Identifying heterogeneous treatment effects of the COVID-19 pandemic on non-fatal opioid overdose among New York State Medicine enrollees

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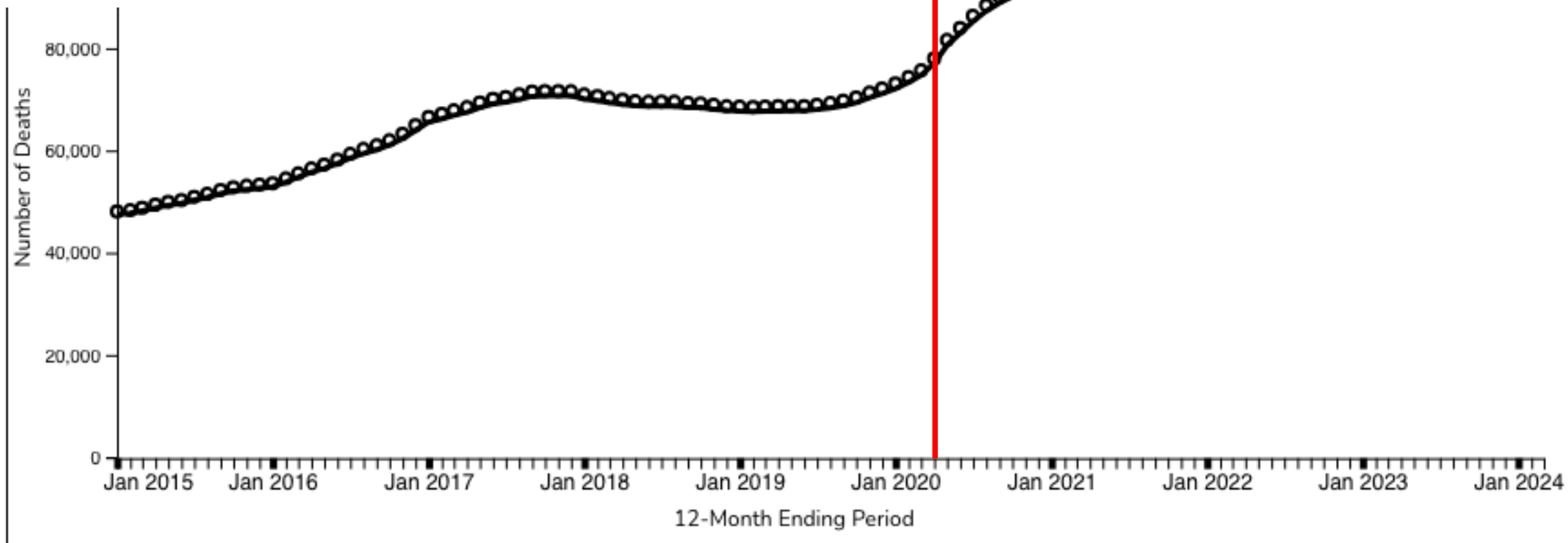World Congress of Epidemiology 2024

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Figure 1a. 12 Month-ending Provisional Counts of Drug Overdose Deaths: United States

