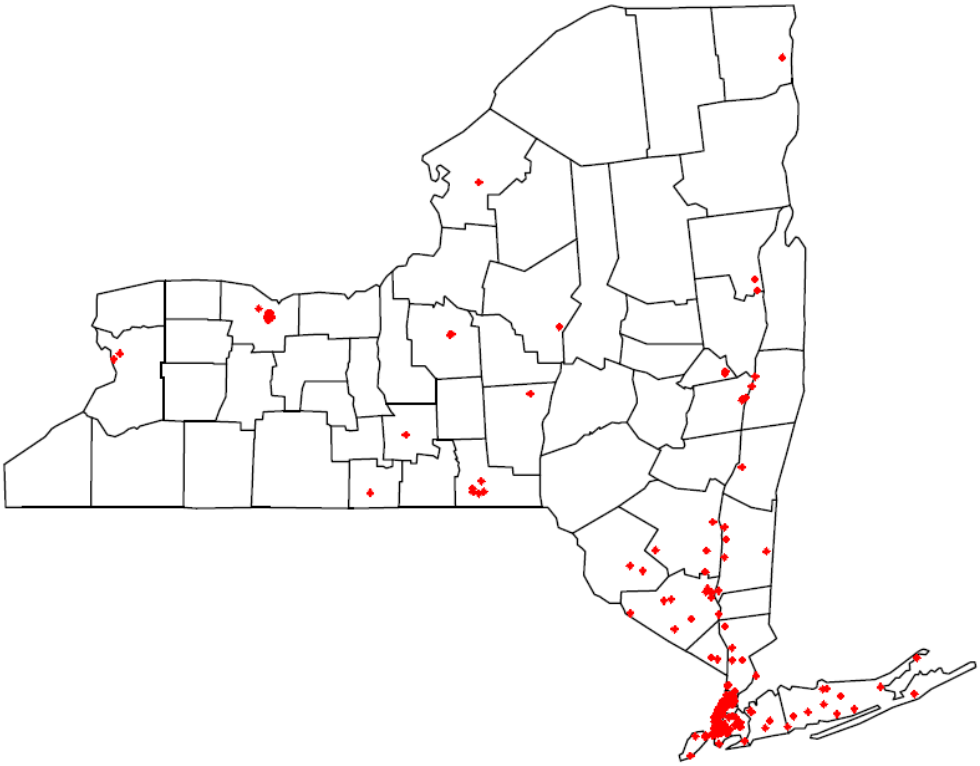
New York State
HIV Quality of Care Program

Annual Data Report
Based on 2019 Performance Data



238 clinics submitted approved data for care provided in 2019. Each ✸ represents one clinic.

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Report prepared by:

Christopher Wells, Data Analyst

AIDS Institute, Office of the Medical Director

New York State Department of Health

90 Church Street, 13th Floor

New York, NY 10007

Christopher.Wells@health.ny.gov

With the assistance of Tory Brock and Nicole Fera, NYS HIV Quality of Care Program Assistants

NYS HIV Quality of Care Program Leads

Charles Gonzalez, M.D.

Medical Director, AIDS Institute/OMD

New York State Department of Health

Daniel Belanger

Director, HIV Quality of Care Program

NYSDOH/AIDS Institute

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Background

The New York State Department of Health (NYSDOH) AIDS Institute's HIV Quality of Care (QOC) Program, overseen by the Office of the Medical Director (OMD), promotes capacity building in HIV quality management programs throughout New York State (NYS) to enhance the quality of clinical care and supportive services delivered to people with HIV in NYS. Major activities of the QOC 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 QOC Program is committed to ensuring that patients who are in care receive the best care to achieve desired outcomes of good health and viral load 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.

Despite the considerable challenges posed by the Covid-19 epidemic, the QOC Program was able to solicit the participation of most organizations that provide medical care to PLWH in New York State (NYS) in a full review of care provided in 2019 using an Excel template similar to that used for the previous review (of 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 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), a section for conducting tests of statistical significance, 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 96 publicly funded medical organizations, including community health centers, drug treatment centers and hospitals, that provided clinical care to HIV-infected individuals in 2019. When we closed this review on December 1, 2020 (extra time having been allotted due to the Covid-19 pandemic), submissions for 82 of these organizations, encompassing 238 individual medical clinics, had been completed and approved. 65 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 (11 hospitals and 6 diagnostic and treatment centers). The remaining 14 targeted organizations either failed to submit data or submitted data that were deemed unusable. These include:

- BronxCare Health System – Department of Family Medicine
- BronxCare Health System – Designated AIDS Center
- Brooklyn Plaza Medical Center, Inc.
- Brownsville Community Development Corporation
- Center for Comprehensive Health Practice
- East Harlem Council for Human Services, Inc. - Boriken CHC
- Heritage Health and Housing
- Kaleida Health
- Medalliance Medical Health Services
- Montefiore Mount Vernon Hospital

- Richmond University Medical Center
- Ryan Network
- St. Joseph's Health
- START Treatment and Recovery Centers

While the template used for care provided in 2019 was very similar to that used previously, a few important changes were made:

1) We clarified our definition of HIV diagnosis date, matching that on hivguidlines.org.
2) We added a simple yes/no indicator for assessment of baseline resistance testing among newly diagnosed patients, restricting this to those who were enrolled in HIV care at the reporting organization.
3) We modified our approach to assessing date of linkage to care, eliminating the distinction between patients diagnosed as inpatients and on an ambulatory basis and instead accepting as linkage date the first HIV ambulatory care visit date or first ARV prescription date, whichever came first.
4) We added a field for the ZIP Code of each patient's last known address. Participants could use this to analyze their own results geographically, and we have used this information in several places within this report.
5) To facilitate the AIDS Institute's promotion of attention to health equity, we added an additional spreadsheet with three tools to facilitate the identification of subpopulations with significantly lower "scores" for key indicators (ARV prescription, viral load testing, and viral load suppression):
    a. A "scratch pad" section where participants could perform ad hoc analyses.
    b. A chi-square test tool to check for significant variation between one group and the remaining eligible patients.
    c. A logistic regression tool that allowed for variable inclusion of multiple possible factors (age, gender, race, etc.) at the same time.

Eligibility Criteria

All HIV-positive patients (diagnosed prior to 12/31/2019) who were seen at the organization in 2019 for medical care or medically supportive social services 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 as described in following sections. See the first appendix for a complete discussion of our reporting conventions and a glossary of terms.

Submission Process

For the review of care provided in 2019, the NYS DOH Quality of Care Program modified a previous 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) Generation of a patient-level scored data report
7) Generation of a pivot-table report
8) Data analysis using chi-square tests and automated logistic regression (new for 2019)

The template also stored the following written statements:

1) Methodology

2) Key findings
3) Planned QI projects
4) 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 for the 17 Health + Hospitals clinics were submitted separately in a single master file and then processed and scored by the OMD data analyst with input from Eunice Casey of Health + Hospitals. These data were accepted with the understanding of some limitations:

1) No distinction could be made within the previously diagnosed caseload between patients established in care and those new to care or returning after an absence of two or more years.
2) Lack of clarity around date of initial diagnosis, date of first HIV care appointment, and date of first ARV prescription precluded scoring of linkage to care and timely testing and suppression of newly diagnosed patients.
3) Only sexual exposure risk data were available (not perinatal infections or IDU history).

Twenty four patients were excluded entirely from the Health + Hospitals data: 22 who were not affiliated with a particular medical center within their network and 2 who had ambiguous data regarding diagnosis during or prior to 2019.

Data Review and Acceptance Process

The QOC 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 QOC 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 December 1, 2020, 65 submissions (besides the data for Health + Hospitals) had passed the automated checks and been accepted for overall integrity and completeness. The submission from Richmond University Medical Center was deemed unusable due to uncorrected problems, and the OMD never received submissions from the remaining 13 organizations (see previous list).

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Summary and Key Findings

Summary

Indicator Trends

Compared to 2018, we saw a modest increase in the mean clinic suppression rate on final viral load for previously diagnosed patients enrolled in care in 2019, from 80% to 81%. The NYS suppression rate among all of these patients in aggregate was approximately 86%, and the average rate by ZIP Code in those with at least 10 patients was approximately 91%. These results indicate that suppression failure is more common among relatively small clinics and within more populous ZIP Codes. However, clinic size itself does not appear to be a cause of suppression failure in this population; rather, it is associated with patient-level factors as well as other clinic-level variation. A full analysis is provided in an appendix.

Indicator scores for newly diagnosed patients improved more substantially from 2018 to 2019. The average organization rate for linkage to care within 3 days increased from 43% to 52%, and the average organization rate for suppression within 91 days increased from 44% to 49%. Introduction of an indicator for baseline resistance testing among newly diagnosed patients enrolled in care revealed considerable variation in rates (mean = 70%; 25th percentile = 50%; 75th percentile = 100%).

Key Findings from Viral Load Suppression Regression Analysis

- Newly enrolled patients, younger patients, Black patients, patients in temporary housing, patients covered though Medicaid or Medicare or without any known insurance, and transgender patients with a history of injecting drugs were less likely than other previously diagnosed patients to be suppressed on final viral load. See the table on page 6 for some examples of this variation.
- Patients living in ZIP Codes with higher percentages of residents reporting adjusted gross income of under $25,000 were less likely to be suppressed on final viral load while the ZIP Code of the facility where they received care was not a significant predictor of suppression.
- After taking these patient-level factors into account, the likelihood of suppression still depended significantly on where patients were treated in 2019, both at the organizational and clinic level.

2019 Indicator Benchmarks

Benchmarks for all of the formal indicators are provided here with the numerator and denominator definitions for each indicator. Indicators that applied only to "active patients" (see glossary in Appendix 1) were scored at the clinic level while those that also included inactive patients were scored at the organizational level.

Indicator	Numerator	Denominator	Scoring Level	Eligible Pts.	Avg.	25th Pct.	Med.	75th Pct.
ARV Therapy – Open Pts.*	Patients with documented ARV prescription in 2019.	All previously diagnosed non-excusable patients who were not new to HIV care at the reporting organization in 2019 (combines "established active" patients and those seen exclusively outside the HIV clinic).**	Org.	71,694	88%	83%	96%	98%
VL Testing – Open Pts.*	Patients with documented VL test in 2019.	All previously diagnosed non-excusable patients who were not new to HIV care at the reporting organization in 2019 (combines "established active" patients and those seen exclusively outside the HIV clinic).**	Org.	71,694	85%	82%	93%	97%
VL Suppression – Open Pts.*	Tested patients whose final VL in 2019 was < 200 copies/mL.	All previously diagnosed non-excusable patients who were not new to HIV care at the reporting organization in 2019 (combines "established active" patients and those seen exclusively outside the HIV clinic).**	Org.	71,694	75%	63%	83%	89%

ARV Therapy – Established Active Pts.*	Patients with documented ARV prescription in 2019.	Previously diagnosed patients who had received HIV care (visit or VL) at the reporting organization in 2017 or 2018 and remained in ongoing HIV care in 2019.	Clinic	52,103	97%	97%	99%	100%
VL Testing – Established Active Pts.*	Patients with documented VL test in 2019.	Previously diagnosed patients who had received HIV care (visit or VL) at the reporting organization in 2017 or 2018 and remained in ongoing HIV care in 2019.	Clinic	52,103	95%	97%	99%	100%
VL Suppression – Established Active Pts.*	Tested patients whose final VL in 2019 was < 200 copies/mL.	Previously diagnosed patients who had received HIV care (visit or VL) at the reporting organization in 2017 or 2018 and remained in ongoing HIV care in 2019.	Clinic	52,103	83%	78%	88%	94%
ARV Therapy – Other New to Care Pts.*	Patients with documented ARV prescription in 2019.	Previously diagnosed patients who did not receive HIV care (visit or VL) at the reporting organization in 2017 or 2018 but were in ongoing HIV care by the end of 2019.	Clinic	5345	95%	96%	100%	100%
VL Testing – Other New to Care Pts.*	Patients with documented VL test in 2019.	Previously diagnosed patients who did not receive HIV care (visit or VL) at the reporting organization in 2017 or 2018 but were in ongoing HIV care by the end of 2019.	Clinic	5345	94%	94%	100%	100%
VL Suppression – Other New to Care Pts.*	Tested patients whose final VL in 2019 was < 200 copies/mL.	Previously diagnosed patients who did not receive HIV care (visit or VL) at the reporting organization in 2017 or 2018 but were in ongoing HIV care by the end of 2019.	Clinic	5345	73%	61%	77%	92%
ARV Therapy – All Previously Dx. Active Pts.	Patients with documented ARV prescription in 2019.	All previously diagnosed patients who were in ongoing HIV care at the reporting organization by the end of 2019.	Clinic	69,548	96%	97%	99%	100%
VL Testing – All Previously Dx. Active Pts.	Patients with documented VL test in 2020.	All previously diagnosed patients who were in ongoing HIV care at the reporting organization by the end of 2019.	Clinic	69,548	94%	96%	99%	100%
VL Suppression – All Previously Dx. Active Pts.	Tested patients whose final VL in 2019 was < 200 copies/mL.	All previously diagnosed patients who were in ongoing HIV care at the reporting organization by the end of 2019.	Clinic	69,548	81%	77%	86%	92%
Linkage to Care within 3 Days – Internally Dx. Pts.*	Patients whose first routine HIV care visit or non-PrEP ARV prescription was within 3 days of HIV diagnosis.	Patients first diagnosed as HIV positive in 2019, restricted to patients whose initial diagnosis was made by the reporting organization.	Org.	785	52%	24%	52%	82%
Baseline Resistance Testing – Active Newly Dx. Pts.	Patients with resistance testing performed in 2019.	Patients first diagnosed as HIV positive in 2019 who were in ongoing HIV care at the reporting organization by the end of 2019.	Clinic	1371	70%	50%	83%	100%
ARV Therapy – Newly Dx. Pts.	Patients with documented ARV prescription in 2019.	Non-excusable patients first diagnosed as HIV positive in 2019.**	Org.	1439	93%	92%	100%	100%
VL Testing within 91 Days – Newly Dx. Pts.*	Patients with documented VL test in 2020 within 91 days of HIV diagnosis.	Non-excusable patients first diagnosed as HIV positive in 2019.**	Org.	1204	89%	87%	95%	100%
VL Suppression within 91 Days – Newly Dx. Pts.*	Patients with suppressed VL test in 2019 (< 200) within 91 days of HIV diagnosis.	Non-excusable patients first diagnosed as HIV positive in 2019. (Seven patients reportedly suppressed on date of diagnosis were excluded.)**	Org.	1193	49%	34%	50%	65%

*Patients from Health + Hospitals excluded due to data limitations.

