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## Patient and Provider Characteristics Associated with Disparities in Retention and Viral Suppression in Hawaii

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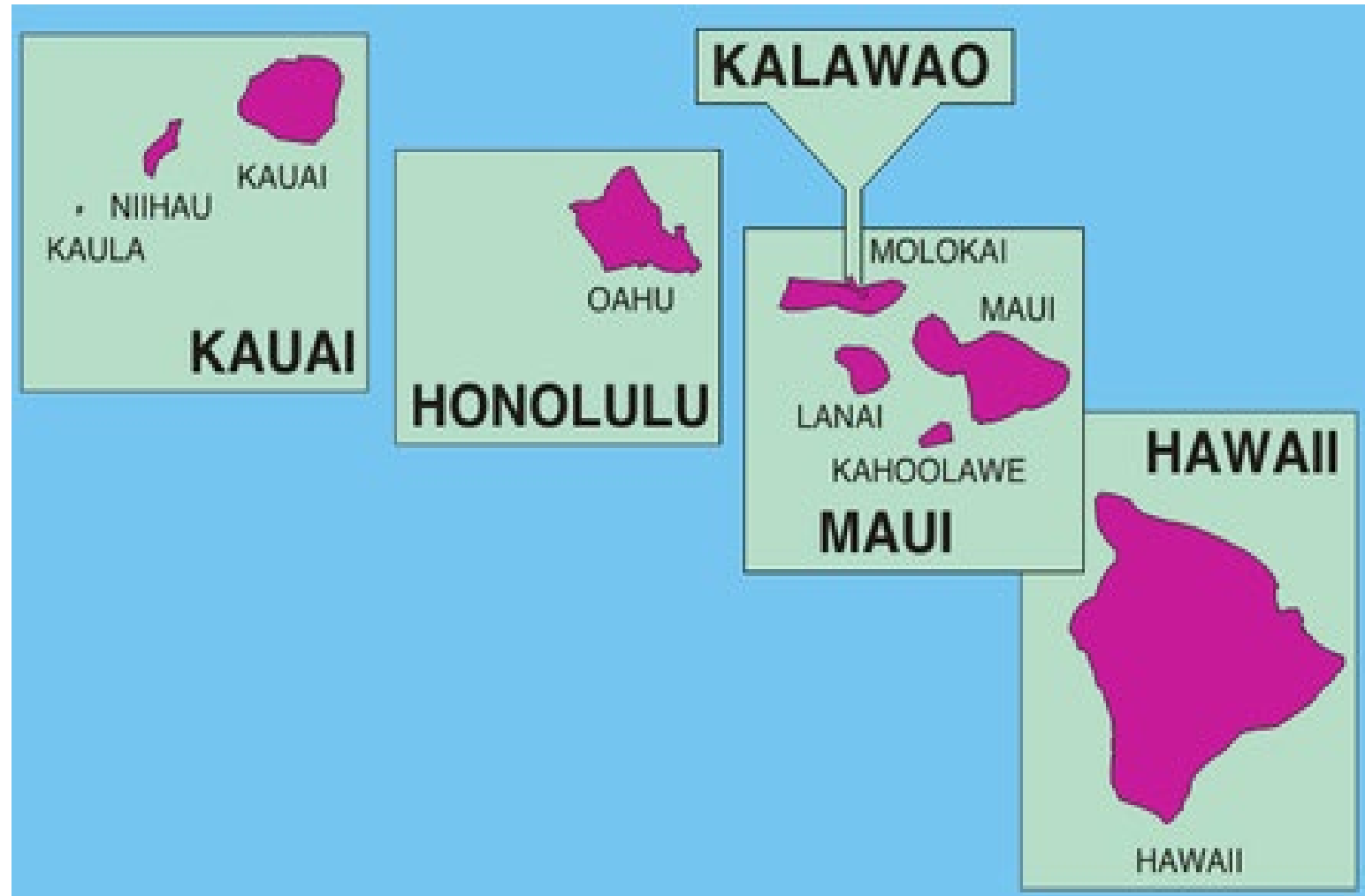
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# Hawaii – Paradise on Earth



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- 8 islands and 5 counties
  - Kauai County
  - Honolulu County:  
**Waikiki Beach and  
Diamond Head**
  - Maui County
    - Kalawao County
  - Hawaii County
- Lowest incidence of Covid-19; by July 15, total cases: 1292; # death: 22



