Disparities in Vulnerability to Severe Complications from COVID-19 in the United States

Emily E. Wiemers (Syracuse University)
Scott Abrahams (Duke University)
Marwa AlFakhri (Duke University)
V. Joseph Hotz (Duke University)
Robert F. Schoeni (University of Michigan)
Judith A. Seltzer (UCLA)

PAA Presentation
July 15, 2020

Introduction

- Presence of preexisting health conditions increases vulnerability to severe complications from COVID-19.
  - 90% of hospitalized patients have at least one preexisting health condition.
  - Among those hospitalized in NYC, median number of preexisting conditions was four.
  - Hypertension, diabetes, cardiovascular disease, kidney disease and obesity are the most common conditions among hospitalized patients.

Introduction

- Longstanding disparities in health and mortality by race-ethnicity & SES.
- Need to translate these disparities into vulnerability of serious complications from COVID-19.
- Surveillance data shows disparities in COVID-19 infections, hospitalizations & deaths
  - Race-ethnicity is missing for some cases
  - Coverage is necessarily limited
  - Lags in detailed data
  - Nothing on SES differences, e.g., by education & income

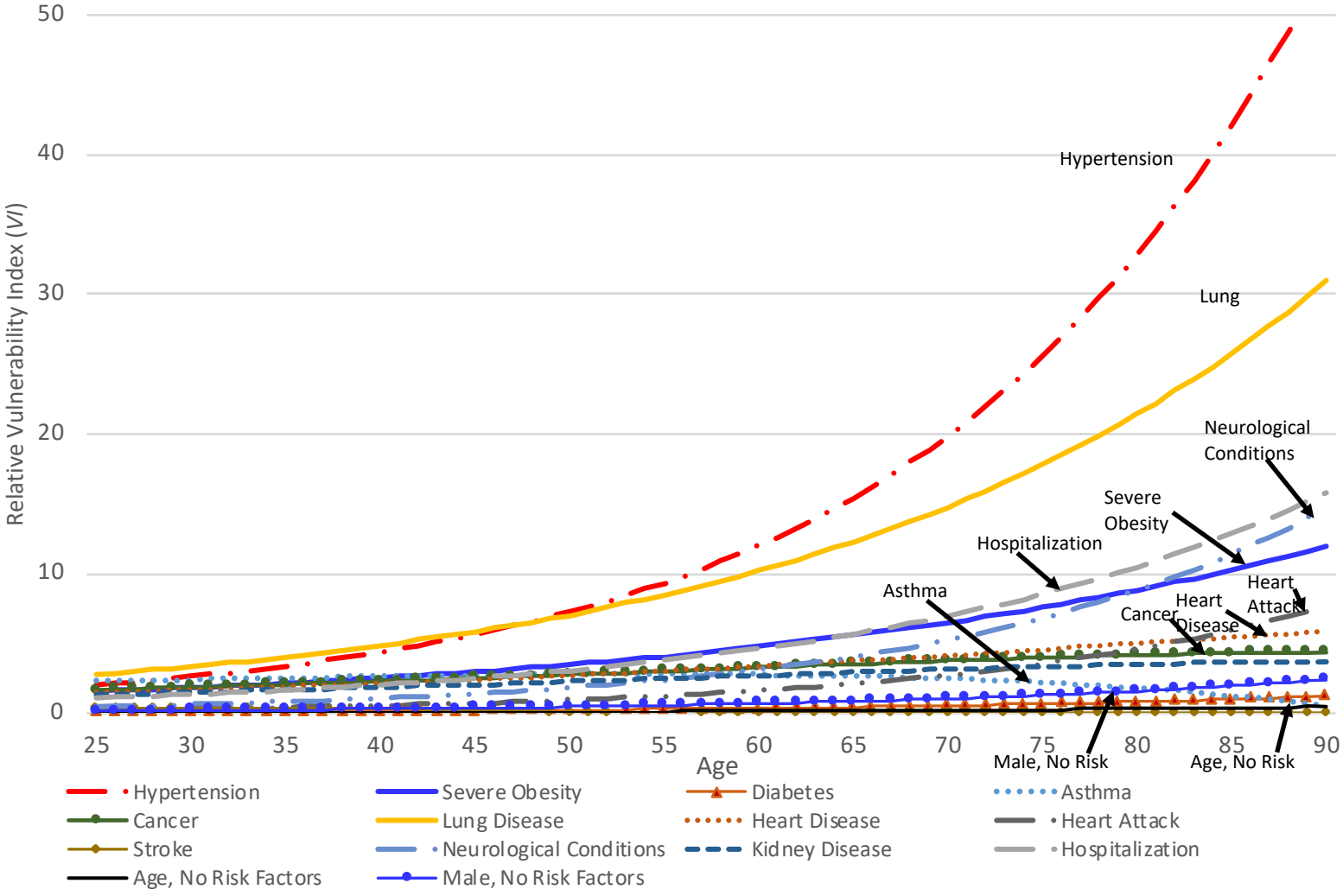
Contribution

- This paper combines
  - Predictive model of vulnerability to in-patient hospitalization trained on previous respiratory infections using Medicare & health care system claims data (DeCaprio et al. 2020) with
  - Nationally- & population-representative data (Panel Study of Income Dynamics)
- We estimate *relative vulnerability to severe complications from* COVID-19 (*VI*) for adults in PSID in 2017 based on preexisting health conditions.
