Utilization of the Social Vulnerability Index to Examine Hepatitis C Continuum of Care Outcomes Among Philadelphians
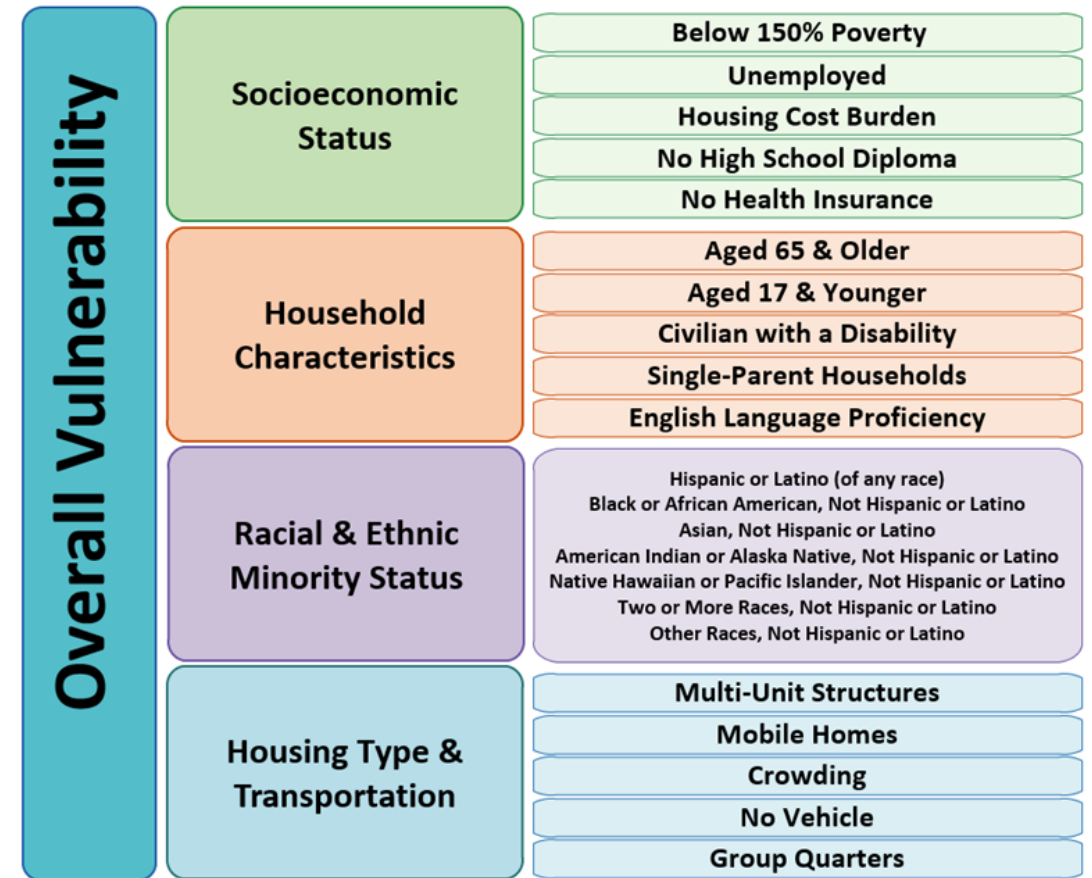
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Background: CDC's Social Vulnerability Index (SVI)

- Assess negative effects on communities caused by stressors on health

- SVI considers various social factors from the community survey
  1. Socioeconomic status
  2. Household composition & disability
  3. Racial & ethnic minority status & language
  4. Housing type & transportation
     - 16 U.S. Census variables

- SVI is assigned by Census Tract (CT)

Overall Vulnerability

Socioeconomic Status
- Below 150% Poverty
- Unemployed
- Housing Cost Burden
- No High School Diploma
- No Health Insurance

Household Characteristics
- Aged 65 & Older
- Aged 17 & Younger
- Civilian with a Disability
- Single-Parent Households
- English Language Proficiency

Racial & Ethnic Minority Status
- Hispanic or Latino (of any race)
- Black or African American, Not Hispanic or Latino
- Asian, Not Hispanic or Latino
- American Indian or Alaska Native, Not Hispanic or Latino
- Native Hawaiian or Pacific Islander, Not Hispanic or Latino
- Two or More Races, Not Hispanic or Latino
- Other Races, Not Hispanic or Latino