THE OPIOID CRISIS AND
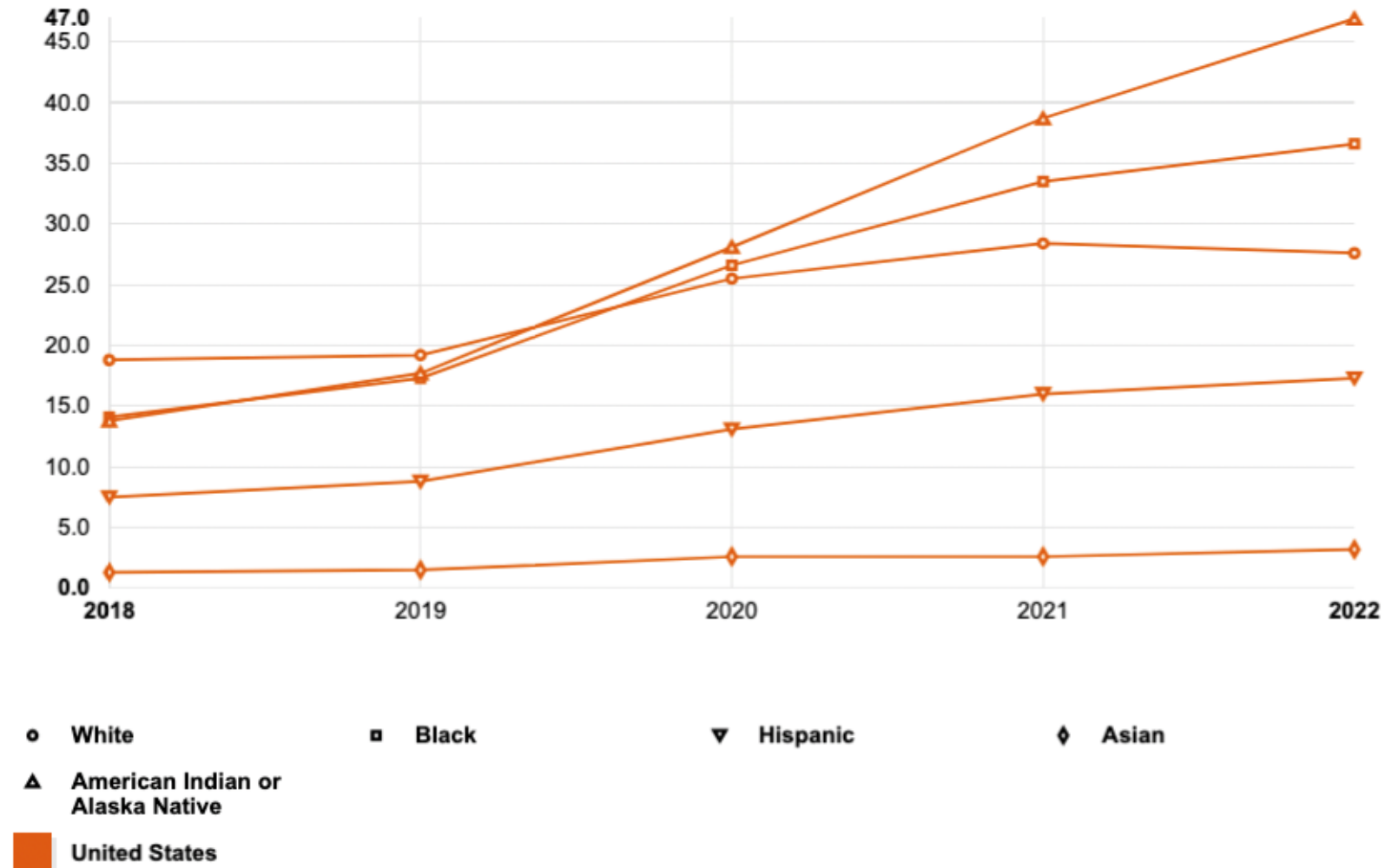THE BLACK/AFRICAN AMERICAN
POPULATION: AN URGENT ISSUE

SAMHSA
Substance Abuse and Mental Health
Services Administration
www.samhsa.gov

o White   ▣ Black   ▽ Hispanic   ◇ Asian

△ American Indian or
   Alaska Native
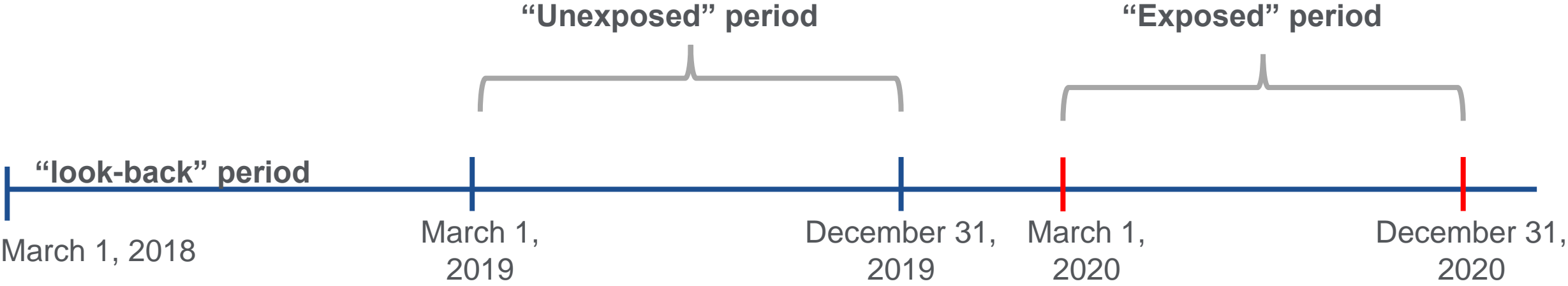
■ United States

