

LONGITUDINAL STUDY OF DUAL USE OF COMBUSTIBLE CIGARETTES AND THE JUUL® SYSTEM IN ADULT CURRENT SMOKERS AT 12 MONTHS

Gem M. Le¹, Arielle Selya², Cameron Hatcher¹, Nicholas Goldenson¹, Shivaani Prakash¹, Erik Augustson¹, Saul Shiffman²

¹ JUUL Labs, Inc., Washington, DC, USA ² PinneyAssociates, Inc., Pittsburgh, PA, USA

Introduction

- Electronic nicotine delivery systems (ENDS) such as the JUUL System (JUUL) deliver nicotine without smoke and offer an alternative to combustible cigarettes (CC) for adult smokers.
- Smokers who switch completely away to a noncombustible alternative can reduce their exposure to harmful constituents in smoke and their risk of smoking-related disease.¹
- As smokers switch away from cigarettes, dual use of ENDS and CCs is common.
- Potential concerns regarding dual use are whether ENDS use extends CC smoking² and increases overall toxicant exposure³.
- On the other hand, dual use may be a transitional stage towards complete switching away from CCs and reduced CC consumption⁴.
- We examine trends in dual use vs. other tobacco-use categories over time (Aim 1), and changes in CC consumption among dual users (Aim 2), using a large, longitudinal survey of adult smokers who recently purchased JUUL.

baseline also analyzed (N=13,742).

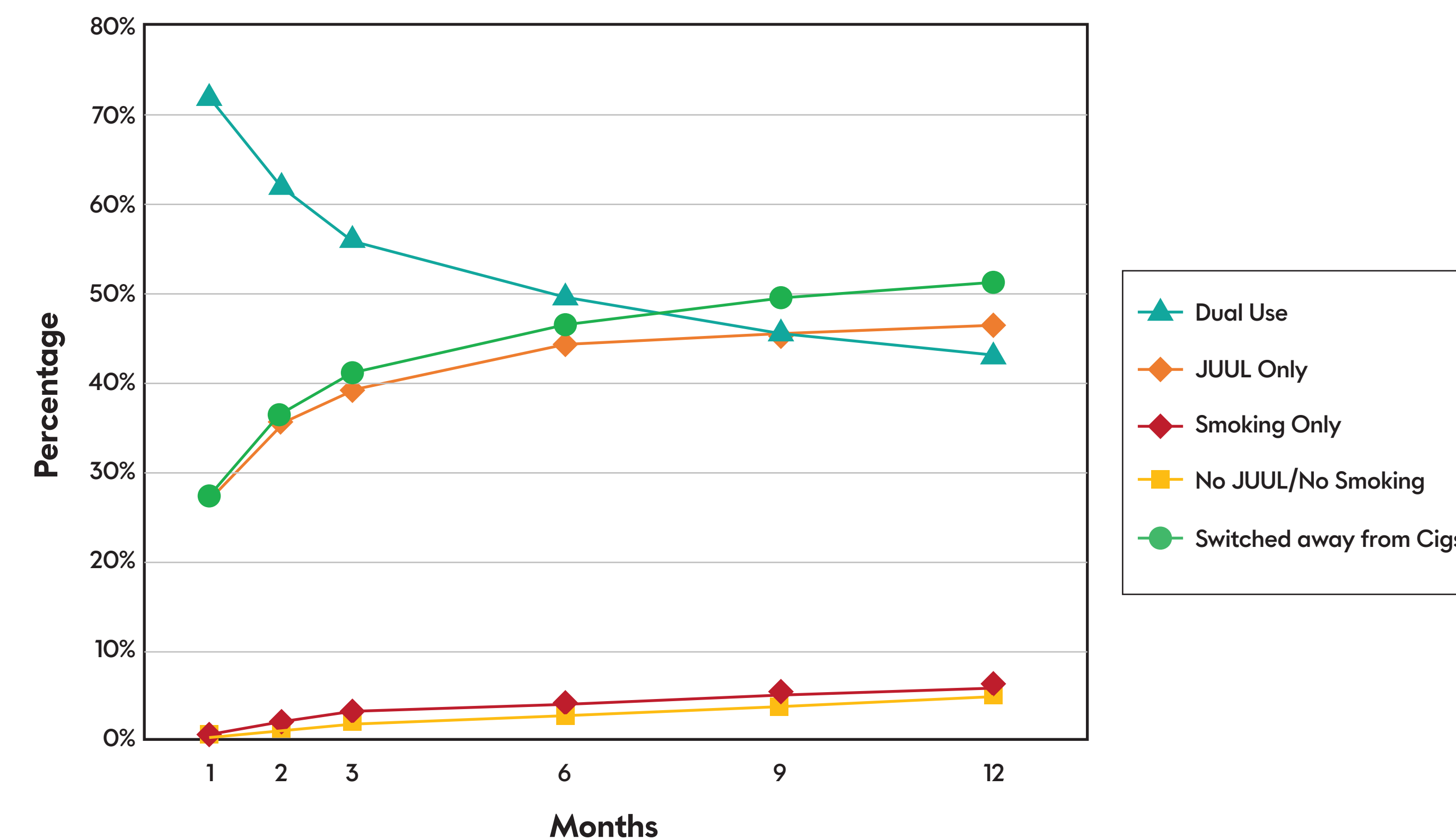
- Analyses: Of remaining dual users at follow-up, examine categorical changes in consumption (decreased by $\geq 50\%$, no substantial change, increased by $\geq 50\%$)
- CC consumption was defined as average daily CPD in the past 30 days.
- Follow-up analyses on degree of change among reducers and non-reducers.