Housing Type & Transportation
- Multi-Unit Structures
- Mobile Homes
- Crowding
- No Vehicle
- Group Quarters

https://www.atsdr.cdc.gov/placeandhealth/svi/documentation/SVI_documentation_2020.html

Background: HCV CoC

- Hepatitis C Virus (HCV) Continuums of Care (CoC) are used to measure HCV-related testing & care outcomes

- HCV outcomes vary by subpopulations (e.g. sex, age, race/ethnicity)

- Sociodemographic characteristics are also linked to HCV outcomes

- We assessed if CDC's SVI could be associated with HCV care outcomes

Objective: This analysis represents an initial exploration & demonstration of early findings when incorporating CDC's SVI with the HCV-CoC.

Methods- Data Sources

Hepatitis C Registry

Inclusion: Individuals residing in Philadelphia with a reported positive HCV antibody or RNA test

Meet inclusion criteria | Evaluation

2013 | 2021 | 2022

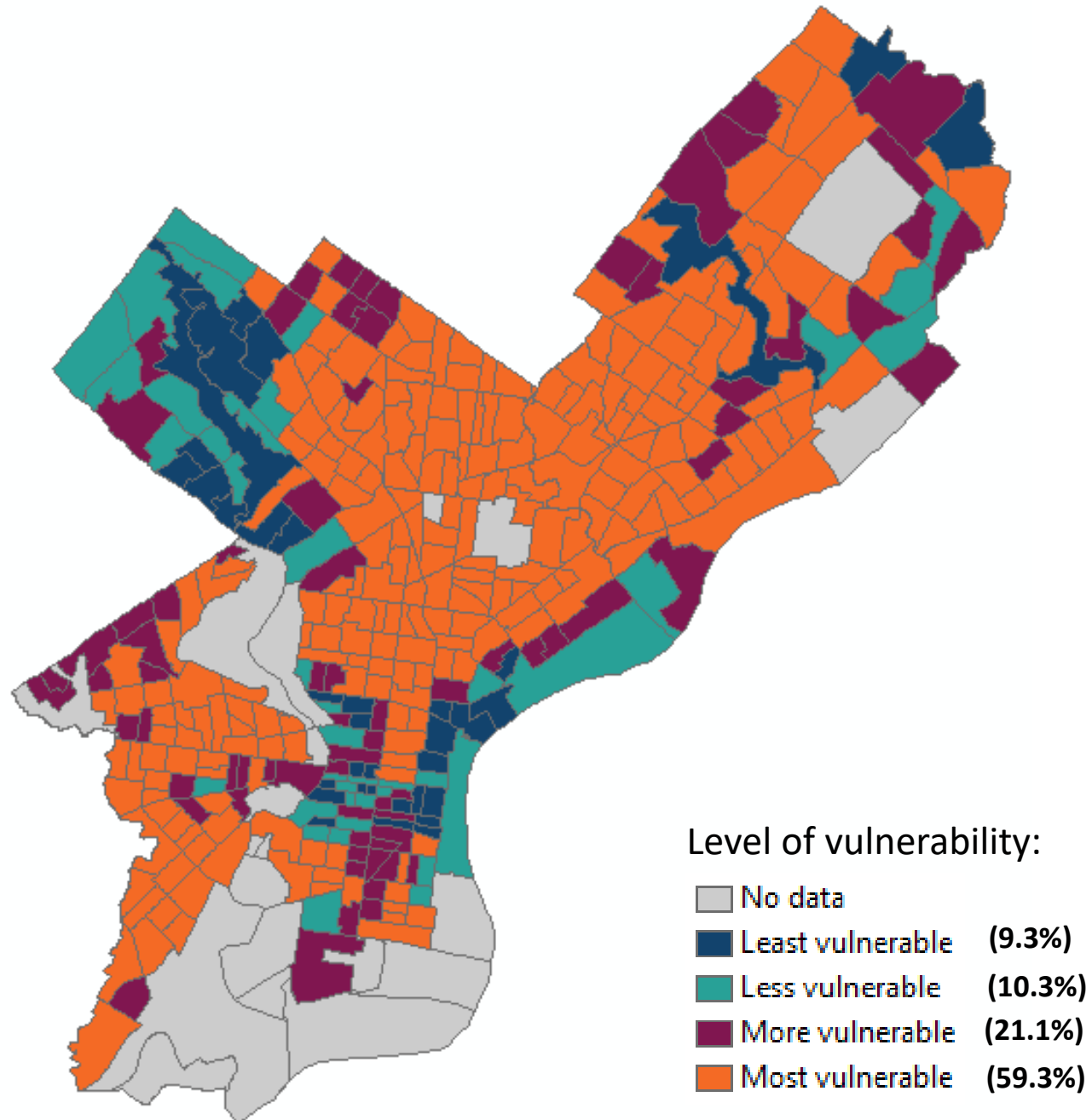## CDC'S Social Vulnerability Index (2020) for CTs

