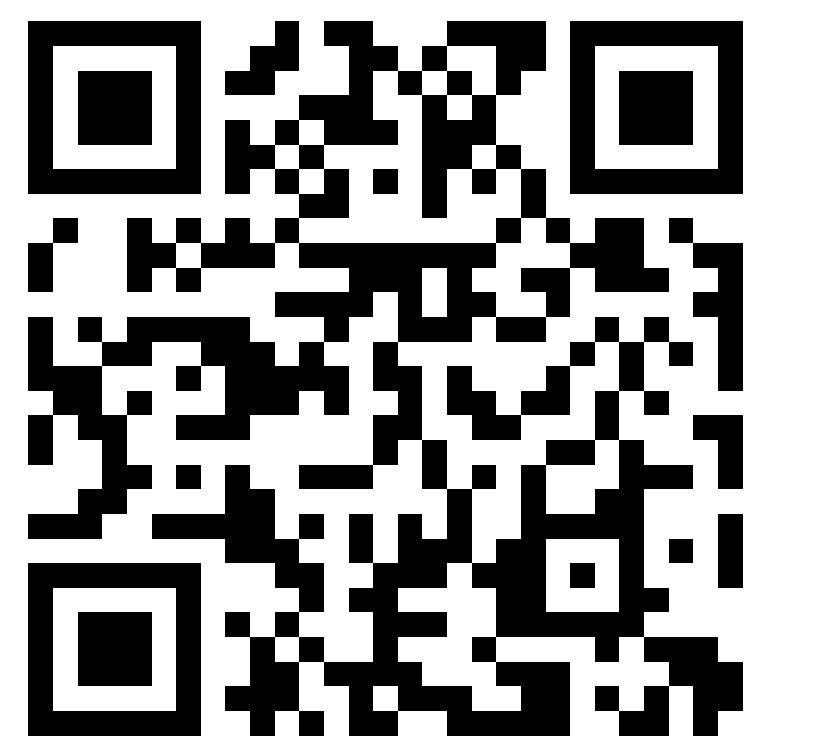# Social Determinants of Health in a Real-World Adult HIV Population: ICD-10-CM and Consumer Linked Data Identification

Pamela Landsman-Blumberg,[1] Kathy Schulman,[2] Jessica Duchen[1]

[1]Magnolia Market Access, [2]Schulman Consulting

Scan the QR code to learn more about Magnolia Market Access' work with HEOR & SDOH

Introduction

- Social determinants of health (SDOH) are the conditions in which people are born, live, work, and age

- SDOH factors are estimated to drive up to 80% of health outcomes and drive health inequities[1]