**"Excused" patients include those who died during the review period or who were known as of the end of the review period to have relocated outside NYS, to be incarcerated, or to be receiving ongoing HIV ambulatory care at another medical provider within NYS.

2019 Indicator Data: VLS Rates in Selected Populations

We continue to see considerable variation in suppression rates among previously diagnosed active patients. The tables here highlight benchmarks for some of the categories that were scored within the cascade template. Participants in the review were encouraged to use this information when formulating QI projects. See the appendices related to logistic regression for an in-depth analysis of the factors significantly associated with viral load suppression.

Age				Race			
Group	Patients	Clinics	Mean	Group	Patients	Clinics	Mean
ALL PATIENTS	69,548	238	81%	ALL PATIENTS	69,548	238	81%
Under 25	1642 (2%)	142	78%	Asian	603 (1%)	66	93%
25 to 29	4211 (6%)	181	78%	Black - Hispanic	2715 (4%)	168	85%
30 to 39	12,306 (18%)	195	80%	Black – non-Hispanic	30,933 (44%)	222	81%
40 to 49	13,236 (19%)	210	80%	Unknown - Hispanic	7737 (11%)	115	81%
50 to 59	21,536 (31%)	210	83%	Unknown – non-Hispanic	6541 (9%)	104	82%
60 to 69	13,169 (19%)	192	87%	White - Hispanic	7277 (10%)	185	83%
70 or Older	3448 (5%)	162	92%	White – non-Hispanic	12,038 (17%)	197	84%
				Additional Races	1704 (2%)	131	85%

Gender				Exposure Risk			
Group	Patients	Clinics	Mean	Group	Patients	Clinics	Mean
ALL PATIENTS	69,548	238	81%	ALL PATIENTS	69,548	238	81%
Cis-gender Female	17,551 (25%)	223	81%	Injecting Drug User (IDU)	3886 (6%)	145	80%
Cis-gender Male	39,352 (57%)	226	82%	Men Who Have Sex with Men (MSM)	23,432 (34%)	210	83%
Female at Birth, Unknown Current Gender	3243 (5%)	28	86%	Perinatal Infection	826 (1%)	97	75%
Male at Birth, Unknown Current Gender	6987 (10%)	33	81%	Other Exposure Risk	25,957 (37%)	209	83%
Transgender or Gender Non-conforming	2415 (3%)	138	77%	Unknown Exposure Risk	15,447 (22%)	138	77%

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Review Population

Participating medical organizations were asked to submit patient-level data for all HIV+ individuals who received any medical service or medically supportive social service in 2019. Deduplication was required (and validated) for each organization, but patients have not been deduplicated across organizations. Instead, we analyzed the data for possible matches between the "inactive" patients (those not enrolled in ongoing HIV care at the reporting organization) and active patients at other organizations.

As described in the glossary (see Appendix 1) and the table below, eligibility for each indicator depended on "care status," which in turn was derived from values entered for diagnosis status (previously diagnosed, diagnosed in 2019 within the organization, or diagnosed in 2019 outside the organization) and enrollment status as defined in the glossary.

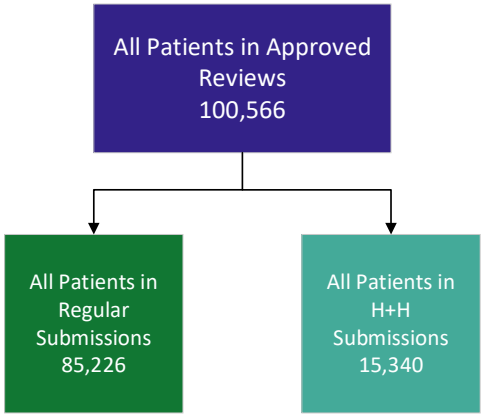
Furthermore, distinctions are made throughout this report between patients submitted by Health + Hospitals, where some data limitations precluded our use for certain indicators, and the remaining body of submissions. All patients, including those receiving care at Health + Hospitals, were used in the patient matching process.

Patient Inclusion by Indicator

Indicator	Eligibility			Notes
	Orgs.	Clinics	Patients	
ARV Therapy, VL Testing, and VL Suppression – Previously Diagnosed Open Pts.	65	NA	71,694	Health + Hospitals excluded (cannot distinguish established from other new to care); includes non-active patients so only scored at organizational level.
ARV Therapy, VL Testing, and VL Suppression – "Established" Active Patients	65	212	52,103	Health + Hospitals excluded (cannot distinguish established from other new to care).
ARV Therapy, VL Testing, and VL Suppression – "Other New to Care" Patients	64	182	5345	Health + Hospitals excluded (cannot distinguish established from other new to care)
ARV Therapy, VL Testing, and VL Suppression – All Previously Diagnosed. Active Pts.	82	238	69,548	Includes Health+Hospitals.
ARV Therapy – Newly Diagnosed Patients	73	NA	1439	Includes Health + Hospitals); includes non-active patients so only scored at organizational level.
VL Testing within 91 Days – Newly Diagnosed Patients	58	NA	1204	Health + Hospitals excluded (data on time from diagnosis to testing not available); includes non-active patients so only scored at organizational level.
VL Suppression within 91 Days – Newly Diagnosed Patients	58	NA	1193	Health + Hospitals excluded (data on time from diagnosis to suppression not available); patients reported as suppressed on date of diagnosis also excluded; includes non-active patients so only scored at organizational level.
Linkage within 3 Days – Newly Diagnosed Patients	56	NA	785	Only includes patients diagnosed within the reporting organization; Health + Hospitals excluded due to data limitations; includes non-active patients so only scored at organizational level.
Resistance Testing – Newly Diagnosed Active Patients	73	162	1371	Includes Health + Hospitals; excludes patients who were not enrolled in care at the reporting organization.

Patient Inclusion Flowcharts

The flowcharts on this and subsequent pages visualize the caseload categories described previously and in the glossary (see Appendix 1) and detail the number of patients in each category and subcategory. Patient counts in subcategories with fewer than 10 patients are suppressed to prevent any possible re-identification, and numbers in related fields are rounded accordingly to prevent calculation of these numbers.



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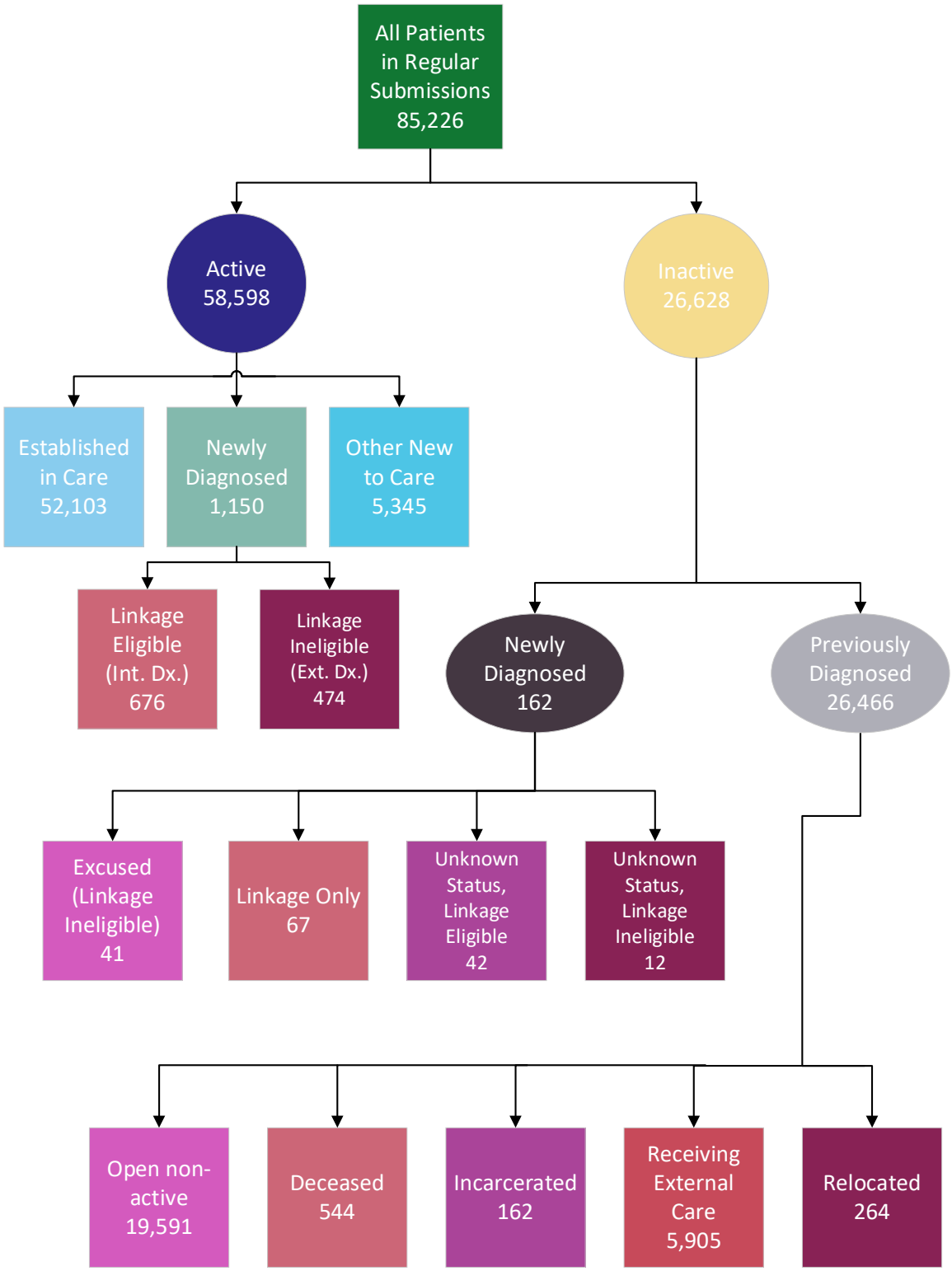
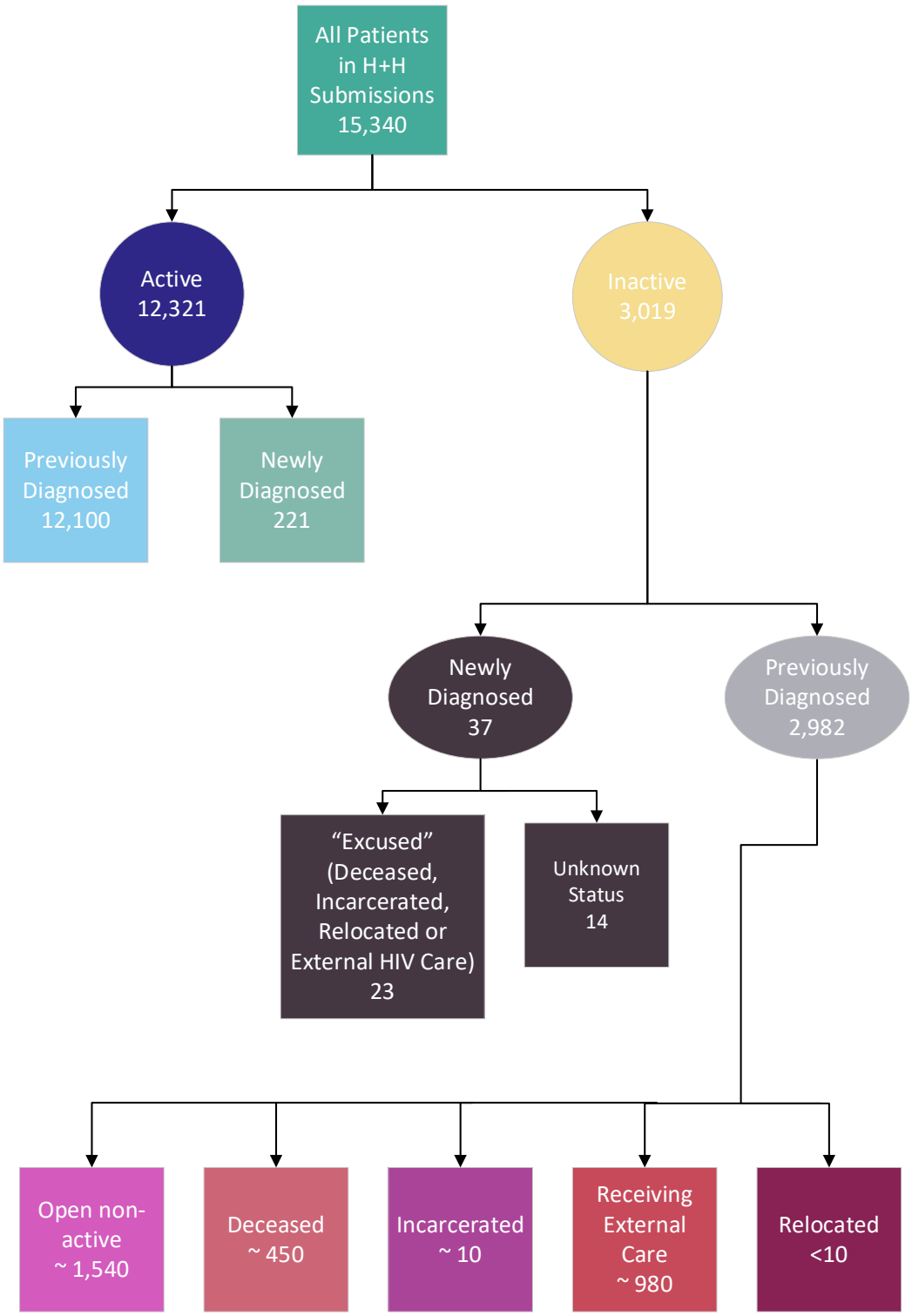
"Regular" Submissions

Sixty five medical organizations, encompassing 221 HIV clinics, submitted data for a total of 85,226 patients (deduplicated within not between organizations).