Level of vulnerability by SVI score:
- **Least vulnerable=** 0.0 - 0.25
- **Less vulnerable=** 0.26 - 0.5
- **More vulnerable=** 0.51 - 0.75
- **Most vulnerable=** 0.76 - 1.0

Methods- continued

- Geocoded (Arc-GIS) addresses to obtain CT of residence of individuals

- Examine associations of demographic & level of vulnerability (CT of residence) using Chi-square

- **HCV-CoC steps:** HCV Antibody positive, HCV-confirmatory test completion, current infection, & viral clearance.

- The outcomes of the HCV-CoC were evaluated with multivariable analysis.
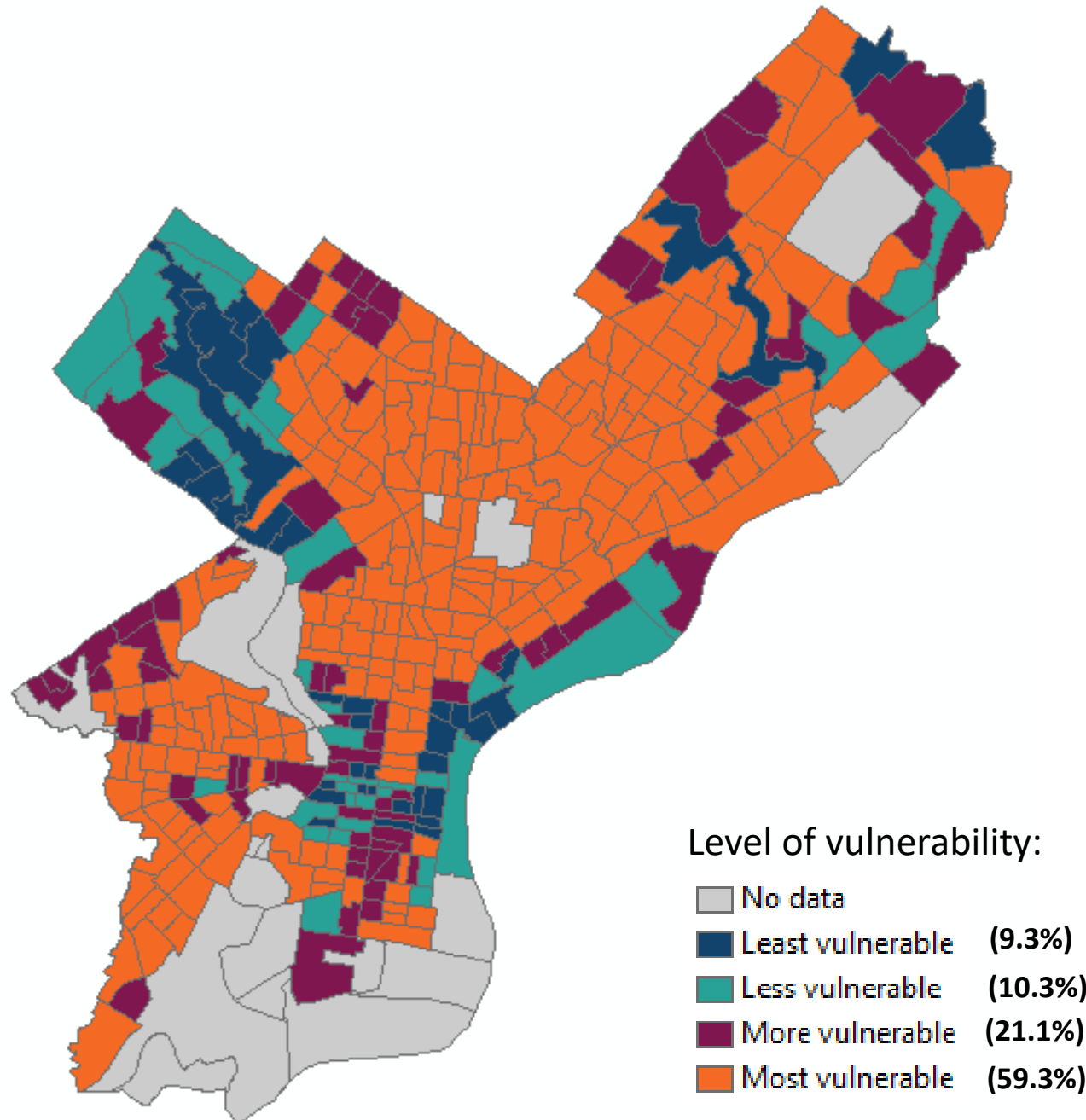
Philadelphia's SVI map by Census Tract