- Focus on disparities by race-ethnicity, education, & household income and how these vary by age.

Methods

- Distribution of number of preexisting health conditions (risk factors) by race-ethnicity, education, and income.
- Median *VI* by race-ethnicity, education, and income
  - *VI* is derived from a model predicting hospitalization with a severe respiratory infection based on age, gender, and risk factors (DeCaprio et al. 2020).
  - VI_i is the odds that individual *i* has of hospitalization from a respiratory infection relative to that for a 30-year-old female with no risk factors.

Figure 1. Marginal Contribution of Each Risk Factor Available in PSID to *VI* by Age



Data

- 2017 Panel Study of Income Dynamics
  - Oversample of Blacks and low-income families as part of original study design.
  - Addition of immigrants who arrived in the US after 1968 in 1997 and 2017.
  - Sample of household heads and partners age 25 and older
  - Not missing data on age, race-ethnicity, educational attainment, household income, or preexisting health conditions.
  - N=13,150

Table 1. Descriptive Statistics

	Percent across Age Categories					
	25-44	45-64	65+	Percent, All Ages (25+)	Mean Age	Sample sizes
Overall					51.9	13,150
Race and Ethnicity						
NH White	33	38	28	71	53.6	7,082
NH Black	42	41	17	11	49.2***	4,158
Hispanic	52	36	13	13	46.5***	1,464
Education						
HS or less	32	40	28	38	54.3***	5,262
BA or more	43	36	22	38	50.1	4,406
Household Income						
Bottom Quartile	31	33	37	18	56.6***	2,550
Top Quartile	37	48	15	32	50.3	3,774

Data Source: 2017 Wave, PSID. Sample: PSID heads and spouses, 25 years and older. Weights: PSID individual cross-section weights.