Results

Aim 1: Trends in dual use over time

- Sample was 56.2% male, 78.9% non-Hispanic white, had a median age of 30 years old, and 71.6% had some college. Median baseline CC consumption was 10 CPD, and just over half smoked daily. Complete-case sample was similar.

Figure 1: Percentage of established smokers at baseline who are in each of the tobacco-use categories at follow-up. "Switched from cigarettes" is defined as not smoking, so includes both JUUL-Only and No JUUL/no smoking.



- Dual use was initially high, but declined curvilinearly over time (Figure 1).
- Dual use primarily gave way to complete switching away from cigarettes by 12 months
- Very few respondents reverted to exclusive smoking
- JUUL use (with or without smoking) continued in strong majorities of respondents.

Aim 2: Changes in CC consumption

- This sample of baseline smokers was majority male (~56%) and non-Hispanic white (~75%), and approximately 70% attended college, and smoked every day or nearly every day in the past month. The subset who smoked 10+ CPD at baseline had a higher proportion of non-Hispanic white participants (83%).
- Participants reporting past 30-day smoking but smoking now "not at all" at follow-up did not provide detailed smoking behavior, thus CC consumption cannot be evaluated (~10-16% of sample).

Figure 2: Percentage of dual use at follow-up, and change in CC consumption among remaining dual users.