Level of vulnerability:

- No data
- Least vulnerable **(9.3%)**
- Less vulnerable **(10.3%)**
- More vulnerable **(21.1%)**
- Most vulnerable **(59.3%)**

Source: CDC Social Vulnerability Index (2020)

Philadelphia's SVI map by Census Tract
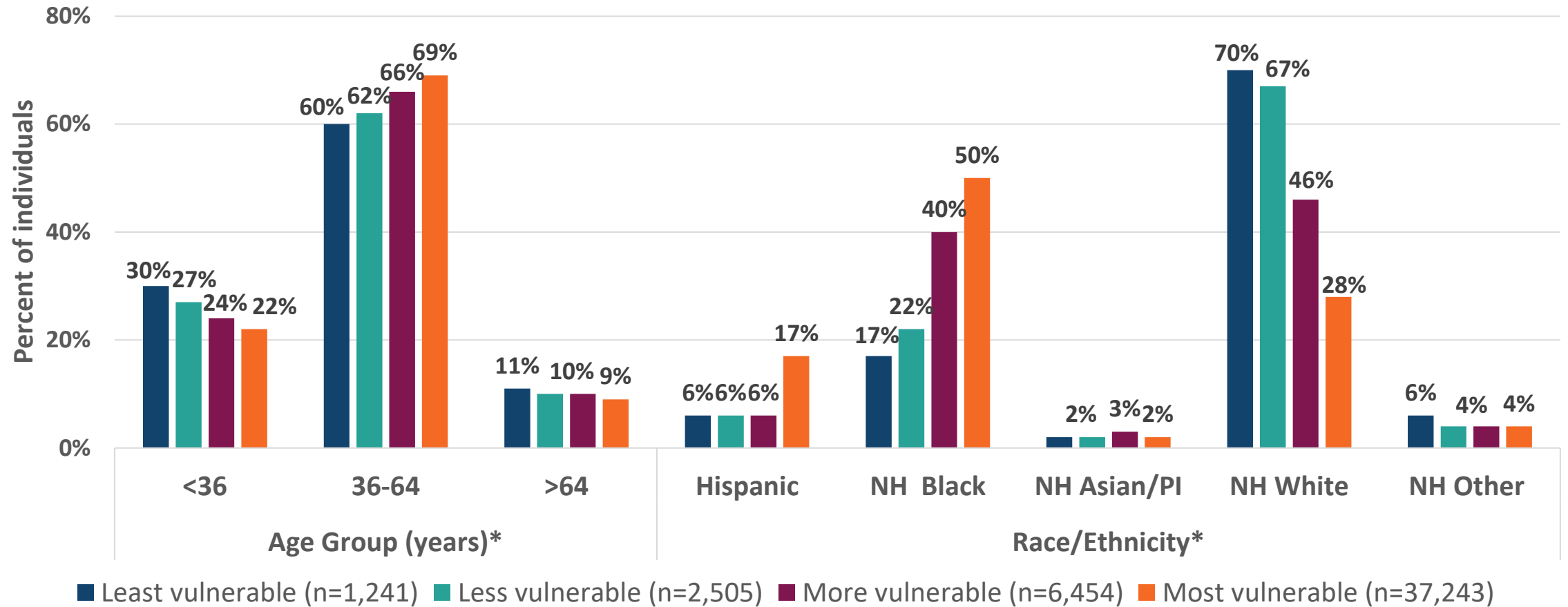
Philadelphians' residing in CTs by SVI :
- **68.6% Most vulnerable**
- **18.7% More vulnerable**

