Geospatial Analysis of HIV Prevalence & Population:

Characteristics of Patients
Residing in Santa Clara County

Michael Shahbaz, MPH
Jennifer Lin, MD

Santa Clara Valley Health and Hospital System
Division of Infectious Diseases
Partners in AIDS Care and Education (PACE) Clinic

Disclosures

None

Outline

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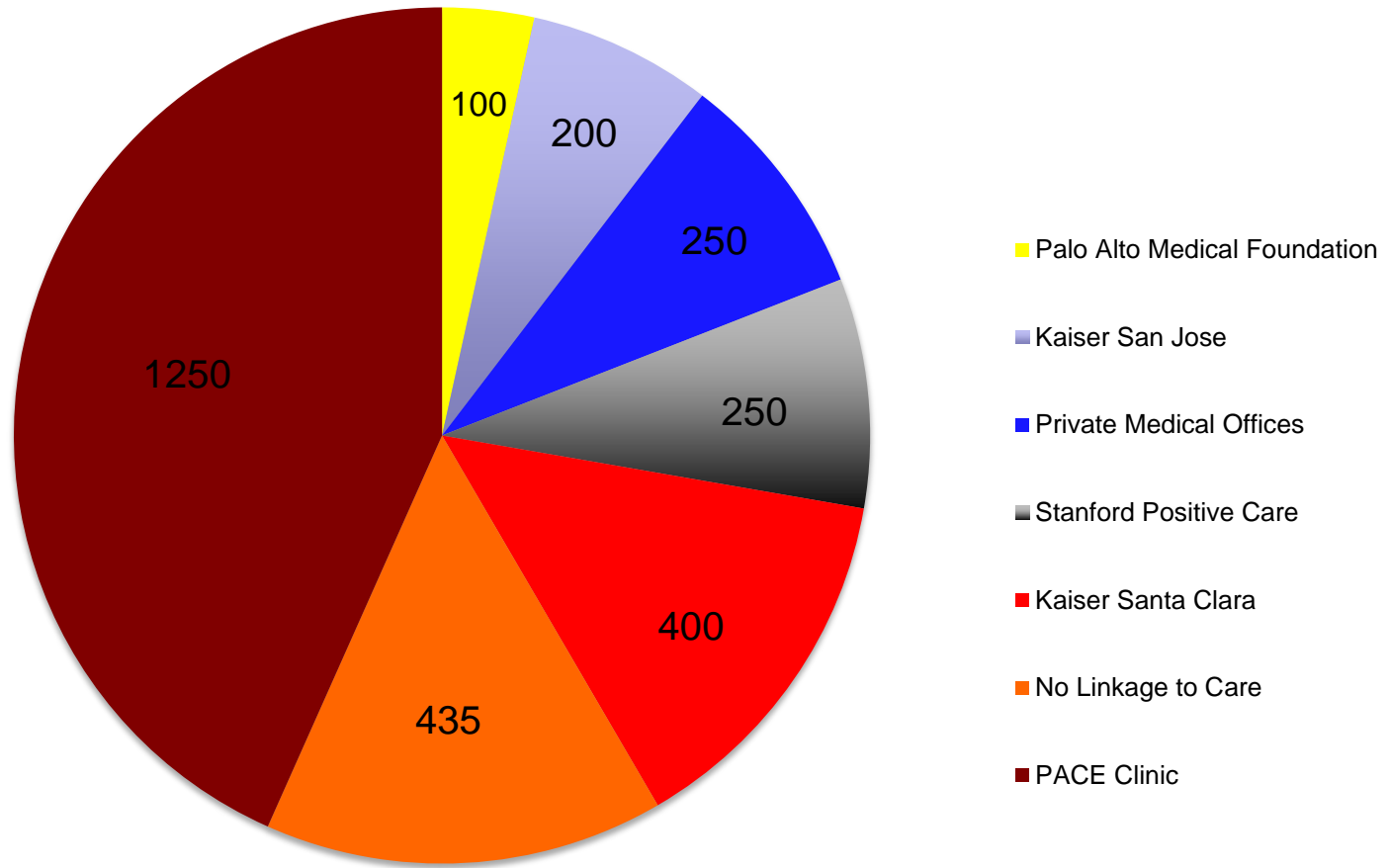- Discussion

National Statistics

- An estimated 1.2 million persons in the US have HIV
  - Only 40% engaged in medical care
  - Only 35% prescribed ARTs
  - Only 30% achieved viral suppression

Santa Clara County Statistics

- Within Santa Clara County (SCC)

  - As of 2013, 3,444 cases of HIV
  - 29.2% of this population experiencing unmet needs for health services

HIV care within Santa Clara County

Pie chart:
- Palo Alto Medical Foundation: 100
- Kaiser San Jose: 200
- Private Medical Offices: 250
- Stanford Positive Care: 250
- Kaiser Santa Clara: 400
- No Linkage to Care: 435
- PACE Clinic: 1250

*Based on old estimates. Current data from 2013 onwards not yet available

Study Background

- The HIV epidemic in the United States adversely and disproportionately impacts low income and communities of color

- Geographical identification of communities with a high prevalence of HIV infection leads to the development of appropriate interventions

Study Background

- Geographic information systems (GIS) is a powerful tool that can be utilized to further dissect and understand geographical regions that may require additional public health and clinical interventions

Study Objectives

- Map out and identify high cluster areas of HIV cases within SCC using PACE Clinic patient population