- Human immunodeficiency virus (HIV) disease burden is experienced disproportionately by racial and ethnic minorities, and those living in the Southern United States. Furthermore, SDOH factors may be associated with decreased access to care, resulting in worse outcomes among those living with HIV[2]
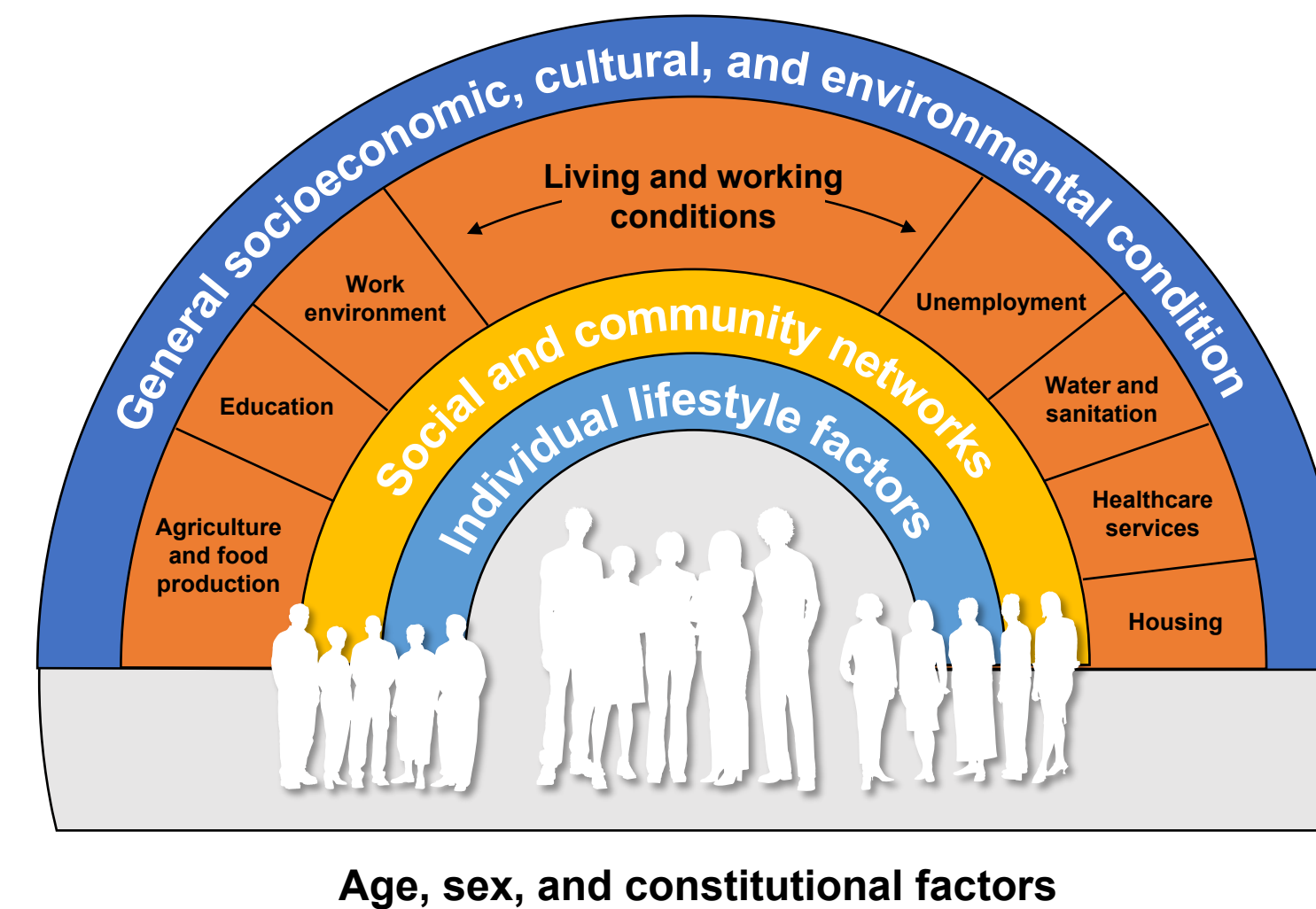
Figure 1. Social Determinants of Health.

Objectives

- Describe SDOH measures in a real-world HIV population through linkage with consumer data and International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) Z codes available in medical closed claims (CC)
- Identify SDOH measures available for inclusion into real-world data analysis to support product value propositions, economic models, and other evidence-generation activities

Methods

- CC from commercially insured enrollees between 1/1/2016 and 12/31/2021 and SDOH factors for calendar year 2022, including demographics, socioeconomic, and household information, were used[3]
- Both data sources are Health Insurance Portability and Accountability Act (HIPAA) compliant and linked by a unique anonymized identifier
- Patients aged 18+ diagnosed with HIV (ICD-10-CM: B20,* Z21) were identified in CC before linking to SDOH data
- Descriptive statistics of SDOH measures were evaluated for age, sex, race, and custom-defined composite measures for household status (marital status; household size; children in the home) and household economic status (economic stability indicator (ESI), household income)
  - ESI ranges from 0 to 30 with higher numbers indicating less economic stability
- SDOH measures identified in CC using ICD-10-CM Z-codes (Z55-Z65, Z72, Z74) were summarized

Results

- Patients living with HIV are most likely to be male (77.2%) and have completed high school
- Compared with other disease cohorts, patients living with HIV have the lowest economic stability
- Composite measures and interactions provide deeper insights into SDOH factors that may influence care patterns and outcomes than individual measures
- 55.3% of patients living with HIV were single and living in a home with or without children
- Even with high income, patients living with HIV may be less economically stable

Table 1. Sociodemographic Characteristics of Linked HIV Cohort

Characteristic	Closed Claims N=69,897
Age, mean (SD)	44.4 (12.6)
Married, n (%)	25.5%
Household size, mean (SD)	2.0 (1.2)
Children in the home, n (%)	27.9%
Occupation, n (%)	
Employed	88.9%
Student	3.6%
Homemaker	5.1%
Retired	1.0%
Home ownership, n (%)	53.0%
Dwelling type, n (%)	
Multi-family	30.0%
Single-family	69.2%

Figure 2. Racial Distribution of Linked Patients With HIV.