Health + Hospitals Submissions

Health + Hospitals submitted a single data file with 15,340 patients (after exclusions described previously) attributed to care at one of their 17 primary HIV care clinics (11 hospitals and 6 diagnostic and treatment centers).



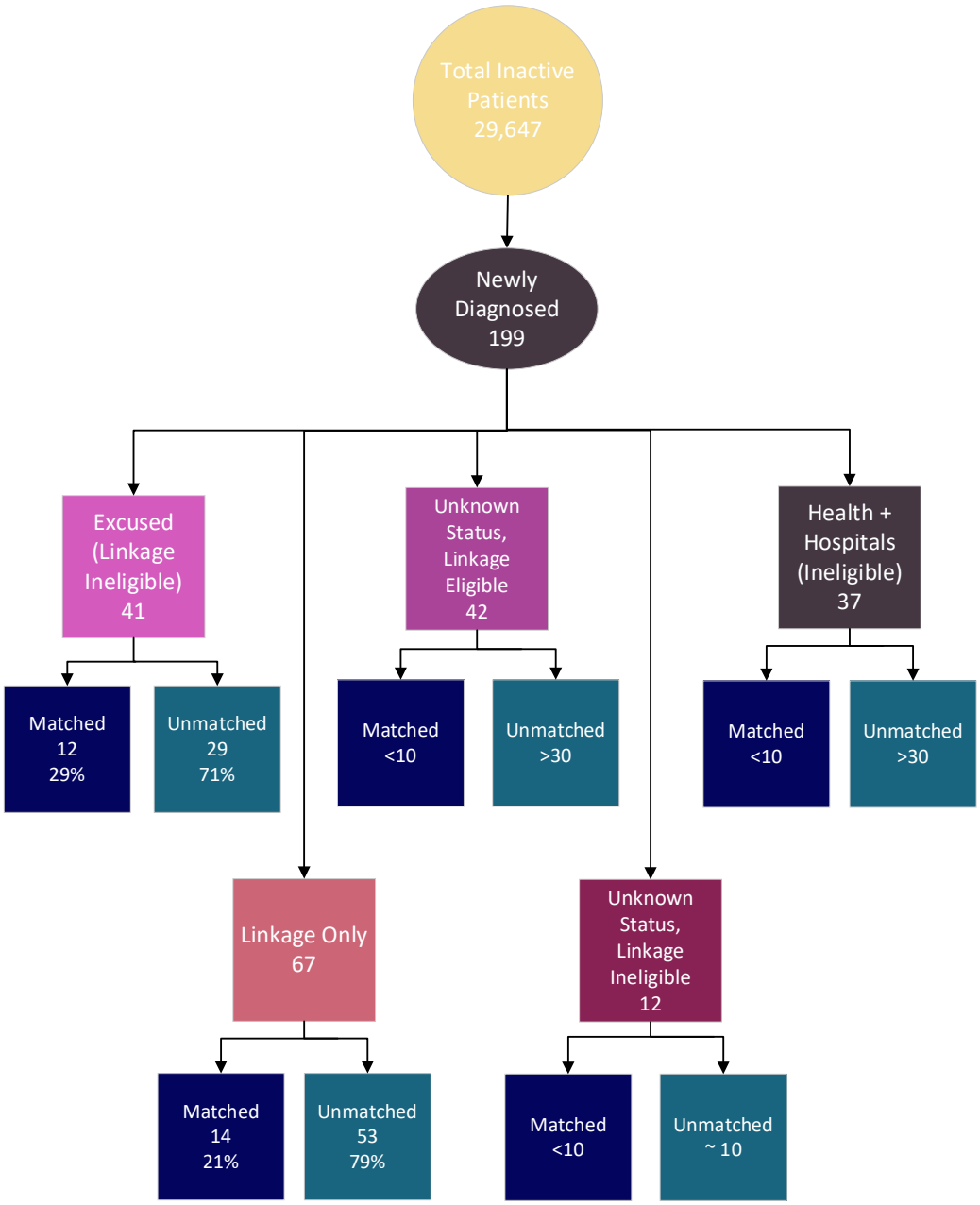
Patient Matching: All Inactive Submissions

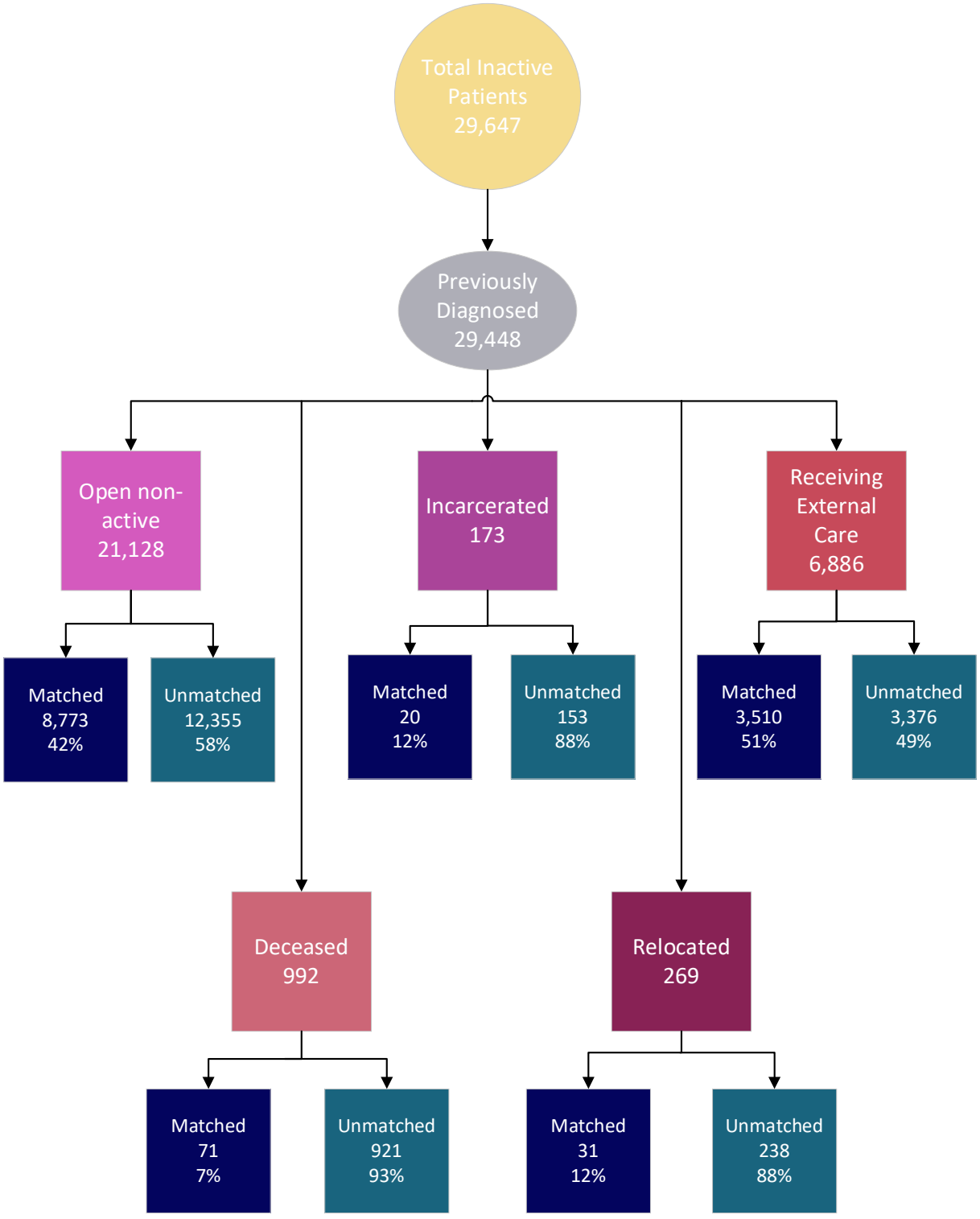
To better understand the breadth of the submitted caseload and the number of patients who may be out of care, we attempted to match each patient who was reported as "inactive" at one organization to an active patient at another. The approximate algorithm follows:

1) Start with all possible matches and eliminate those that do not match on at least two elements of date of birth (day, month, and year).
2) Score the remaining possible matches based on presence or absence of the following: (i) identical date of birth, (ii) same values for ZIP Code and current gender, and (iii) similar or identical name (using SAS's SPEDIS function).
3) Accept as a match if at least two out of three of these criteria are met.

The results are presented below in flowchart format, separating newly and previously diagnosed for clarity.

Newly Diagnosed Patients



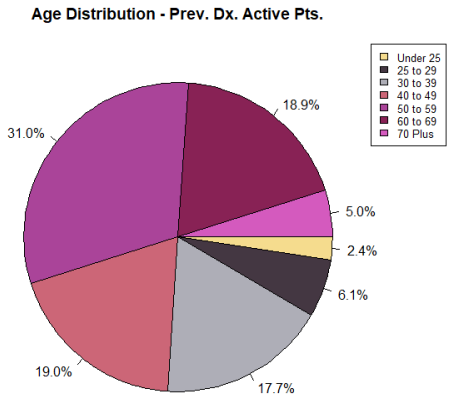

Total Inactive Patients 29,647
Previously Diagnosed 29,448
Open non-active 21,128
Matched 8,773 42%
Unmatched 12,355 58%
Incarcerated 173
Matched 20 12%
Unmatched 153 88%
Receiving External Care 6,886
Matched 3,510 51%
Unmatched 3,376 49%
Deceased 992
Matched 71 7%
Unmatched 921 93%
Relocated 269
Matched 31 12%
Unmatched 238 88%

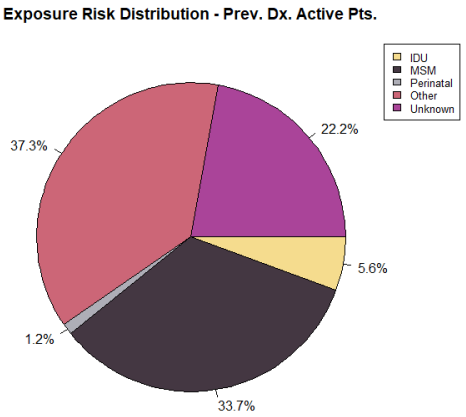
Active Patient Demographic Data by Diagnosis Status

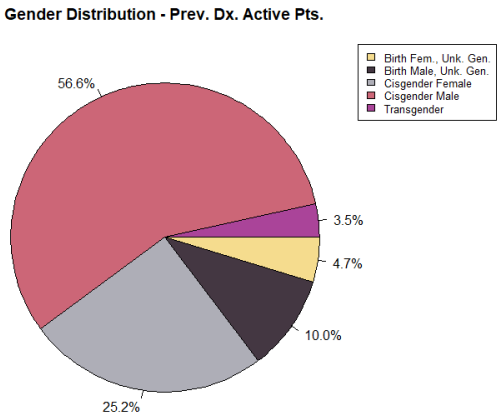
On this and subsequent pages, pie charts are used to describe the demographic profile of the various caseloads included in the review. While patient age is routinely available, information about even "active" patients (those enrolled in HIV care) is often missing for other patient attributes. This represents a mix of lack of documentation on the part of providers and patients opting not to disclose requested information.