- Identify areas that had the highest rate of HIV and sub-optimal virologic suppression as compared to neighboring areas

Methods: Data Source

Retrospective analysis of electronic medical records on Healthlink for all PACE patients meeting the following study inclusion criteria:

1) HIV-positive diagnosis
2) Resident of SCC
3) Current age ≥ 18 years
4) Receiving HIV care services at PACE Clinic
5) A minimum of one clinical visit (MD, PA, PharmD) during the study period (1/2013 through 11/2014)

Methods: Variables

- Basic Demographics

  - Current Age/Sex

  - Age at Diagnosis

  - Primary Language

  - Race/Ethnicity

  - Household Income

  - Housing Status

  - Federal Poverty Level (FPL)

  - HIV Transmission Risk

Methods: Variables

- ART Regimen
  1. Integrase Inhibitors
  2. Protease Inhibitors
  3. Non-Nucleotide Reverse Transcriptase Inhibitors
  4. Salvage Therapy
  5. No Therapy

- Pill-Form
  1. Single Pill
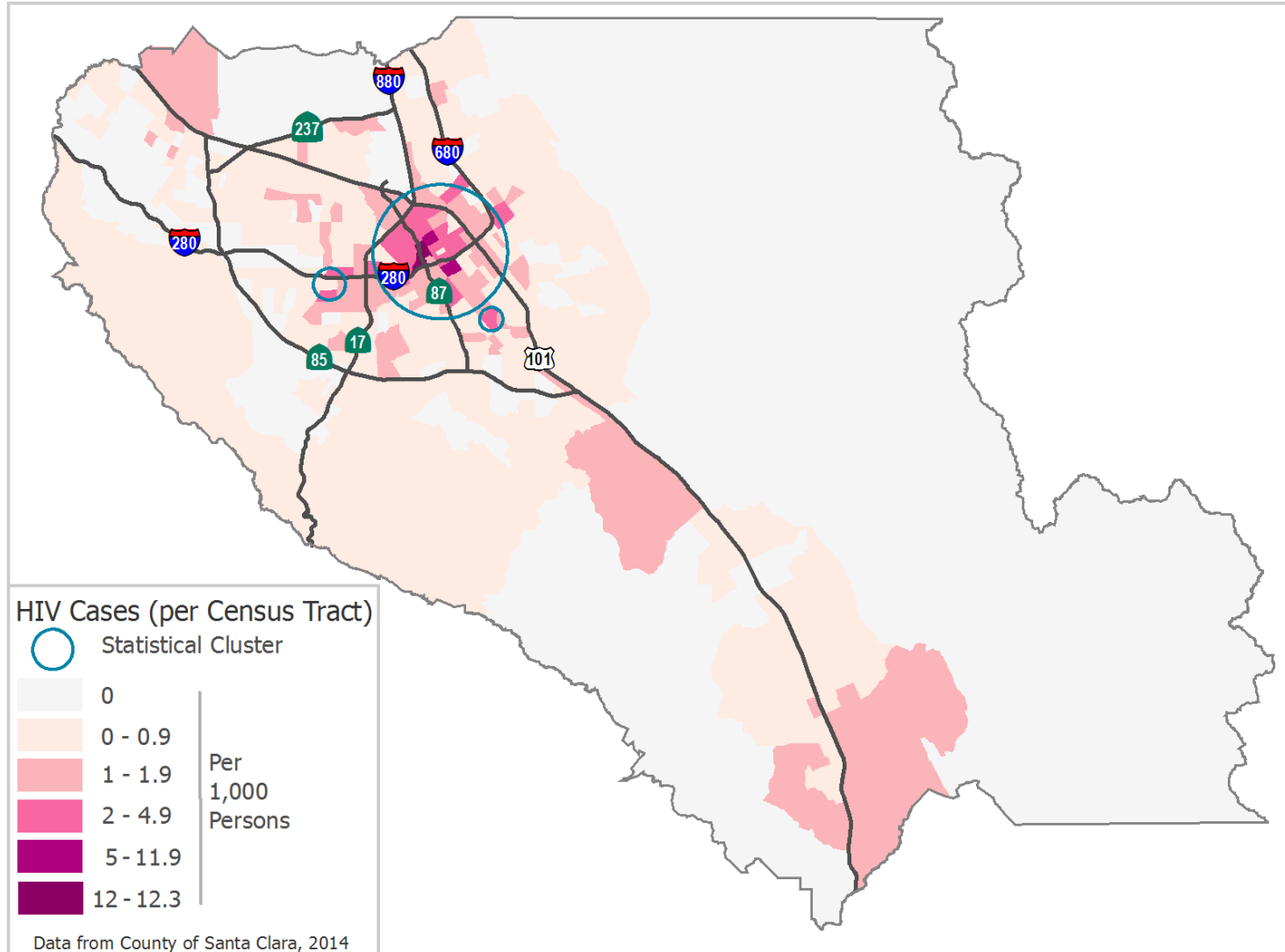 2. Multi-Pill

Methods: Address Processing

- Prior to importing address data, we performed several rounds of manual data cleaning to remove all spelling errors and inconsistent formatting.

