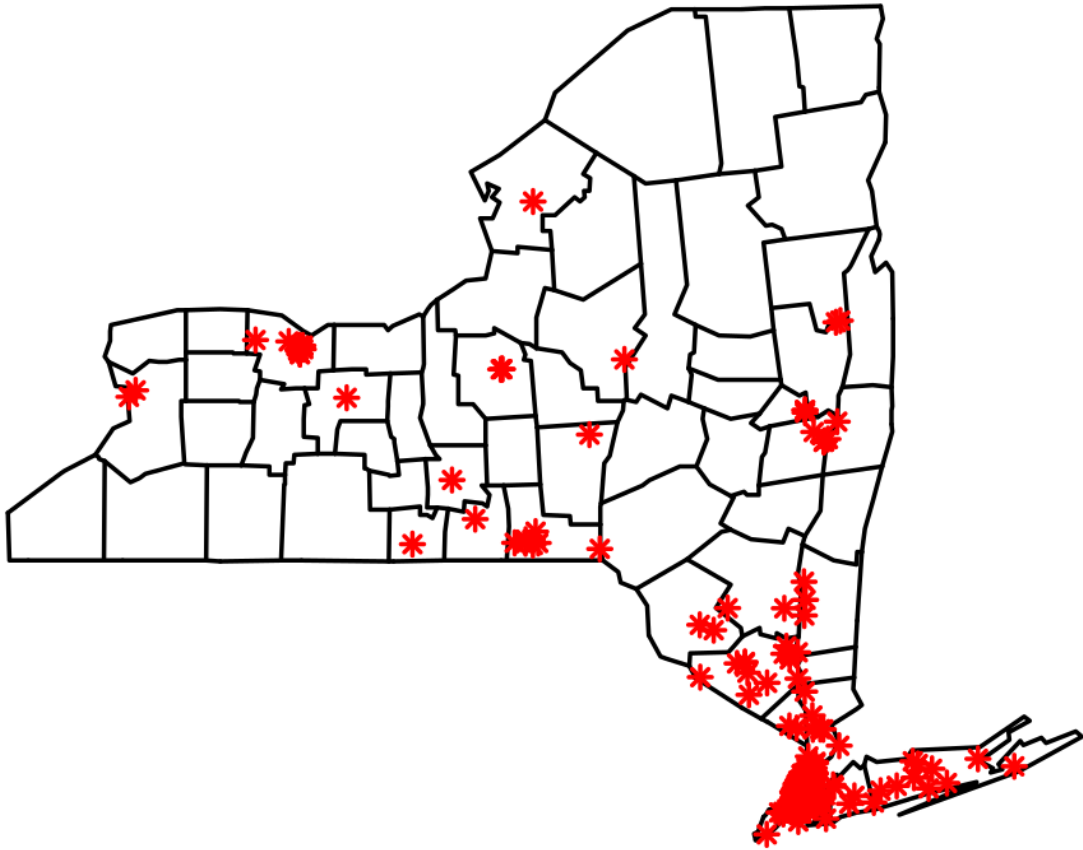


New York State HIV Quality of Care Program

Annual Data Report Based on 2018 Performance Data *2022 Revised Report*



250 sites submitted approved data for 2018. Each * represents a site.

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Background

The New York State Department of Health (NYSDOH) AIDS Institute HIV Quality of Care (QOC) Program, overseen by the Office of the Medical Director (OMD), is committed to promoting the quality of HIV clinical care and supportive services delivered to people with HIV in New York State (NYS) and to building capacity for quality management in HIV programs throughout the state. Major activities of the Program include performance measurement of clinical care and services, improvement coaching and consultation, exchange of improvement resources, peer learning, and collaborative participation of clinical experts and consumer representatives.

The Quality of Care Program is committed to ensuring that patients who are in care receive the best care to achieve desired outcomes of good health and viral suppression. Performance data focusing on viral load suppression are a vital component of the Ending the Epidemic (EtE) metrics and drive actions by providers to achieve the goals set forth in the Governor's EtE Initiative. For providers to have an accurate understanding of the quality of care they are delivering to people living with HIV (PLWH) in their organizations, they must be able to collect, analyze, and visualize data on their performance.

As part of the 2019 annual HIV Quality of Care Program Review, organizations that provide medical care to PLWH in New York State (NYS) were asked to complete the Organizational HIV Treatment Cascade Data Submission Excel Template for care provided in 2018. The Excel template (documentation available from author of this report) was submitted to the New York State Department of Health (NYSDOH) AIDS Institute via the Health Commerce System (HCS), a secure file-sharing platform; submissions that passed validation checks were incorporated into a secure AIDS Institute database. The Data Submission Excel Template included a section to input patient-level data, a section for visualizing cascade indicator results as charts and tables (automatically generated from the provided patient-level data), and a section for the organization's methodology, key findings, and quality improvement plan, including consumer involvement and updates on recent quality improvement (QI) projects and stigma reduction activities.

Design and Methodology

Through review of previous submissions and correspondence with providers, the OMD identified a total of 98 publicly funded medical organizations, including community health centers, drug treatment centers and hospitals, that provided clinical care to HIV-infected individuals in 2018. When we closed this review on October 1, 2019, submissions for 89 of these organizations, encompassing 250 individual medical clinics, had been completed and approved. 72 of these organizations submitted data themselves by completing a password-protected data template and sending it to the NYSDOH via a secure file transfer application within the HCS. Under a special agreement with NYC Health + Hospitals, the public hospital system in New York City, they facilitated submissions for their 17 major treatment sites (hospitals and diagnostic treatment centers). Of the remaining 9 originally targeted organizations, 3 were excused or deemed ineligible, and 6 either failed to submit data or submitted data that were deemed unusable. These include:

- BronxCare Health System – Designated AIDS Center
- Community Healthcare Network
- Heritage Health and Housing
- Kaleida Health

- SBH Health System (formerly St. Barnabas Hospital)
- The University of Vermont Health Network

Eligibility Criteria

All HIV-positive patients who were seen at the organization in 2018 were eligible for the patient-level submission, including those who died during the review period or were incarcerated, relocated or confirmed to be receiving ongoing HIV care at another site as of the end of the review period. Eligibility for each indicator was dependent on care status:

- 1) Newly Diagnosed Patients
 - a. Linkage to care within 3 days of diagnosis (internally diagnosed patients only)
 - b. ARV therapy
 - c. Viral load testing
 - d. Viral suppression within 91 days of diagnosis
- 2) Previously Diagnosed Patients
 - a. ARV therapy
 - b. Viral load testing
 - c. Viral suppression on final test during the year

Results for previously diagnosed patients were analyzed based on three subgroups:

- 1) Established active caseload: patients who had received HIV primary care services prior to 2018 and returned for HIV care in 2018.
- 2) New-to-care patients: patients who received HIV primary care services in 2018 but had not been seen within the reporting organization prior to 2018 (or returned after an absence of at least two years).
- 3) Non-active caseload: patients seen for other services within the reporting organization in 2018 but not HIV primary care. For these patients, providers submitted information on the other site(s) of care (emergency department, non-HIV specialty care, mental health services, etc.).

Reporting Conventions and Glossary

Established active patients: Previously diagnosed open patients who received medical services in the HIV program of the organization during the measurement year, excluding those new to care in 2018 or returning after an absence of at least two years.

Linkage to care: A patient is considered to have been linked to medical care if the individual attended a routine HIV medical visit within three calendar days of diagnosis with HIV by a treating physician. We also collected data on post-discharge care within 30 days for inpatients.

Newly diagnosed patients: Patients first diagnosed with HIV within the measurement year.

New-to-care patients: Patients who are new to an organization's HIV program, regardless of the year in which they were diagnosed, and patients who were seen prior to 2016, not seen in 2016 or 2017, but then returned in 2018.

Non-active patients: Patients who (1) have had contact with a healthcare organization during the measurement year but have not been seen by the HIV clinical program and (2) who could not be confirmed to have died by the end of the year, to be in care elsewhere by the end of the year, or to be incarcerated at the end of the year.

Open patients: Previously diagnosed patients who were not incarcerated at the end of the measurement year, deceased by the end of the measurement year, or confirmed to be in-care elsewhere at the end of the measurement year, and excluding those new to care in 2018 or returning after an absence of at least two years.

Previously diagnosed patients: Patients diagnosed with HIV before the measurement year.

Viral suppression: Patients diagnosed prior to 2018 are considered virally suppressed when their last viral load test conducted in 2018 returned a value of less than 200 copies/mL. Newly diagnosed patients are considered suppressed if they had any VL below that threshold within 91 days of initial HIV diagnosis.

Care Status Categories for Indicator Eligibility

		Diagnosis				
		Internally diagnosed as inpatient during the review period	Internally diagnosed during the review period while not on inpatient service	Externally diagnosed during the review period	Diagnosed prior to the review period.	Unknown
Enrollment	Active, new to clinic during review period, continuing in program	"Newly diagnosed Active"			"Other new to care"	
	Active, seen prior to the review period, continuing in program				"Established Active"	
	Died during review period	"Linkage only"			"Excused- previously diagnosed"	
	Incarcerated as of end of review period					
	Relocated out of New York State during the review period					
	Confirmed to be receiving ongoing HIV care at another site as of end of the review period	"Excused- newly diagnosed"			"Excused- previously diagnosed"	
	Other status, not enrolled in care at your organization					

Submission Process

For the review of care provided in 2018, the NYS DOH Quality of Care Program created an Excel submission template where the following tasks could be performed in one place:

- 1) Patient-level data collection
- 2) Data sorting
- 3) Data validation

- 4) Scoring of cascade indicators
- 5) Generation of charts depicting scored cascade indicators
- 6) Scoring of patient-level data
- 7) Generation of patient-level scored data report
- 8) Generation of a pivot-table report

The template also stored the following written statements:

- 1) Methodology
- 2) Key findings
- 3) Planned QI projects
- 4) Updates on previous QI projects
- 5) Consumer involvement

All healthcare organizations participating in this review were asked to appoint a person responsible for submitting the template on their organization's behalf. When all elements of the template were completed, the template was uploaded via the Health Commerce System for final processing and storage on a secure DOH data server. After a series of automated validation checks were applied, each submission was reviewed for completeness and integrity by the organization's quality coach and the OMD data analyst. If problems were identified, providers were asked to correct them and resubmit their template.

Data Review and Acceptance Process

The OMD used a dedicated web application to process all submissions. Those that did not pass rigorous patient-level data integrity checks (including for submission of all applicable data elements for each patient, no nonstandard values or dates outside of the review period, and no logical contradictions among the data for any patient) were automatically rejected with a message to the provider specifying necessary corrections. The OMD data analyst and the quality coach for the organization analyzed submissions that passed these tests for general plausibility of the results as well as robustness of the requested quality improvement statements. Any concerns were reported to the organization, and updated submissions overwrote previous submissions in the database for the review. By October 1, 2019, 76 submissions had passed the automated checks, and 72 of these had been accepted for overall integrity and completeness. Submissions from BronxCare Health System - Department of Family Medicine, BronxCare Health System - Division of Infectious Disease, Community Healthcare Network, and The University of Vermont Health Network were deemed unusable due to uncorrected problems, and the OMD never received submissions from Heritage Health and Housing, Kaleida Health, or SBH Health System.

Data Aggregation and Analysis

Data that met the inclusion criteria were exported from the SQL Server web application and scored using SAS statistical software. SAS was also used to conduct "fuzzy" matching of active and inactive patients. R statistical software was used for our logistical regression analysis of viral load suppression and to create the map of submitting clinics. Microsoft Excel was then used to create charts, generate indicator score dot plots, format the viral suppression heat map, and calculate random effects benchmarks.

Active-patient performance rates (among the 250 clinics with active patients) are displayed for each clinical indicator. Clinic means and interquartile range (IQR) analyses are included to help visualize the

spread of performance. The number of sites included for each indicator may be lower than the number of sites with acceptable data as some sites did not have any eligible patients for some indicators.

Other data cleaning decisions related to the indicator definitions and demographic analysis included the following:

- Inactive patients reported as receiving outside HIV primary care in 2018 (n=5,047), or who were incarcerated (n=239), relocated outside NYS (n=329) or died in 2018 (n=580) were excluded from the ART and VLS indicators for “open” patients.
- Data necessary to evaluate timely viral testing and suppression among newly diagnosed patients were not available for NYC Health+Hospitals submissions, and they are excluded from this analysis.
- Due to limited information about the patients seen at Health+Hospitals facilities (age, birth sex and race were generally available, but we did not receive actionable data for current gender, insurance status, exposure risk or housing status), these patients and their clinics were excluded from the viral load suppression regression analysis.
- Information about enrollment status among previously diagnosed active patients (i.e., established v. other new to care) was provided for Health+Hospitals facilities and was used to assess suppression rates. However, only 4.2% (526/12,581) of these Health+Hospitals patients were reported as new to care. This is considerably lower than in the other submissions (6,070/58,507 = 10.4%) and suggests that some Health+Hospitals patients reported as established may have been new to care (“transfer patients”).