Level of vulnerability:

⬜	No data	
🟦	Least vulnerable	**(9.3%)**
🟩	Less vulnerable	**(10.3%)**
🟪	More vulnerable	**(21.1%)**
🟧	Most vulnerable	**(59.3%)**

Source: CDC Social Vulnerability Index (2020)

HCV population breakdown:

Demographic Characteristics	N	%
Gender		
Male	28,717	61%
Female	18,653	39%
Age group (years)		
<36	10,889	23%
36-64	32,137	68%
>64	4,356	9%
Race/ethnicity		
Hispanic	5,631	14%
Non-Hispanic (NH) Black	18,142	46%
NH Asian/ Pacific Islander	988	3%
NH White	13,033	33%
NH Other	1,574	4%
Social vulnerability		
Least vulnerable	1,241	3%
Less vulnerable	2,505	5%
More vulnerable	6,454	14%
Most vulnerable	37,243	78%

Demographic characteristics by level of vulnerability of people living with HCV in Philadelphia
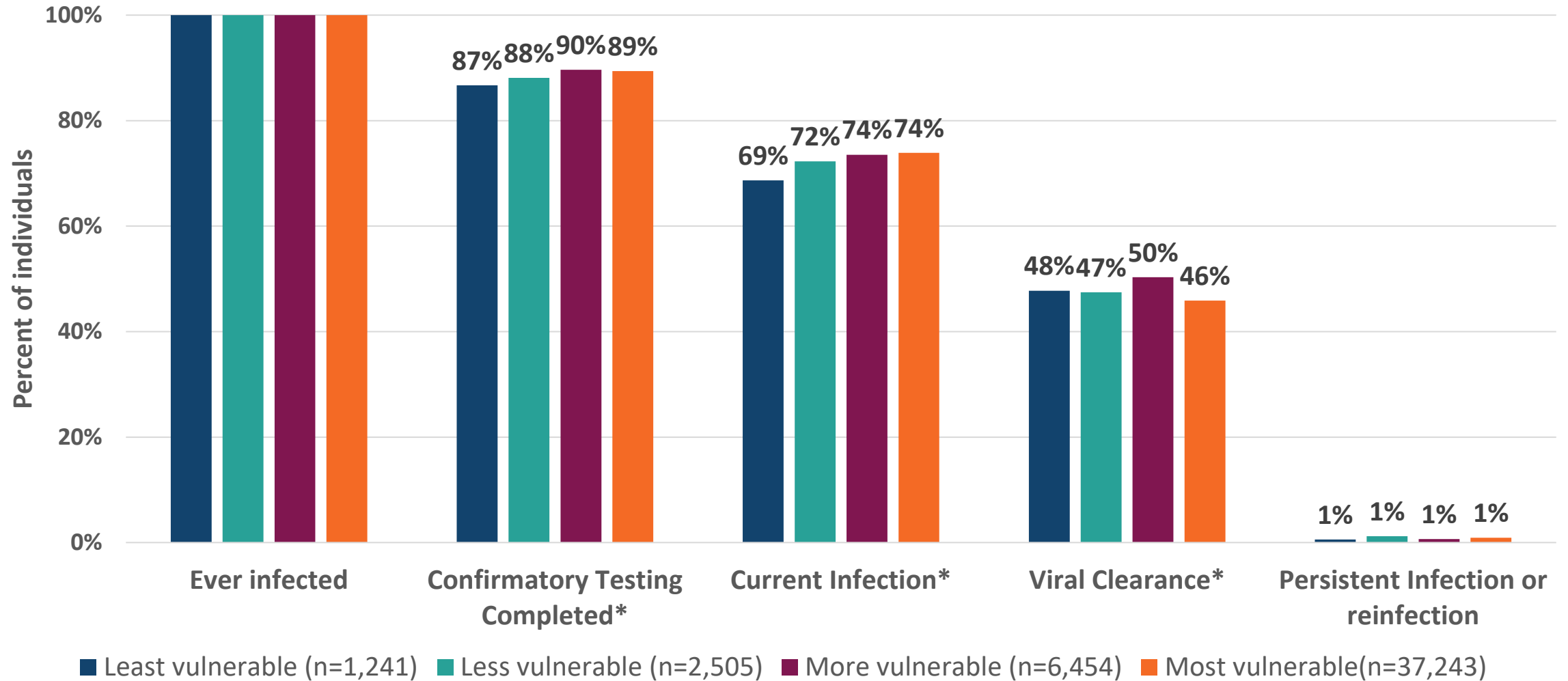