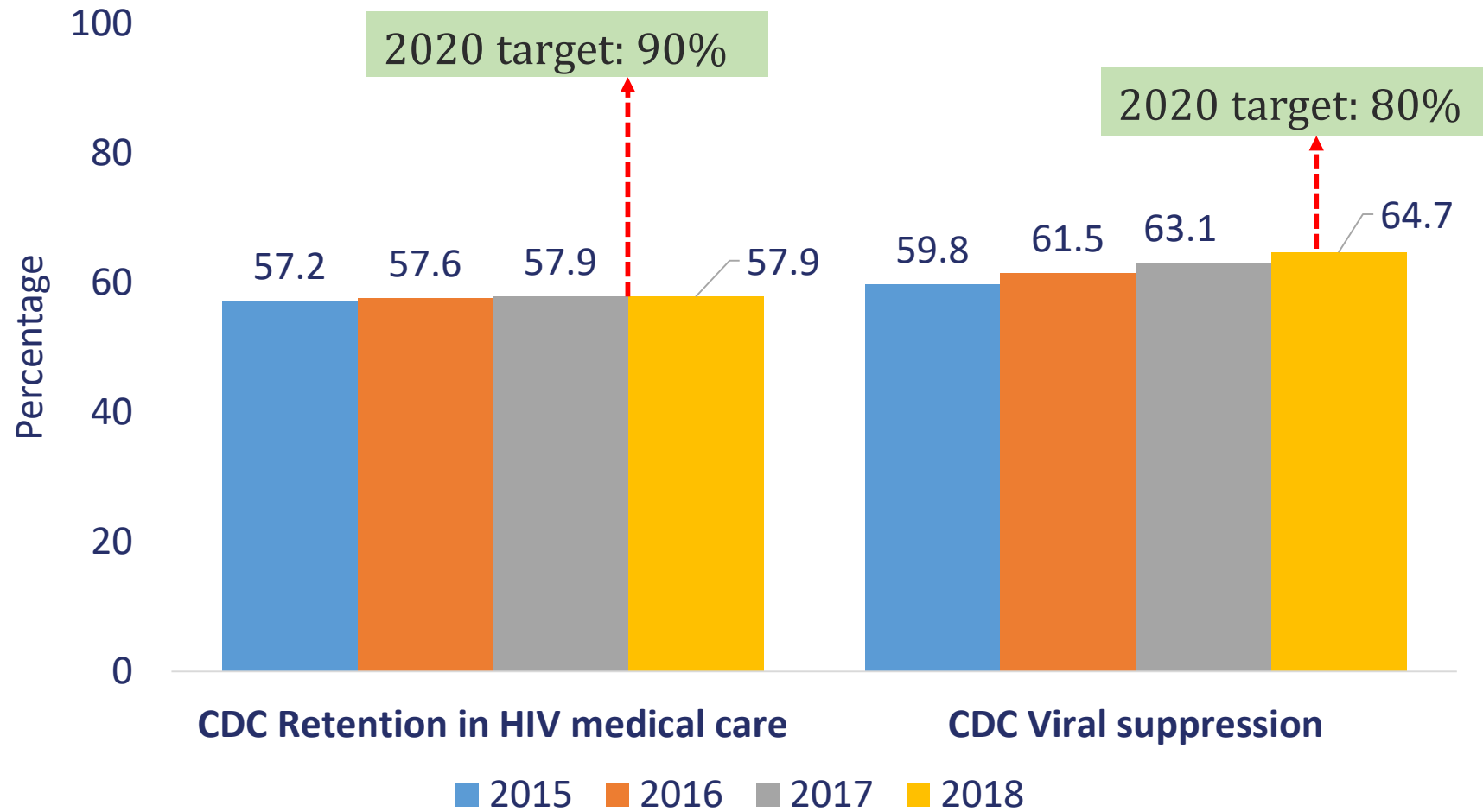


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# Introduction

- **National 2020 target**
  - Retention in HIV medical care:  $\geq 90\%$
  - Viral suppression:  $\geq 80\%$
- Some progress in viral suppression but no progress in retention in care
- Challenging to reach the national 2020 target



# Disparities in Retention in HIV Medical Care and Viral Suppression, 2018, National Data



- **National data** reported disparities in both indicators by the following characteristics:
  - **Age group:** the percentage increased as age increased; however, the lowest percentage for retention was for persons aged 25-34 years (55.2%) and for viral suppression, for persons aged 13-24 years (60.3%)
  - **Race/ethnicity:** persons of multiple races had highest percentages for both (66.3% and 72.5%); Native Hawaiians/Other Pacific Islanders had lowest (52.9%) for retention and blacks/African Americans had lowest for viral suppression (59.9%).

Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data – United States and 6 dependent areas, 2018. HIV surveillance supplemental report 2020;25 (No.2).

<http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>

# Disparities in Retention in HIV Medical Care and Viral Suppression, 2018, National Data



- **National data** reported disparities in both indicators by the following characteristics:
  - **Transmission category:** males with infection attributed to male-to-male sexual (MSM) contact and injection drug use (IDU) had the highest percentage for retention in care (61.7%); males with infection attributed to MSM had highest for viral suppression (67.3%); males with infection attributed to IDU had lowest for both (50.6% and 53.2%)

Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data – United States and 6 dependent areas, 2018. HIV surveillance supplemental report 2020;25 (No.2).

<http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>



# Disparities in Retention in HIV Medical Care and Viral Suppression, 2016, Hawaii data



- **Hawaii data** reported similar disparities by those factors:
  - **Age group:** the percentage increased as age increased, with the lowest percentage for retention for persons aged 13-24 years persons (40.4%) and for viral suppression, persons aged 25-34 years (63.2%)
  - **Race/ethnicity:** Asians had the highest for both (66.7% and 80.7%) and blacks/African Americans had the lowest for both (52.6% and 62.8%)

Hawaii State Department of Health. 2016 Hawaii HIV/AIDS Integrated Epidemiologic Profile. Accessed on June 24<sup>th</sup>, 2020 available at [https://health.hawaii.gov/harmreduction/files/2019/09/Hawaii\\_2016\\_HIVAIDS-Epidemiologic-Profile\\_20190715\\_one-correction.pdf](https://health.hawaii.gov/harmreduction/files/2019/09/Hawaii_2016_HIVAIDS-Epidemiologic-Profile_20190715_one-correction.pdf).