- White 58.7%
- Black 24.6%
- Hispanic 13.5%
- Asian 1.6%
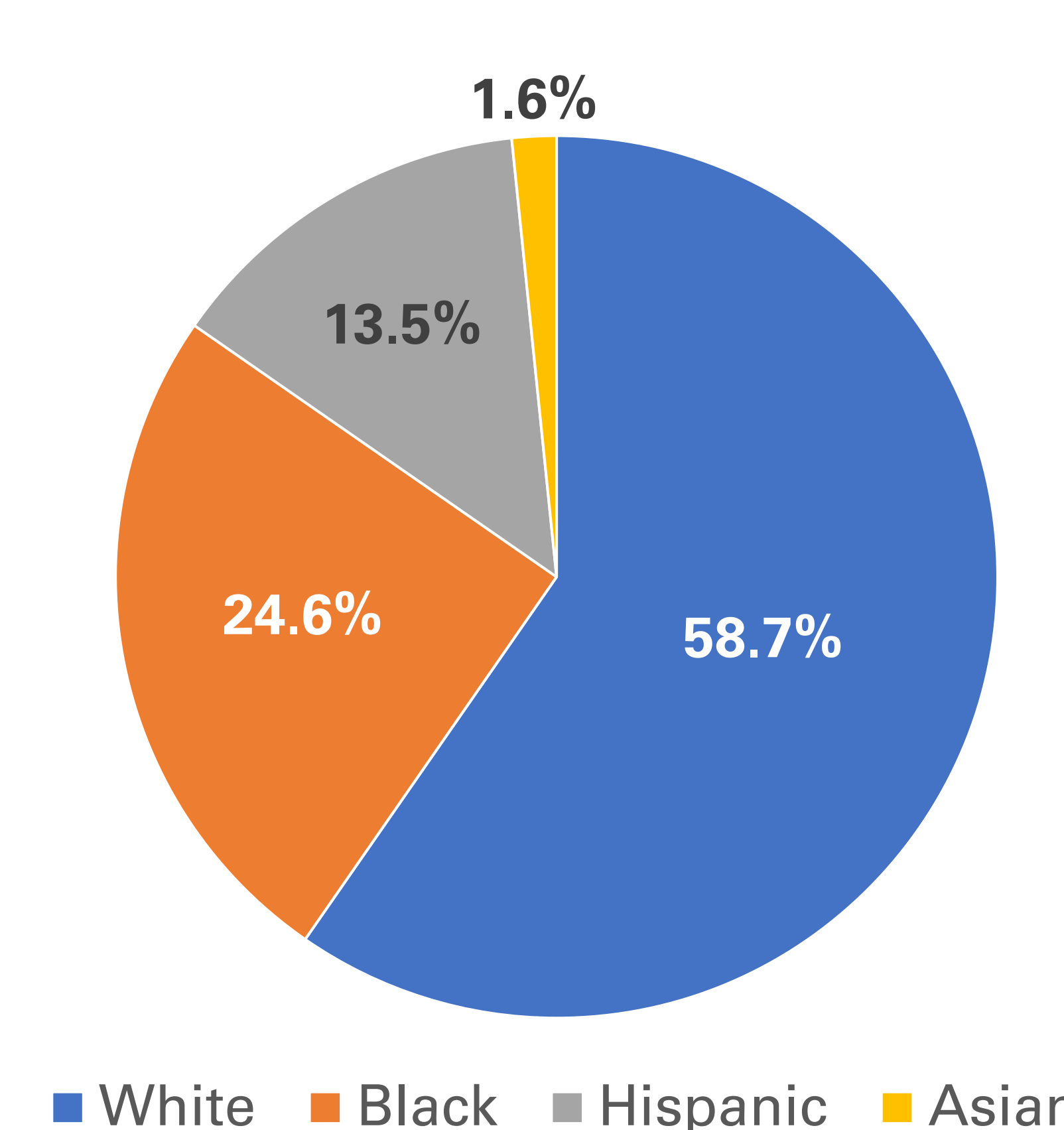
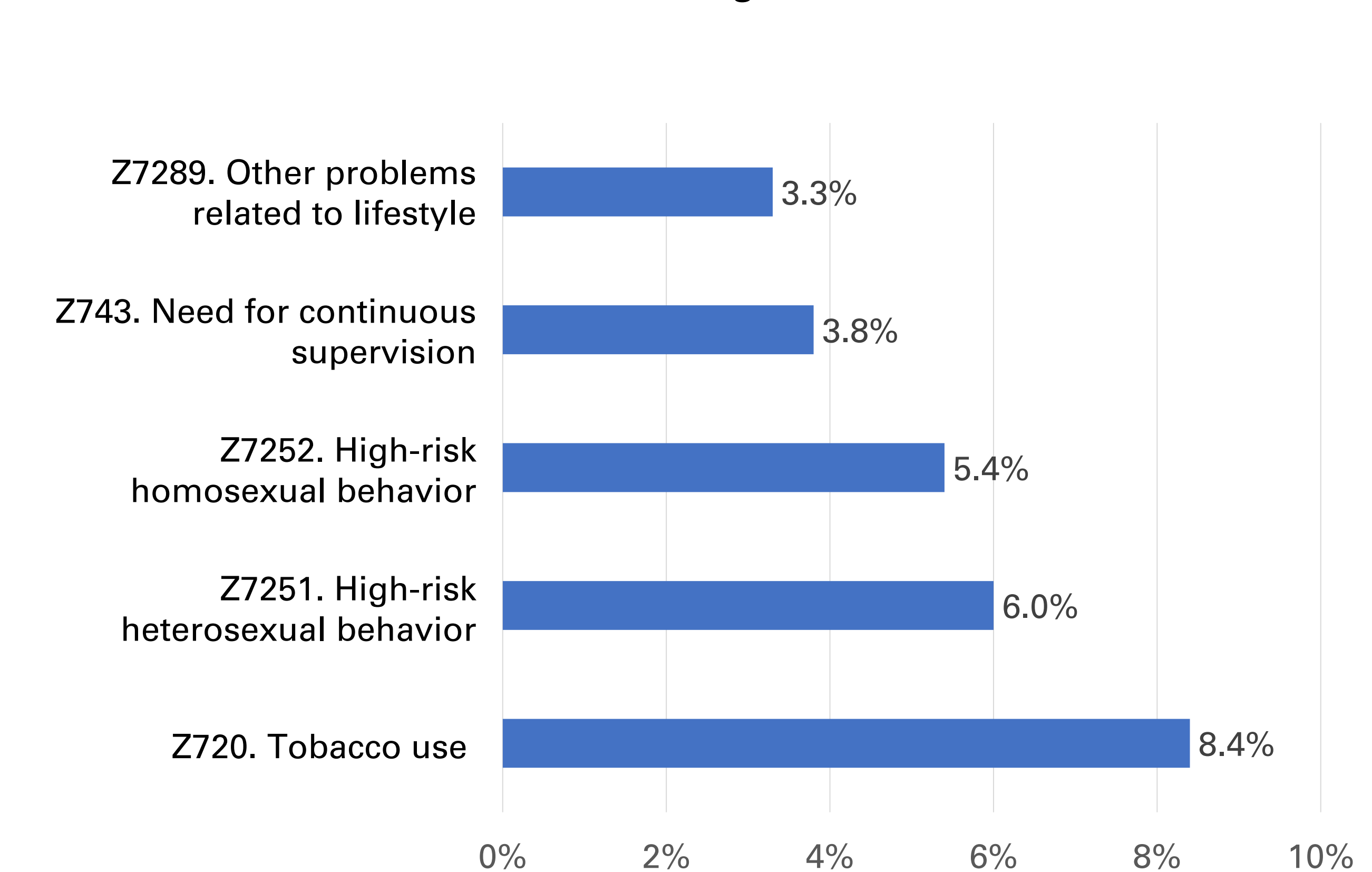**Figure 3. Using ICD-10-CM Z codes identified large numbers of tobacco users and high-risk sexual behaviors.**