NH=non-Hispanic; PI= Pacific Islander

Note: Unknown race/ ethnicity ranged from 17-19%   *Statistically significant

Laboratory-based HCV-CoC by level of vulnerability

Percent of individuals

Ever infected: 100%, 100%, 100%, 100%

Confirmatory Testing Completed*: 87%, 88%, 90%, 89%

Current Infection*: 69%, 72%, 74%, 74%

Viral Clearance*: 48%, 47%, 50%, 46%

Persistent Infection or reinfection: 1%, 1%, 1%, 1%

■ Least vulnerable (n=1,241) ■ Less vulnerable (n=2,505) ■ More vulnerable (n=6,454) ■ Most vulnerable(n=37,243)

Note: The percentage for each step in the HCV-CoCs is calculated using the previous step as the denominator.

*Statistically significant

aOR for completion of confirmatory testing

- **Females: 20% decreased odds**

- **<36 years old: 34% decreased odds**

- **>64 years old: 49% decreased odds**

- **Non-Hispanic Asian/PI: 32% decreased odds**

- **Least vulnerable Census Tracts: 20% decreased odds**

		aOR	95% CI
Gender	Female	0.80	(0.74-0.87)
Age group (years)	<36	0.66	(0.61-0.72)
	36-64	ref	ref
	>64	0.51	(0.45-0.57)
Race/ ethnicity	NH Asian/ PI	0.68	(0.56-0.84)
	Hispanic	1.13	(0.99-1.28)
	NH Black	0.99	(0.91-1.09)
	NH White	ref	ref
	NH Other	0.92	(0.76-1.11)
Census Tract: SVI	Most vulnerable	ref	ref
	More vulnerable	0.97	(0.90-1.04)
	Less vulnerable	0.90	(0.81-1.05)
	Least vulnerable	0.80	(0.69-0.92)

☐ Statistically significant

aOR for achieving viral clearance

- **More vulnerable CTs: 1.23 increased odds**

- **Less vulnerable CTs : 1.17 increased odds**

- **Least vulnerable CTs : 1.31 increased odds**

		aOR	95% CI
Gender	Female	1.22	(1.16-1.28)
Census Tract: SVI	Most vulnerable	ref	ref
	More vulnerable	1.23	(1.14-1.32)
	Less vulnerable	1.17	(1.04-1.31)
	Least vulnerable	1.31	(1.11-1.54)
Age group (years) by race/ethnicity	<36 years old — NH White	ref	ref
	<36 years old — Hispanic	1.2	(1.03-1.39)
	<36 years old — NH Black	1.15	(0.98-1.34)
	<36 years old — NH Asian/ PI	2.64	(1.71-4.10)
	36-64 years old — NH White	ref	ref
	36-64 years old — Hispanic	1.05	(0.95-1.16)
	36-64 years old — NH Black	1.26	(1.17-1.35)
	36-64 years old — NH Asian/PI	2.15	(1.67-2.75)

☐ Statistically significant

Note: The model included an interaction between race ethnicity & age groups & not all data is shown in the table.

Limitations

- Missing addresses for some individuals→ needed to be geocoded to obtain an individual's SVI score

- SVI is a population-based measure

- CDC's SVI is a static measure of social vulnerability

- SVI variables from the ACS limits the factors that are being assessed by CTs

- We did not use other indices to assess vulnerable subpopulations

Conclusions

- Most HCV-positive individuals were living in the most vulnerable Census Tracts.

- Disparities exist in HCV-related outcomes associated with residing in the most vulnerable Census Tracts.

- Recognizing variations in care settings & treatment access can inform prevention & care programs.

- Further analysis are needed to fully understand the relationship of SVI & HCV-CoC outcomes.

Thank you!

Acknowledgment:

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