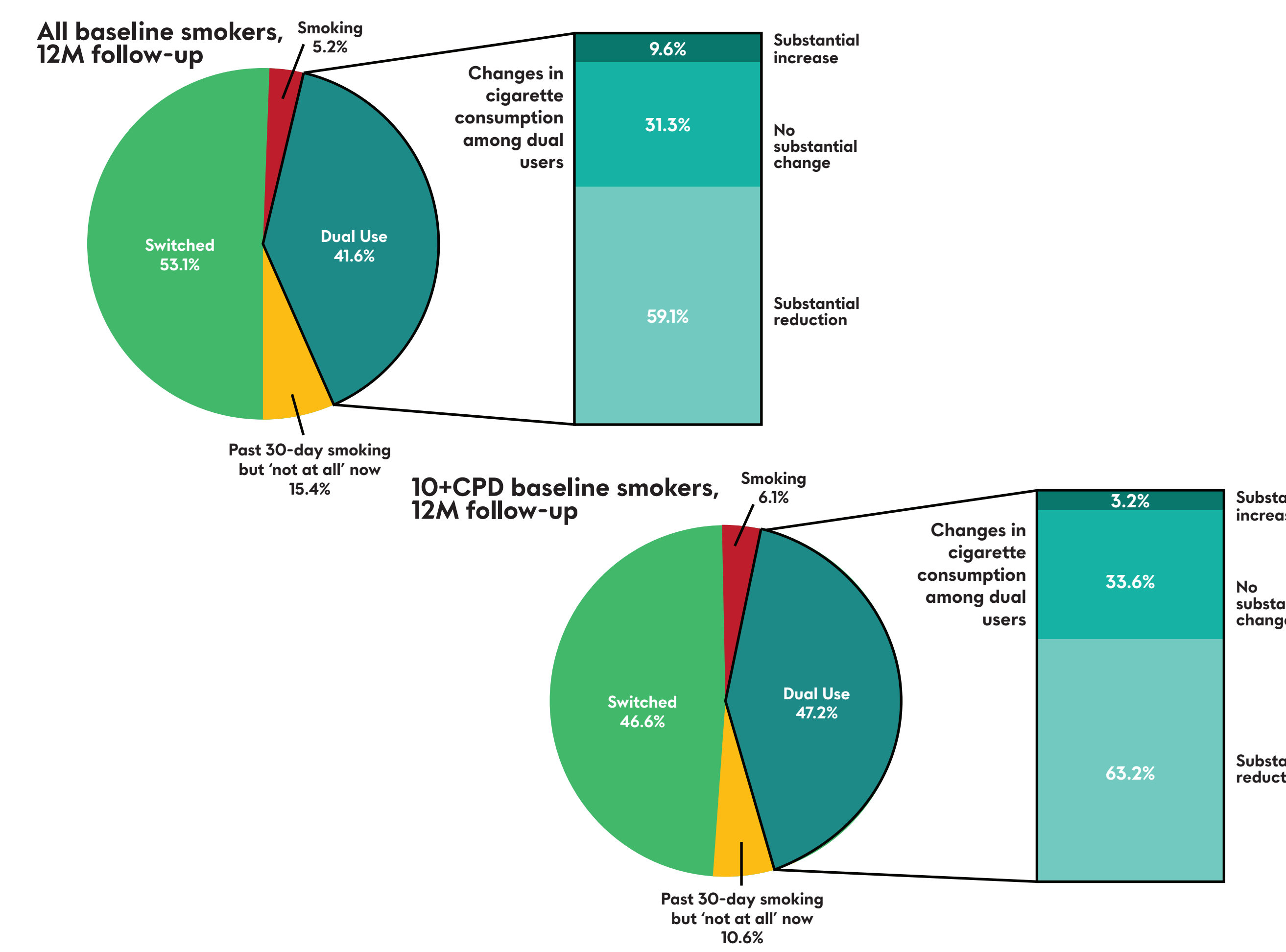
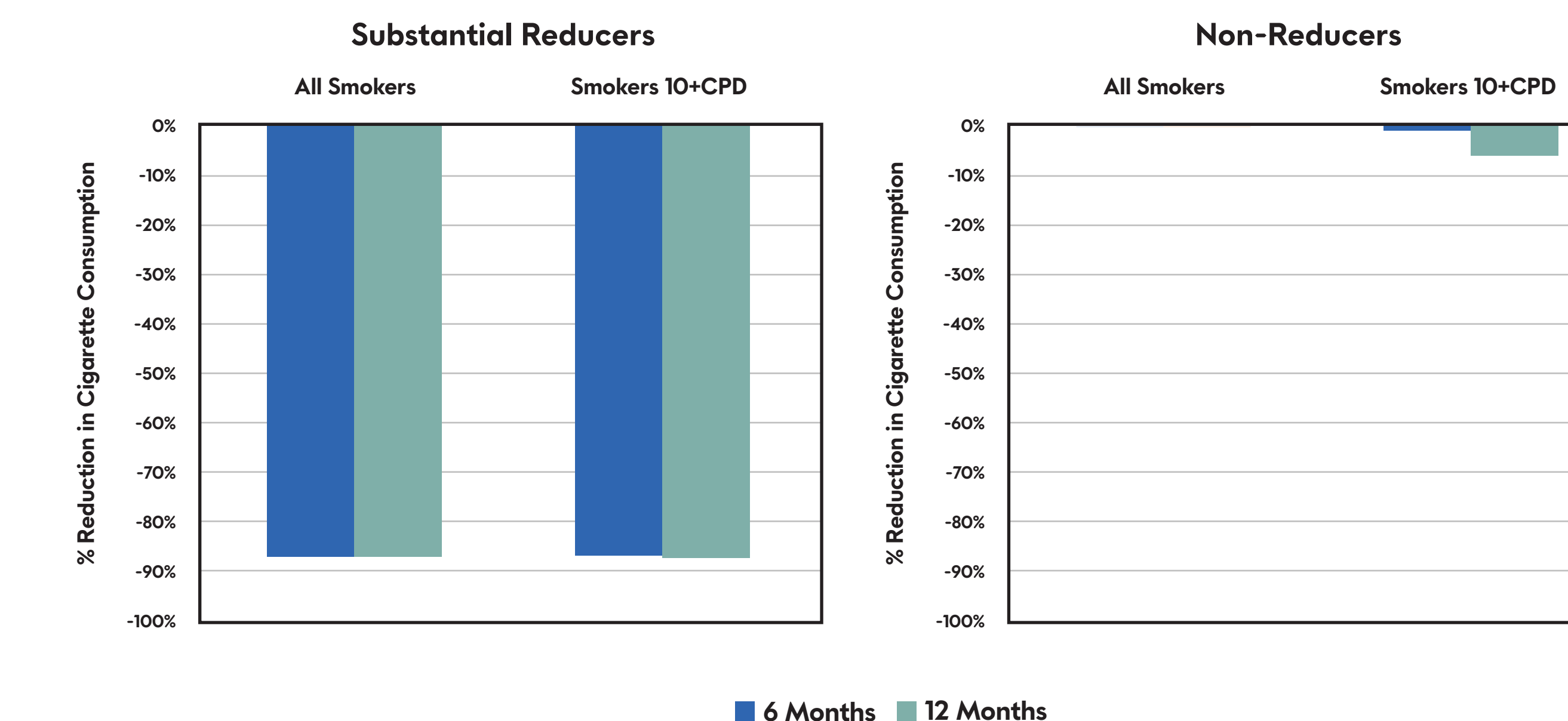