Results

Figure 2a. Distribution of Number of Risk Factors by Race-Ethnicity and Age

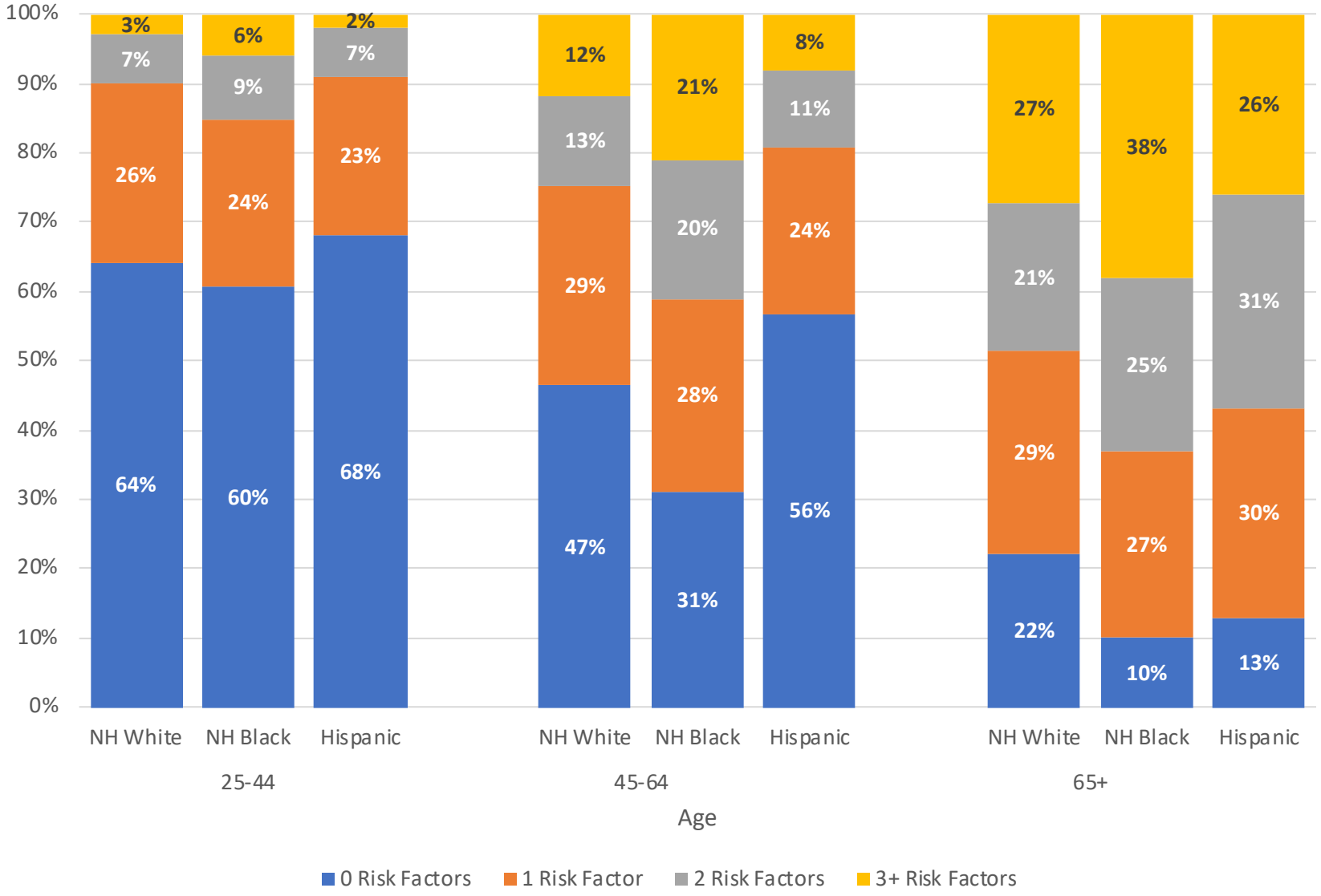


Figure 2b. Distribution of Number of Risk Factors by Education and Age