- Z7289. Other problems related to lifestyle — 3.3%
- Z743. Need for continuous supervision — 3.8%
- Z7252. High-risk homosexual behavior — 5.4%
- Z7251. High-risk heterosexual behavior — 6.0%
- Z720. Tobacco use — 8.4%

Figure 4. Educational Attainment: Most patients with HIV completed high school.

- Completed High School — 55.4%
- Completed College — 22.4%
- Completed Graduate School — 8.0%
- Attended Vocational/Technical — 0.4%
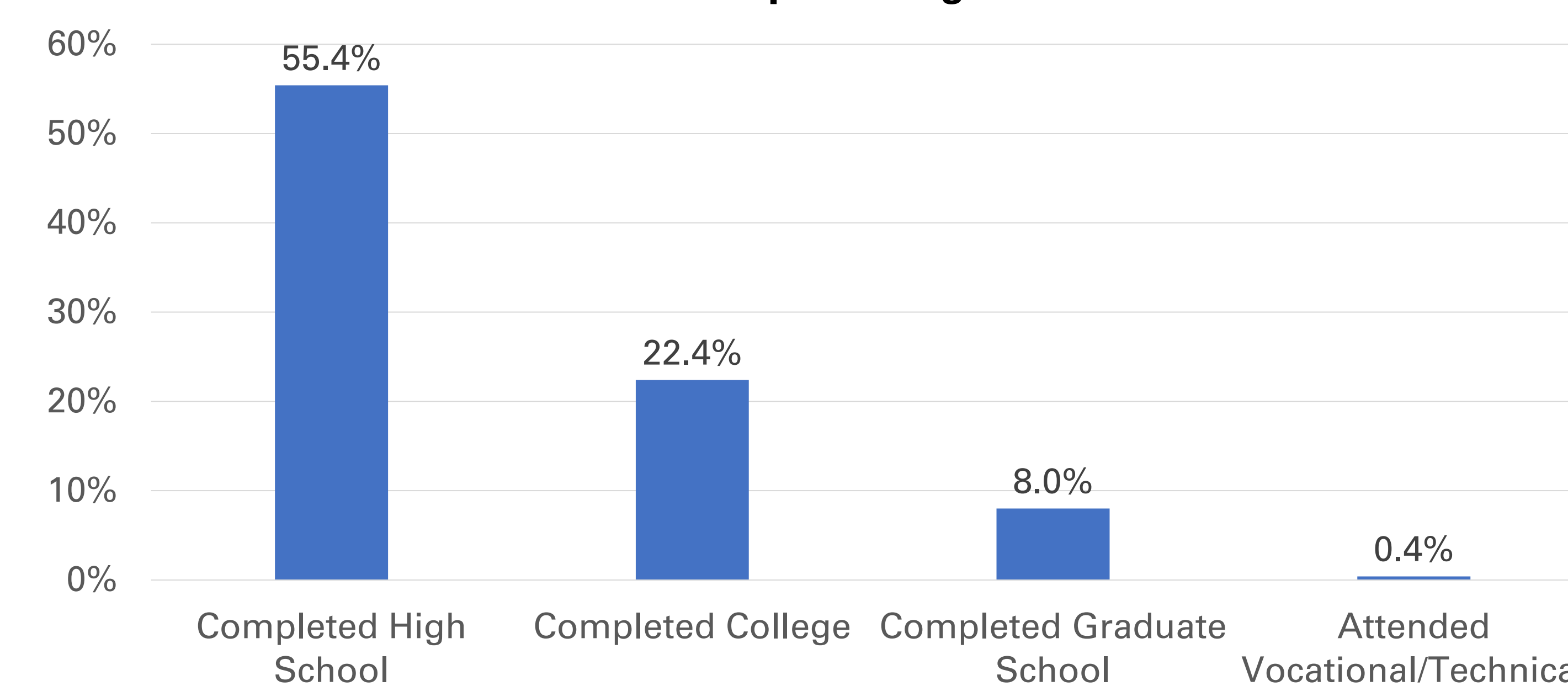
Figure 5. Household Income: The majority of patients with HIV live below the US median household income.