Objective

Identify subpopulations of the New York state Medicaid population who experienced the greatest increases in risk of non-fatal opioid overdose following onset of the COVID-19 pandemic

Data

Center for Medicare and Medicaid Services COVID-19 Supplement

- Cohort of NYS Medicaid beneficiaries (n = 1,235,335)
    - Aged 18-64
    - Continuously enrolled for 10-months as of February 2020

- Outcome defined as non-fatal opioid overdose
    - ICD-10 codes: X40-X44, X60-X64, X85, Y10-Y14, T40.0-T40.4
    - Observation period begins March 1, 2019

Study Timeline

"Unexposed" period

"Exposed" period

"look-back" period

March 1, 2018   March 1, 2019   December 31, 2019   March 1, 2020   December 31, 2020

* "Treatment" = Emergence of the COVID-19 Pandemic in NYS

Predictors

- ## Individual-level
  - Age, race/ethnicity, gender, disability status, chronic pain, opioid use disorder (OUD), treatment for OUD, Health Service Area
    - Assessed at beginning of observation period

- ## Contextual-level (census tract-linked ACS data)
  - Population density, median household income, gender, age, race/ethnicity, marital status, employment, poverty, home ownership, housing stability, family size
    - Operationalized in quintiles

	$N = 1,021,889$	
	N	**%**
Non-fatal overdose		
≥ 1 during Pre-COVID	1871	0.18%
Aged, Blind, Disabled	123457	12.08%
Health Service Area		
Central NY	57103	5.59%
Finger Lakes	54166	5.30%
Mid-Hudson	79624	7.79%
Nassau-Suffolk	81662	7.99%
New York City	625401	61.20%
Northeastern NY	47047	4.60%
NY-Penn	9363	0.92%
Western NY	67523	6.61%
Baseline Documentation of Opioid Use Disorder	24592	2.41%
Baseline Documentation of Opioid Use Treatment	11479	1.12%
35-44	200007	19.59%
45-54	238301	23.32%
55-64	239225	23.41%

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Heterogeneous Treatment Effect Scan

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- Identifies subgroups for whom the observed treatment effect is the most significantly different than the average effect of treatment under the null hypothesis
  - H_0: uniform effect of treatment for all individuals

- Iteratively scans data for the subgroup with the greatest penalized log-likelihood statistic
  - $F(S) = \log(\Pr(\text{Data} \mid H_1(S)) / \Pr(\text{Data} \mid H_0))$

- Ran 100 iterations of HTE-scan
  - Permutation tested across 100 simulated datasets to assess statistical significance at $\alpha = .05$