# Disparities in Retention in HIV Medical Care and Viral Suppression, 2016, Hawaii data



- **Hawaii data** reported similar disparities by those factors:
  - **Transmission category:** male heterosexual contact had highest percentages for both (73.3% and 81.1%); female injection drug users had lowest percentage for retention in care (51.9%); male injection drug users had lowest percentage for viral suppression (64.0%).

Hawaii State Department of Health. 2016 Hawaii HIV/AIDS Integrated Epidemiologic Profile. Accessed on June 24<sup>th</sup>, 2020 available at [https://health.hawaii.gov/harmreduction/files/2019/09/Hawaii\\_2016\\_HIVAIDS-Epidemiologic-Profile\\_20190715\\_one-correction.pdf](https://health.hawaii.gov/harmreduction/files/2019/09/Hawaii_2016_HIVAIDS-Epidemiologic-Profile_20190715_one-correction.pdf).



1. Why is percentage of retention in care so low?
  - Definition: documentation of  $\geq 2$  CD4/Viral load (VL) tests performed at least three months apart during the measurement year
    - Is the definition too strict?
  - How often are viral load and CD4 tests performed?
    - Are national guidelines on monitoring CD4/VL followed by care providers?
  - Are there difference at the patient, provider, geographical level in monitoring CD4/VL?

2. Are there disparities by other factors at the patient, provider, and geographical levels?
  - Participation in Ryan White Program
  - Provider characteristics: experienced vs inexperienced
  - Geographical difference: neighboring island county vs Honolulu County
3. When examined simultaneously in multiple logistic regression models, what factors are associated with retention in care or viral suppression? Will the difference observed in binary analysis still exist?

- **Source of data**

- Data on age, race/ethnicity, sex at birth, county of residence, care provider, receipt of and retention in HIV medical care, and viral suppression were obtained from state's Enhanced HIV/AIDS Surveillance System (eHARS).
- Data on whether a patient was a Ryan White (RW) client was obtained from state's case management data system (E2 Hawaii).
  - Ryan White client referred to persons whose RW eligibility was documented or who received a RW-funded service during 2017.

- **Receipt of any HIV medical care, or In care**, was measured by documentation of  $\geq 1$  CD4 /viral load test performed in the year of measurement.
- **Retention in HIV medical care** was measured by documentation of  $\geq 2$  CD4 /viral load tests performed  $\geq 3$  months apart in the year of measurement.
- **Viral suppression** was measured by a viral load test of  $< 200$  copies/mL at the most recent viral load test in the year of measurement.

- **Study population**

- Only patients with HIV infections diagnosed through 2016, residing in Hawaii at year-end 2016 and 2017, and with  $\geq 1$  CD4/viral load tests (in care) in 2017 were included.
  - In care in 2017
  - Residing in Hawaii at the end of both 2016 and 2017

- **Care Provider (experienced vs inexperienced)**
  - Number of patients under care was based on data from providers associated with the first documented CD4/VL test in 2017
  - Care providers were categorized as follows: Very Frequent ( $\geq 50$  patients), Frequent (25-49 patients), Occasional (10-24 patients) and Infrequent ( $< 10$  patients).
  - To assess whether a patient changed care providers in 2017, only provider data from the first and last documented CD4/VL in 2017 was used.



# Statistical Analyses



- Percentage of retention in care and viral suppression were first compared by selected factors at the patient, provider, and geographic levels by chi-square tests.
- Logistic regression models were conducted to assess the relationship between retention/viral suppression and selected factors simultaneously, including patient's birth sex, age, race/ethnicity, HIV transmission category, Ryan White status, county of residence, provider category, and whether the patient changed provider. Odds ratios and 95% CI were the primary statistics reported from the models.

# Results - Study Population Characteristics



- A total of 1,752 persons were included.
  - Males (89.3%)
  - Persons aged  $\geq 45$  years at year-end 2016 (75.2%)
  - Top four racial/ethnic groups: Whites (49.4%), Asians (17.4%), Native Hawaiian/Other Pacific Islanders (9.9%), Hispanics (9.9%)
  - Top two HIV transmission categories: male-to-male sexual contact (74.1%), heterosexual contact (11.0%)
  - Honolulu County (65.2%), Hawaii County (16.9%), Maui County (12.6%) and Kauai County (4.1%)
  - Ryan White clients: 35.4%