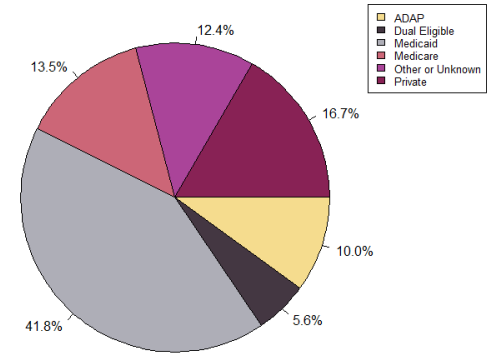
Previously Diagnosed

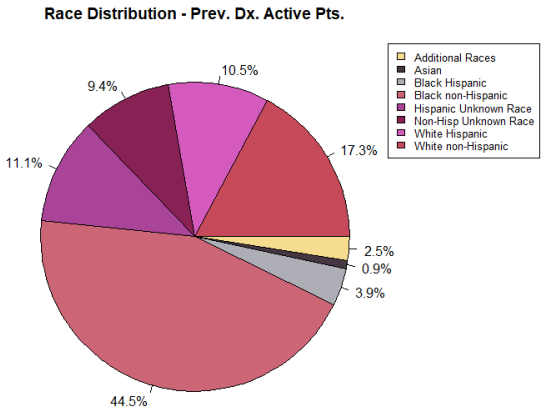
All previously diagnosed active patients (both established in care and new to care at the organization) are characterized here to allow for inclusion of patients from Health + Hospitals, where this distinction could not be made.







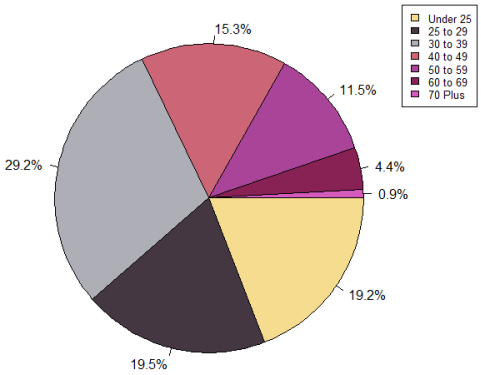




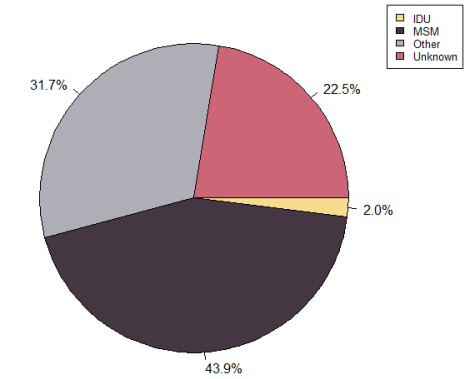
Newly Diagnosed

The demographics of all newly diagnosed patients (including those reported by Health + Hospitals) are described by the pie charts included here.

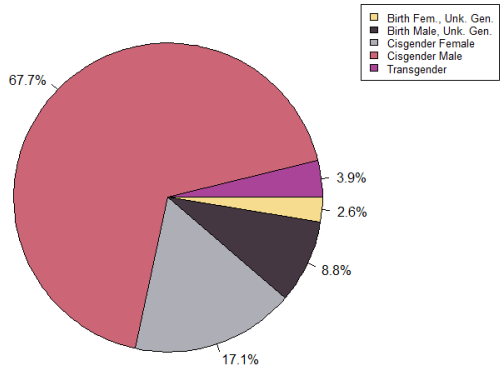
Age Distribution - Newly Dx. Active Pts.



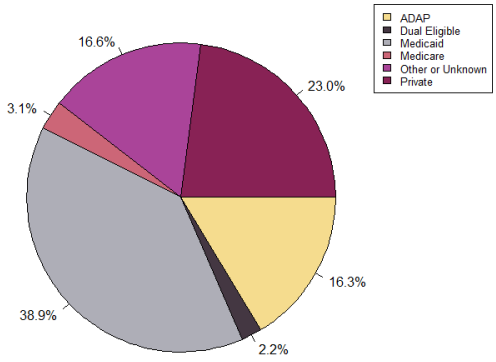
Exposure Risk Distribution - Newly Dx. Active Pts.



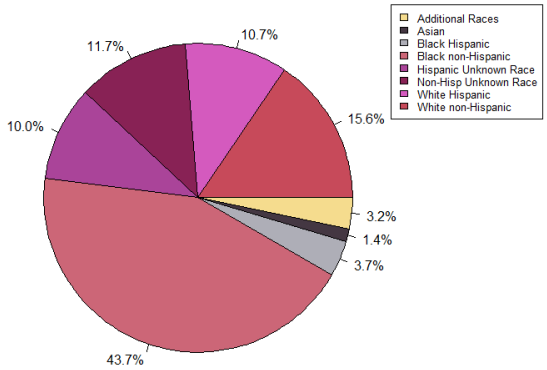
Gender Distribution - Newly Dx. Active Pts.



Insurance Distribution - Newly Dx. Active Pts.



Race Distribution - Newly Dx. Active Pts.



Age of Active Patients by Race/Ethnicity and Exposure Risk

To further explore the demographics of the review population, we calculated benchmarks for the age distribution, stratifying the patients by diagnosis status (prior to or during 2019). We subdivided each of these larger groups, first by race/ethnicity and then, separately, by HIV exposure risk (hierarchical classification as described in Appendix 1). The overall results clearly demonstrate the aging profile of the overall population; while less pronounced, this is also seen among just the newly diagnosed patients. The categorizations by risk show more variation than those by race/ethnicity. In particular, the average age of patients with IDU exposure risk was 57.6 while the average for patients with reported MSM risk was 44.5. (The perinatally infected patients are, as expected, considerably younger, but the average age for those patients is now 26.9.)

		Patients	Mean	10th Pct.	25th Pct.	Median	75th Pct.	90th Pct.
Race / Ethnicity	Asian	622	45.4	28	35	46	55	63
	Previously Diagnosed	603	45.5	29	35	46	55	63
	Newly Diagnosed	19	40.4	26	28	38	50	59
	Black - Hispanic	2766	47.5	28	35	49	58	65
	Previously Diagnosed	2715	47.8	29	36	49	58	65
	Newly Diagnosed	51	29.8	21	24	29	33	39
	Black – non-Hispanic	31,532	49.0	29	38	51	59	66
	Previously Diagnosed	30,933	49.3	30	38	51	59	66
	Newly Diagnosed	599	35.6	21	25	31	45	56
	Unknown - Hispanic	7874	48.9	31	39	50	58	65
	Previously Diagnosed	7737	49.2	31	39	51	58	65
	Newly Diagnosed	137	35.1	22	26	34	41	53
	Unknown – non-Hispanic	6701	48.7	30	38	50	59	66
	Previously Diagnosed	6541	49.1	30	38	51	59	66
	Newly Diagnosed	160	34.9	23	27	32	40	54
	White - Hispanic	7424	49.1	31	39	51	58	65
	Previously Diagnosed	7277	49.4	31	39	51	59	65
	Newly Diagnosed	147	35.0	22	27	33	42	51
	White – non-Hispanic	12,252	51.1	33	42	53	60	66
	Previously Diagnosed	12,038	51.3	33	42	53	60	66
	Newly Diagnosed	214	39.1	25	30	37	49	55
	Additional Races	1748	46.1	29	36	46	56	63
	Previously Diagnosed	1704	46.4	29	36	46	56	63
	Newly Diagnosed	44	35.8	23	26	32	45	53
Risk Factor	Intravenous Drug Use (IDU)	3913	57.6	43	53	59	65	69
	Previously Diagnosed	3886	57.8	44	53	59	65	69
	Newly Diagnosed	27	38.5	23	26	38	49	57
	MSM Sexual Risk	24,034	44.5	28	33	44	55	62
	Previously Diagnosed	23,432	44.8	29	34	44	55	62
	Newly Diagnosed	602	32.0	21	24	29	37	48
	Perinatal Infection	826	26.9	19	23	28	30	34
	Previously Diagnosed	826	26.9	19	23	28	30	34
	Newly Diagnosed	0	NA	NA	NA	NA	NA	NA
	Other Risk Factors	26,391	52.5	35	45	54	61	67
	Previously Diagnosed	25,957	52.7	35	45	54	61	67
	Newly Diagnosed	434	40.7	25	30	39	51	59
	Unknown Exposure Risk	15,755	49.9	30	40	52	60	66
	Previously Diagnosed	15,447	50.1	31	40	52	60	66
	Newly Diagnosed	308	36.2	21	27	33	44	57

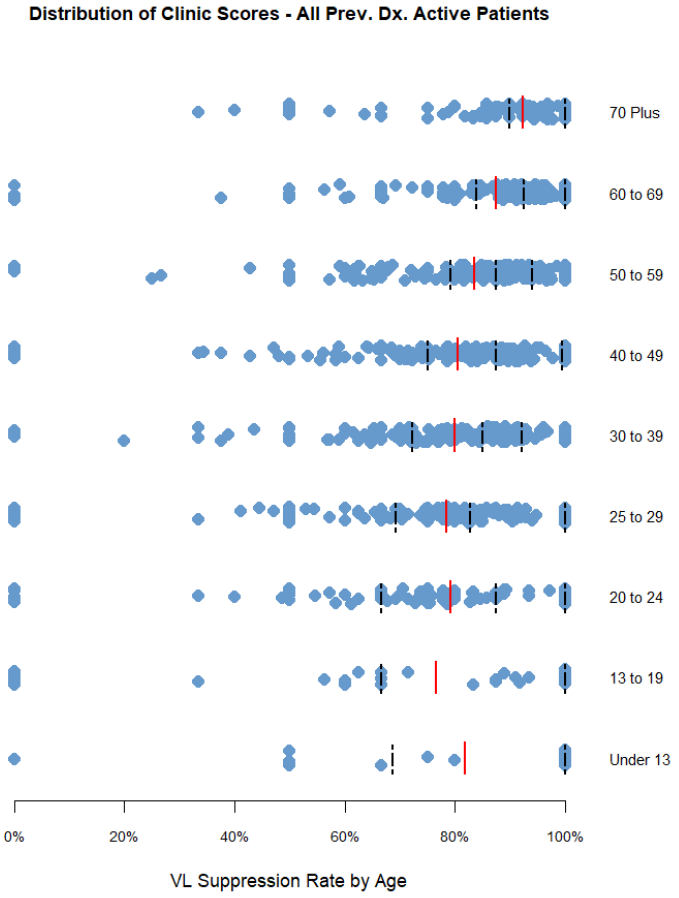
Benchmarks and Distribution of Outcomes

The following several pages present a fuller picture of outcomes by displaying clinic- and organization-level scores after disaggregation of each clinic into one of several groups based on various demographic data. See the example below for more details about how these data were prepared and charted. Of note, as mentioned elsewhere in this report, data for Health + Hospitals clinics could not be included for several indicators (those involving distinction of established from other new to care patients or requiring information related to intervals between diagnosis date and other events for newly diagnosed patients).

Data for indicators such as ARV prescription among established patients, where the rates are very high with little variation, are not presented here. The charts for the remaining indicators are divided into three sections:

1) Indicators related to the previously diagnosed "open" patients (those either established in HIV care or of unknown care status);
2) Indicators specific to newly diagnosed patients; and
3) Viral load suppression indicators for previously diagnosed active patients.

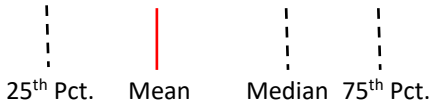
Example: Clinic-Level VLS by Age Group among All Previously Diagnosed Active Patients



Process for creating this chart:

1) The eligible patients for each clinic were assigned to sub-clinic groups based on the age categories shown on the chart (some clinics had no patients in some age groups).
2) For each age category, the viral load suppression rate was calculated for each of the applicable groups created in step (1).
3) For each age category, the mean, 25th percentile, median, and 75th percentile benchmarks were calculated for the set of groups described in step (1).
4) For each age category, we plotted these benchmarks (see Key) and the score for each group in the category. (Slight random "jiggering" of the vertical positioning of these scores was used to reduce obscuring of multiple identical scores.)

Benchmark Key:



Notes:

1) Mean may be on either side of median and even outside 25th/75th percentiles.
2) If there are few scores, some benchmarks may be identical.

Previously Diagnosed Open Patients

The category of "open patients" is, to some degree, an artifact of the history of these organizational treatment cascade reviews. It includes those that an HIV ambulatory clinic might refer to as "our patients," but only those who were diagnosed prior to the review year (2019) as a separate treatment cascade is formed for the newly diagnosed patients to allow for reporting of indicators specific to those patients (linkage to care, resistance testing, and timely initial viral load testing and suppression).

The open-patients group also includes previously diagnosed patients of unknown HIV care status. In other words, we request data for all previously diagnosed patients who "touched the system" at the reporting organization, including those seen in an emergency department, as inpatients, or who received other ambulatory care services but were not enrolled in HIV care at the reporting organization. Patients who died during the review period or who were documented as receiving ongoing HIV care at another organization, had relocated outside of NYS by the end of the review period, or who were incarcerated at the end of the review period were then "excused" from these indicators (but still reported for patient-matching purposes as described previously in this report).

The interpretation of these results is challenged by the variation among the reporting organizations. Some are small community health centers with no HIV+ patients outside the HIV clinic while others are large hospital systems with several hundred HIV+ patients passing through emergency and in-patient services. Still, this is our most comprehensive look at the extent and variation of documented treatment and viral load suppression among patients seen at participating organizations.