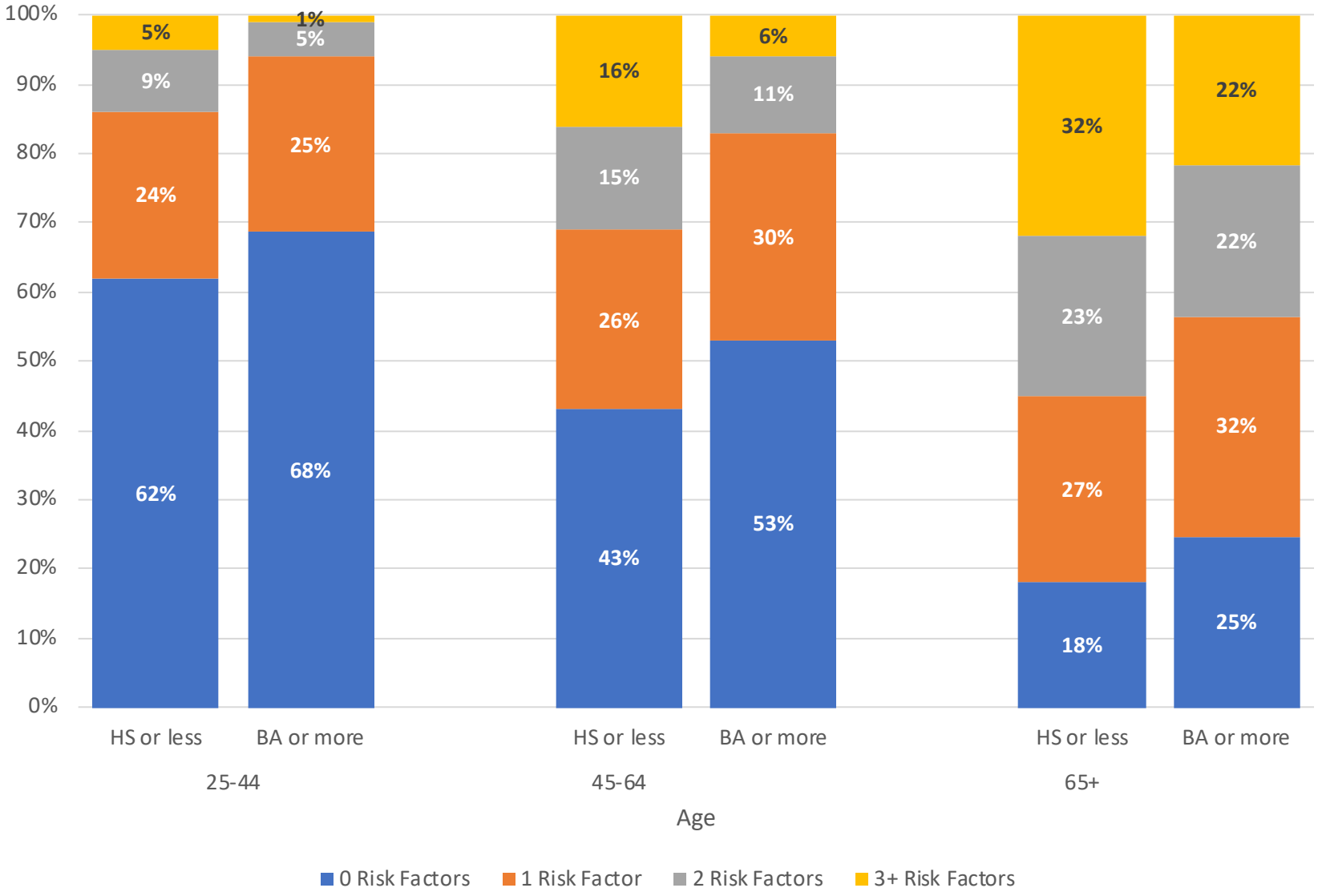


Figure 2c. Distribution of Number of Risk Factors by Income and Age

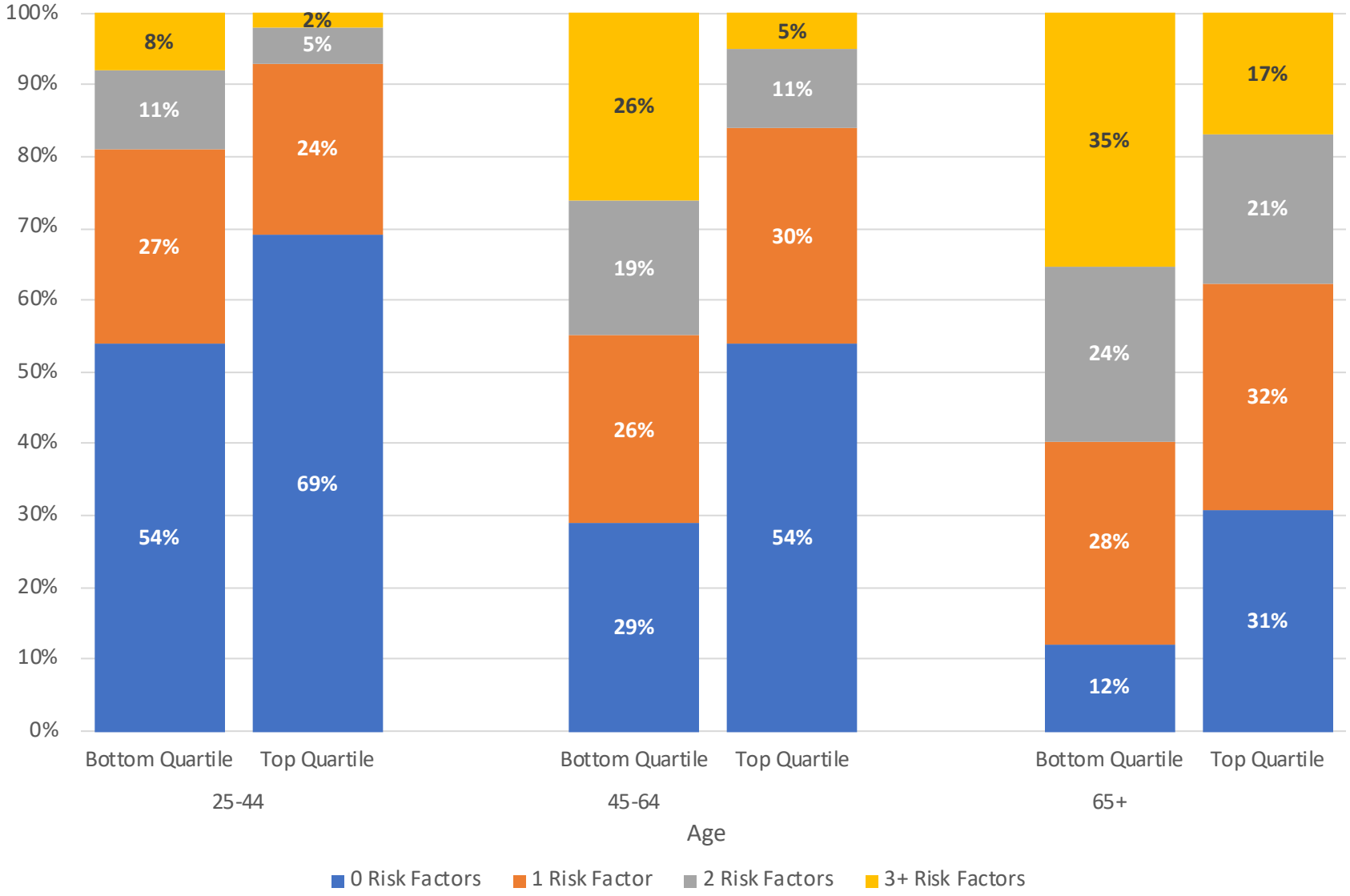


Figure 3a. Median *VI* by Race-Ethnicity and Age