Summary and Key Findings

Narrative Summary

The data presented here are generally consistent with results seen in recent years, although exact comparison is not possible given the change from the eHIVQUAL review process used through 2016 to a pilot version of treatment cascades in 2017 (where patient-level results were not required), and then to this year’s patient-level submission of cascade data. The mean clinic rate for viral load suppression among all previously diagnosed active patients was 80%, which represents an improvement from the first years when we collected these data, but an apparent plateauing of results since 2016, when the mean rate was also 80%. A similar pattern is seen for ARV prescription, albeit at a very high rate among these patients (clinic mean = 96%).

Suppression rates among patients established in care (clinic mean = 82%; n=63,065 patients at 242 clinics) were substantially higher than for patients new to care at the organization in 2018 (clinic mean = 70%; n=6,596 patients at 202 clinics). Variation was also seen across various demographic factors. For instance, 91% of all previously diagnosed active patients age 60 or older (n=15,639) were suppressed on final VL, but only 75% of these patients aged 20 to 24 (n=1,482) were suppressed. Similarly, while 88% of stably housed patients (n=45,466) were suppressed on final VL, only 69% of temporarily housed patients (n=2,298) were suppressed.

We investigated these variations in viral suppression using a hierarchical mixed-effects logistic regression analysis that considered both “fixed effects” (housing instability, age, race, insurance status, etc.) and the

“random effects” of where the patients were receiving care (which medical organization and then, in turn, where applicable, which clinic within the organization). Statistically significant results were obtained for both types of effect. These results are reported in more detail in the body of the report, and appendices provide an assessment of the relative performance of different clinics as well as a complete table of parameter estimates for the fixed effects.

Suppression rates for newly diagnosed patients (within 91 days of diagnosis) were considerably lower than rates for established patients (at final VL) and show greater variation among clinics. The mean clinic rate for suppression among newly diagnosed patients was 44%, and the inter-quartile range was 26 percentage points (25th percentile = 29%; 75th percentile = 55%). Of note, however, this includes patients diagnosed during the final quarter of the year with limited time for initiation of therapy and suppression. The average rate for linkage to care within 3 days from diagnosis was 43%, but this increased to 57% for linkage within a week, 82% for linkage within a month and 88% for linkage within 3 months.

As in recent years, among the active patient population whose demographic information was reported, majorities by demographic category included male gender (39,429/57,618 = 68%), Black race (34,368/55,323 = 62%), age 40 years or greater (52,357/71,088 = 74%), and those receiving care in New York City (56,238/71,031 = 79%). Within this caseload, newly diagnosed patients tended to be younger, but more than a third (491/1,427 = 34%) were at least 40 years old. Newly diagnosed patients were also more likely than established patients or other new to care patients to have MSM exposure risk (among those with known risk, 56% v. 44% and 53%, respectively). These demographic trends are reported in greater detail in the report, where a table lists the age distributions by race and risk factors with results separated by enrollment status.

Suppression rates among inactive patients are hard to determine due to limited documentation of care provided outside the reporting organization. However, among 20,795 eligible inactive patients (i.e. after excluding for relocation, incarceration, external care, or death), 4,306 (20.7%) were known to have been suppressed on final VL in 2018.

To assess care status statewide, we used conservative fuzzy matching (computer-assisted translation logic) on names and date of birth to identify likely matches between inactive patients at one site and active patients at another site. Among all subcategories of inactive patients, the majority could not be matched to active patients at other organizations. This is unsurprising for patients reported as deceased (match rate of 22/580 = 3.8%), relocated outside NYS (17/329 = 5.2%) or incarcerated (17/239 = 7.1%) by the end of the year. Match rates were somewhat higher for inactive patients seen as inpatients (1,352/5,031 = 26.9%) and in emergency departments (1,343/4,584 = 29.3%). Of some concern, however, the match rate for patients reported as in external care within NYS was only 19.2% (968/5,047). However, it’s likely that many of the unmatched patients were receiving care from medical providers who would not appear in these data (at a non-reporting site, at a Veteran’s Administration facility, or in private practice) or had actually relocated outside NYS. Significant variation in reporting of a patient’s name would also result in a missed match.

Key Findings

Newly Diagnosed Patients

Linkage to Care

The average organizational rate for linkage of newly diagnosed patients to HIV care within 3 days of diagnosis was 43%. The average rate for linkage within 7 days was 57%; for linkage within 30 days, 82%; and for linkage within 90 days, 88%.

Prescription of ARV

Antiretroviral therapy usage was measured for all patients. The average rate among newly diagnosed patients was 88% for those diagnosed within the reporting organization and 91% for those diagnosed externally.

Viral Load Testing

Among newly diagnosed patients, the average organizational rate for at least one test was 94% for internally diagnosed patients and 93% for externally diagnosed patients. The average rate for testing within 91 days of diagnosis was 93% for internally diagnosed patients and 81% for those diagnosed externally.

Viral Load Suppression

For newly diagnosed patients, the average organizational rate of suppression within 91 days of diagnosis was 48% among internally diagnosed patients and 37% among externally diagnosed patients.

Previously Diagnosed Patients

Established Active Patients

Prescription of ARV

Among established active patients, the average clinic rate for ARV therapy prescription was 97%.

Viral Load Testing

At the average clinic, 95% of established active patients received at least one viral load test during the review period.

Viral Load Suppression

Among established active patients, the average clinic rate for suppression on final VL of the year was 82%.

Other New-to-Care Patients

Prescription of ARV

The average clinic-level prescription rate among the “other new to care” patients (previously diagnosed but new to care at the reporting organization or returning after an absence of at least two years) was 92%; at the organizational level the average was 93%.

Viral Load Testing

For other new to care patients, the average clinic-level testing rate was 92%; at the organizational level the average was 96%.

Viral Load Suppression

For other new to care patients, the average clinic-level suppression rate (on final VL) was 70%; at the organizational level the average was 71%.

Unknown Status Patients

Prescription of ARV

The average organization-wide rate of documented prescription among the “unknown status” patients (previously diagnosed but not in care at the reporting organization nor excludable due to death, incarceration, relocation outside NYS or known ongoing HIV care at another provider) was 48%.

Viral Load Testing

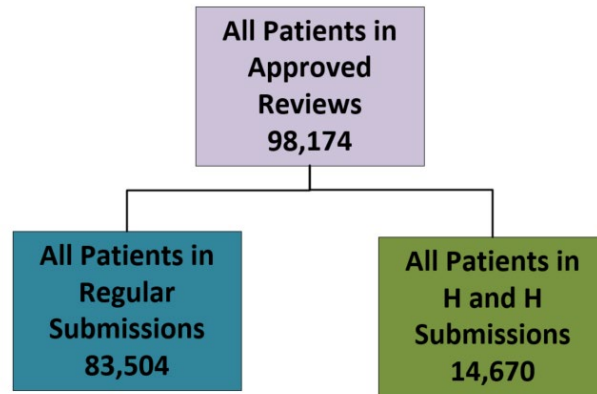
For unknown status patients, the average organization-level rate of documented testing was 31%.

Viral Load Suppression

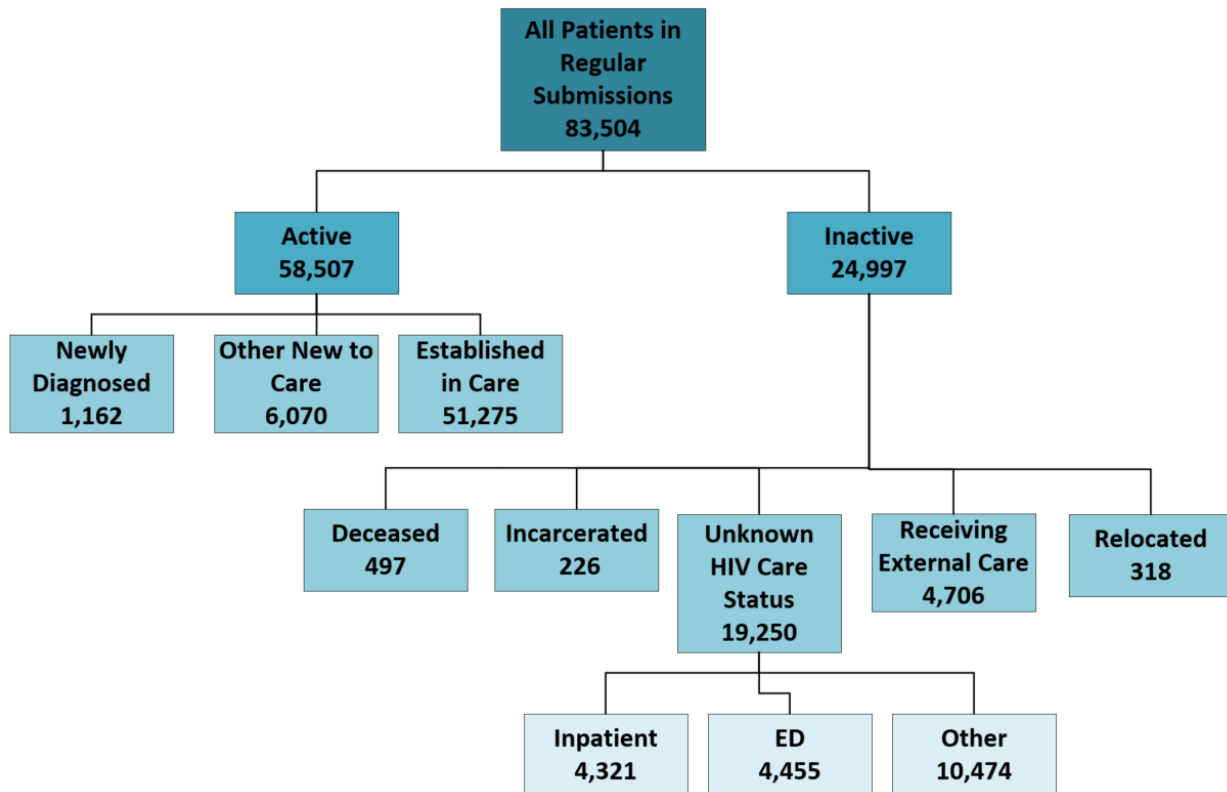
For unknown status patients, the average organizational-level rate of documented viral suppression was 17%.

