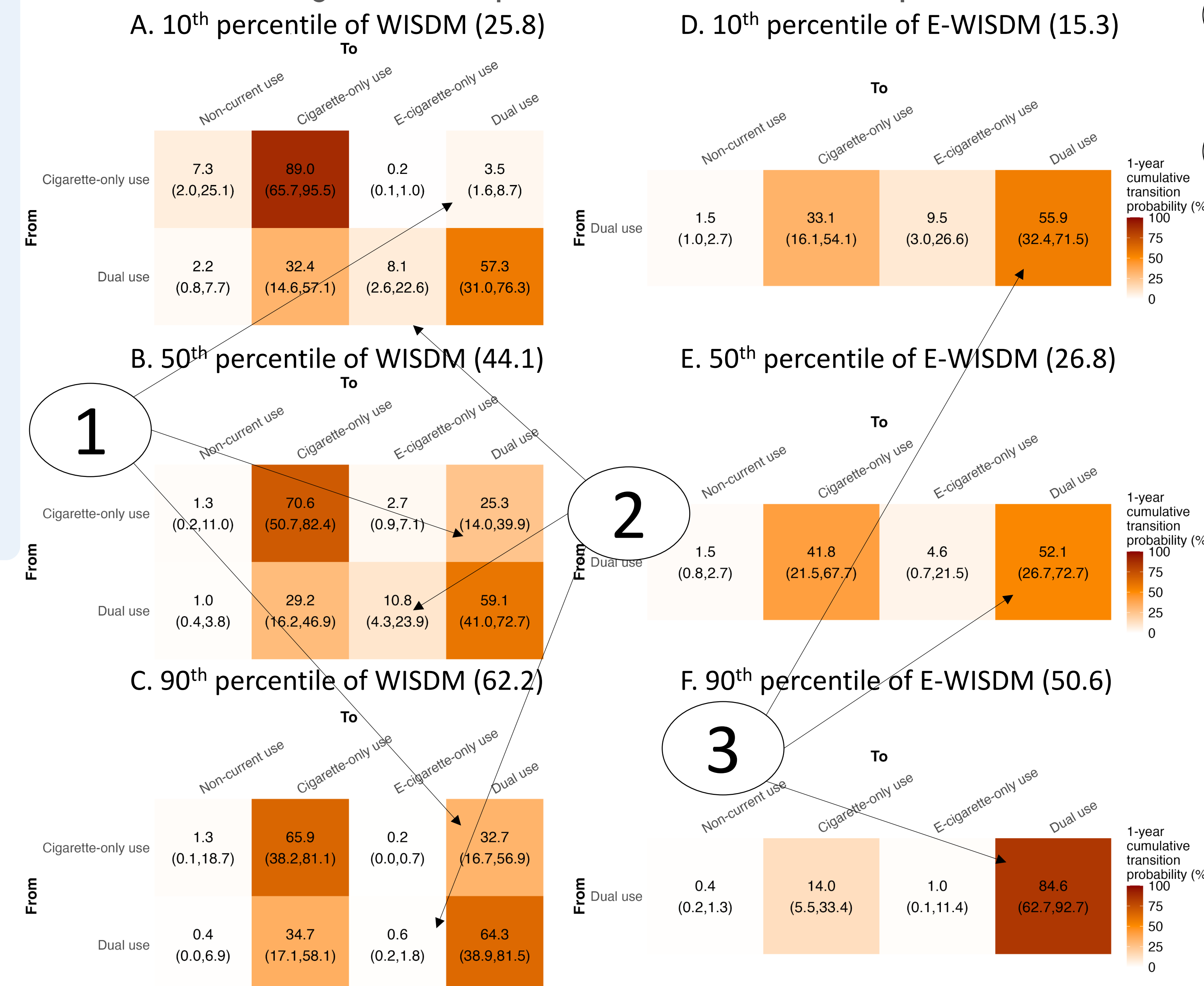
- Nicotine content affects product dependence; product dependence affects the likelihood of product cessation and other transitions. We may better predict how regulations restricting nicotine concentration may affect use product transitions by better estimating how product dependence predicts transition probabilities.
- The Wisconsin Inventory of Smoking Dependence Motives (WISDM) and its e-cigarette counterpart (e-WISDM) capture both intrinsic tobacco addiction and external factors that contribute to nicotine addiction or dependency.
- We used a multistate transition model in the Exhale study to estimate how WISDM/e-WISDM scores are associated with transitions, including product cessation and initiation, among those using cigarettes only or both cigarettes and e-cigarettes.