- Residential addresses were imported to ArcGIS 10.2 for geocoding using ArcMap.
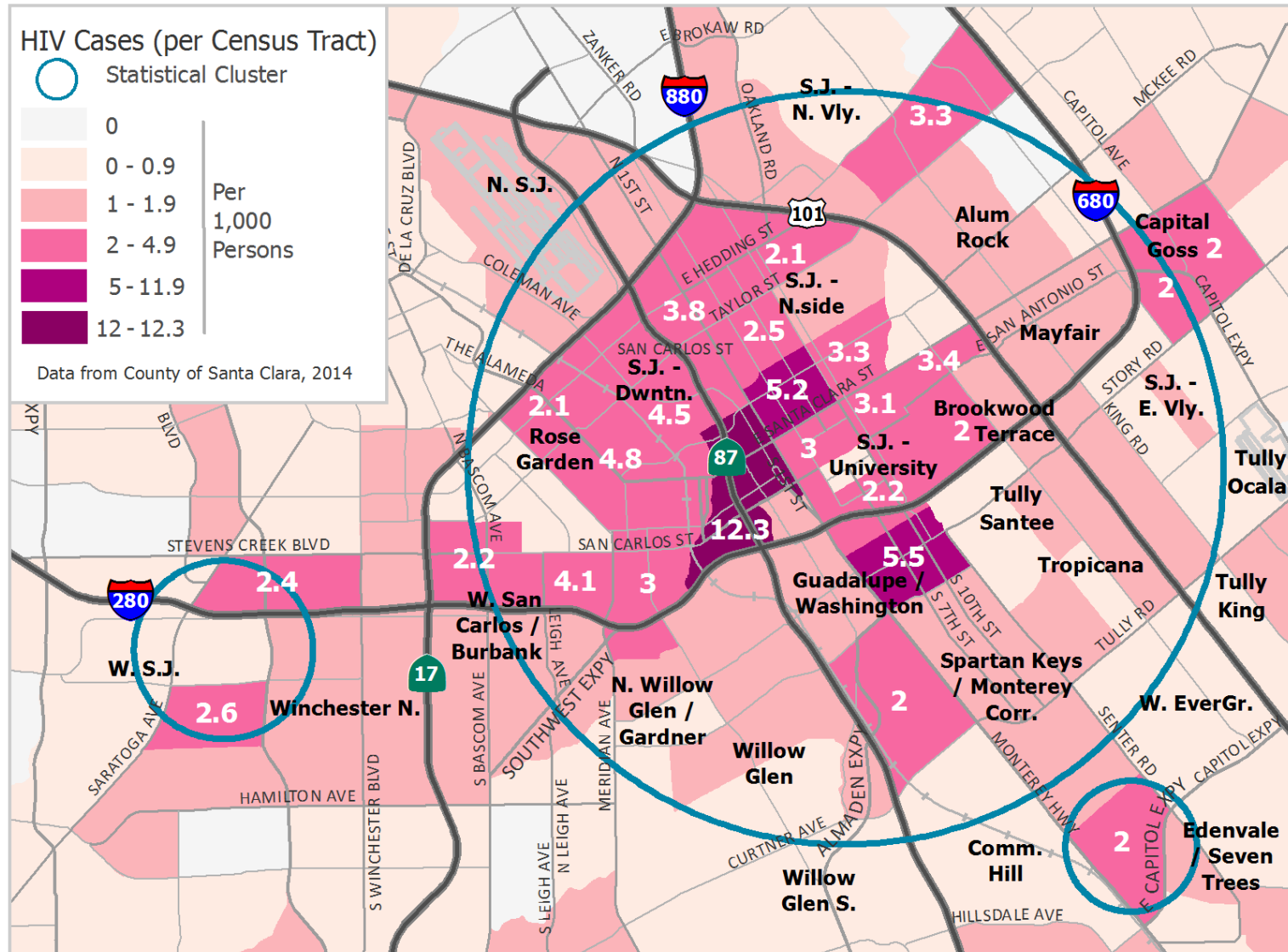
Methods: Cluster Identification

- A spatial scan model developed by Kulldorff et al. was utilized in our analyses

- Allowed us to locate census tracts that fell in areas with the highest HIV prevalence, but also identified spatial clusters with the highest significance

Overall Prevalence for SCC

HIV Cases (per Census Tract)