Results

Subgroup 1: Older working-aged Black and Hispanic men

Black and Hispanic; male; aged 45-64; no history of OUD

N = 53,065
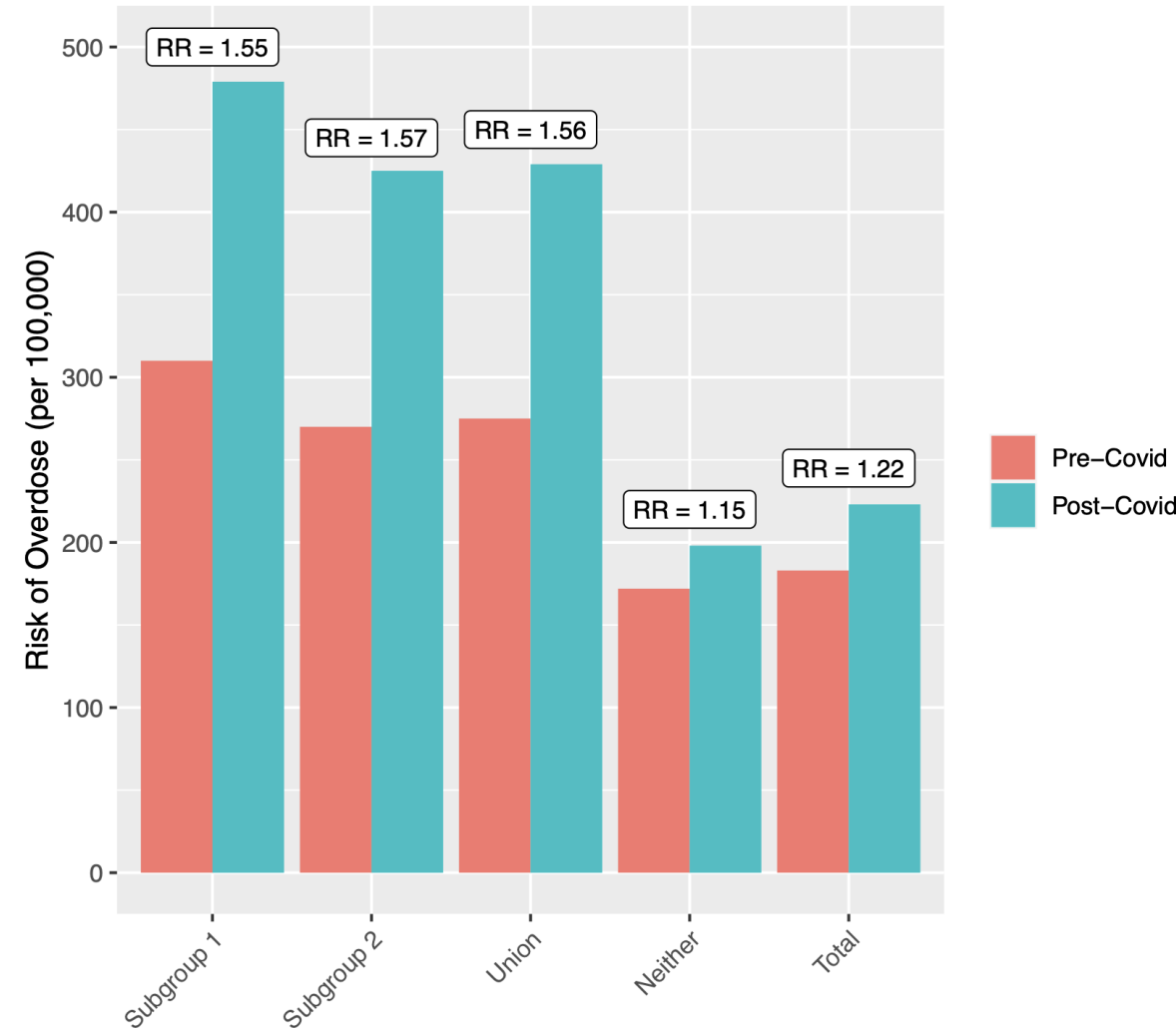
Penalized Log-likelihood score: 44.15

RR = 1.55

Subgroup 2: Older working-aged adults with Aged/Blind/Disabled status

Aged/Blind/Disabled status; aged 45-64; no history of OUD

N = 73,694

Penalized log-likelihood score: 41.46

RR = 1.57

Implications

- Prominent role of age, race/ethnicity, and disability status
  - Highlight role of structural factors in producing increased overdose risk

- Underlying mechanisms may be key targets for intervention during future Big Events
  - Further work to identify and study these mechanisms is vital

- Limitations
  - Limited generalizability (Medicaid enrollees; 18-64 years of age)
  - Could not look at fatal overdose due to inclusion criteria for parent study
  - Potential misclassification of outcome due to lack of formal diagnosis

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Acknowledgments

#BlackEpiMatters

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