## Data

- A longitudinal cohort study daily smokers was conducted in Wisconsin from October 2015 to July 2017, with participants not intending to quit in the next 30 days:
  - Cigarette-only users (smoking >5 cigarettes daily for six months without e-cigarette use)
  - Dual users (smoking daily and using nicotine e-cigarettes more than once a week)
- WISDM and e-WISDM scores were assessed at baseline and after one year, with follow-up on product use 2 months later.
- 302 participants were included in this analysis.
- Tobacco product use states were determined by self-reported abstinence in the past 30 days and users were categorized into four categories:
  - Non-current use, cigarette-only use, e-cigarette-only use, or dual use of cigarettes and e-cigarettes

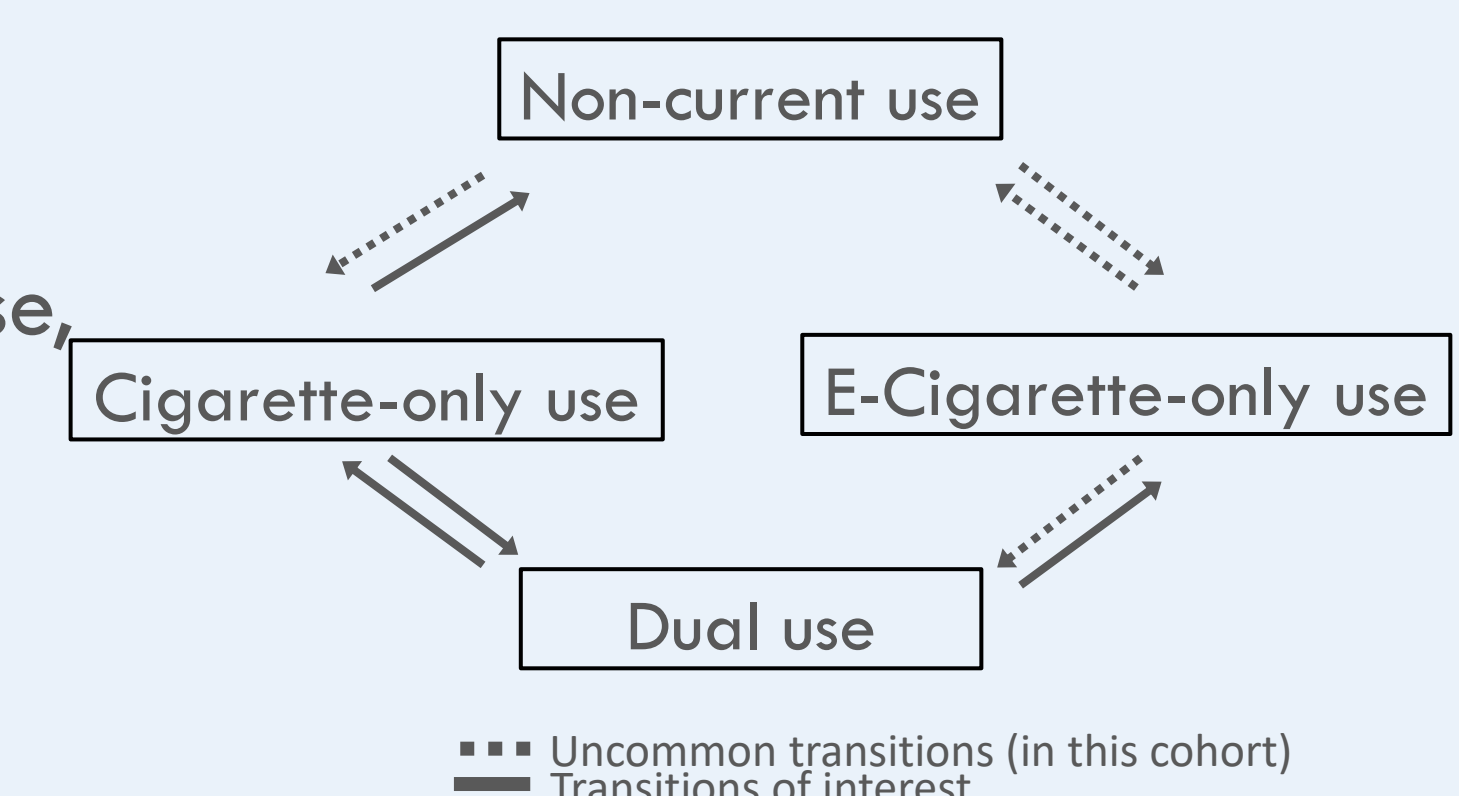


## Predicting transition probabilities at different percentiles



## Methods

- We used a Markov multistate transition model (MSTM) to examine how transition rates between the four product-use states were associated with continuous WISDM/e-WISDM scores.
- Transition propensities (rates) depend on an individual's current state and any relevant covariates, but not on previous states.
- Transitions could occur at any time between follow-ups.
- Applied a natural cubic spline estimator to model the continuous relationship.
- Transitions of interest:
  - Cigarette-only to non-current use,
  - Cigarette-only to dual use,
  - Dual to cigarette-only use,
  - Dual to e-cigarette-only use