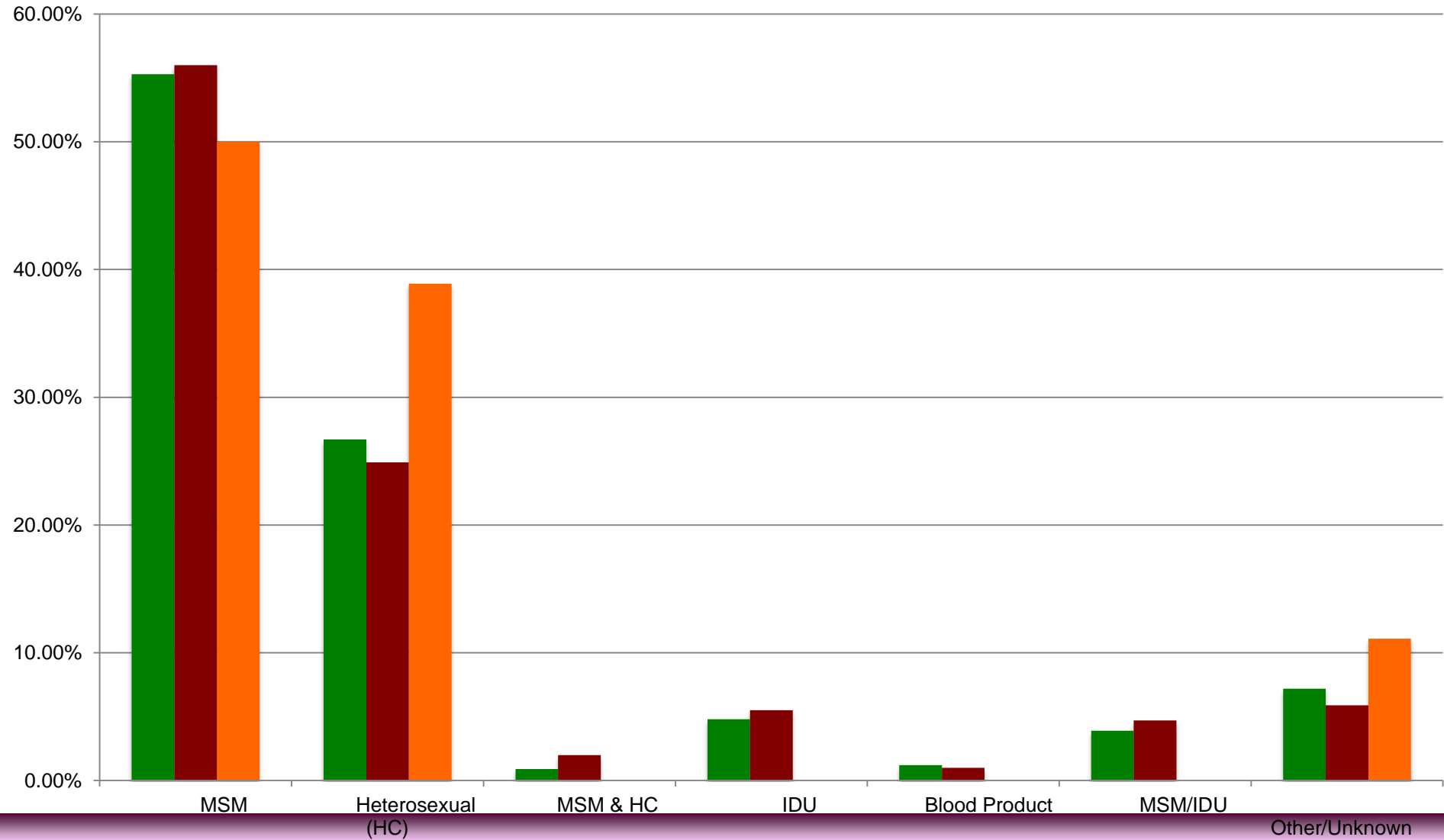○ Statistical Cluster

- 0
- 0 - 0.9
- 1 - 1.9 — Per 1,000 Persons
- 2 - 4.9
- 5 - 11.9
- 12 - 12.3

Data from County of Santa Clara, 2014

High Prevalence Clusters

Demographic Results

Characteristics	Non-Cluster Cases (n=667)	Cluster One Cases (n=510)	Cluster Two Cases (n=36)
Census Tract Population Size	1,506,738	257,061	17,843
Census Tracts Included	232	56	3
Average Current Age	45.7	46.0	44.8
Gender			
Male	547 (82%)	422 (82.7%)	25 (69.4%)
Female	110 (16.5%)	78 (15.3%)	10 (27.8%)
MTF Transgender	10 (1.5%)	10 (2%)	1 (2.8%)
Race/Ethnicity			
White, Non-Hispanic	219 (32.8%)	151 (29.6%)	9 (25%)
Hispanic	254 (38.1%)	243 (47.6%)	13 (36.1%)
Asian/Pacific Islander, Non-Hispanic	76 (11.4%)	40 (7.8%)	1 (2.8%)
Black or African American, Non-Hispanic	78 (11.7%)	62 (12.1%)	9 (25%)
Other/Multiracial	40 (6%)	14 (2.7%)	4 (11.1%)
Age at HIV Diagnosis (in years)			
0-18	10 (1.5%)	8 (1.6%)	-
19-29	197 (29.5%)	164 (32.2%)	11 (30.6%)
30-39	254 (38.1%)	177 (34.7%)	18 (50%)
40-49	143 (21.4%)	122 (23.9%)	4 (11.1%)
50-59	42 (6.3%)	30 (5.9%)	2 (5.6%)
≥60	12 (1.8%)	4 (0.8%)	1 (2.8%)
Unknown	9 (1.3%)	5 (1%)	-

Demographic Results, continued

Characteristics	Non-Cluster Cases (n=667)	Cluster One Cases (n=510)	Cluster Two Cases (n=36)
Census Tract Population Size	1,506,738	257,061	17,843
Census Tracts Included	232	56	3
HIV Risk Factor			
MSM	369 (55.3%)	286 (56%)	18 (50%)
Heterosexual (HC)	178 (26.7%)	127 (24.9%)	14 (38.9%)
MSM & HC	6 (0.9%)	10 (2%)	-
IDU	32 (4.8%)	28 (5.5%)	-
Blood Product	8 (1.2%)	5 (1%)	-
MSM/IDU	26 (3.9%)	24 (4.7%)	-
Other/Unknown	48 (7.2%)	30 (5.9%)	4 (11.1)
Housing Status			
Stable	649 (97.3%)	466 (91.4%)	35 (97.2%)
Unstable	7 (1%)	11 (2.2%)	1 (2.8%)
Homeless	2 (0.3%)	5 (1%)	-
Incarcerated	9 (1.3%)	28 (5.5%)	-
Poverty Level			
≤ Poverty	336 (50.4%)	278 (54.5%)	18 (50%)
101-200%	173 (25.9%)	142 (27.8%)	10 (27.8%)
201-300%	76 (11.4%)	28 (5.5%)	5 (13.9%)
≥301%	33 (4.9%)	20 (3.9%)	-
Unknown	49 (7.3%)	42 (8.2%)	3 (8.3%)
Insurance			
Ryan White	200 (30%)	156 (30.5%)	18 (50%)
Medicare	113 (16.9%)	113 (22.1%)	1 (2.8%)
MediCal	240 (36%)	162 (31.8%)	11 (30.6%)
Private	92 (13.8%)	45 (8.8%)	3 (8.3%)
County/Other Programs	22 (3.3%)	34 (6.7%)	3 (8.3%)