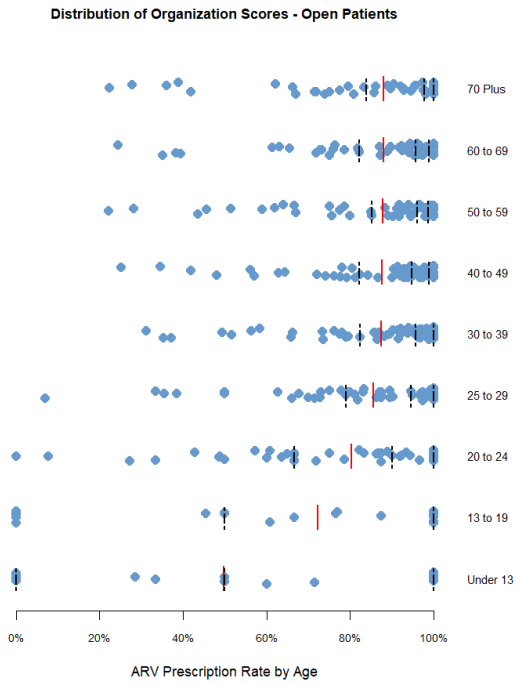
The results on the following pages illustrate some aspects of this variation. Indicator scores are typically lower for patients with unknown race, exposure risk, etc., likely reflecting lack of information about whether the patient was treated, tested and suppressed. Nevertheless, the overall pattern is similar to that seen for the active patients, in part because these patients are also included here.

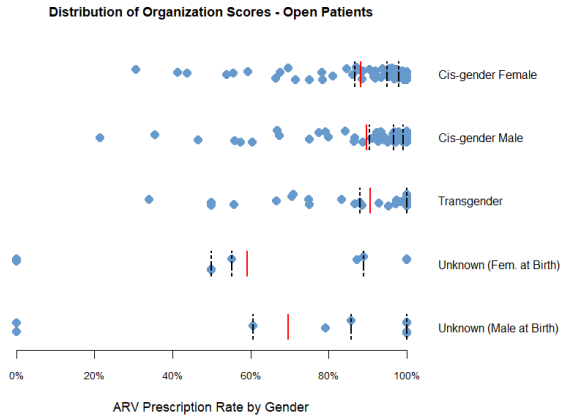
[Report continues next page.]

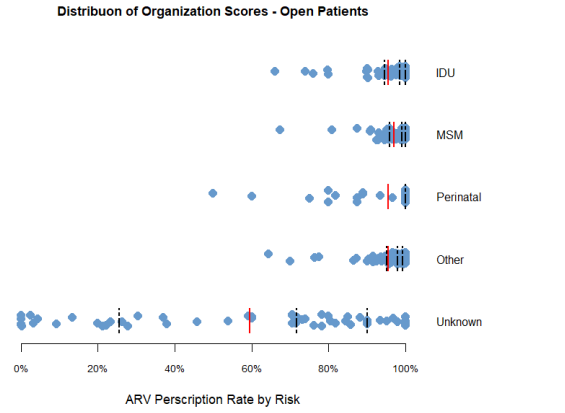
Previously Diagnosed Open Patients: Organization-Level ARV Rates

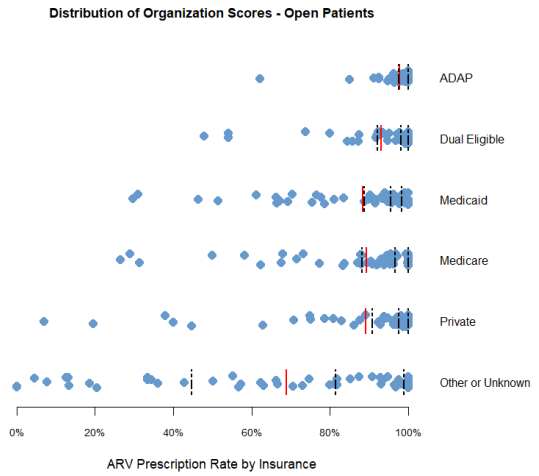
2019 All-Patients Org.-Level Benchmarks: Mean = 88%; 25th Percentile = 83%; Median = 96%; 75th Percentile = 98%

(n = 71,694 patients at 65 organizations)





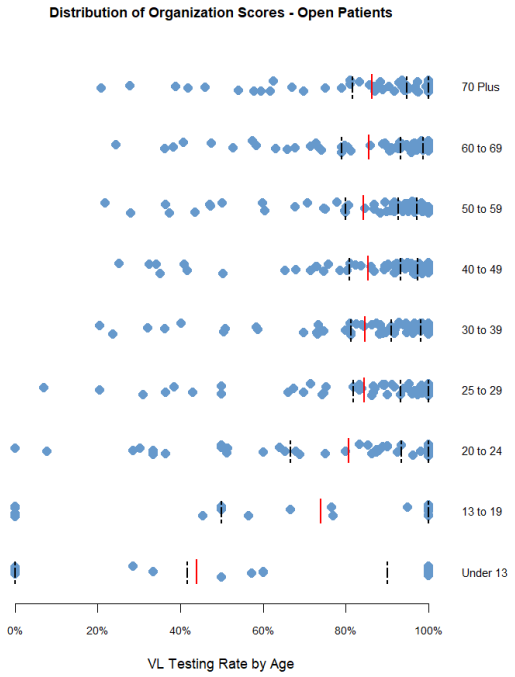


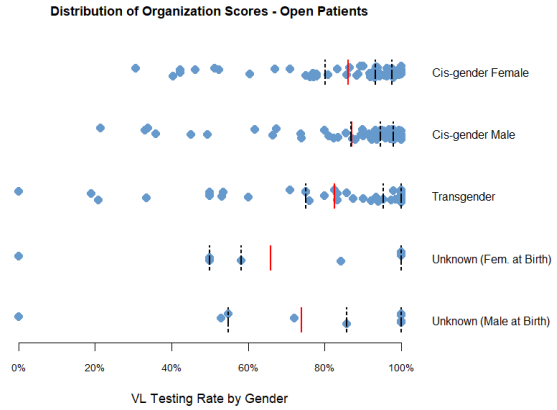


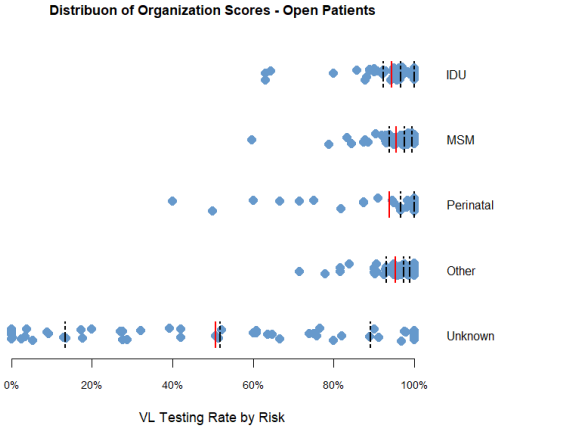
Previously Diagnosed Open Patients: Organization-Level VL Testing Rates

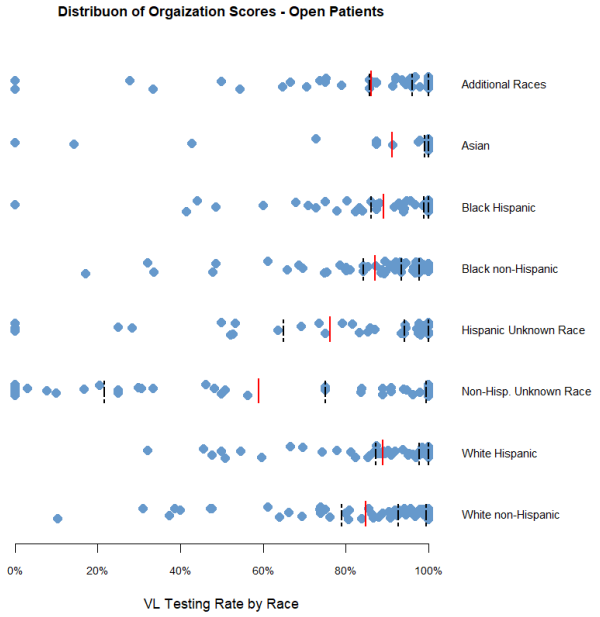
2019 All-Patients Org.-Level Benchmarks: Mean = 85%; 25th Percentile = 82%; Median = 93%; 75th Percentile = 97%

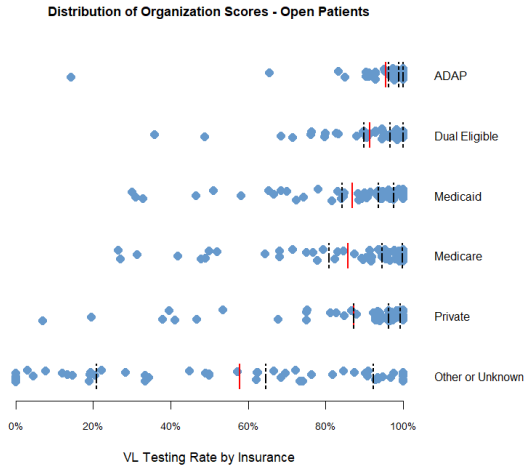
(n = 71,694 patients at 65 organizations)







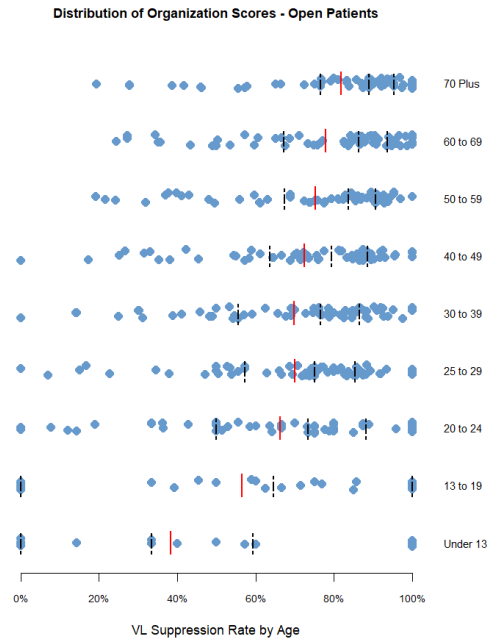


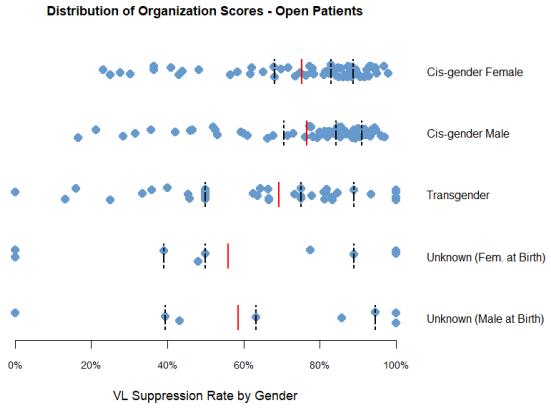


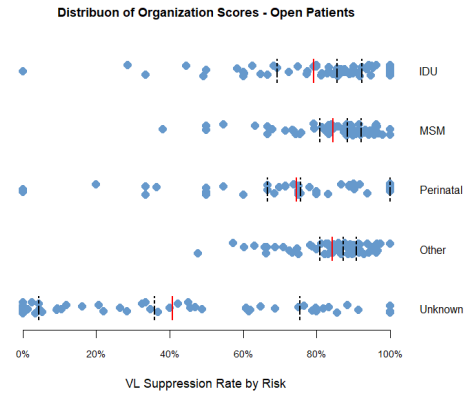
Previously Diagnosed Open Patients: Organization-Level VLS Rates (Final VL)

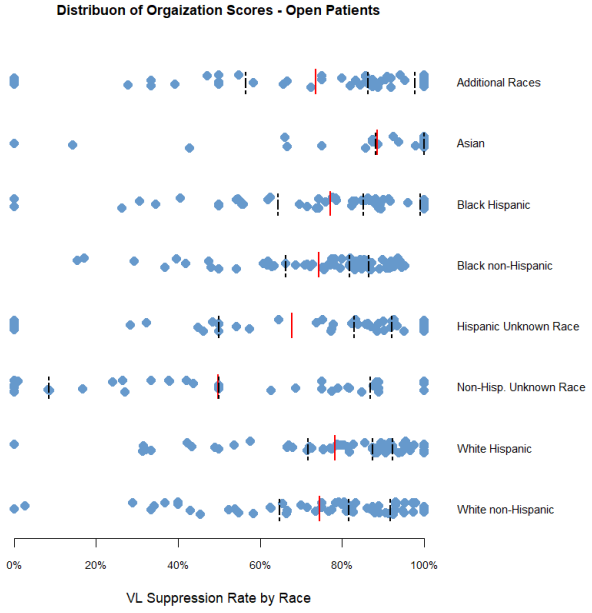
2019 All-Patients Org.-Level Benchmarks: Mean = 75%; 25th Percentile = 63%; Median = 83%; 75th Percentile = 89%

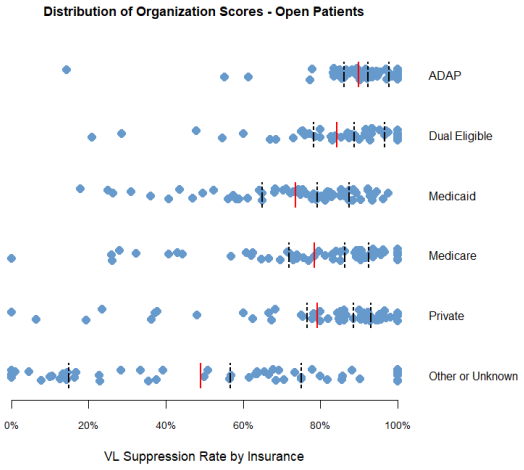
(n = 71,694 patients at 65 organizations)











Newly Diagnosed Patients

Newly diagnosed patients include all whose initial HIV+ diagnosis (rather than subsequent re-confirmation by another provider) occurred in 2019, regardless of whether that initial diagnosis was made within or outside the reporting organization. However, only those diagnosed within the organization were eligible for the linkage to care measure, and only those who were enrolled in HIV care by the end of 2019 were eligible for the baseline resistance testing indicator. For indicators besides resistance testing, both patients who enrolled in HIV care at the reporting organization ("active" patients) and those who did not ("inactive" patients) were included. Consequently, reporting here is at the organization level for all indicators besides resistance testing, which is reported by clinic.