Report

2018 Active vs. Inactive Patients¹

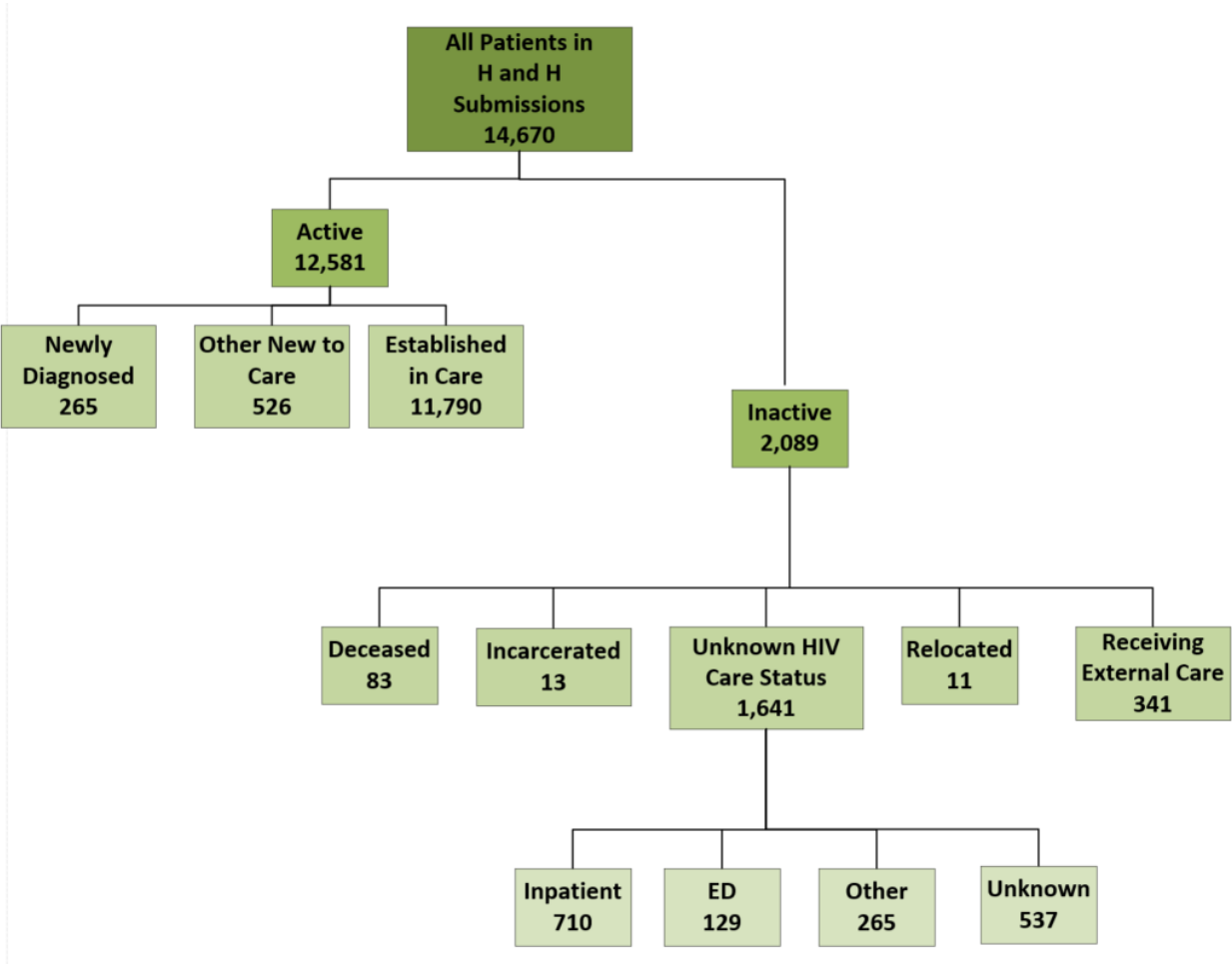


2018 Patients in Regular Submissions

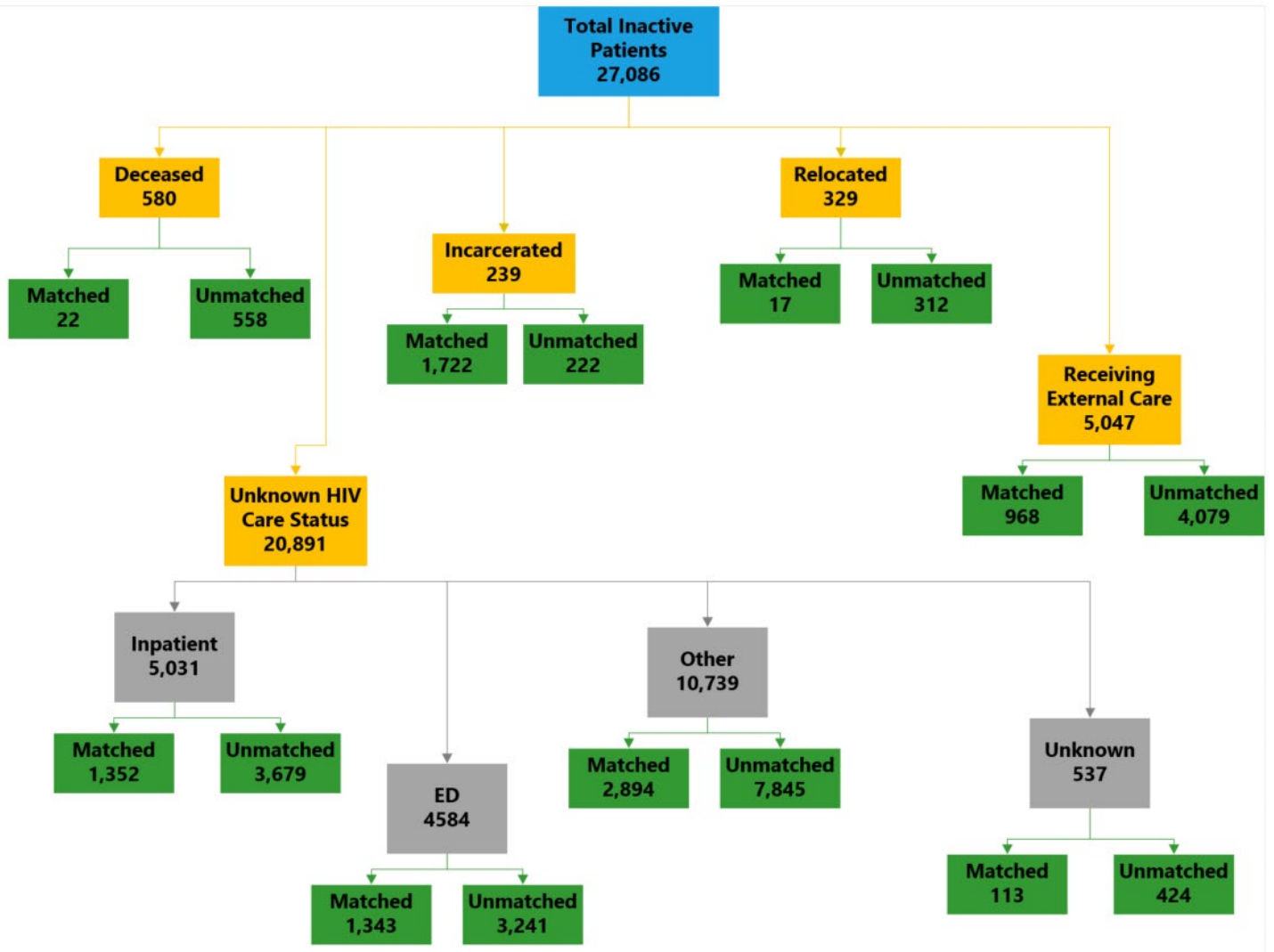


¹ In all flowcharts, patients were deduplicated by each submitter at their organizational level, but patients may be duplicated across organizations.

2018 Patients in Health+Hospital Submissions

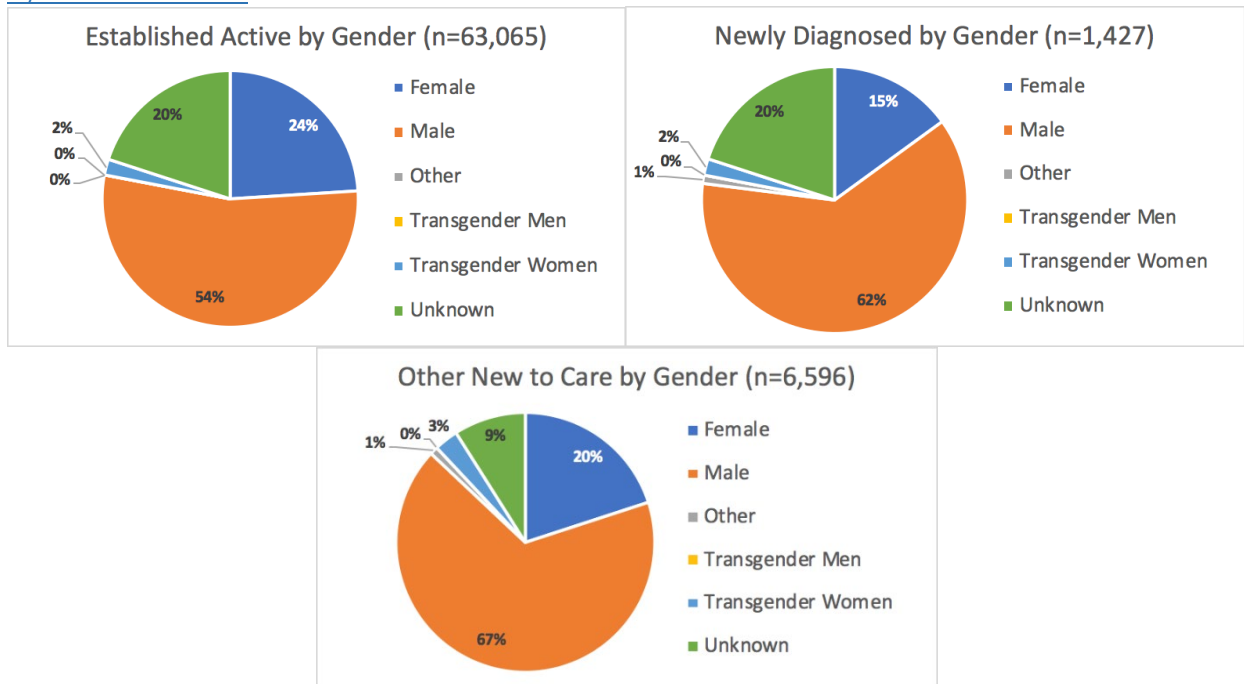


Inactive Patients Matched and Unmatched by Care Status

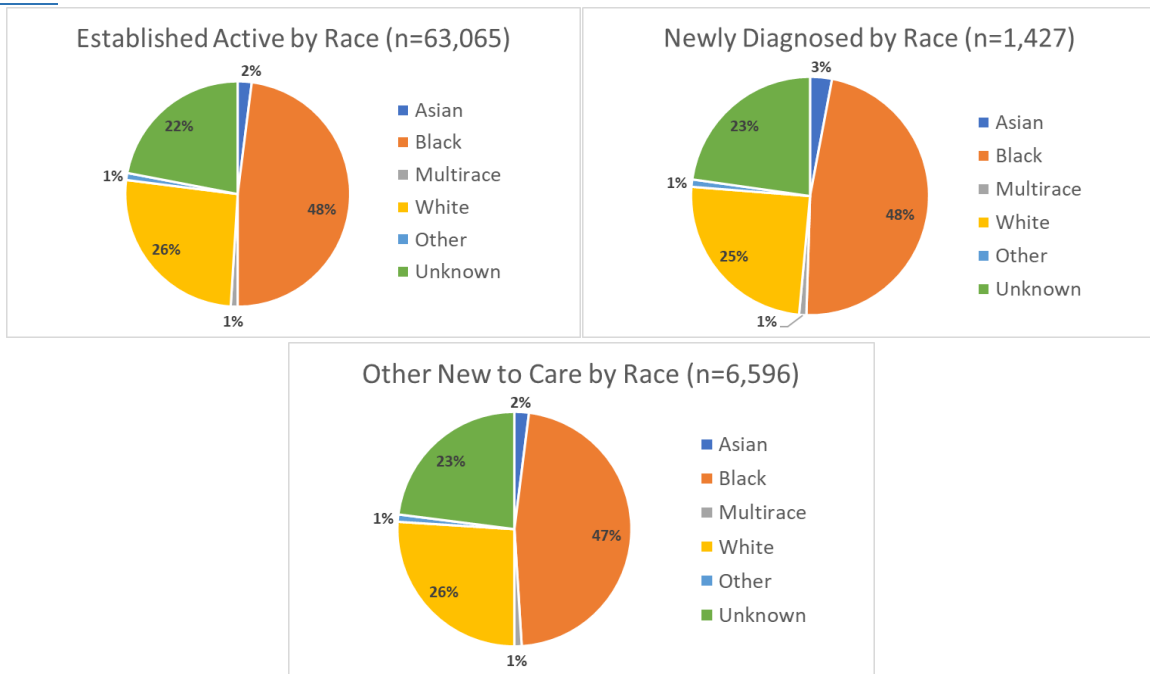


Active Patient Characteristics (Newly Diagnosed, Established Active, Other New-to-Care)