Figure 3: Percentage change in CC consumption, by reduction status.



- Of remaining dual users at 6 months and 12 months, the majority (approximately 60% or higher) had reported substantially reducing (i.e. by $\geq 50\%$) their average daily CC consumption (Figure 2).
- Only a minority of remaining dual users (3-10%) substantially increased their consumption (i.e. by $\geq 50\%$)
- Slightly more 10+CPD baseline smokers substantially reduced (by ~2-3%).
- Reductions were large (~87%) among those who substantially reduced (Figure 3).

Sensitivity Tests

- Results were similar when cigarette consumption was defined by cigarettes smoked on days smoked (i.e., not taking account of the number of days smoked).
- Results were similar when calculated based on the subset of respondents who provided smoking and JUUL use data at all 6 follow-ups (complete-case sample).

Conclusions

- The majority of smokers who purchased JUUL engaged in dual use initially, but by 12 months most had switched completely away from CCs.
- Complete-case sample shows very similar results
- In the subset of remaining dual users at 6 and 12 months, the majority had substantially reduced their daily average CC consumption.
- Few dual users increased their cigarette consumption, and most increases were small.
- Dual use is often a transitional stage characterized by reductions in CC consumption followed by switching completely away from CCs.
- Reductions in CC consumption likely have harm reduction implications, as other research shows significant reductions in harmful/potentially harmful constituents after similar reductions in CC consumption^{5,6}.

References

- Public Health England. E-cigarettes: An evidence update. A report commissioned by the Public Health England. PHE publications gateway number: 2015260. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733022/E-cigarettes_an_evidence_update_A_report_commissioned_by_Public_Health_England_FINAL.pdf. Published 2015
- Oslbogun O, Bursac Z, McKee M, Li T, Mazziak W. Cessation outcomes in adult dual users of e-cigarettes and cigarettes: the Population Assessment of Tobacco and Health cohort study. USA. 2013-2016. Int J Public Health. 2020;65(6):923-936
- Goniewicz ML, Smith DM, Edwards KC, et al. Comparison of Nicotine and Toxicant Exposure in Users of Electronic Cigarettes and Combustible Cigarettes. JAMA Netw Open. 2018;1(8):e185957.
- Is the use of electronic cigarettes while smoking associated with smoking cessation attempts, cessation and reduced cigarette consumption? A survey with a 1-year follow-up - PubMed (nih.gov)
- D'Ruiz CD, Graff DW, Robinson E. Reductions in biomarkers of exposure, impacts on smoking urge and assessment of product use and tolerability in adult smokers following partial or complete substitution of cigarettes with electronic cigarettes. BMC Public Health. 2016;16:543.
- Cohen G, Goldenson NI, Baily P, Chan S, Shiffman S. Changes in biomarkers of cigarette smoke exposure after 6 days of switching exclusively or partially to use of the JUUL with two nicotine concentrations: A randomized controlled study in adult smokers. Under review. "Concurrent poster at SRNT 2021"

Methods

- Data drawn from the Adult JUUL Users' Smoking and Switching Trajectories (ADJUSST) Study
- A naturalistic, observational study of US adults (21+) who purchased a JUUL Starter Kit in 2018
- Follow-up assessments at 1, 2, 3, 6, 9, and 12 months after baseline
- Aim 1: Trends in dual use over time**
 - Sample: N=22,905 past 30-day (P30D) established smokers at baseline (now smoked some days or every day, and smoked ≥ 100 CCs/lifetime).
 - Analyses: Examine prevalence of dual use over time
 - Vs. other tobacco use categories: 1) smoking only, 2) JUUL only, and 3) no JUUL/no smoking, and 4) a composite category of switched away from CCs (i.e. 2) JUUL only or 3) no JUUL/no smoking).
- Aim 2: Changes in CC consumption**
 - Sample: N=26,522 P30D smokers at baseline (regardless of established status)
 - Subsample of those smoking 10+ cigarettes per day (CPD) at