# Results - Study Population Characteristics



**Table 1. Distribution of 1,752 patients under care from 159 care providers, 2017, Hawaii**

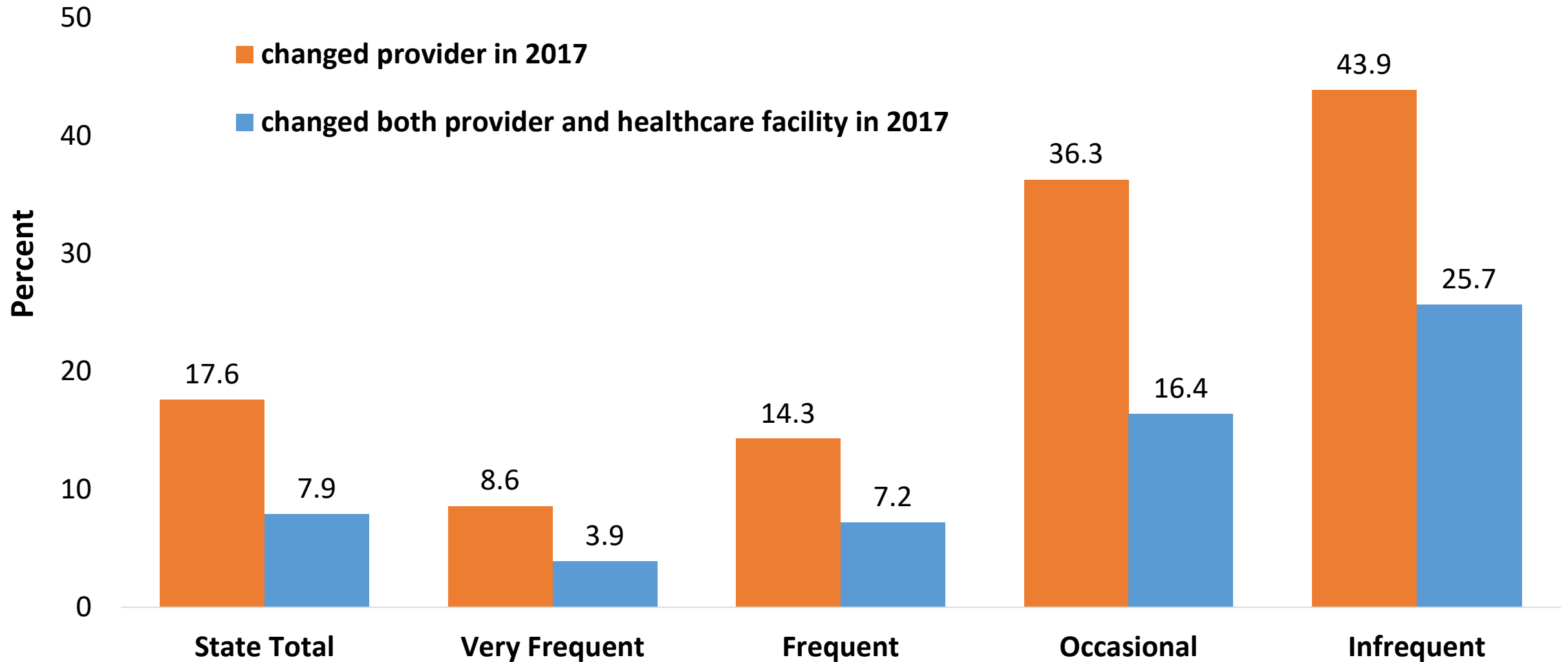
Care Provider Category	Total number of care provider	Total number of patients	Notes
<b>Very Frequent (≥50 patients)</b>	5	828 (47.3%)	The minimum number of patients was 99 and the maximum number was 251
<b>Frequent (25-49 patients)</b>	13	526 (30.0%)	The minimum number of patients was 29
<b>Occasional (10-24 patients)</b>	11	168 (9.6%)	
<b>Infrequent (&lt;10 patients)</b>	130	230 (13.1%)	

# Results - Study Population Characteristics



- **“Infrequent” care providers:**
  - Included 130 providers, of which 98 (75.0%) had only one patient.
  - Patients in this group were less likely to be Ryan White clients (28.7% vs 35.4% state average) but were more likely to have transmissions attributed to categories other than the male-to-male sexual contact (65.1% vs 74.1%), reside on a neighbor island county (44.3% vs 34.8% state average), and changed providers or changed both providers/facilities in 2017.

# Results - Study Population Characteristics





# Results related to research question 1

Why retention in HIV medical care is so low? How often are viral load and CD4 tests performed?



# National Guideline on Monitoring CD4 Count and Viral Load



Clinical Scenario	Viral Load Monitoring	CD4 Count Monitoring
During the first 2 years of antiretroviral therapy (ART)	Every 3 to 4 months	Every 3 to 6 months
After 2 years of ART (viral load consistently suppressed, CD4 consistently 300-500 cells/mm <sup>3</sup> )	Can extend <b>to every 6 months</b> for patients with consistent viral suppression for ≥2 years	Every 12 months
After 2 years of ART (VL consistently suppressed, CD4 consistently >500 cells/mm <sup>3</sup> )		Optional
<b>Summary</b>	<b>≥2 per year</b>	<b>Optional or ≥1 per year</b>

# Laboratory Data of 2017

Type of Laboratory Testing	Frequency	Percent
CD4 and Viral Load (VL)	1,595	91.0
CD4 and VL and Other	89	5.1
CD4 Only	16	0.9
VL and Other	5	0.3
VL Only	47	2.7

\* Other type of tests were mostly genotype tests and a few HIV diagnostic tests.