By Current Gender

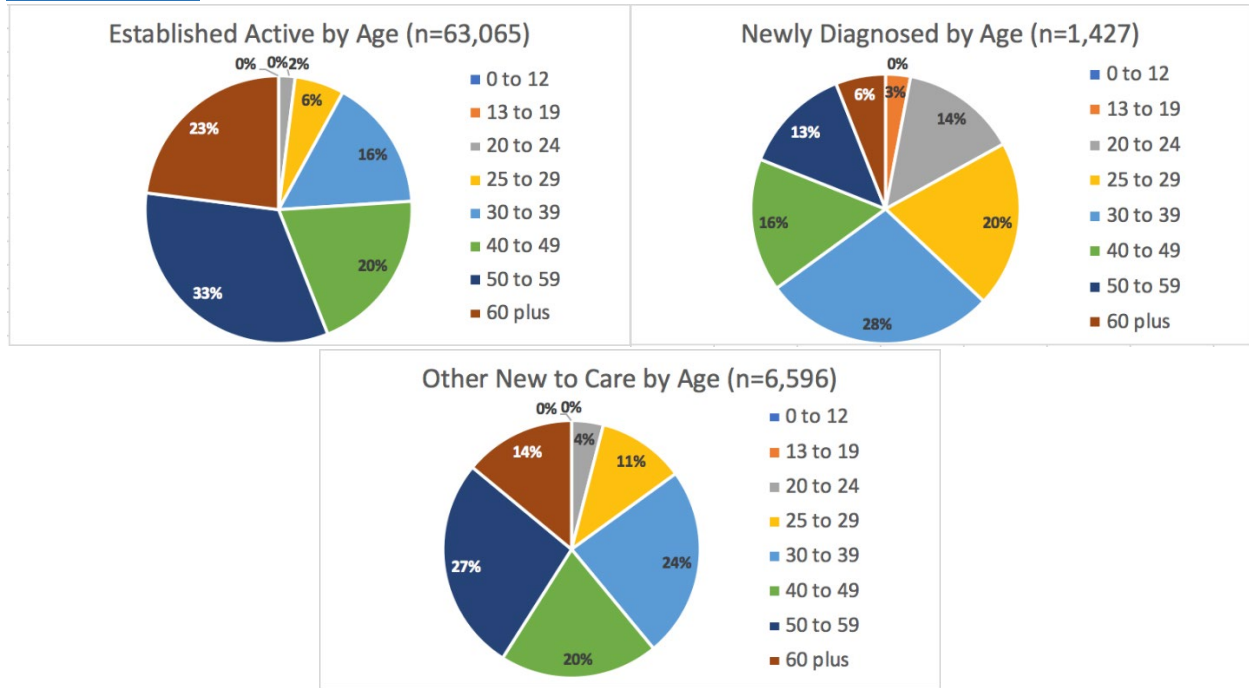


By Race²

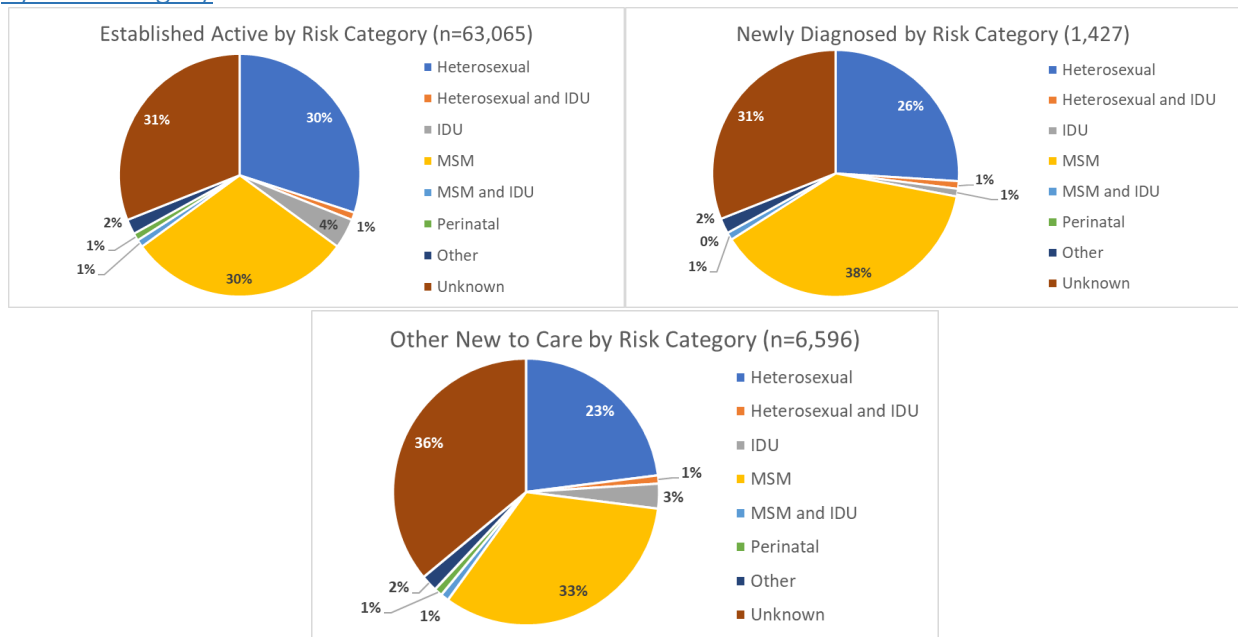


² Options for race included American Indian/Alaskan Native (AIAN), Asian, Black, Native Hawaiian/Pacific Islander (NHPI) and White. Patients listed exclusively as AIAN or NHPI were grouped as “Other” for analytical purposes. Any patient with more than one option reported was categorized as “Multirace.”

By Current Age

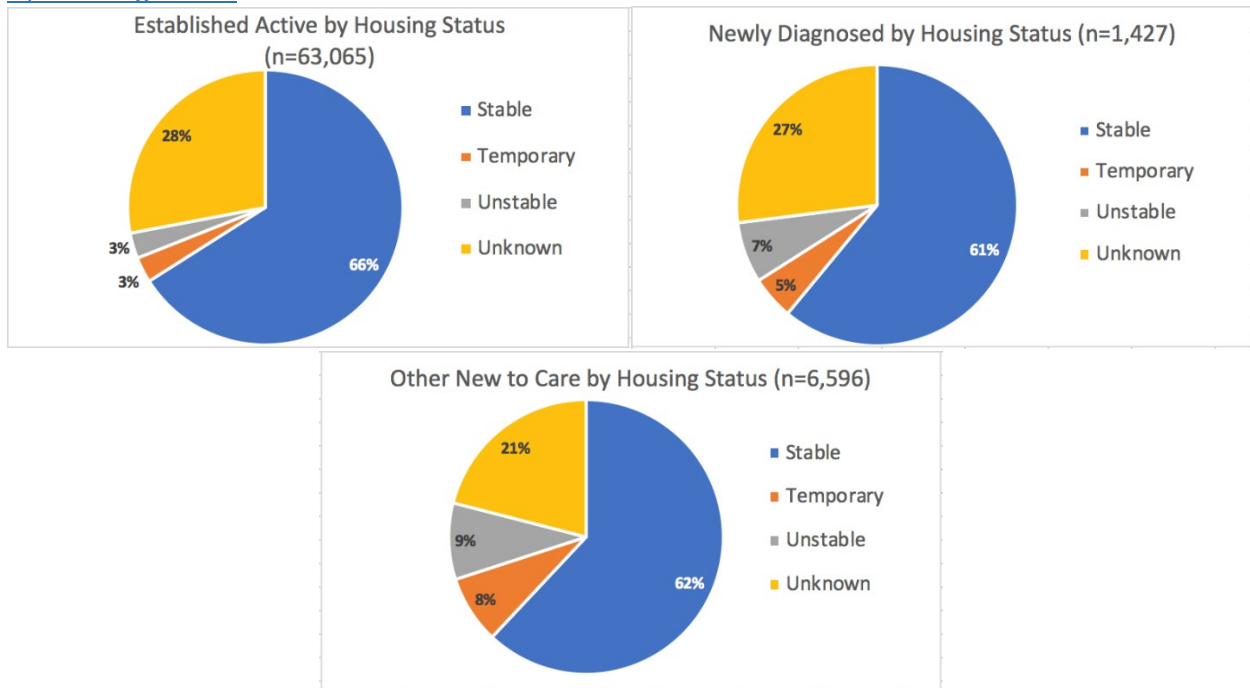


By Risk Category³

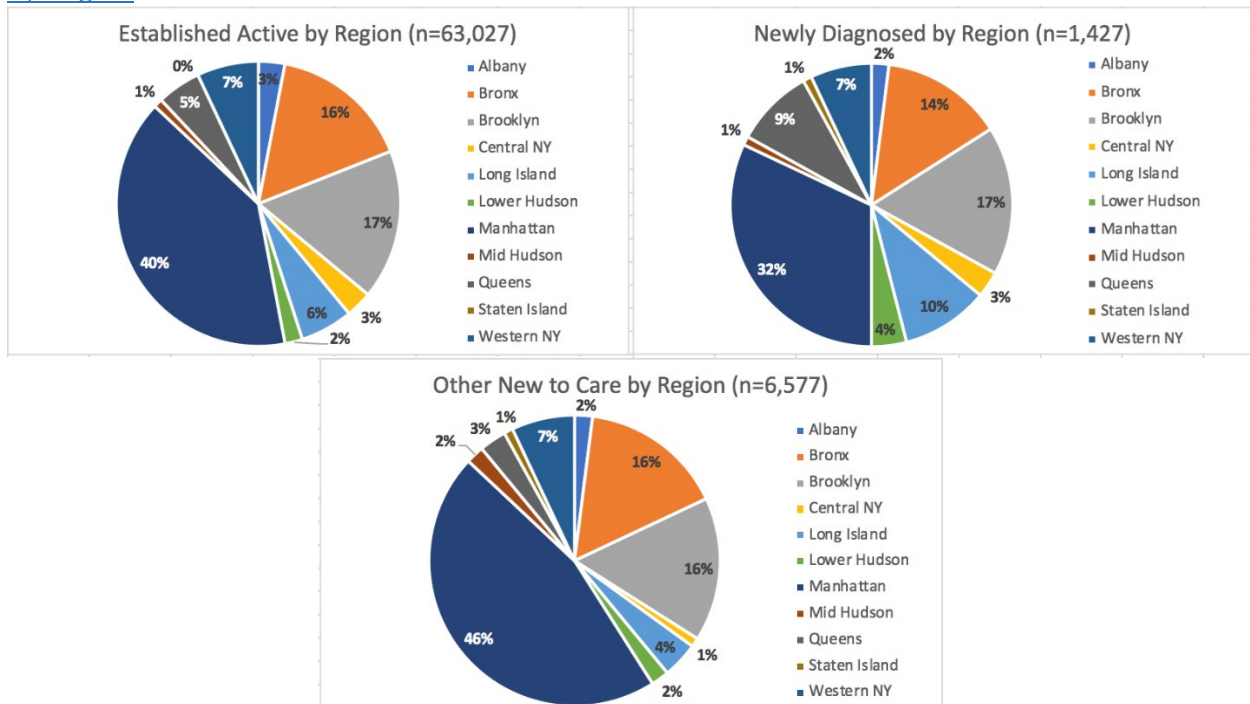


³ Options for exposure risk included blood exposure, hemophilia, heterosexual contact, intravenous drug use, MSM contact, perinatal exposure and “other risk.” Due to small numbers reported, blood exposure, hemophilia and multiple risks besides heterosexual and IDU or MSM and IDU were also treated as “other risk” for this analysis.

By Housing Status⁴



By Region⁵



⁴ Temporary housing was defined as short-term arrangement with family or friends, transitional housing, or temporary institutional placement including substance abuse treatment facilities and psychiatric hospitals. Unstable housing was defined as emergency shelters, jail/prison, and places not meant for human habitation.

⁵ 38 established patients and 19 new-to-care patients were seen at a mobile clinic in New York City and were not assigned to a region as the City encompasses five regions (one per borough).

Age of Active Patients by Race and Risk Factor

		Patients	Mean*	10th Pct.	25th Pct.	Median	75th Pct.	90th Pct.
Race	Asian	1270	45.0	29	35	45	54	62
	Established	1121	45.8	30	36	45	54	62
	Newly Diagnosed	42	34.1	23	27	31	40	52
	Other New to Care	107	41.0	26	30	40	52	56
	Black	34,368	48.6	29	38	51	59	65
	Established	30,583	49.4	30	39	52	59	65
	Newly Diagnosed	689	35.8	22	25	32	45	56
	Other New to Care	3096	43.8	27	32	44	55	61
	Multi-race	428	46.7	27	35	49	57	66
	Established	353	48.1	28	36	51	58	66
	Newly Diagnosed	12	33.0	22	25	28	37	59
	Other New to Care	63	41.3	23	28	42	52	61
	Other	535	48.0	31	40	50	57	62
	Established	~465	48.6	32	40	50	57	62
	Newly Diagnosed	<10						
	Other New to Care	~60	44.5	29	35	46	53	60
	Unknown	15,765	48.8	30	39	50	58	65
	Established	13,903	49.5	31	40	51	58	65
	Newly Diagnosed	325	36.3	23	27	33	43	56
	Other New to Care	1537	44.9	28	34	45	55	62
White	18,722	50.0	32	41	52	59	65	
Established	16,639	50.7	32	42	52	59	65	
Newly Diagnosed	350	38.2	24	29	35	46	57	
Other New to Care	1733	45.7	28	35	47	55	62	
Risk Factor	Heterosexual	20,954	52.2	35	45	53	60	66
	Established	19,085	52.7	36	46	54	60	66
	Newly Diagnosed	373	41.8	25	32	40	52	60
	Other New to Care	1496	48.5	30	39	50	57	63
	Hetero and IDU	727	57.2	45	52	58	64	68
	Established	~650	57.9	47	53	59	64	68
	Newly Diagnosed	<10						
	Other New to Care	~70	52.8	35	46	56	61	67
	IDU	2747	58.3	48	54	59	64	68
	Established	2513	58.9	49	54	60	64	68
	Newly Diagnosed	21	41.9	25	29	44	53	56
	Other New to Care	213	53.7	36	47	55	62	66
	MSM	21,572	44.6	28	34	45	54	61
	Established	18,840	45.3	29	34	46	55	62
	Newly Diagnosed	537	31.9	21	25	29	36	48
	Other New to Care	2195	41.2	27	31	39	51	58
	MSM and IDU	440	49.5	32	39	51	58	64
	Established	379	50.7	32	42	53	59	65
	Newly Diagnosed	13	34.9	26	29	33	44	46
	Other New to Care	48	44.1	30	36	43	54	59
Other risk	1458	49.7	30	39	52	59	66	
Established	1288	50.3	31	41	52	59	66	
Newly Diagnosed	29	36.4	23	28	36	42	49	
Other New to Care	141	46.5	28	35	48	56	63	

