

INTRODUCTION

- Flavored ENDS and ONPs have reshaped the nicotine landscape
- Flavored variants drive youth initiation, possibly leading to sustained use and combustible use increasing lung cancer risk
- US states have adopted non-uniform flavor restrictions
- Cross-product effects are poorly understood
- Heterogeneity of state-level policies provides a comparative framework to examine these dynamics

METHODS

Data: Nielsen retail scanner data, 22 US states, Jan 2020 – Dec 2024, in 4-week intervals. Per-capita ENDS volume = 0.7 mL/units; ONP = pouches

How:

- Three flavor categories: [mint/menthol](#), [other flavored](#) and [tobacco/unflavored](#)
- Comprehensive flavor bans: MA (Jun 2020), CA (Dec 2022)
- ENDS only flavor bans: NY, NJ (~ May 2020)
- All other states: no flavor bans (unrestricted)
- Mean of sales calculated post policy or market event through study end

DISCUSSION AND CONCLUSION

States that enacted **comprehensive flavor bans** were associated with a substantial reduction in per-capita ENDS sales and slight reduction in ONP sales but failed to curtail the rise of ONPs as a category.

States that enacted **partial flavor bans** covering ENDS appeared to shift consumer use towards ONPs, predominantly mint/menthol flavored.

Findings suggest that comprehensive, cross-product understanding is necessary to enact effective regulations of nicotine products.

Future Direction for Research

- Do comprehensive flavor bans and cross-product substitution reduce or increase initiation and progression risk?

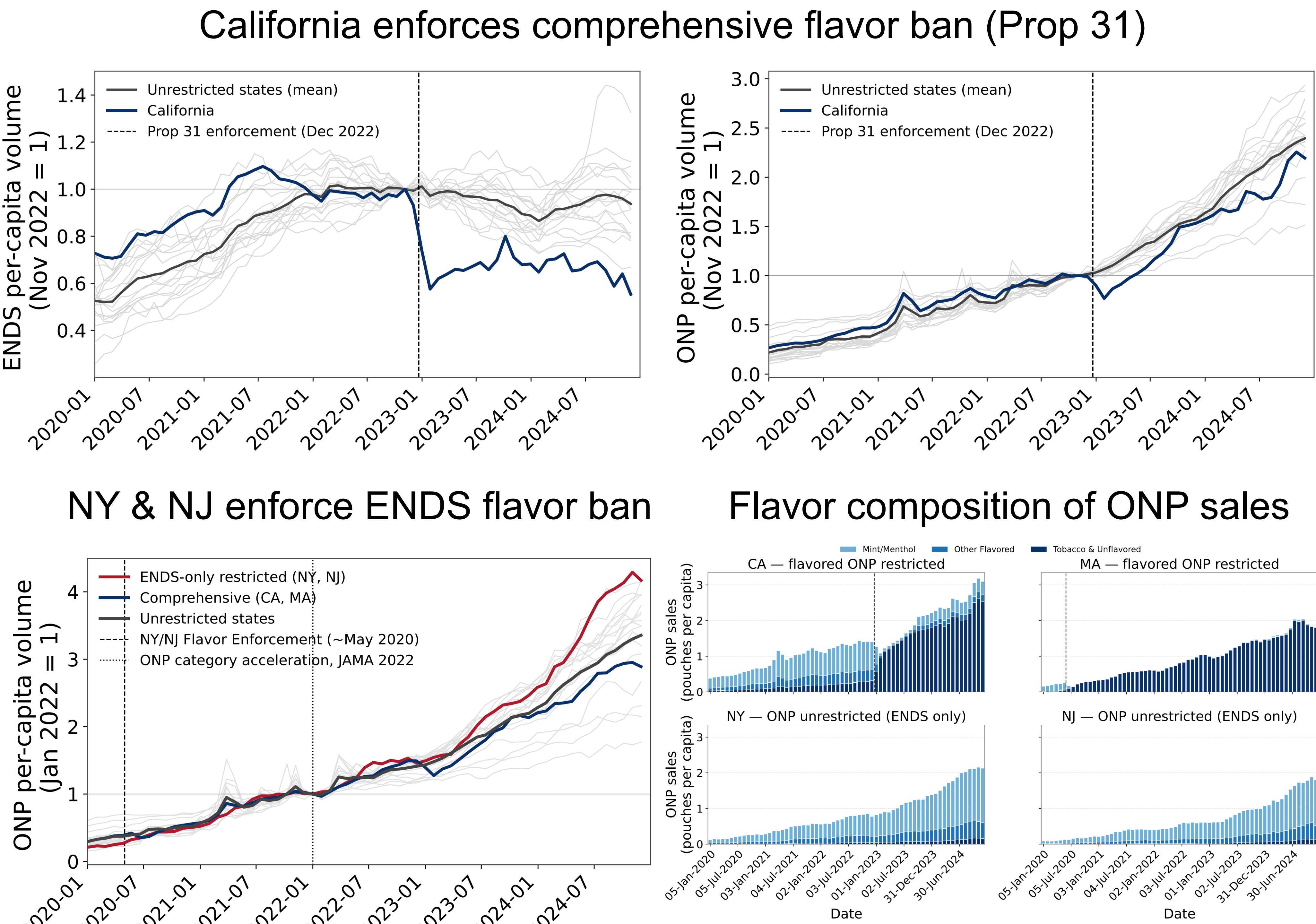
REFERENCES & ACKNOWLEDGEMENTS

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RESULTS



Observation	Normalized Volume (mean)	Unrestricted (mean)	Difference	Rank*	P-value**
ENDS decrease after comprehensive ban in California (CA)	0.67	0.95	-29.4%	1/19	0.053
ONP decrease suggestive after comprehensive ban in California	1.49	1.68	-11.1%	3/19	0.16
ONP unaffected by comprehensive ban in Massachusetts (MA)	2.48	2.38	+4.4%	9/19	0.47
ONP increase after ENDS-only ban in New Jersey (NJ)	2.94	2.38	+23.4%	1/19	0.053
ONP increase suggestive after ENDS-only ban in New York (NY)	2.65	2.38	+11.28%	5/19	0.26

* n=19 (18 unrestricted states and the state with flavor restriction being tested)
** One-sided permutation p-value = rank/n, the probability under reassignment of a state's rank or more extreme ranking occurring by chance, based on permutation across comparison states. Minimum value = 0.053.
*** Volumes normalized to Nov 2022 (ENDS) or Jan 2022 (ONP) baseline.