Transmission Risk

Primary Language
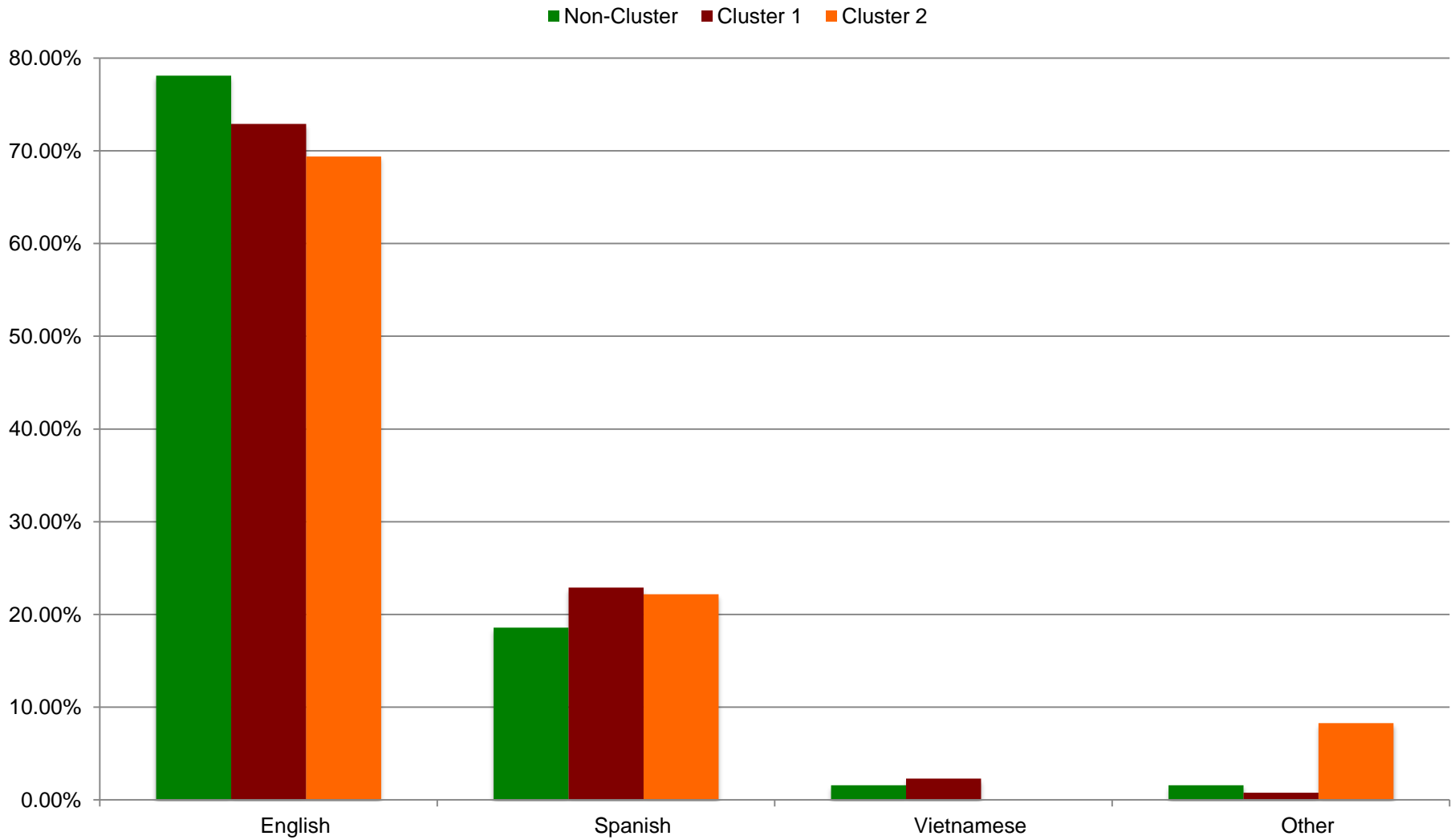
Overall Non-Virologic Suppression

HIV Cases - High Viral Load
Greater than 200
(per Census Tract)