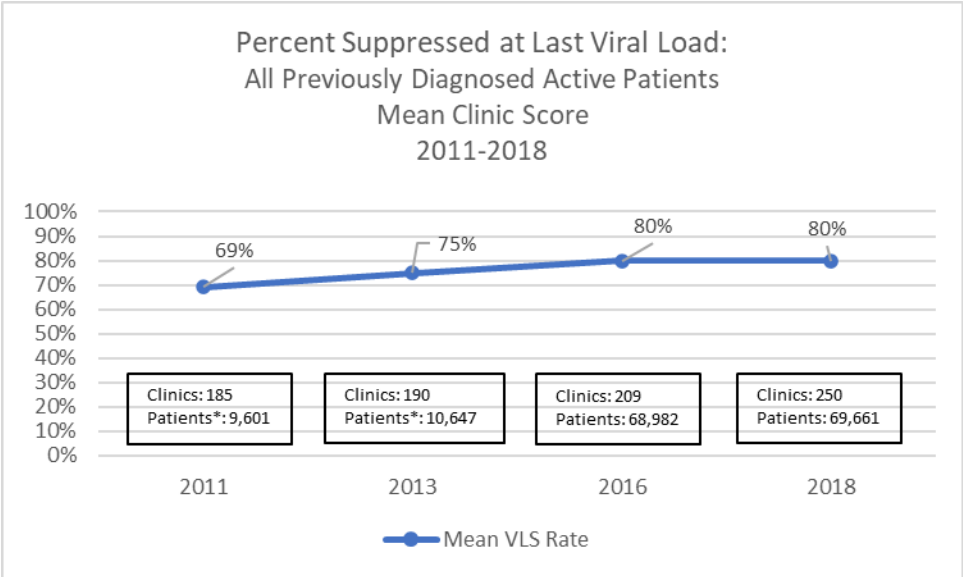
Perinatal	863	26.0	18	22	26	29	33
Established	~780	25.9	18	22	26	29	33
Newly Diagnosed	<10						
Other New to Care	~80	26.5	19	22	26	30	33
Unknown	22,327	49.6	30	40	51	59	66
Established	19,527	50.4	31	41	52	60	66
Newly Diagnosed	444	37.3	22	27	34	47	56
Other New to Care	2356	44.5	27	33	45	55	61

*Means are reported to tenths place. Percentile benchmarks are rounded up, as needed, to nearest integer value.

Viral Load Suppression

Assessment of suppression (< 200 copies/mL) at final viral load has been a component of our quality reviews since 2009. Data presented here have been rescored to measure suppression rates among all previously diagnosed “active” patients (those enrolled in HIV care). Data for 2009 are not included as we did not distinguish between newly and previously diagnosed patients. Data for 2014 are omitted as inclusion criteria differed among clinics and it is not possible to identify retrospectively “active” patients (those enrolled in HIV ambulatory care). No review was conducted for care provided in 2010, 2012, or 2015. In the review of care provided for 2017, participants were not asked to specify the clinic where patients who were previously diagnosed but new to the organization were treated.

Viral Load Suppression Rates 2011-2018 (Mean Clinic Scores for All Previously Diagnosed Active Patients)



[Previously Diagnosed Active Patients: Suppressed on Last Viral Load of Review Period](#)

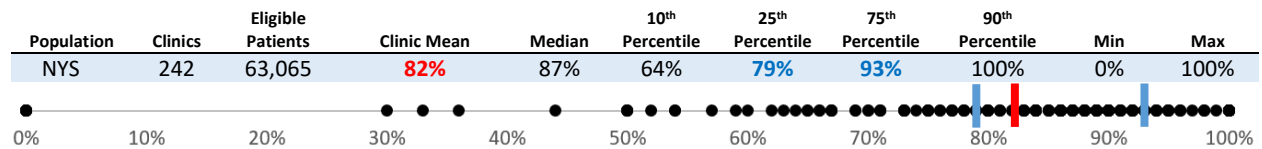
Suppression on Final VL: Percentage of patients with a VL < 200 copies/mL on last VL test during the review period. Patients with no VL tests during the review period are counted as unsuppressed.

Exclusions: None

Established Active Patients

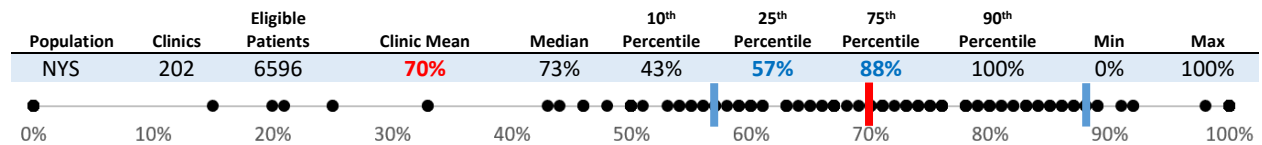
Mean 82%

Benchmarks on Dot Plots: Vertical bars mark the 25th percentile (blue), mean (red), and 75th percentile (red).



Other New to Care Patients

Mean 70%



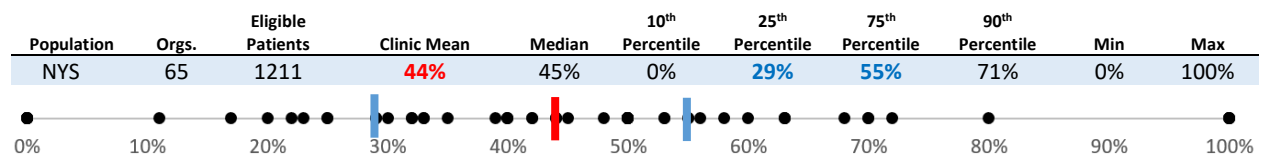
[Newly Diagnosed Patients: Ever Suppressed Within 91 Days](#)

Suppression within 91 days of diagnosis: Percentage of patients with a VL < 200 copies/mL on any VL test performed within 91 days of the initial date of diagnosis. Patients with no VL tests during this period are counted as unsuppressed.

Exclusions: None

Scoring of suppression among newly diagnosed patients was conducted at the organization level as the indicator includes patients not known to be in HIV ambulatory care at a clinic within the organization. Data were not available for Health+Hospitals facilities.

Mean 44%

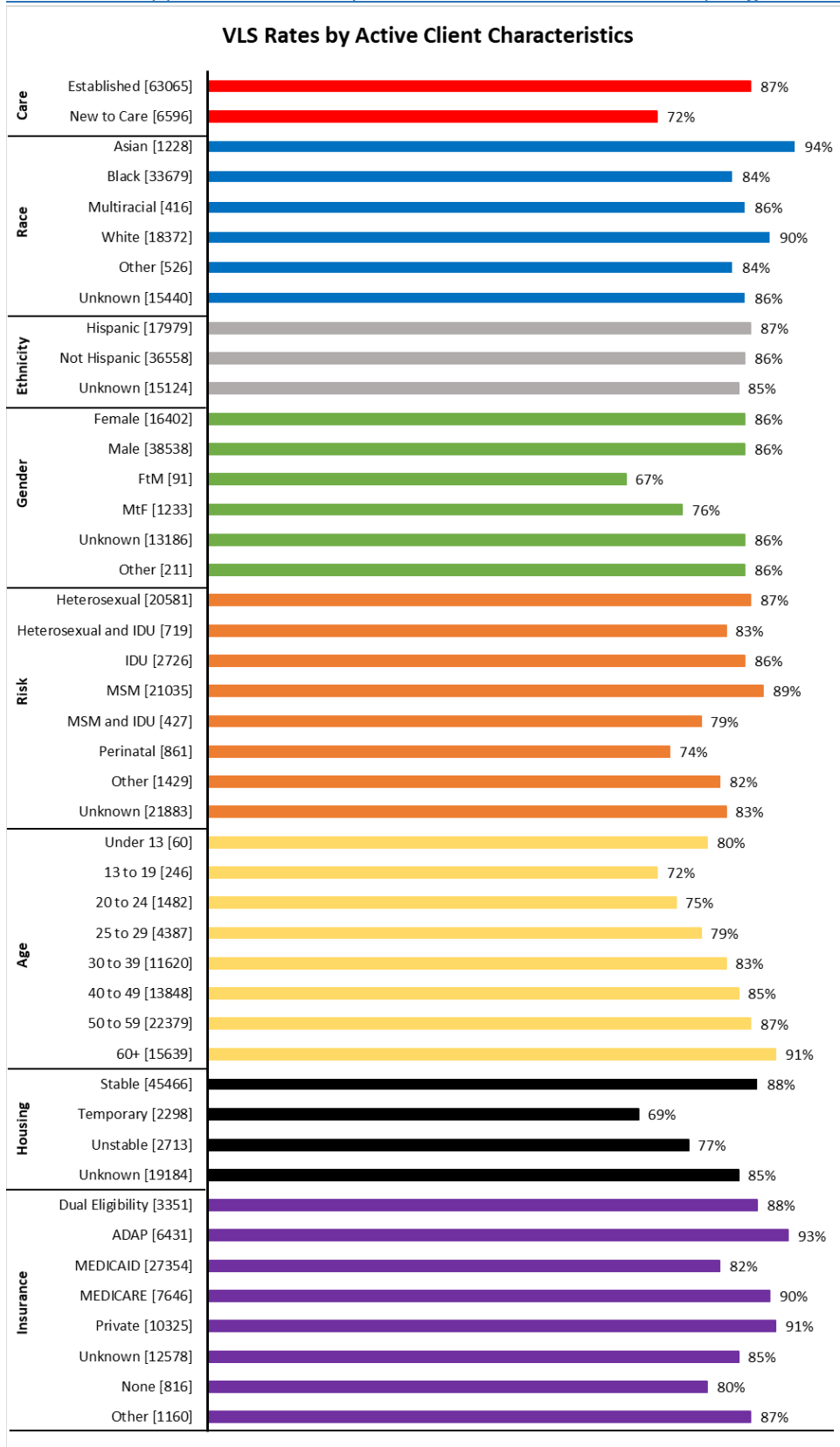


Viral Load Suppression among Previously Diagnosed Active and Inactive Patients

	Established Active Patients		Other New to Care Patients		Eligible Non-Enrolled Patients*	
	Documented Suppression	Not Suppressed or Unknown	Documented Suppression	Not Suppressed or Unknown	Documented Suppression	Not Suppressed or Unknown
On ART	62,023		6,237		10,188	
VL obtained	54,653 (88.1%)	6,296 (10.2%)	4,658 (77.7%)	1,250 (20.0%)	3,564 (35.0%)	950 (9.3%)
No known viral load		1,074 (1.7%)		329 (5.3%)		5,674 (55.7%)
Not on ART	1,037		356		1,358	
VL obtained	459 (44.3%)	307 (29.6%)	115 (32.3%)	141 (40.0%)	116 (8.5%)	194 (14.3%)
No known viral load		271 (26.1%)		100 (28.1%)		1,048 (77.2%)
ART Unknown	5		3		9,249	
VL obtained	0 (0.0%)	3 (60.0%)	0 (0.0%)	0 (0.0%)	626 (6.8%)	415 (4.5%)
No known viral load		2 (40.0%)		3 (100.0%)		8,208 (88.7%)

* Patients who died during the review period or were known to be in care elsewhere, relocated outside NYS or incarcerated as of the end of the review period were ineligible and are excluded.

Viral Load Suppression Rates by Active Patient Characteristics (Diagnosed Prior to 2018)



Viral Load Suppression Regression Analysis

To evaluate the variation in viral load suppression rates among previously diagnosed active patients, we conducted a hierarchical mixed-effects logistic regression analysis modeling the likelihood of being suppressed on final viral load. (As in the rest of this report, the relatively few active patients with no viral load at all in 2018 were treated as unsuppressed. See Appendix 2 for a more detailed discussion of logistic regression.) Beginning with a “null model,” where the only information included was where patients were treated and their outcomes, we confirmed the presence of significant facility effects at both the clinic (95% CI for standard deviation of intercept 0.375 = to 0.570) and organizational level (95% CI for standard deviation of intercept 0.398 = to 0.692).

We then developed an intermediate model that included (i) a set of normally distributed “random” factors, with patients nested within clinics that were in turn nested within organizations, (ii) patient-level “fixed effects” (i.e., influences on suppression rates independent of site of care) for the available patient-level factors (age, gender, exposure risk, race, Hispanic ethnicity, insurance status, housing status, and new v. established patient status), (iii) fixed effects at the clinic level (caseload and county SNAP rates), and (iv) interactive effects at the patient and clinic levels. In some cases, we simplified the original set of classes for a factor or transformed the data to improve model fit. For example, the full set of possible combinations of gender and risk was reduced to male patients with MSM risk, heterosexual women, and all other patients combined, and the effect of patient age was assessed using the squared difference from 20 years of age (the approximate nadir of suppression rates by age).