Of note, no perinatal infections were reported among the newly diagnosed patients, and therefore this row is blank in this section. As described in the previous section, the results for patients with missing information (unknown exposure risk, for example) may be driven by lack of knowledge about inactive patients. Among those where the requested patient-characterizing data were available, considerable variation is seen in some results, and this sometimes differs from the patterns common for the cascade indicators that apply to the previously diagnosed active patients (see next section). For instance, while "positive" outcomes are typical for the older patients in the previously diagnosed group, among the newly diagnosed patients the mean clinic scores for linkage to care, resistance testing, and timely viral load suppression are lower among those aged 70 or above than for many of their younger counterparts.

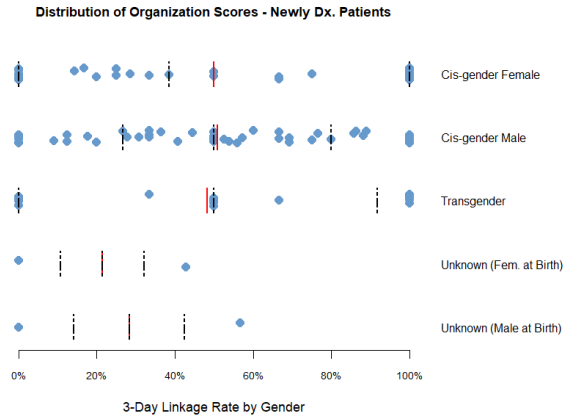
Also noteworthy, the scores for newly diagnosed patients with IDU exposure risk history tend to be lower than for newly diagnosed patients with MSM exposure risk; however, there were relatively few of the former and, in turn, fewer eligible clinics. Conversely, scores for patients with ADAP as primary insurance tended to be higher than for other insurance categories. Variation by race is still seen among the newly diagnosed, but differences are relatively small compared to other factors.

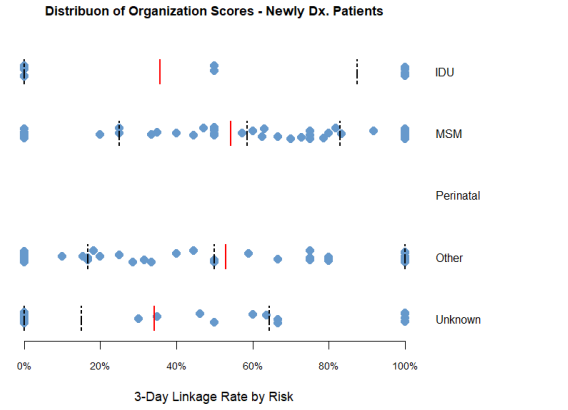
[Report continues next page.]

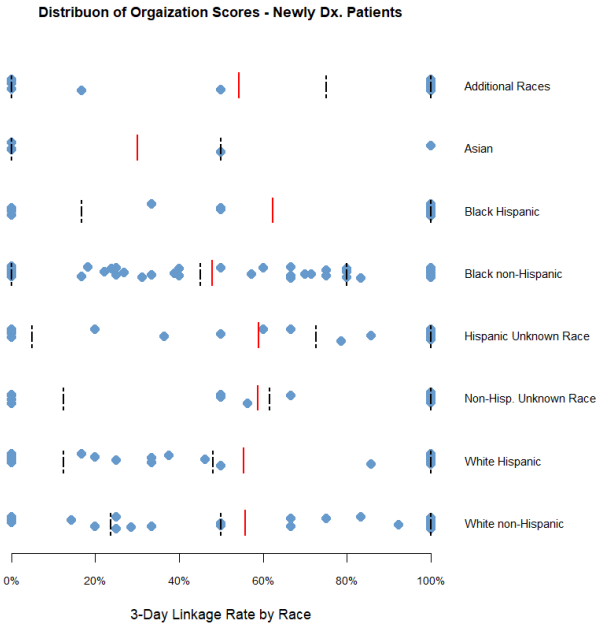
Newly Diagnosed Patients: Organization-Level Linkage to Care Rates (Within 3 Days of Diagnosis)

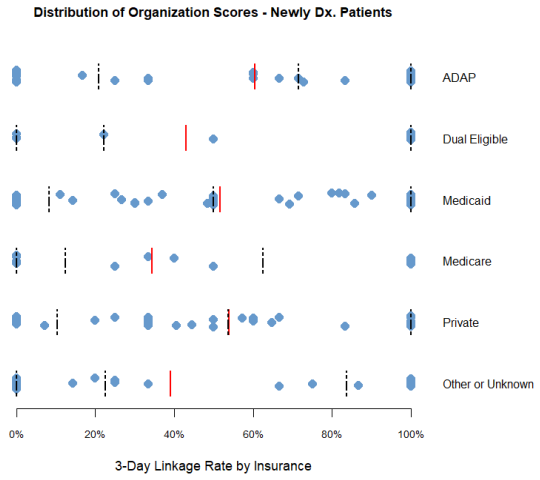
2019 All-Patients Org.-Level Benchmarks: Mean = 52%; 25th Percentile = 24%; Median = 52%; 75th Percentile = 82%

(n = 785 patients at 56 organizations)





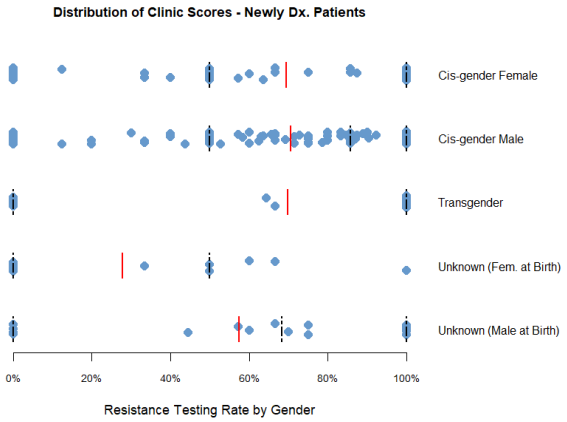


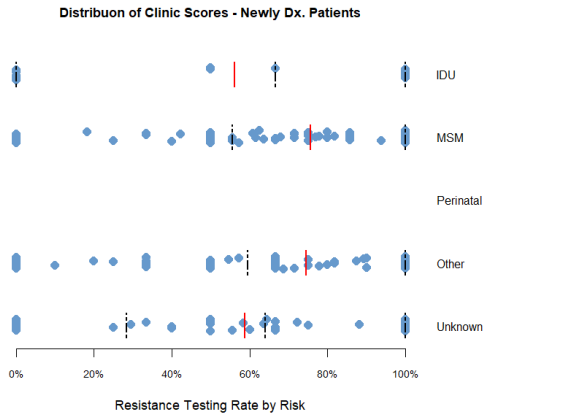


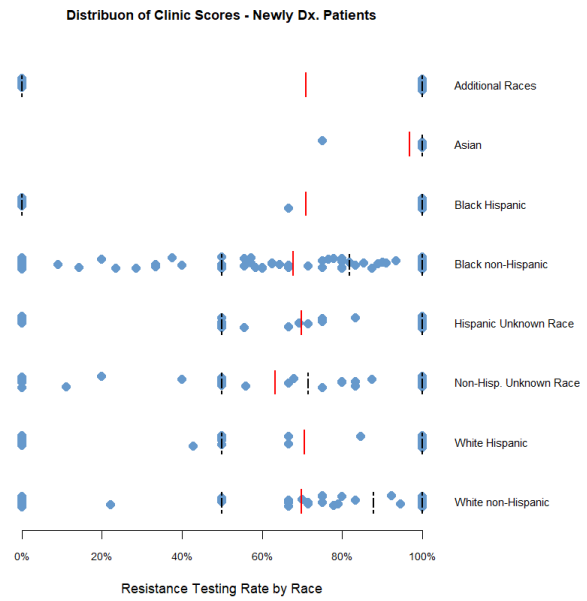
Newly Diagnosed Patients: Clinic-Level Resistance Testing Rates (Patients Enrolled in HIV Care)

2019 All-Patients Clinic-Level Benchmarks: Mean = 70%; 25th Percentile = 50%; Median = 83%; 75th Percentile = 100%

(n = 1371 patients at 162 clinics)



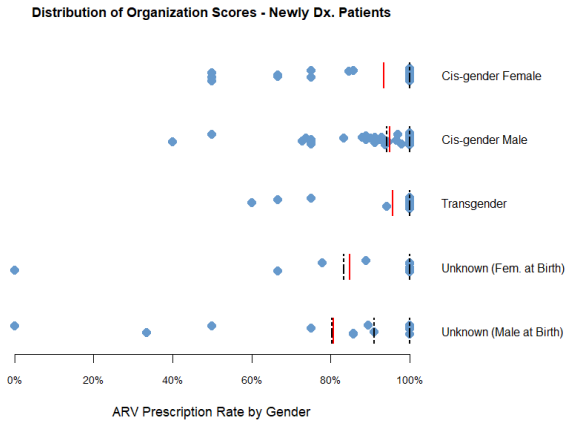


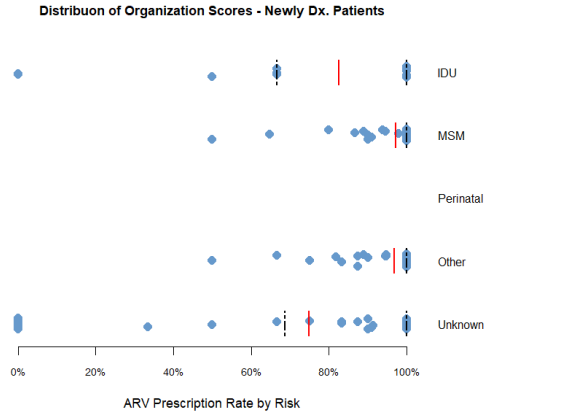


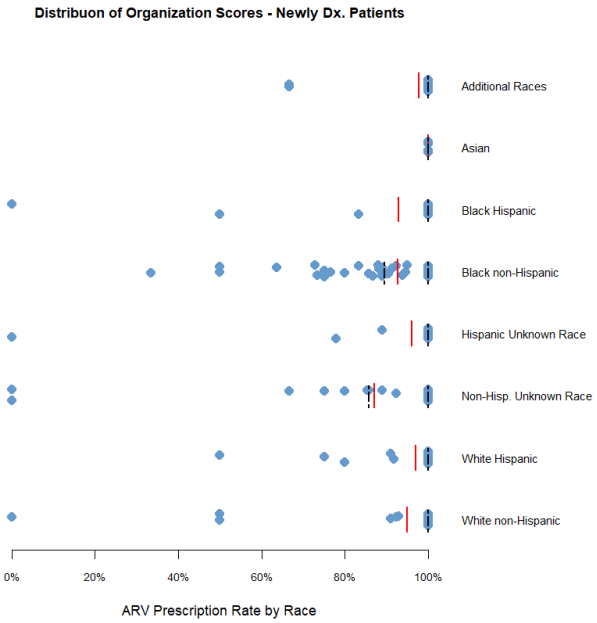
Newly Diagnosed Patients: Organization-Level ARV Rates

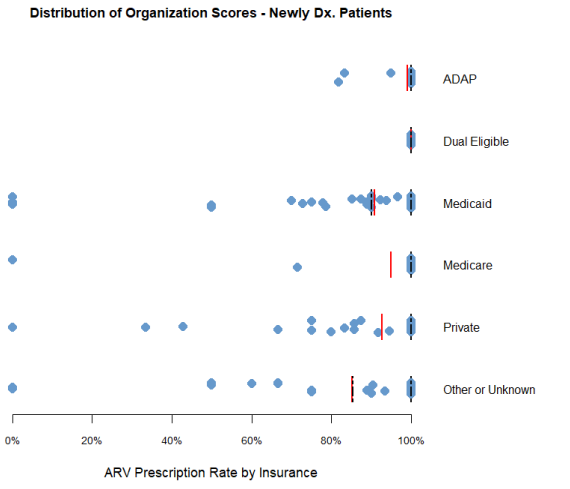
2019 All-Patients Org.-Level Benchmarks: Mean = 93%; 25th Percentile = 92%; Median = 100%; 75th Percentile = 100%