Statistical Cluster

	Per 1,000 Persons
0	
0 - 0.9	
1 - 2.9	
3 - 3.8	

Data from County of Santa Clara, 2014
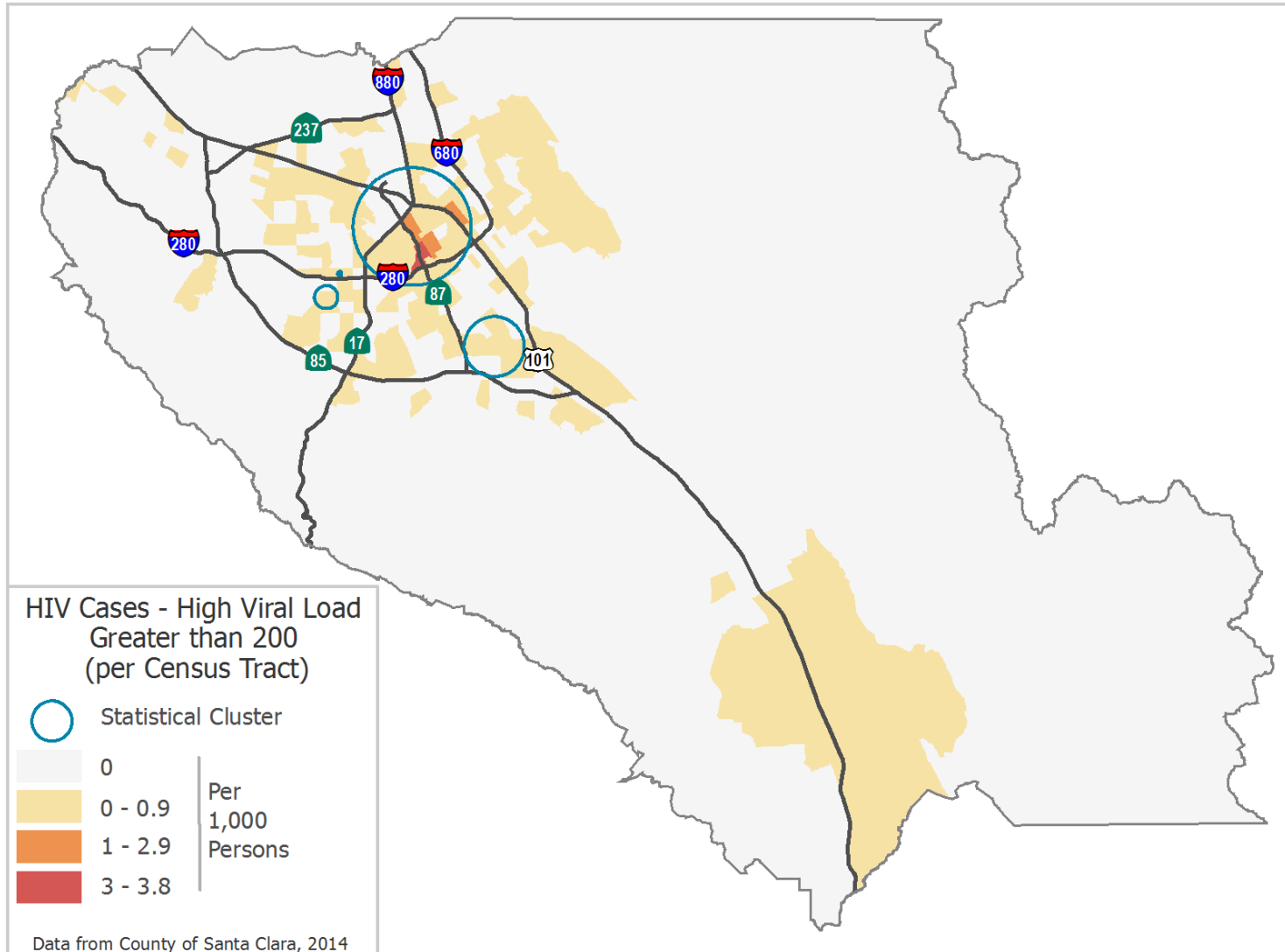
Non-Virologic Suppression Clusters
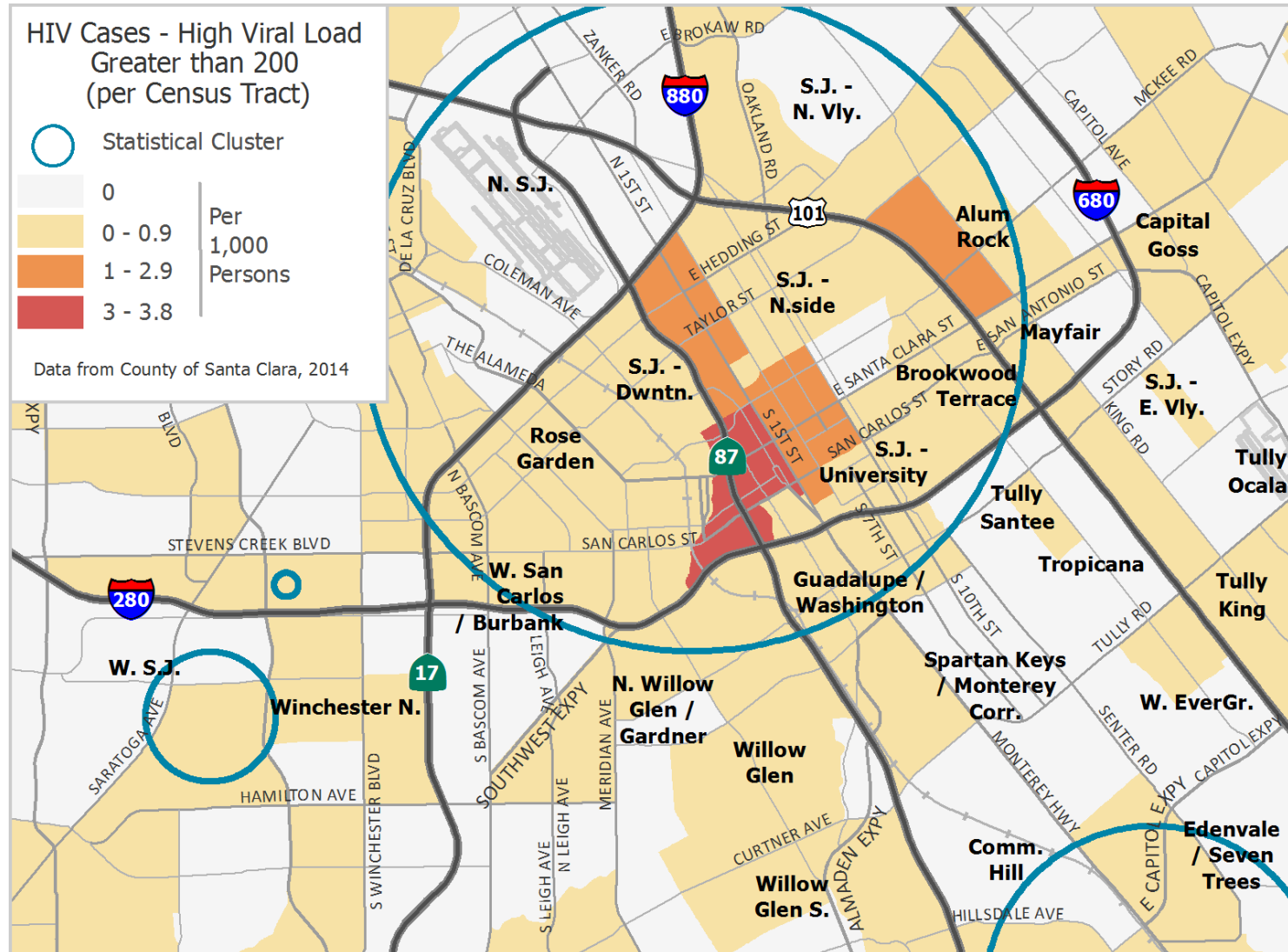
ART Regimen → VL Suppression