# Laboratory Data of 2017



Count of CD4 Test	Frequency	Percent
1	491	28.9
2	754	44.4
3	322	18.9
4	90	5.3
5	23	1.4
6	13	0.8
7	5	0.3
8	2	0.1
Frequency missing = 52		

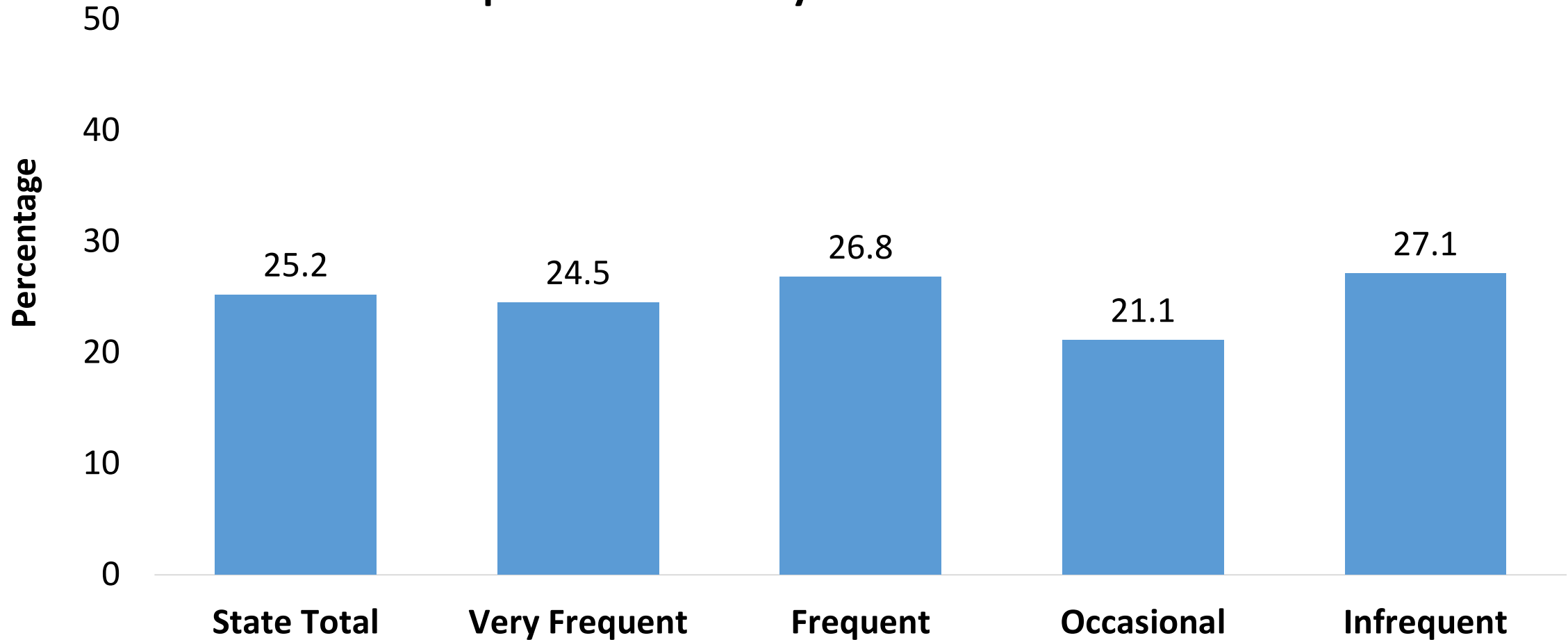
Count of Viral Load (VL) Test	Frequency	Percent
1	437	25.2
2	800	46.1
3	328	18.9
4	124	7.1
5	30	1.7
6	12	0.7
7	3	0.2
8	1	0.1
10	1	0.1
Frequency missing = 16		

- 37 persons had either one CD4 (n=14) or one VL test (n=23): 100% not retained
- 384 persons with one paired CD4/VL test: 381 (99.2%) not retained
- 1,311 had  $\geq 2$  CD4/VL test or both: 72 (5.4%) not retained
- **In total, 28.0% were not retained in care among 1,752 persons in care in 2017.**