(n = 1439 patients at 73 organizations)





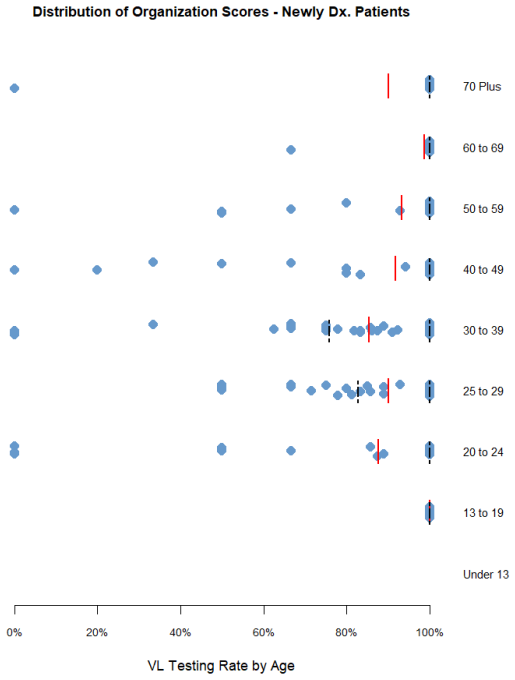


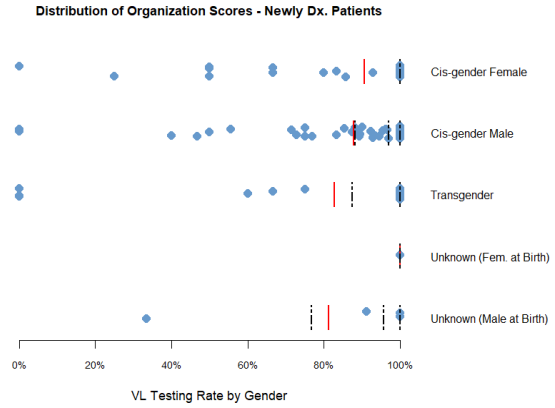


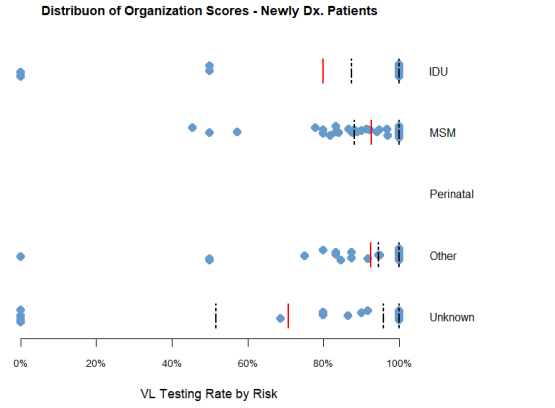
Newly Diagnosed Patients: Organization-Level VL Testing Rates (Within 91 Days of Diagnosis)

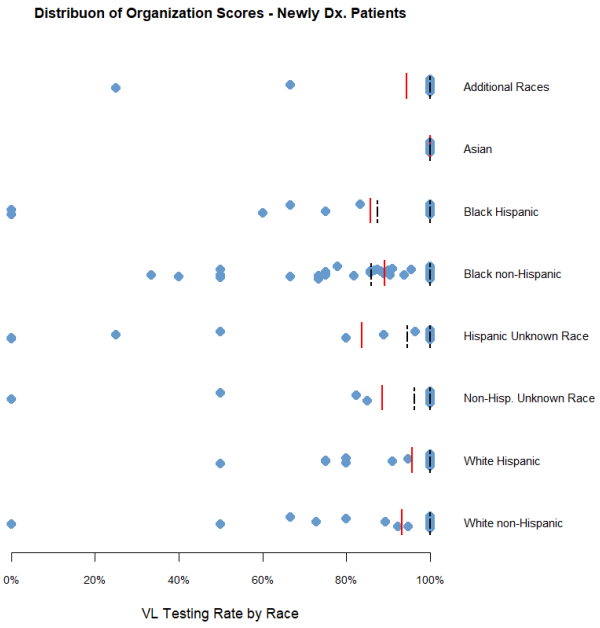
2019 All-Patients Org.-Level Benchmarks: Mean = 89%; 25th Percentile = 87%; Median = 95%; 75th Percentile = 100%

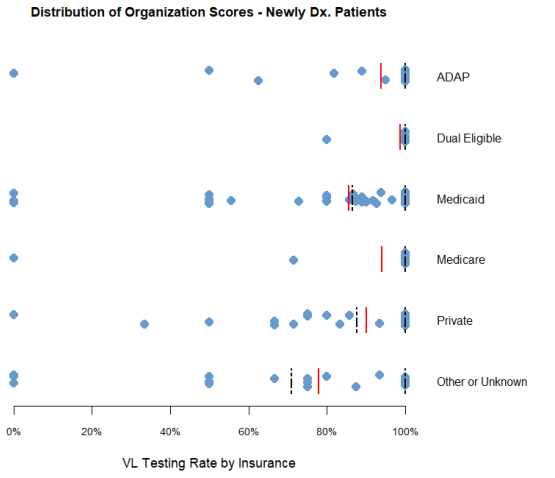
(n = 1204 patients at 58 organizations)







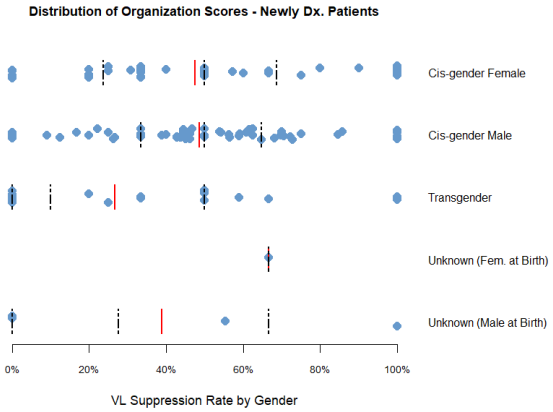


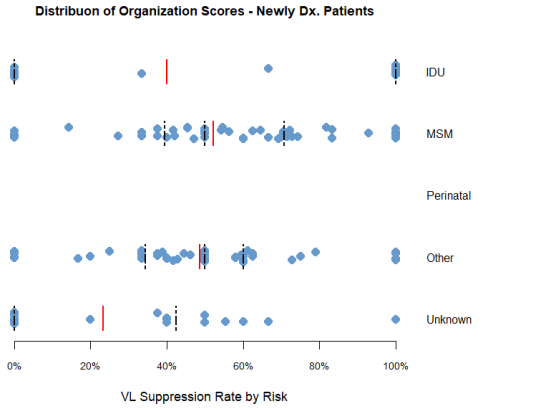


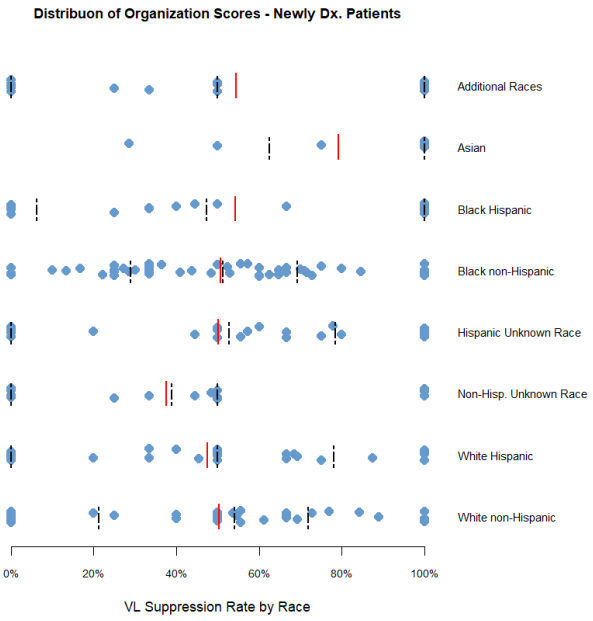
Newly Diagnosed Patients: Organization-Level VLS Rates (Within 91 Days of Diagnosis)

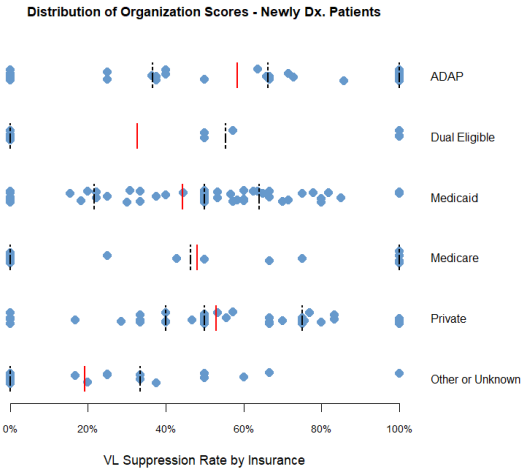
2019 All-Patients Org.-Level Benchmarks: Mean = 49%; 25th Percentile = 34%; Median = 50%; 75th Percentile = 65%

(n = 1193 patients at 58 organizations)









Viral Load Suppression among Previously Diagnosed Active Patients

Analysis of viral load suppression among previously diagnosed active patients has been a mainstay of these quality reviews for several years. It provides a relatively consistent way to examine key outcomes among patients affiliated with each reporting organization, excluding some of the variability among the newly diagnosed. It does, however, contain two subgroups that tend to have different outcomes: (i) patients "established in care" at the reporting organization, and (ii) the "other new to care" patients at the organization, where "other" refers to "other than newly diagnosed."

This distinction is a bit more nuanced than it may appear. Reporting organizations were asked to classify patients as "established" if, in addition to receiving care at HIV clinic in 2019, they received "HIV services" at the organization in either or both of the two preceding years (2017 and 2018). Qualifying services included HIV ambulatory care visits during this time period or a viral load test reported to the organization during these years. Participating organizations varied in their ability to make these determinations retrospectively, and we asked them to document the limitations of their methodology in their submission. The Health + Hospitals data do not make this distinction at all, and consequently the scores for their clinics are only included for the "all previously diagnosed active" category where these two subgroups are combined.

As mentioned above, we only report viral load suppression outcomes in this section as ARV prescription rates and viral load testing rates show very limited variation among these populations. The patterns for suppression follow those seen in recent years. In general, the scores for new-to-care patients tend to be lower than for those established in care, but to some extent this may be attributable to the "artificial" nature of the review period (e.g., it may have been especially difficult to obtain a suppressed viral load in 2019 for a patient first seen, or returning after a two-year absence, in December of that year).

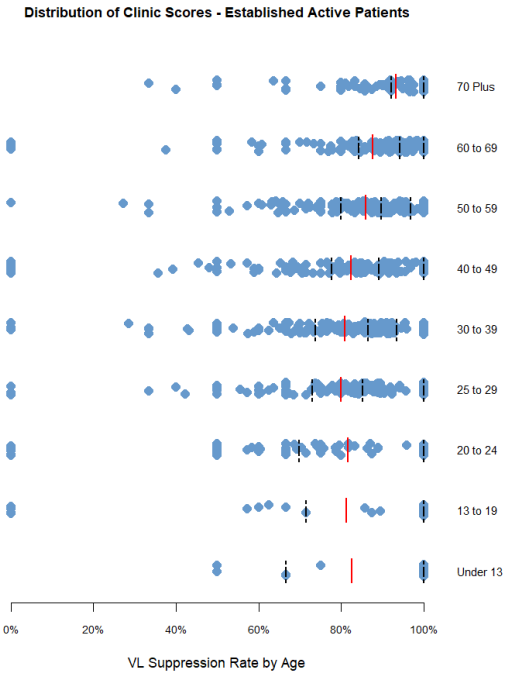
Within each subgroup and the recombined data, the results follow the general trends we have observed: higher suppression rates for older patients; lower suppression rates among transgender patients, insecurely housed patients, and patients whose primary insurance is Medicaid. Variation by race is also seen, but these differences may be diminishing to some degree; see section later in this report that compares benchmark by race for 2018 and 2019. Further analysis of these results is described in the section on logistic regression and in the related appendices.

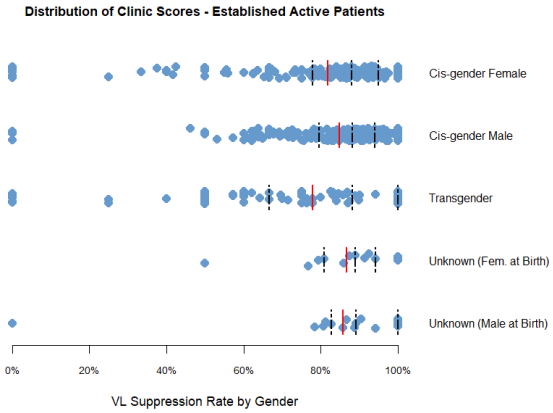
[Report continues next page.]