After optimizing this first intermediate model, we then allowed the magnitude of each of the random effects to vary between clinics and organizations (a “random slopes” model). Working with one effect at a time, we conducted analysis of variance (ANOVA) tests to determine which of the random-slope models differed significantly from the initial intermediate model. Significant variation was seen for the facility effects on suppression of age, gender/risk, housing status, and enrollment status (new v. established in care) but not for insurance status or race:

ANOVA: Initial Intermediate Model v. Random-Slopes Model	
“Random” Effect Allowed to Vary Between Clinics/Organizations	P Value (> Chi Sq.)
Age (Squared Difference from Age 20 Divided by 100)	1.45E-09
Enrollment Status (“Established” v. New to Care)	9.20E-05
Gender/Exposure Risk (Male MSM, Heterosexual Women, Other)	1.52E-03
Housing Status (Stable, Temporary, Unstable, Unknown)	< 2.2E-16
Insurance Status (ADAP, Dual-Eligible, Medicaid, Medicare, Private, Other Plan, None, Unknown)	0.3767
Race/Ethnicity (Asian, Black Hispanic, Black non-Hispanic or Unknown Ethnicity, White, All Other, Unknown)	0.9783

The model was iteratively reduced using likelihood ratio tests and analysis of variance with prior models, checking for improvement of adjusted model fit (AICC statistic). The final model, with the lowest AICC value, includes patient-level effects with overall p-value (Type II Wald chi-square test) well below conventional thresholds for significance. No fixed facility effects or interactive effects were retained in this model. P-values were also estimated for specific values of each variable using the Wald test. See Appendix 2 for a complete table of these results.

Type II Wald Tests of Fixed Effects on VLS for Final Model (3-level Hierarchical Logistic Regression Analysis)			
Fixed Effects Retained in Final Model	Chi-square	Deg. Freedom	Pr. > Chi-square
Age (Squared Difference from Age 20 Divided by 100)	190.777	1	< 2.2E-16
Enrollment Status ("Established" v. New to Care)	154.463	1	< 2.2E-16
Gender/Exposure Risk (Male MSM, Heterosexual Women, Other)	55.675	2	8.14E-13
Housing Status (Stable, Temporary, Unstable, Unknown)	67.827	3	1.25E-14
Insurance Status (ADAP, Dual-Eligible, Medicaid, Medicare, Private, Other Plan, None, Unknown)	368.350	7	< 2.2E-16
Race/Ethnicity (Asian, Black Hispanic, Black non-Hispanic or Unknown Ethnicity, White, Other, Unknown)	115.745	5	< 2.2E-16

Solutions for these fixed effects allow us to compare the relative odds of suppression for different patient groups at the same "typical" facility. For example, to look at the relative likelihood of previously diagnosed patients being suppressed, we can examine the effect of race/ethnicity and gender/risk:

Factor(s)	Levels	Regression Coefficient Estimate
Race/Ethnicity	Asian	0
	Black-Hispanic	-0.7178
	Black-Other	-0.7998
	White	-0.4806
	All Other Races	-0.6222
	Unknown	-0.6219
Gender/Risk	Female Heterosexual	0
	Male MSM	0.1598
	Other	-0.2772

The coefficient estimates can be added and the differences between the totals exponentiated to calculate relative odds of suppression. For example, the sum of the listed coefficients for a white cisgender MSM patient is $-0.4806 + 0.1598 = -0.3208$, and the sum of these coefficients for a non-Hispanic heterosexual Black woman is $-0.7178 + 0 = -0.7178$. Therefore, the odds of suppression (probability of being suppressed divided by probability not suppressed) for the white MSM patient are approximately 1.487 (i.e., $e^{(-0.3208 - (-0.7178))}$) times those of the Black heterosexual female patient in this case. Additional refinements in these calculations can be made using other factors such as age, diagnosis date, etc., and their interactions with these factors. A full table of the fixed-effects coefficient estimates is provided as an appendix to this report.

Of note, these odds ratios emphasize the relative risk of "failure" (lack of suppression) and can be more dramatic than the relative probabilities of success. For instance, the predicted probability of suppression

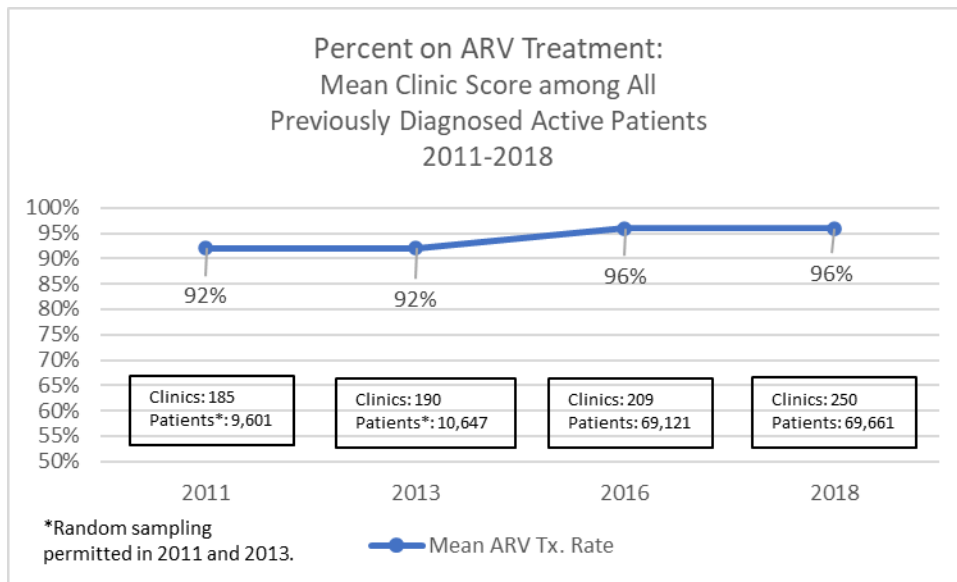
on final viral load for an unstably housed 28-year-old Asian patient with IDU exposure risk who was previously diagnosed but newly enrolled in care at the organization, on private insurance and receiving care at a “typical” clinic is approximately 77.2%, while the probability for a similar non-Hispanic Black patient is approximately 60.3%. This corresponds to an odds ratio of approximately $3.39/1.52 = 2.23$, compared to a suppression probability ratio of $0.772/0.603 = 1.28$.

We also used the estimates of the “random” effects to gauge the positive or negative influence of each site and its umbrella organization on outcomes. The results are presented as a heatmap in an appendix to this report.

Antiretroviral Therapy Usage

Assessment of antiretroviral therapy prescription rates has changed over the years as expectations have moved from treatment of those whose CD4 count had descended below a certain threshold, to universal treatment of HIV-infected patients. Data presented here have been rescored to include all previously diagnosed “active” patients (those enrolled in HIV ambulatory care). Data for 2014 are omitted as inclusion criteria differed among clinics and it is not possible to identify retrospectively “active” patients (those enrolled in HIV ambulatory care). No review was conducted for care provided in 2010, 2012, or 2015. In the review of care provided for 2017, participants were not asked to specify the clinic where patients who were previously diagnosed but new to the organization were treated.

Percentage of Previously Diagnosed Active Patients on ART 2011-2018 (Mean Clinic Rates)



Antiretroviral Therapy by Diagnosis Status

Antiretroviral Therapy: Percentage of patients with at least one ART drug prescribed at any time during the review period.

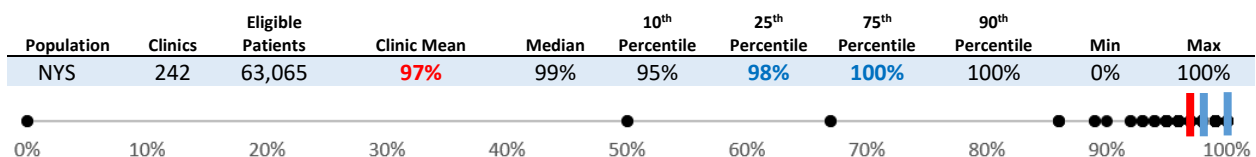
Exclusions: None

Previously Diagnosed Active Patients

Established Active Patients

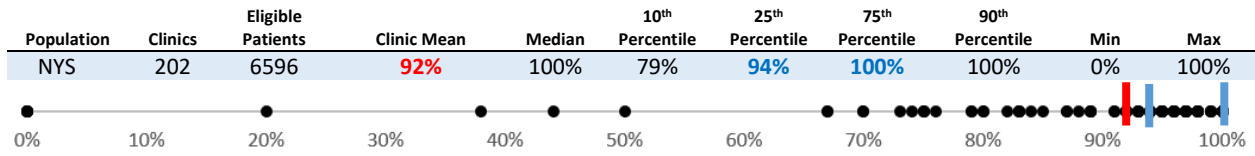
Mean 97%

Benchmarks on Dot Plots: Vertical bars mark the 25th percentile (blue), mean (red), and 75th percentile (red)



Other New to Care Patients

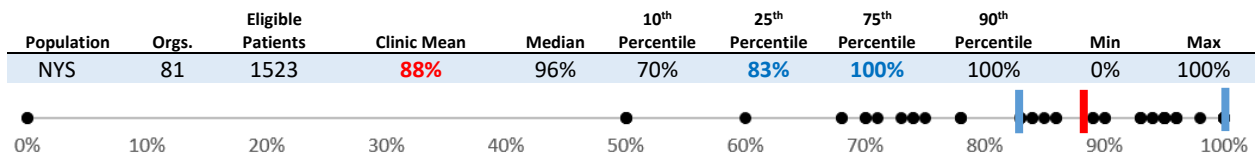
Mean 92%



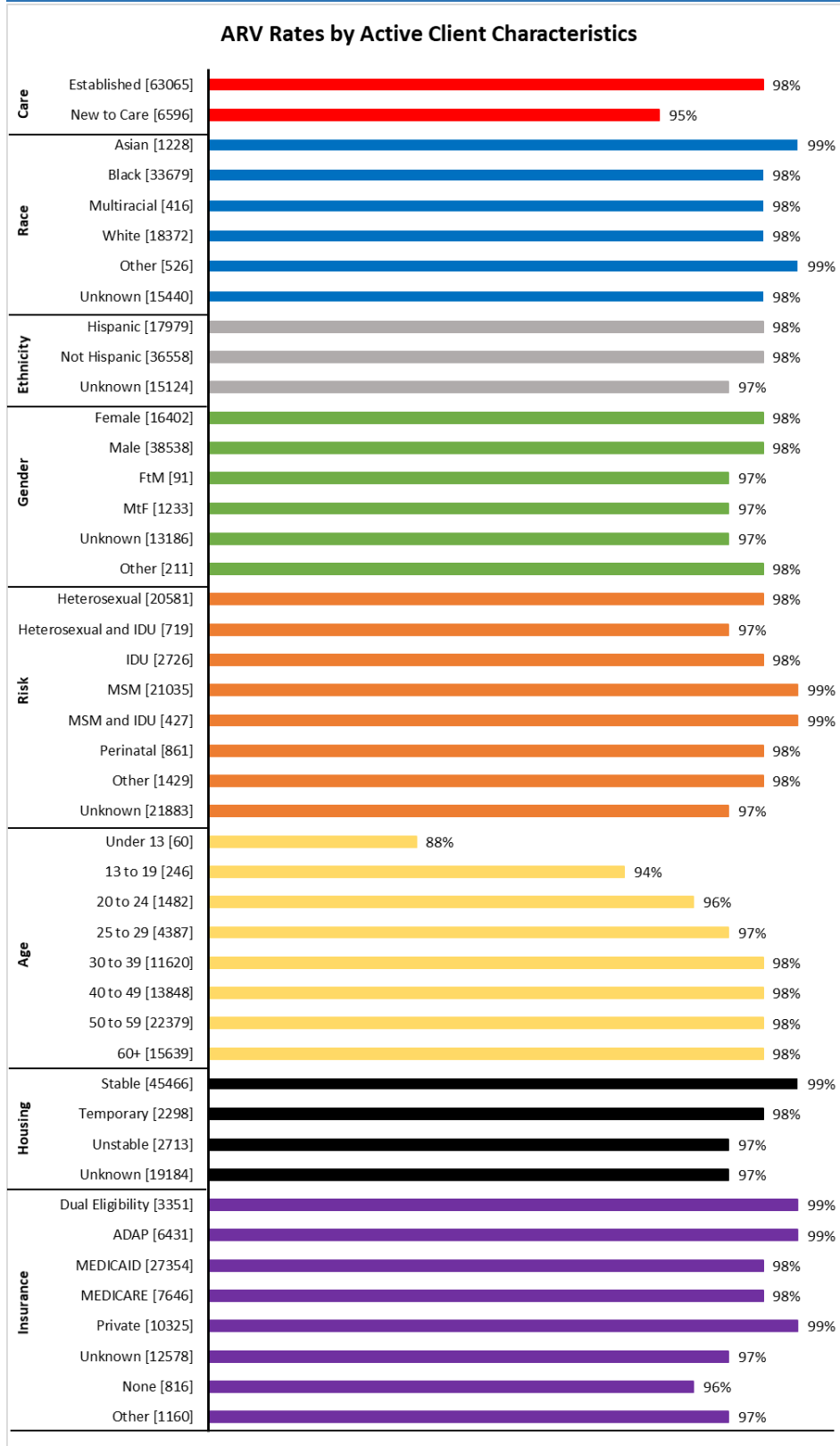
Newly Diagnosed Patients

Scoring of ARV prescription among newly diagnosed patients was conducted at the organization level as the indicator includes patients not known to be in HIV ambulatory care at a clinic within the organization.