- Federal poverty level for single person
- Federal poverty level for family of 4
- Median US household income
- <$15K — 9.9%
- $15K-$29.9K — 19.2%
- $30K-$74.9K — 41.7%
- $75K-$99.9K — 11.3%
- $100K+ — 17.9%
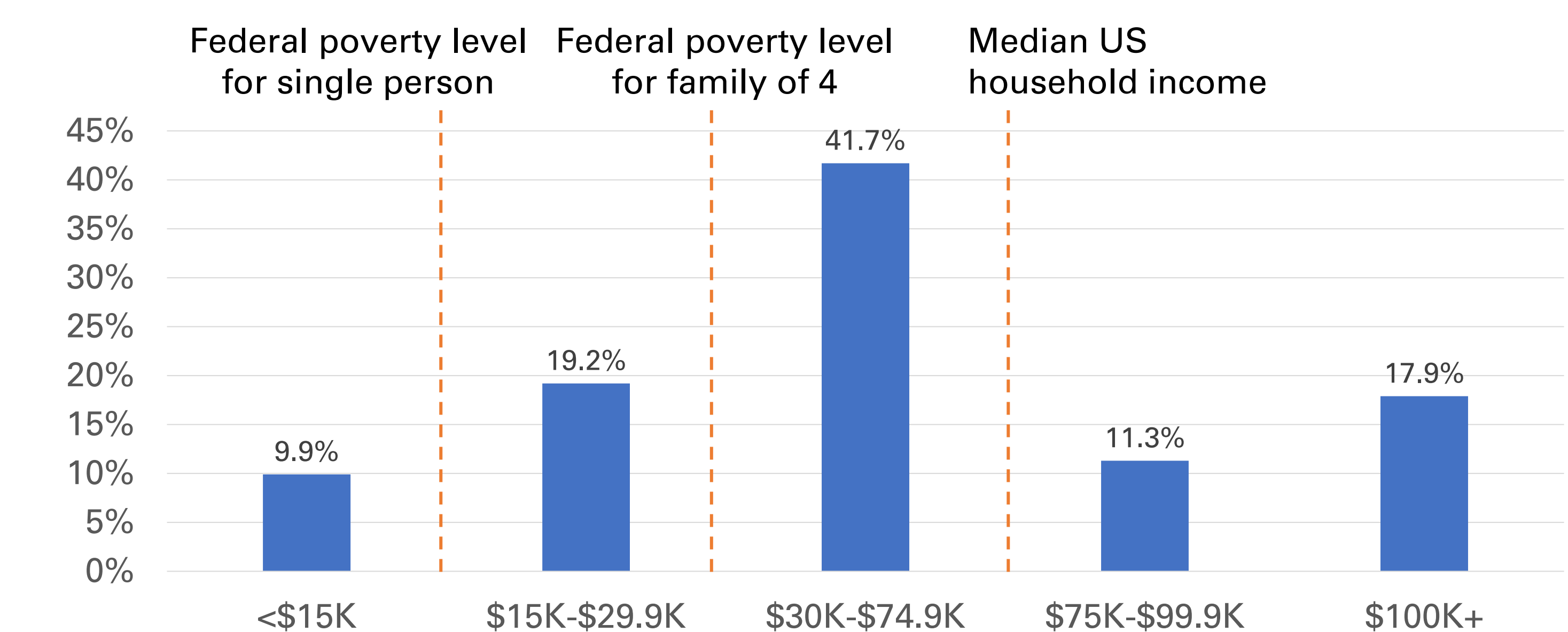
Conclusions

- Linking claims data with person-level SDOH data can provide new insights into disease-specific cohorts beyond the standard age and gender demographic information, which is most often focused on in evaluating health equity
- SDOH measures, individually as interaction terms, or composite measures could be included in propensity score models to remove additional biases and imbalances
- SDOH measures, individually as interaction terms, or composite measures could be included as independent variables in time-to-event, outcomes, or economic models to measure their association with the dependent measure of interest and to identify possible areas of additional intervention
- It's not all about the percentage of overlap when linking or the completeness of Z-coding as it is the number of patients that allows for informative subset analyses
- As with analysis of any real-world data source, you must understand the underlying population represented in your claims or electronic medical records data to put your findings into the correct context

References

1. Greer ML, Garza MY, Sample S, Bhattacharyya S. Social determinants of health data quality at different levels of geographic detail. *Stud Health Technol Inform*. 2023;302:217-221. doi:10.3233/SHTI230106
2. Sprague C, Simon SE. Ending HIV in the USA: integrating social determinants of health. *Lancet*. 2021;398(10302):742-743. doi:10.1016/S0140-6736(21)01236-8
3. CHRONOS. 2017-2023. Forian, Inc., Newtown, PA. https://forian.com