Pill Form

Bar chart comparing VL<200 and VL>200 percentages across Overall (1213), Single pill (453), and Multi pill (689).
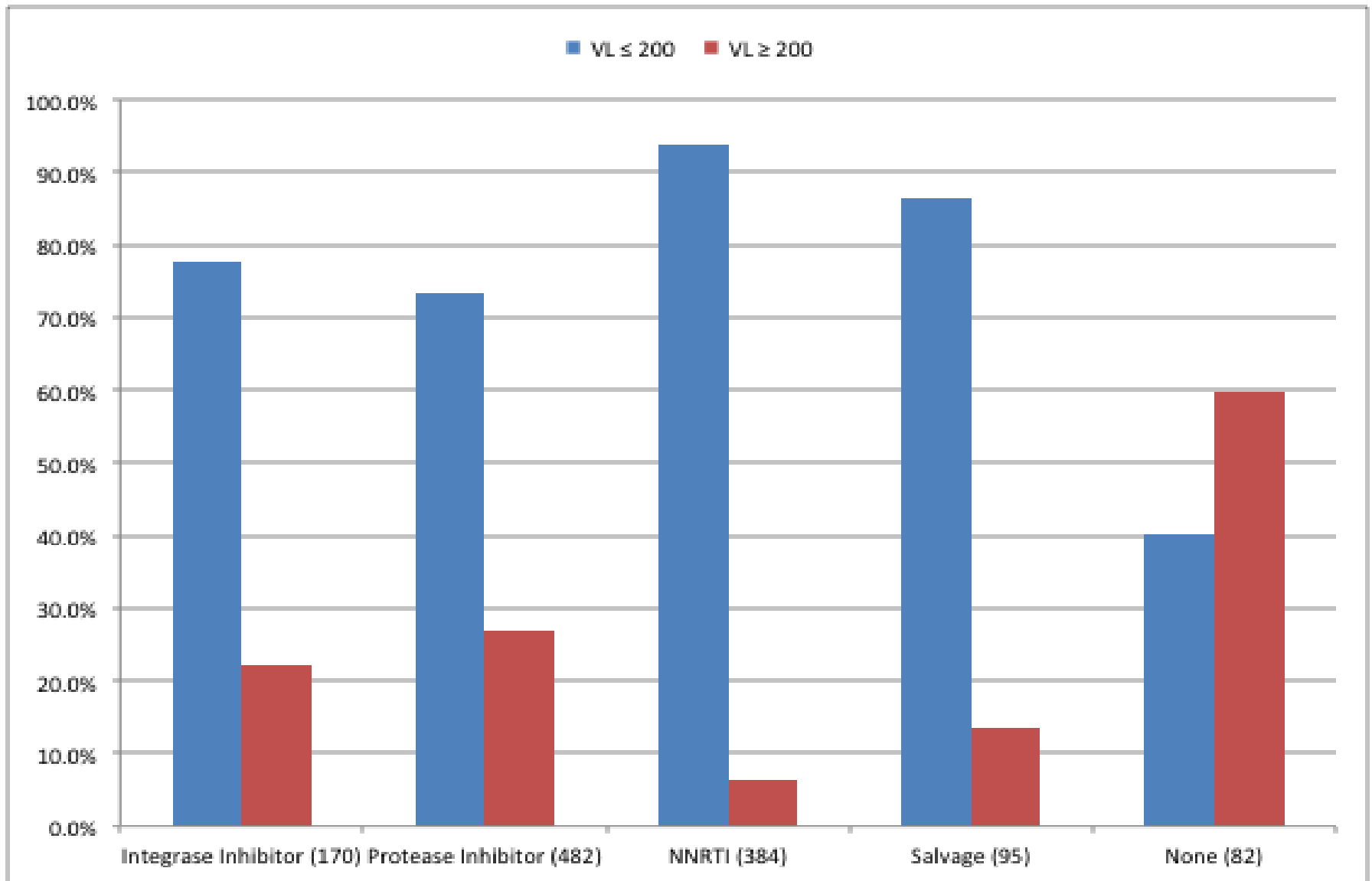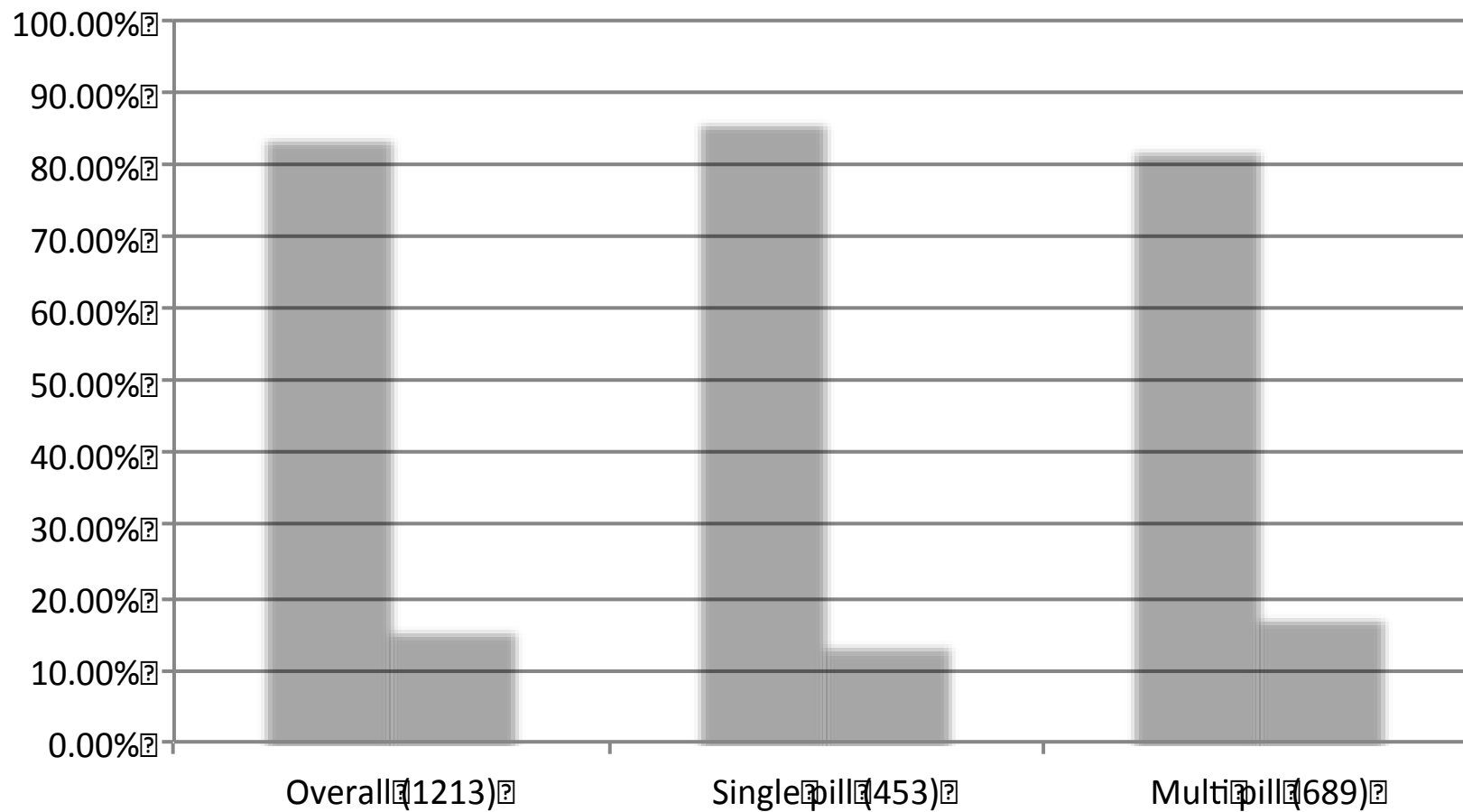
Discussion

- Through the utilization of spatial analysis, we were able to identify two clusters that had a significantly higher HIV prevalence compared to other regions

- As compared to the non-cluster cases, these individuals were more likely to use Ryan White, had unstable housing, and had a younger population (18-29)

Limitations

- Our study is limited because we only used a sub-set of HIV-positive individuals in SCC receiving their care at the PACE Clinic

- Virologic non-suppression currently includes all comers including new diagnoses (<1 year) and patients recently started on ARTs

- Selection bias to place less adherent patients on PI-based regimens

Implications

- The goal of this study was to identify geographical clusters with disproportionately high rates of HIV infection

- Collaborate with SCC DPH to develop appropriate interventions and behavior change models to encourage retention in care and adherence to ART

Next Phase

- Develop maps showing:
    - New diagnoses within past year
    - More accurate evaluation of virologic failure- excluding new diagnoses and patients on ART for < 1 year

Acknowledgements

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