# Viral Load Test by Care Provider



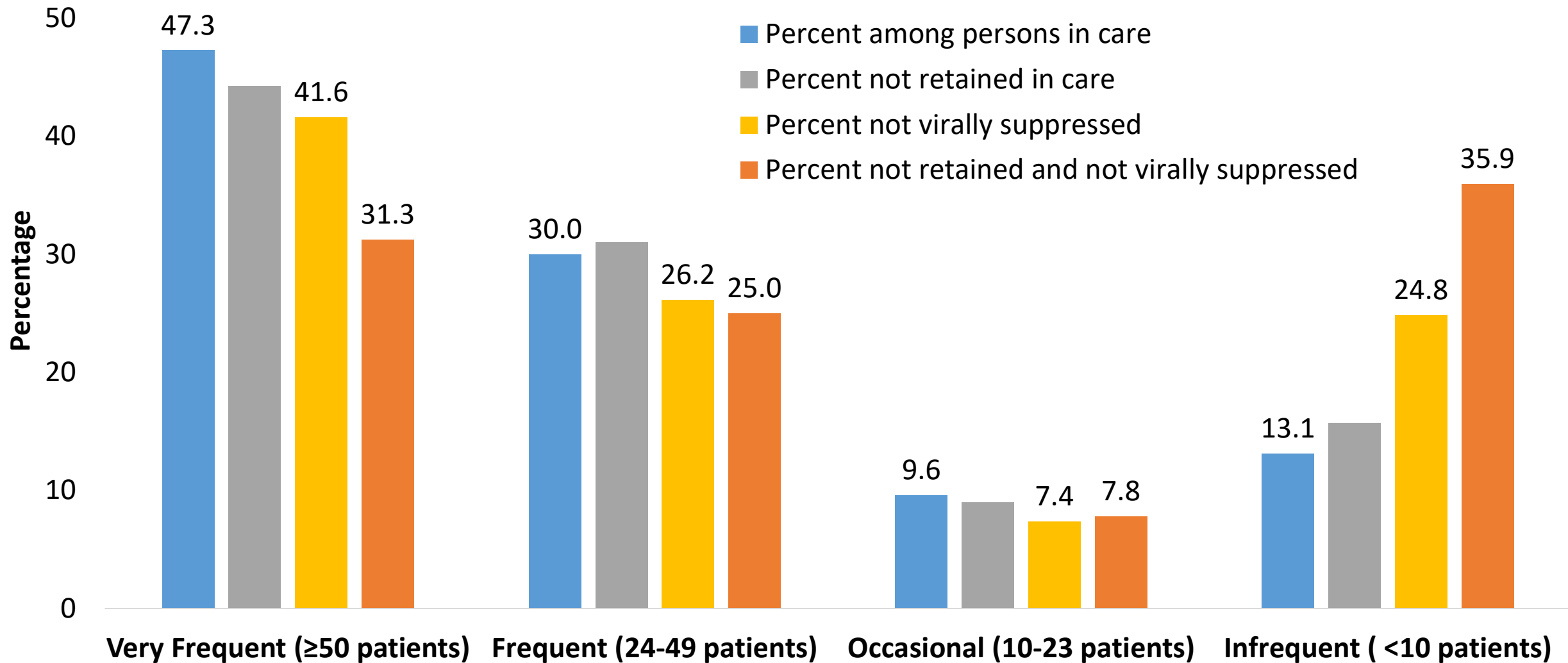
Percent of persons with only one viral load test in 2017



## Results related to research questions 2 & 3

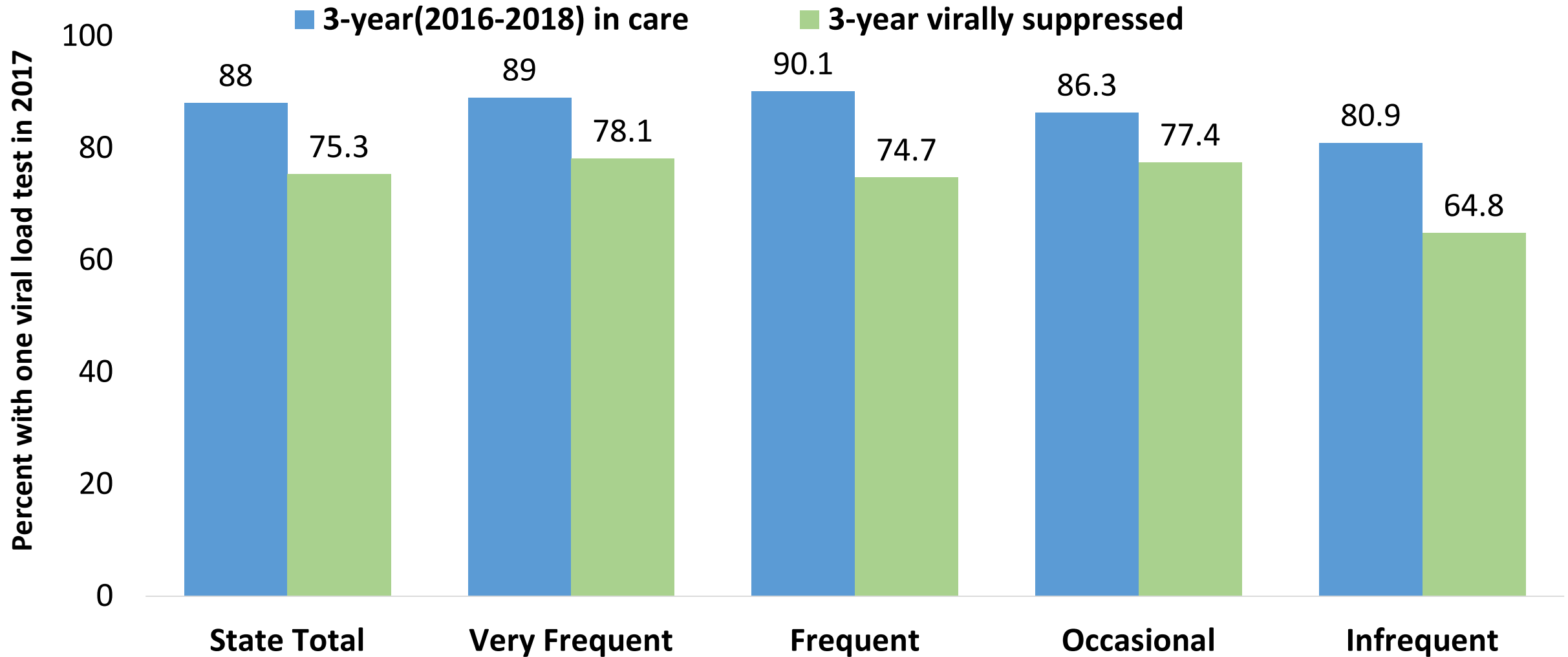
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# Results – HIV Medical Care and Clinical Outcome in 2017 by Care Provider Category