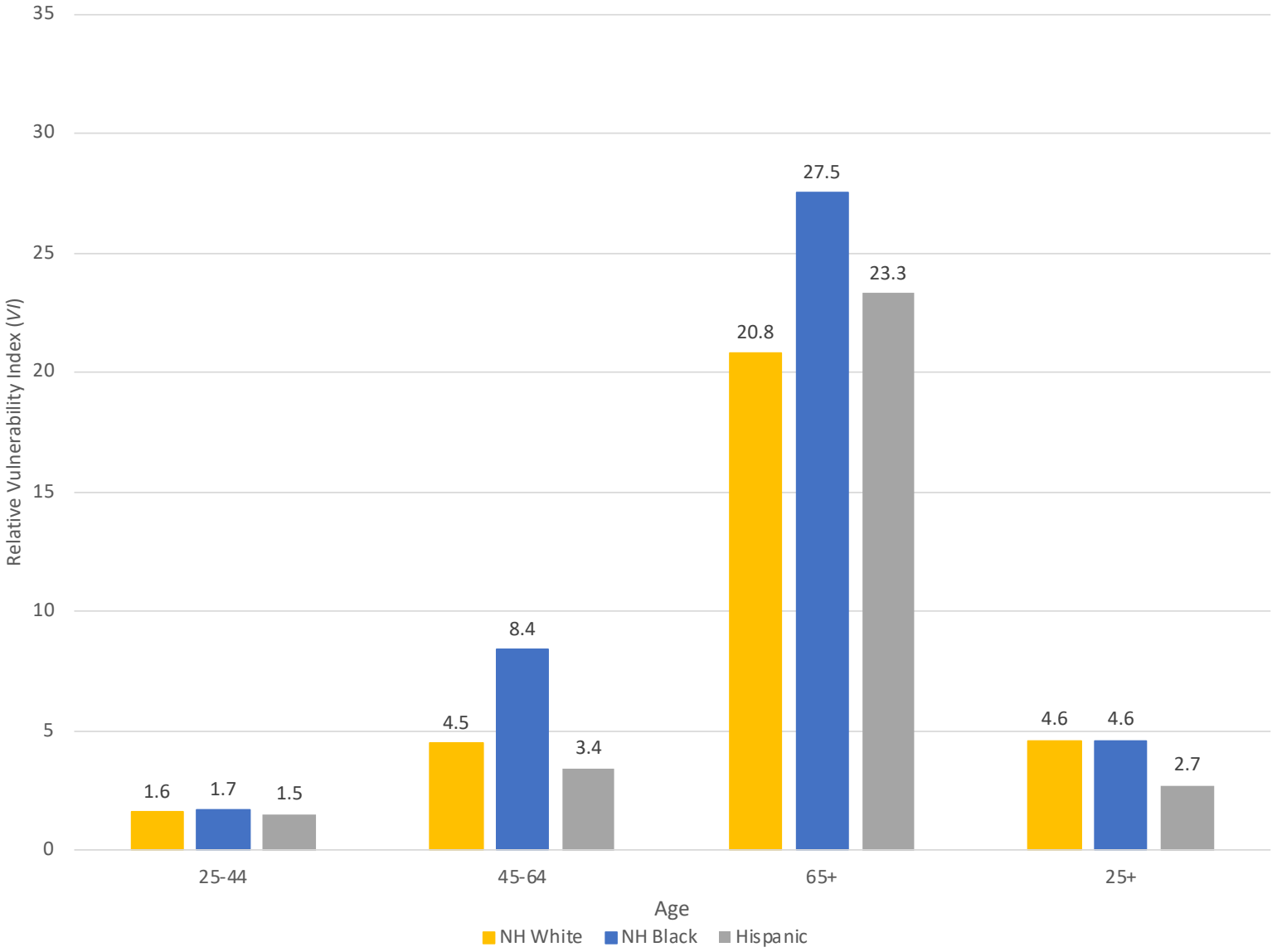


Figure 3b. Median *VI* by Education and Age

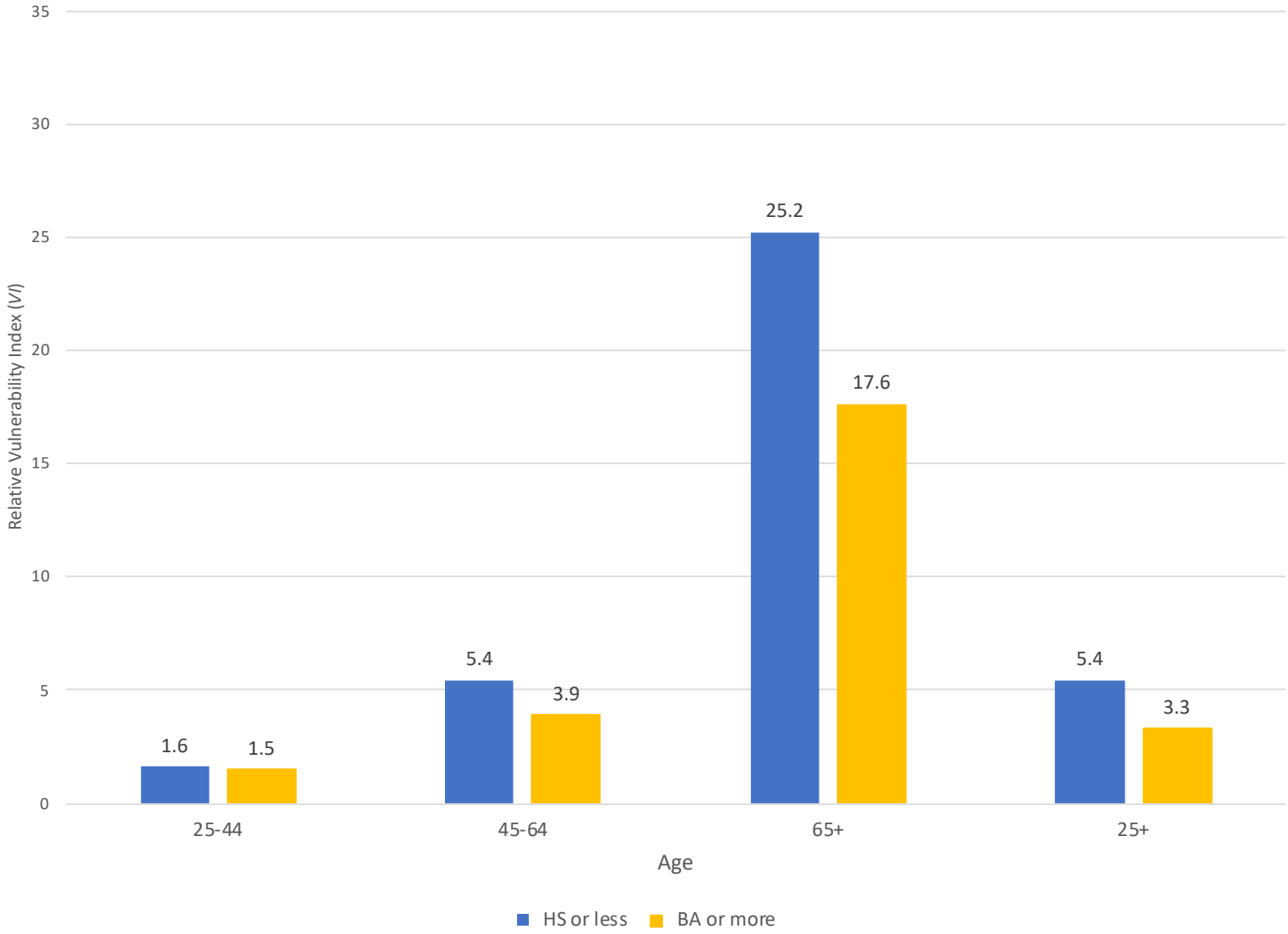
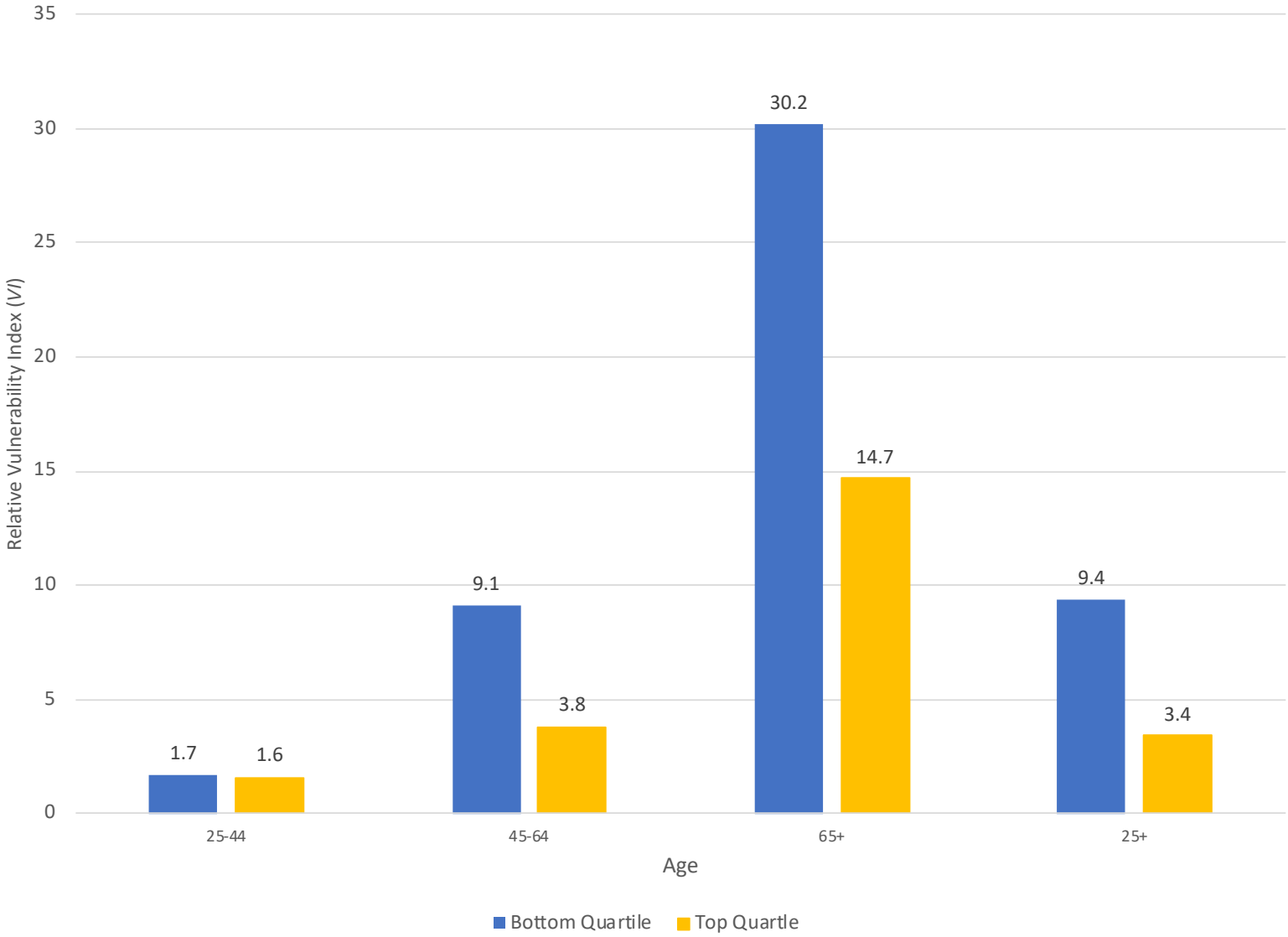


Figure 3c. Median *VI* by Income and Age



Discussion

- We also find:
  - Estimated *VI* of hospitalized patients based on preexisting conditions reported in Garg et al. (2020) is in the upper-end of the distribution of vulnerability for patients age 50 and older.
  - But greater & different disparities by race-ethnicity than predicted by pre-existing health conditions.
- Latter likely due to disparities in exposure.
- Next steps:

  Look at disparities in exposure – in jobs, where one lives & family-shared risks – with data from PSID, HRS, Add Health and Add Health Parent Study, Great Smoky Mountains Study & others.