Mean 88%



ART Rates by Active Patient Characteristics (Patients Diagnosed Prior to 2018)



Appendices

Appendix 1: Viral Load Suppression Heat Maps (Active Patients; Excluding Health+Hospitals Clinics)

All sites with approved 2018 submissions (except those within Health+Hospitals) are reported here if they had any active patients. We ranked these sites from best to worst in terms of absolute viral load suppression rates among active patients and then again by the each of the facility effects seen in the regression model described in the body of this report. We then bracketed each set of rankings into five performance levels, with half of the sites in the middle range (yellow) and smaller groupings of very high performing (green), high performing (yellow-green), low performing (light red) and very low performing (dark red) sites.

On the following page, we provide a key that shows how this color coding is used for these brackets throughout the maps. The following table provides the benchmark values for both unadjusted VLS and the regression factors. Of note, given the relatively high suppression rates in this population and a number of relatively small clinics, the 90th percentile and 100th percentile rates for unadjusted VLS are both 100%. (There are, in fact, 31 clinics with 100% VLS rates, representing 13.3% of all clinics in this analysis, and all of these are assigned the “very high performing” color for unadjusted VLS.) By incorporating additional information about the patients, some distinctions at the higher end of performance may be seen, but caution should still be taken in interpreting the results for small clinics. Accordingly, those with caseloads of fewer than 25 patients have “***” appended to their clinic name to draw attention to their relatively small patient population. When the caseload is under 10 patients the exact number is suppressed to protect against the possibility of patient identification.

By exponentiating the difference between the various regression factor benchmarks, we can calculate various adjusted odds ratios. For instance, everything else being equal, the odds of an unstably housed patient being suppressed at a clinic that falls at the 75th percentile for performance in suppression particular to these patients are 1.22 times the odds for the same patient seen at a clinic falling at the 25th percentile for this factor. When we compare the odds for these patients seen at the 90th and 10th percentile clinics, the odds ratio increases to 1.67.

As described in the body of the report and Appendix 2, these factors can be combined. For the odds ratios, this involves multiplying those for different factors. In particular, we can combine the “all patients” factors (those that are not specific to, for instance, unstable housing or being new to care) through multiplication to get an overall estimate of the odds of a suppression for a patient at a higher performing v. lower performing clinic. As reported in the table on the next page, if there had been 100% correlation between the all-patients factors, the relative odds for a patient seen at a hypothetical 75th percentile clinic versus one seen at a 25th percentile clinic would have been 1.56, and when comparing a 90th percentile clinic to a 10th percentile one the relative odds would have increased to 2.97. However, since clinics scored better for some of these factors than others, the observed odds ratios for the combined effects are lower: 1.36 and 1.90, respectively. See Appendix 2 for additional details.

The tables on the subsequent pages list all organizations included in the regression analysis. For each, their clinics with previously diagnosed active patients are listed with the number of these patients seen at each clinic in parentheses. As described above, their performance is then reported using color coded cells for the unadjusted suppression rate at each clinic and the “random effects” regression estimates for all patients (intercepts) and specific subpopulations (slopes).

Key	
Percentile Range and Corresponding Color	
0th percentile <= Clinic X < 10th percentile	Red
10th percentile <= Clinic X < 25th percentile	Red
25th percentile <= Clinic X < 75th percentile	Yellow
75th percentile <= Clinic X < 90th percentile	Light Green
90th percentile <= Clinic X < 100th percentile	Green

Unadjusted VLS Rate (% Suppr. Final VL)	Regression Model Random Effect Coefficients: Sum of Clinic- and Organizational-Level Values										
	Housing				Gender/Risk			Enrollment Status		Age	
	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients	(Age-20) ² / 100
53.4	-0.087	-0.158	-0.508	-0.182	-0.106	-0.128	-0.136	-0.135	-0.213	-0.217	-0.016
75.0	-0.034	-0.064	-0.187	-0.071	-0.042	-0.058	-0.063	-0.045	-0.082	-0.095	-0.008
91.9	0.041	0.105	0.160	0.130	0.050	0.043	0.076	0.054	0.069	0.086	0.006
100.0	0.110	0.209	0.368	0.334	0.096	0.140	0.128	0.141	0.205	0.199	0.014
100.0	0.418	0.534	1.525	0.671	0.238	0.645	0.284	0.294	0.917	0.367	0.031

Adjusted Odds Ratios	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients	(Age-20) ² / 100	Combined All-Patients Effects (If Correlated)	Combined All-Patients Effects (Observed)
75th Pct. / 25th Pct.	1.08	1.18	1.42	1.22	1.10	1.11	1.15	1.10	1.16	1.20	1.01	1.56	1.36
90th Pct. / 10th Pct.	1.22	1.44	2.40	1.67	1.22	1.31	1.30	1.32	1.52	1.52	1.03	2.97	1.90

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
Acacia Network	Casa Maria Community Health Center (161)											
	Claremont Family Health Care Center (78)											
	Clay Avenue Family Health Care Center (93)											
	La Casa de Salud (61)											
	Park Avenue Family Health Care Center (<10)**											
	Ramon Valez Health Center (16)**											
Albany Medical Center	Department of Medicine - Washington Avenue											
	Department of Medicine/HIV - Clara Barton (1329)											
	Department of Medicine/Infectious Diseases											
	Department of Pediatrics (29)											
Apicha Community Health Center	Apicha Community Health Center (884)											
Arnot Health	Ivy/HIV Care Clinic-Elmira (149)											
	Ivy/HIV Care Clinic-Ithaca (53)											
Bedford Stuyvesant Family Health Center, Inc.	Bedford Stuyvesant Family Health Center (236)											
	Broadway Family Health Center (18)**											
Betances Health Center	Betances Health Center - Henry Street (453)											
Brightpoint Health	Bay Street Health Center (67)											
	Boom! Health (58)											
	Church Avenue Health Center (107)											
	Inwood Health Center (677)											
	Sidney R. Baer, Jr Health Ctr. A28 (<10)**											
	Sterling Health Center (361)											
	Sutphin Health Center (310)											
The HUB Health Center (167)												
BronxCare Health System - Department of Family Medicine	Crotona Park (<10)**											
	Dr. Martin Luther King, Jr. Health Center (18)**											
	Fulton Family Health Center (58)											
	Mid-Bronx Desperadoes (<10)**											
	MLK Wellness Clinic (154)											
Brookdale University Hospital Medical Center	Brookdale University Hospital and Medical Center											
Brooklyn Plaza Medical Center, Inc.	Brooklyn Plaza Medical Center, Inc. (218)											
	Whitman Ingersoll Farragut Health Center (25)											
Brownsville Community Development Corporation	BMS @ Genesis (<10)**											
	BMS Institute @ Bristol (342)											
	BMS Life & Wellness @ Ashford (<10)**											
	BMS Main (17)**											
Care for the Homeless	Susan's Place Health Center (35)											
Center for Comprehensive Health Practice	Center for Comprehensive Health Practice (44)											

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
Community Health Project, Inc.	Callen-Lorde Bronx (381)											
	Callen-Lorde Community Health Center (3291)											
	Health Outreach to Teens (HOTT) (51)											
Cornerstone Family Healthcare	Binghamton (<10)**											
	Center for Recovery (<10)**											
	Harper Health for Individuals and Family (<10)**											
	Highland Falls (25)											
	Kaplan Family Pavilion (142)											
	Middletown- Benton Avenue (73)											
	New Windsor (<10)**											
	Port Jervis Family Medicine (<10)**											
Crystal Run Healthcare	Goshen - 7 Hatfield Lane (<10)**											
	Middletown - 100 Crystal Run Road (<10)**											
	Middletown - 155 Crystal Run Rd. (92)											
	Monroe (<10)**											
	Newburgh (16)**											
	Rock Hill (27)											
	Warwick - 75 Ronald Reagan Blvd. (<10)**											
	West Nyack (12)**											
Damian Family Care Centers	121st Street Family Health Center (<10)**											
	Damian Family Health Center (27)											
	Ellenville Health Center (<10)**											
	Firehouse Health Center (98)											
	Long Island City Family Health Center (<10)**											
	Ralph Avenue Family Health Center (<10)**											
	Rhinebeck Family Health Center (19)**											
	Ronkonkoma Family Health Center (<10)**											
	Starhill Health Center (46)											
	Third Avenue Family Health Center (424)											
	Wards Island Family Health Center (<10)**											
East Harlem Council for Human Services, Inc.	Boriken Neighborhood Health Center (176)											
Ellis Medicine	Ellis Infectious Disease (74)											
	Ellis Primary Care Plus (<10)**											
	Ellis Primary Care/ Family Medicine Residency (98)											
Erie County Medical Center	Erie County Medical Center (733)											
Harlem United	The Nest Community Health Center (551)											
	Willis Green Jr. Health Center (83)											

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
Housing Works	37th Street Health Center (63)											
	Downtown Brooklyn Health Center (556)											
	East New York Community Health Center (446)											
	Keith D. Cylar Community Health Center (311)											
HRHCare Community Health	Elsie Owens Health Center at Coram (20)**											
	Family Partnership Health Center at Poughkeepsie											
	Health Center at Beacon (108)											
	Health Center at Brentwood (182)											
	Health Center at Monticello (100)											
	Health Center at Riverhead (27)											
	Health Center at Spring Valley (110)											
	HRHCare Patchogue (70)											
	Maxine S. Postal Tri-Community Health Center (70)											
	MLK Health Center at Wyandach (117)											
	Shellabarger Health Center at Shirley (55)											
	The Jeannette J. Phillips Health Center (70)											
	Hudson Headwaters Health Network	Health Center on Broad Street (Glens Falls) (76)										
West Mountain Health Services- Bldg 1 (54)												
Institute for Family Health	All Forney Center (11)**											
	All Angels Church (<10)**											
	Amsterdam Family Health Center (<10)**											
	Broadway Presbyterian Church (<10)**											
	Cadman Family Health Center (22)**											
	Family Health Center of Harlem (427)											
	Family Practice Center of Hyde Park (<10)**											
	Mt. Hope Family Practice (<10)**											
	Nathaniel Clinic (<10)**											
	New Paltz Family Health Center (<10)**											
	Sidney Hillman/Phillips Family Practice (<10)**											
	Stevenson Family Health Center (18)**											
	The Institute for Family Health at 17th Street (349)											
	Urban Horizons Family Health Center (211)											
Valley Lodge (<10)**												
Interfaith Medical Center	Primary Care Designated AIDS Treatment Center											
Jamaica Hospital Medical Center	Ambulatory Care Center (35)											
	Morton Safran Family Medicine Center (<10)**											
Jordan Health	Anthony L. Jordan Health Center (157)											
	Brown Square Center (<10)**											
	Jordan Health at CCIA (<10)**											
	Woodward Health Center (53)											