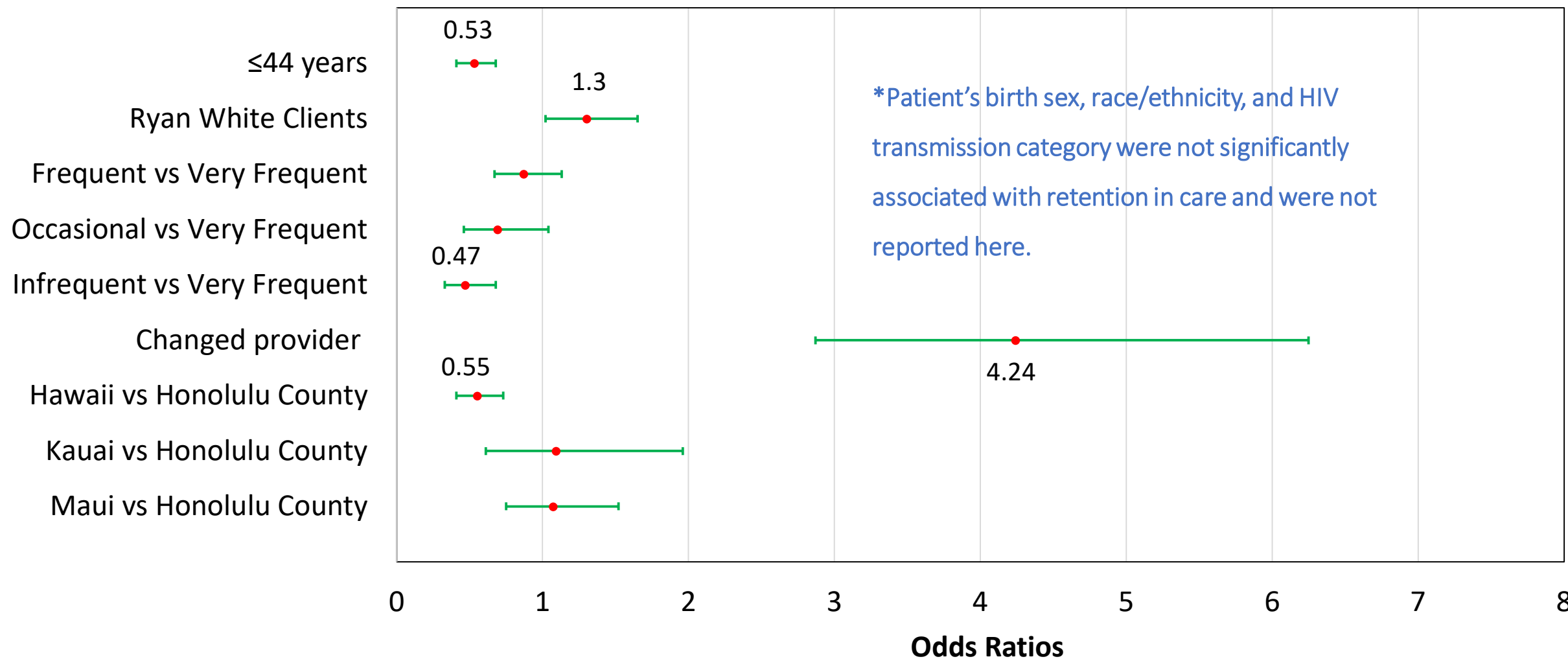




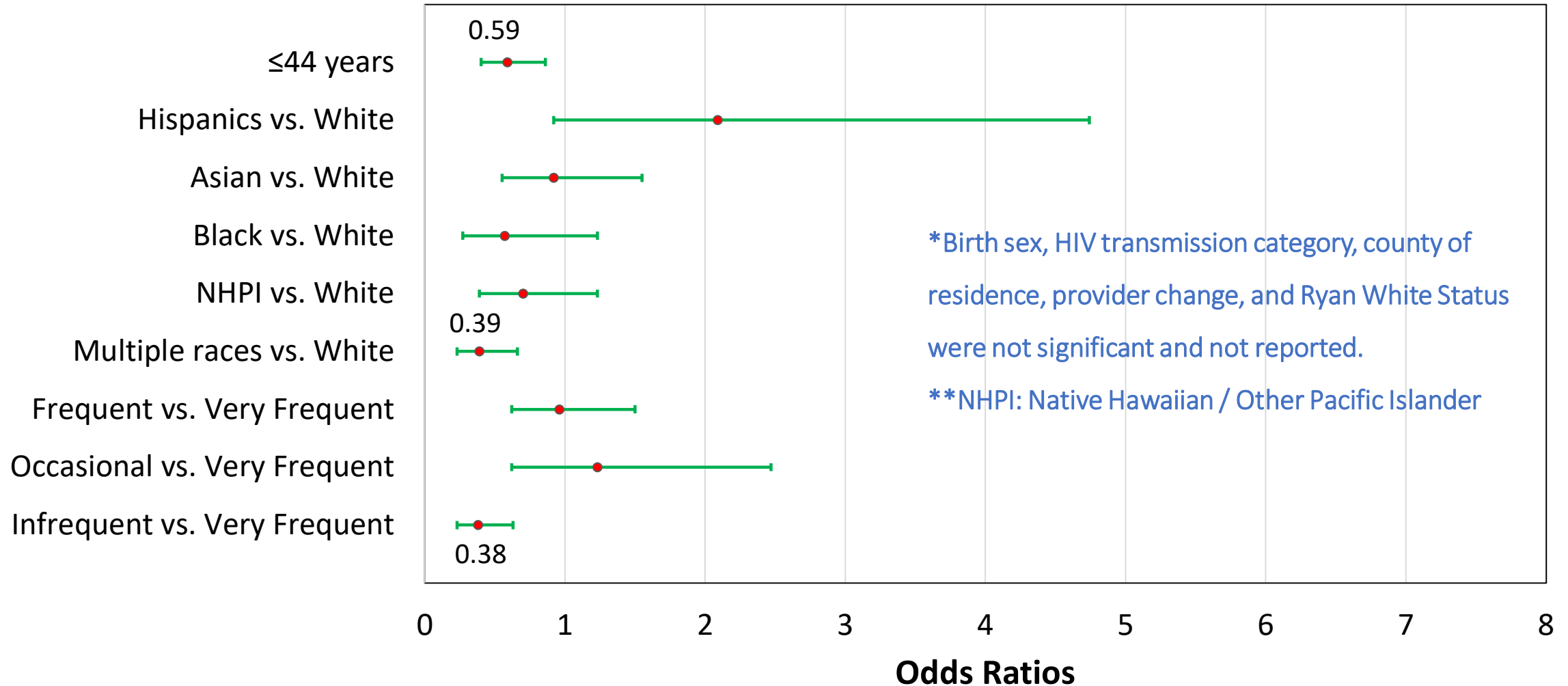
# Results – HIV Medical Care and Clinical Outcome in 2017 by Care Provider Category



# Adjusted Associations of Factors at the Patient, Provider, and Geographic Level with Retention in Care



# Adjusted Associations of Factors at the Patient, Provider, and Geographic Level with Viral Suppression



- **At the patient level**

- Multiple logistic regression found disparities in retention in care by patient's age and disparities in viral suppression by both patient's age and race/ethnicity
  - Compared to whites, multiple races were less likely to be virally suppressed

- **At the geographic level**

- There is significant difference in retention in care but not viral suppression
- Patients from Hawaii County (physician shortage) were less likely to be retained in care

- **At the provider level**
  - Patients under care from the ‘Infrequent’ group were less likely to be retained (OR=0.47, 95% CI, 0.33-0.68) or virally suppressed (OR=0.38, 95% CI 0.23-0.63), compared to patients from the ‘Very Frequent’ group

- **At the provider level**
  - Percentage of not retained and not virally suppressed was disproportionately higher among patients receiving care from the ‘infrequent’ group (36%), compared to its proportion among persons in care in 2017 (13%).
  - Percentage of three-year (2016-2018) in care (80.9%) and viral suppression (64.8%) was lowest in this group as well, compared to state average (88.0% and 75.3%, respectively).



- **At the provider level**
  - Percentage of patients who changed providers in 2017 were highest among the 'Infrequent' group (44%), compared to state average (18%)
  - Percentage of patients who changed both providers and healthcare facilities were also highest in this group (26%), compared to state average (8%)

- Less optimal viral suppression and retention in care were observed among patients under care from providers who infrequently provided HIV medical care.
- HIV medical care is also more likely to be interrupted among patients under care from this group.
- Establishing a long-term relationship with an experienced HIV provider appears beneficial to achieve sustainable viral suppression and uninterrupted HIV medical care.
- More resources and services to younger patients and patients of multiple races

# Study Limitation



- Snapshot using frozen dataset
  - Data is only as accurate as the information available
- Included only patients who were in care in 2017
  - Not generalizable to all persons living with diagnosed HIV
  - Overestimation of retention in care and viral suppression
    - Low percentage of retention in care (72%) relative to the 2020 national target of 90%

# Acknowledgement



- Special thanks to my wonderful colleagues and coauthors
  - Timothy McCormick, Alan Katz, Peter Whitar, and Glenn Wasserman
- Hawaii HIV Surveillance team, in particular, our HIV Surveillance Coordinator, Sandy Qiu, for collecting and managing HIV data at a high standard
- Hawaii HIV Medical Management Services team for linking persons living with HIV to Ryan-White and other community-based services
- HIV care providers in the community

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Thank You!

Q & A