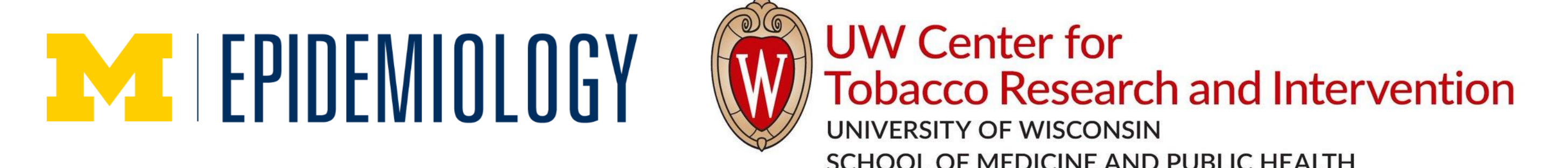
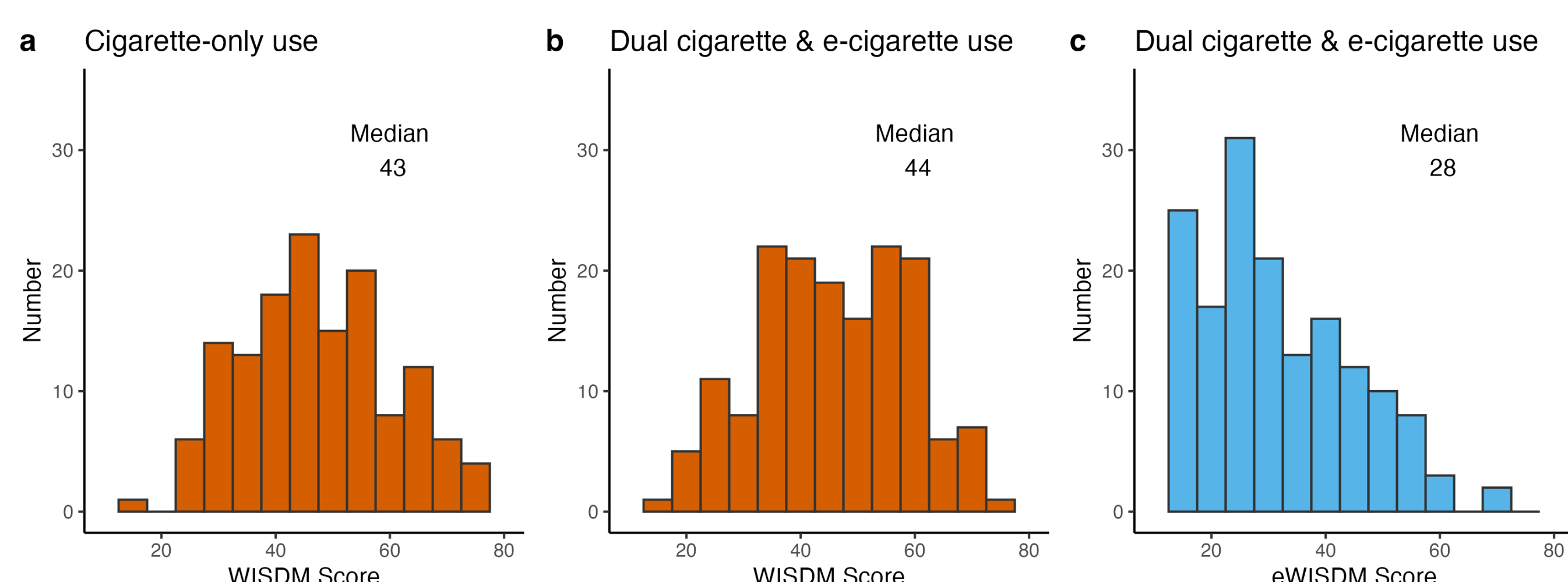
## Key Findings

- Participants with lower dependence on their cigarette (lower WISDM scores) were less likely to transition from cigarette-only use to dual use.
- Cigarette dependence (WISDM) was largely not predictive of transitions for those dual using cigarettes and e-cigarettes, although transitions to e-cigarette-only use decreased substantially for high dependence scores.
- Dependence on e-cigarettes (e-WISDM) was only associated with transitions from dual use at the highest levels of dependence, with persistence of dual use increasing from 55.9% at the 50th percentile to 84.6% at the 90th percentile.

## Takeaways

- Understanding how proposed regulations, such as those reducing nicotine content in tobacco product to non-addictive levels, affect dependence may be a pathway for understanding how those regulations will in turn affect product use and public health.
- Future studies will also need estimates of how potential regulations may impact tobacco dependence and whether people with higher product dependence switch to other full-nicotine products to maintain addiction.

## Distributions of WISDM and e-WISDM scores at baseline



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