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
Joseph P. Addabbo Family Health Center	Addabbo Family Health Center - Arverne (180)											
	Addabbo Family Health Center - Brooklyn (61)											
	Addabbo Family Health Center - Jamaica (199)											
Kingsbrook Jewish Medical Center	Pierre Toussaint Family Health Center (369)											
Maimonides Medical Center	Life Forward Program (197)											
Medalliance Medical Health Services	Fordham Location (104)											
	South Bronx Location (89)											
Mohawk Valley Health System	Sister Rose Vincent Family Medical Center (224)											
Montefiore Health System	Adolescent ADS Program (84)											
	Castle Hill Family Practice (22)**											
	Center for Positive Living/Infectious Diseases											
	Comprehensive Family Care Center (158)											
	Comprehensive Health Care Center (292)											
	Department of Pediatrics (109)											
	Marble Hill Family Practice (11)**											
	Montefiore Family Health Center (192)											
	South Bronx Center for Child. & Fam. (118)											
	University Avenue Family Practice (24)**											
	Wellness Center at Melrose (61)											
	Wellness Center at Port Morris (64)											
	Wellness Center at Waters Place (63)											
	West Farms Family Practice (32)											
Williamsbridge Family Practice (37)												
Montefiore Mount Vernon Hospital	Montefiore Mount Vernon Hospital (145)											
Morris Heights Health Center	Bronx Medical and Wellness Center (<10)**											
	MHHC at 137th Street (17)**											
	MHHC at 85 West Burnside Avenue (285)											
	MHHC at Melrose (11)**											
	MHHC at Walton Avenue (98)											
Mount Sinai Health System	Adolescent Health Center (74)											
	Comprehensive Health Center (3483)											
	FPA - Beth Israel (966)											
	FPA - Brooklyn (137)											
	FPA - Mount Sinai Hospital (992)											
	Jack Martin (1802)											
	Morningside (1360)											
	Peter Krueger (1149)											
	Samuels (1600)											
Mount Vernon Neighborhood Health Center Network	Mount Vernon Neighborhood Health Center (100)											
NewYork-Presbyterian - Brooklyn	Infectious Diseases Division (196)											

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
NewYork-Presbyterian - East	Center for Special Studies - Glenn Bernbaum (1426)											
	Jewish Peabody Wellness Ctr. - David Rogers (1430)											
	Lower Manhattan Infectious Diseases (36)											
NewYork-Presbyterian - Queens	Special Care Center (616)											
NewYork-Presbyterian - West	Comprehensive Health Program (1822)											
	Project STAY - Vanderbilt Clinic (211)											
Northwell Health - CART	Ctr. for AIDS Research and Treatment (CART) (2108)											
Northwell Health - CYAAPH	Ctr. for Young Adults, Adol. & Pediatric HIV (99)											
Northwell Health - Lenox Hill	Retroviral Disease Center (453)											
Northwell Health - SIUH	Canarsie Multi Service Center (10)**											
	Coney Island Multi Service Center (20)**											
	Stapleton Clinic (51)											
	Staten Island University Hospital-South (227)											
NuHealth	Designated AIDS Center (478)											
	Roosevelt/Freepport Family Center (119)											
NYU Langone Health - FHC	Community Medicine Program (57)											
	Family Physician Family Health Center (<10)**											
	Flatbush Family Health Center (82)											
	Park Ridge Family Health Center (<10)**											
	Park Slope Family Health Center (<10)**											
	Seventh Avenue Family Health Center (<10)**											
	Sunset Park Family Health Center (32)											
Sunset Terrace Family Health Center (391)												
Open Door Family Medical Centers and Foundation	Open Door Port Chester (72)											
	Open Door Sleepy Hollow (<10)**											
	Ossining Open Door (58)											
Project Renewal	Third Street Men's Shelter (30)											
Richmond University Medical Center	Richmond University Medical Ctr. ID/HIV Clinic (71)											
Rochester Regional Health	Unity at Brockport (<10)**											
	Unity Campus (21)**											
	Unity St. Mary's Campus (146)											
Ryan Network	Ryan/Adair Community Health Center (12)**											
	Ryan/Chelsea Clinton Community Health Ctr. (290)											
	Ryan/Fredrick Douglass Community Health Ctr.											
	Ryan-NENA Community Health Center (158)											
	William F. Ryan Community Health Center (414)											
Samaritan Health Systems	Infectious Disease Clinic (121)											
Settlement Health	Internal Medicine (75)											
St. John's Riverside Hospital	HOPE Center (333)											

Organization	Clinics and Number of Eligible Patients	Unadjusted VLS	Housing			Gender/Risk			Enrollment Status		Age	
		All Patients	All Patients	Temp. Housing	Unknown Housing	Unstable Housing	All Patients	Male MSM	Not Heterosexual Female or Male MSM	All Patients	Other New to Care	All Patients
START Treatment and Recovery Centers	Bushwick (<10)**	Green	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Fort Greene (<10)**	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow
	Highbridge (<10)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Kaleidoscope (<10)**	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Starting Point (<10)**	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Third Horizon (<10)**	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Stony Brook Medicine	Adol. & Young Adult HIV Care and Prev. Ctr. (19)**	Yellow	Yellow	Red	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green
	Designated AIDS Center (672)	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green
	Rose Walton Care Services at David E. Rogers (186)	Green	Yellow	Red	Yellow	Red	Yellow	Yellow	Green	Red	Green	Yellow
SUNY Downstate Medical Center	HEAT Program (98)	Red	Red	Yellow	Yellow	Yellow	Yellow	Red	Green	Yellow	Yellow	Green
	STAR Program (1227)	Yellow	Yellow	Yellow	Green	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green
SUNY Upstate Medical University	Immune Health Services (899)	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Red	Yellow	Green
	Pediatric Designated HIV Ctr./Adol./YA (23)**	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green
Syracuse Community Health Center, Inc.	Main Office (Salina Street) (26)	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Green
The Brooklyn Hospital Center	Church Avenue Family Health Center (369)	Yellow	Red	Yellow	Green	Yellow	Red	Yellow	Green	Red	Yellow	Yellow
	The Brooklyn Hospital Center- Main Campus (981)	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green
The Evergreen Association	Evergreen Health Services (1400)	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow
Trillium Health	Trillium Health (762)	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Green	Yellow
UHS	UHS Primary Care - Binghamton (301)	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Red	Yellow	Yellow	Yellow
	UHS Primary Care - Candor (<10)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	UHS Primary Care - Deposit (<10)**	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	UHS Primary Care - Johnson City (<10)**	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	UHS Primary Care - Sherburne (<10)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	UHS Primary Care - Upper Front St (37)	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	UHS Primary Care - Vestal (14)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow
	UHS Walk-In - Endicott (<10)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
University of Rochester Medical Center	AIDS Center (1133)	Green	Yellow	Red	Green	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green
	Infectious Disease (<10)**	Green	Yellow	Yellow	Green	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green
Urban Health Plan	Bella Vista Health Center (46)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	CitiCARES Community Health Center (54)	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red
	El Nuevo San Juan (190)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Plaza Del Sol Family Health Center (13)**	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
VIP Community Services	VIP Community Services (78)	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red
West Midtown Medical Group	West Midtown Medical Group (36)	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Westchester Medical Center Health Network	AIDS Care Center Primary Care - Adult (317)	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green
	AIDS Care Center Primary Care - Ped. and Adol.	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green
Whitney Young Health	Albany Health Center (191)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Troy Health Center (<10)**	Green	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Wyckoff Heights Medical Center	Positive Health Management Program (637)	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Red

Appendix 2: Viral Load Suppression Logistic Regression Parameter Estimates

Logistic regression estimates the natural log of the odds of an occurrence in terms of an intercept value and parameter estimates for various factors that may affect the likelihood of that occurrence. Mixed-effects models used in this report also include a normally distributed set of “random” effects for the group in which each of the occurrences did or did not occur. In this case, we analyzed the likelihood of suppression on final viral load for each patient, considering both the clinic where the patient was treated and the medical organization managing that clinic.

The odds of viral load suppression for a patient seen at a “typical” facility (i.e. where the “random” effects for that facility at the clinic and organization level sum to zero) can be calculated from this equation, where both sides of the initial regression equation have been exponentiated: $Odds = e^{(\alpha + B_1 + B_2 + \dots + B_N)}$, where α is the intercept estimate listed below in the table of fixed effects and the various Bs are all of the parameter estimates that apply based on the patient’s age, housing status, insurance status, etc., as well as any interactive effects between these factors.

The odds of suppression are also defined as the probability of suppression divided by the probability that the patient was not suppressed (i.e., $1 - \text{probability of suppression}$), and algebraic rearrangement yields the following equation for the probability of suppression: $\text{probability} = \text{odds} / (\text{odds} + 1)$.

Using these two equations allows for estimation of the probability of suppression for any patient seen at a typical facility. Of note, however, the sum of the clinic and organization-level “random” effects that apply to all patients ranged from approximately -1.0904 to 0.9244. Adding these to the original intercept and fixed-effects regression parameters is equivalent to multiplying the odds of suppression by $e^{-0.8963}$ or $e^{0.8869}$, respectively. Therefore, the odds for suppression for the “default” patient (Asian, stably housed, heterosexual female, ADAP coverage, established in care, and 20 years old) at a typical facility are approximately 3.1 times those at the lowest performing site, and the odds at the highest performing site are about 2.4 times those of a typical facility. The first table below calculates these effects for various benchmarks within the distribution of combined clinic and organization effects.

A full analysis of the facility effects is complicated by the significant differences seen in the influence of age, sex/risk, housing status and enrollment status among the clinics under review. The second table below reports benchmarks for these effects. Results for individual clinics are presented in a heat map in Appendix 1.

Random Effect Parameter Benchmarks: Combined Site and Organizational “All Patients” Effects

Key Finding: The odds of suppression depended significantly on where patients were treated in 2018.

Benchmark	Combined Parameter Estimate	Odds Relative to Typical (Median) Site
Minimum	-1.0904	0.3228
10 th Percentile	-0.3696	0.6637
25 th Percentile	-0.1800	0.8022
75 th Percentile	0.1693	1.1376
90 th Percentile	0.3270	1.3319
Maximum	0.9244	2.4205

[Random Effect Parameter Benchmarks: Other Combined Site and Organizational Effects](#)

Key Finding: Some clinics did significantly better than others in mitigating the effects of housing status, gender/risk category, enrollment status, and patient age on the odds of viral load suppression.

Benchmark	Odds of Suppression on Final VL Relative to Median Clinic						
	Temporary Housing	Unknown Housing Status	Unstable Housing	Male MSM	Not MSM or Hetero. Female	New to Care	(Age – 20) ² / 100
Minimum	0.6223	0.09157	0.5776	0.7744	0.5472	0.6431	0.9660
10 th Pct.	0.84765	0.5998	0.8271	0.8875	0.8563	0.8110	0.9830
25 th Pct.	0.9316	0.8266	0.9241	0.9519	0.9212	0.9245	0.9913
75 th Pct.	1.1032	1.1698	1.1297	1.0531	1.0586	1.0754	1.0049
90 th Pct.	1.2234	1.4398	1.3850	1.1597	1.1149	1.2316	1.0134
Maximum	1.6948	4.5792	1.9415	1.9224	1.3038	2.5108	1.0311

[Solutions for Fixed-Effects Parameter Estimates in Viral Load Suppression Regression Model](#)

Key Finding: Significantly lower odds of suppression were seen for newly enrolled patients, younger patients, patients insecurely housed, and patients covered through Medicaid or Medicare or without any known insurance. Asian patients had significantly higher suppression odds than other patients. No significant interactive effects or fixed facility-level effects were included in the final model.

Effect	Enrollment Status	Race/Ethnicity	Risk/Gender	Housing	Insurance	Estimate	Prob. > z
Intercept	-	-	-	-	-	2.84574	< 2.00E-16
(Age – 20) ² / 100	-	-	-	-	-	0.04546	< 2.00E-16
Enrollment Status	Established	-	-	-	-	0.00000	-
Enrollment Status	New to Care	-	-	-	-	-0.65442	< 2.00E-16
Race/Ethnicity	-	Asian	-	-	-	0.00000	-
Race/Ethnicity	-	Black-Hispanic	-	-	-	-0.71783	1.48E-06
Race/Ethnicity	-	Black-Non Hisp./Missing	-	-	-	-0.79983	9.79E-09
Race/Ethnicity	-	All Other Races	-	-	-	-0.62222	2.51E-04
Race/Ethnicity	-	Unknown Race	-	-	-	-0.62194	1.09E-05
Race/Ethnicity	-	White	-	-	-	-0.48062	6.27E-04
Risk/Gender	-	-	Heterosexual Female	-	-	0.00000	-
Risk/Gender	-	-	MSM Male	-	-	0.15982	5.48E-03
Risk/Gender	-	-	Other Risk/Gender	-	-	-0.27236	2.37E-08
Housing	-	-	-	Stable	-	0.00000	-

Housing	-	-	-	Temporary	-	-0.53752	1.31E-09
Housing	-	-	-	Unknown Housing	-	-0.43372	2.61E-03
Housing	-	-	-	Unstable	-	-0.6089	1.50E-11
Insurance	-	-	-	-	ADAP	0.00000	-
Insurance	-	-	-	-	Dual Eligible	-0.60824	3.25E-14
Insurance	-	-	-	-	Medicaid	-0.73341	< 2.00E-16
Insurance	-	-	-	-	Medicare	-0.51759	8.63E-15
Insurance	-	-	-	-	No Insurance	-0.82925	5.47E-15
Insurance	-	-	-	-	Other Insurance	-0.59625	1.27E-07
Insurance	-	-	-	-	Private/Commercial	-0.11934	6.01E-02
Insurance	-	-	-	-	Unknown Insurance	-1.41431	< 2.00E-16