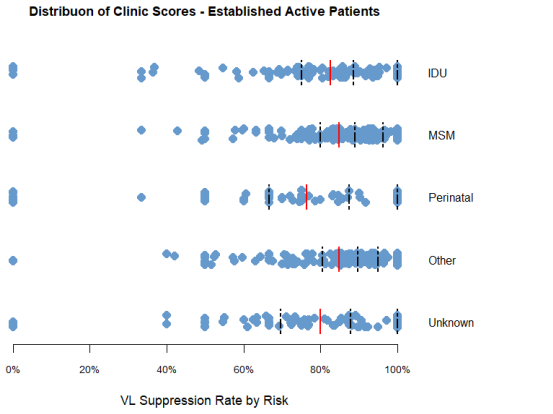
Patients Established in Care: Clinic-Level VLS Rates (Final VL)

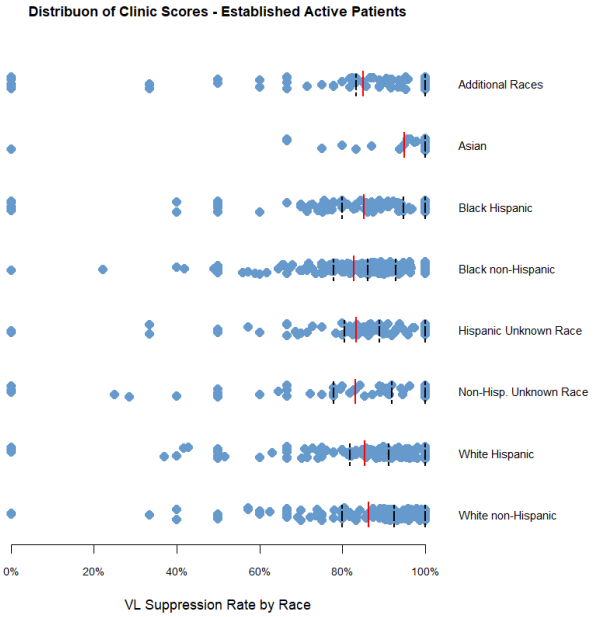
2019 All-Patients Clinic-Level Benchmarks: Mean = 83%; 25th Percentile = 78%; Median = 88%; 75th Percentile = 94%

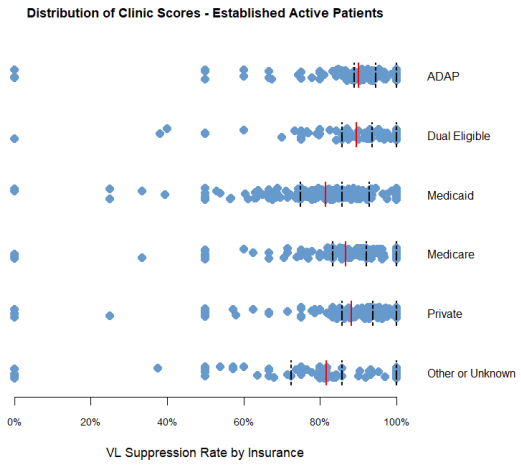
(n = 52,103 patients at 212 clinics)







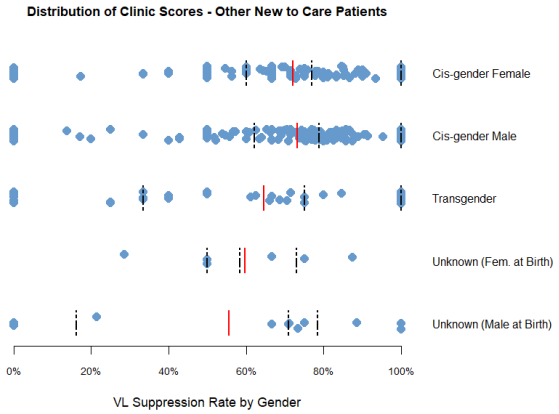


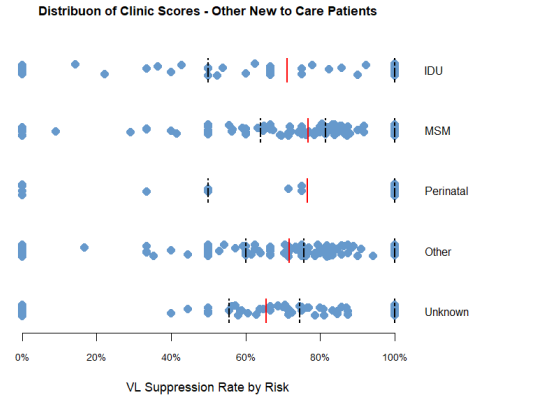


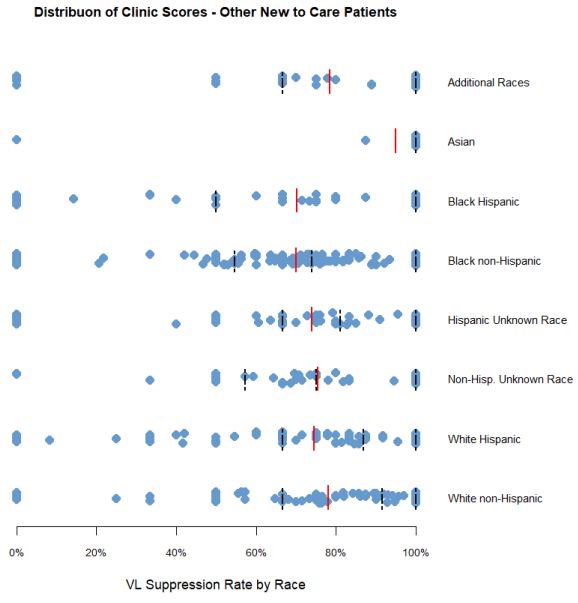
Other New to Care Patients: Clinic-Level VLS Rates (Final VL)

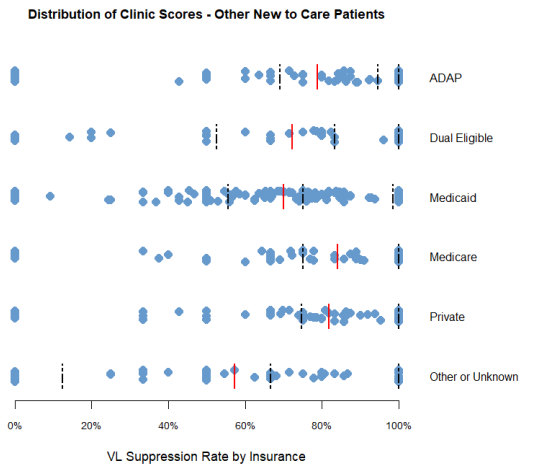
2019 All-Patients Clinic-Level Benchmarks: Mean = 73%; 25th Percentile = 61%; Median = 77%; 75th Percentile = 92%

(n = 5345 patients at 182 clinics)





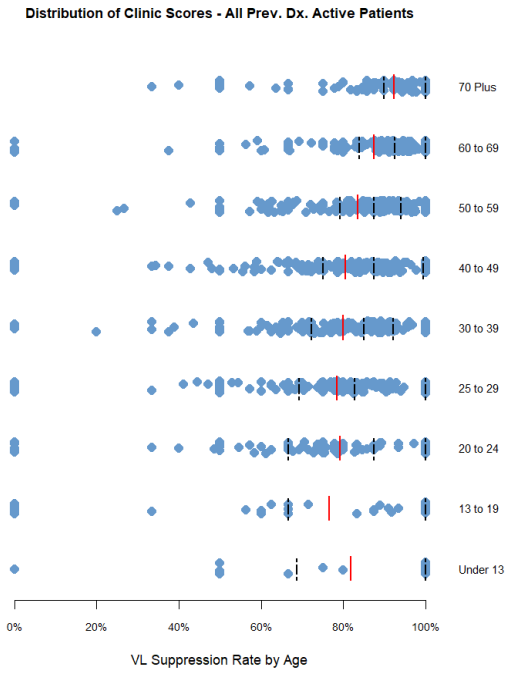


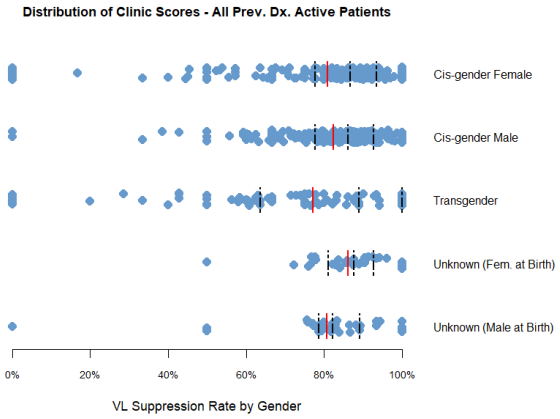


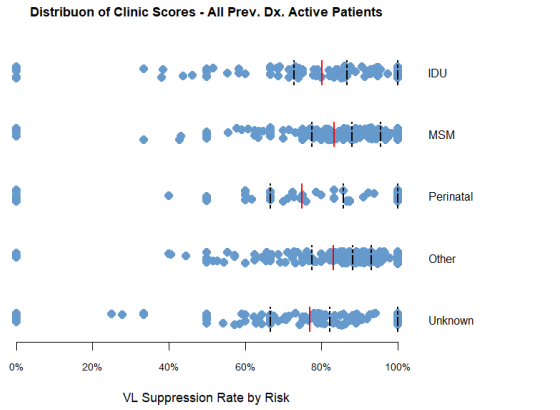
All Previously Diagnosed Active Patients: Clinic-Level VLS Rates

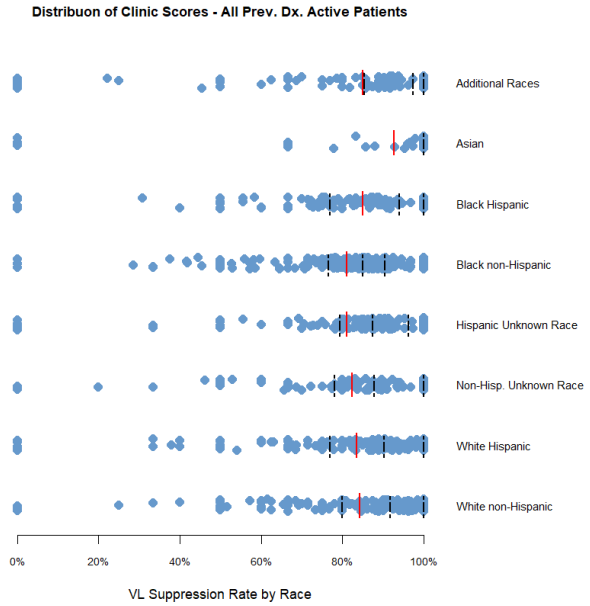
2019 All-Patients Clinic-Level Benchmarks: Mean = 81%; 25th Percentile = 77%; Median = 86%; 75th Percentile = 92%

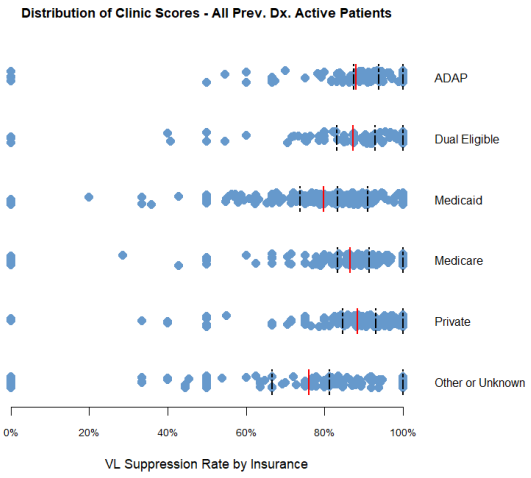
(n = 69,548 patients at 238 clinics)







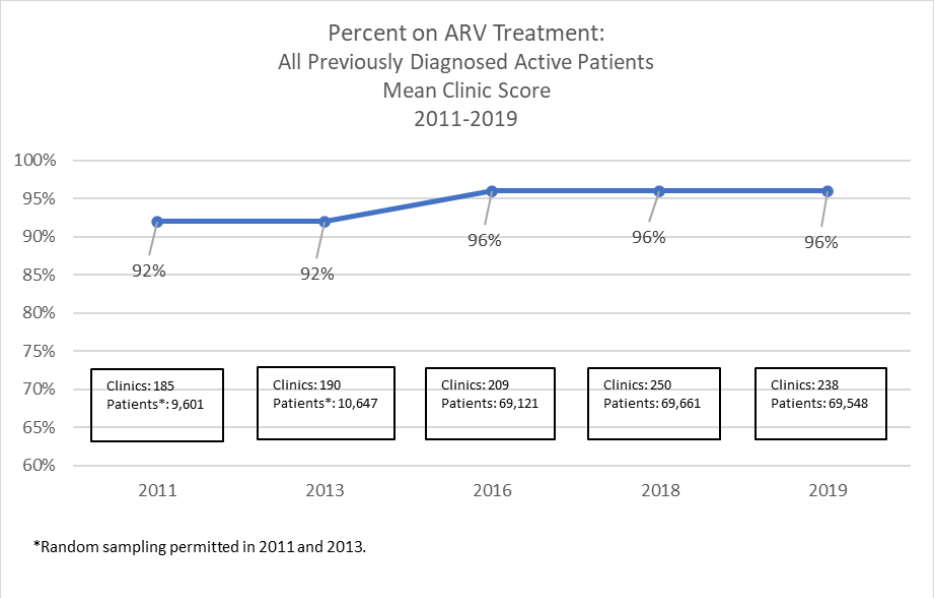




Antiretroviral Therapy (ART) and Viral Load Suppression (VLS): General Analysis

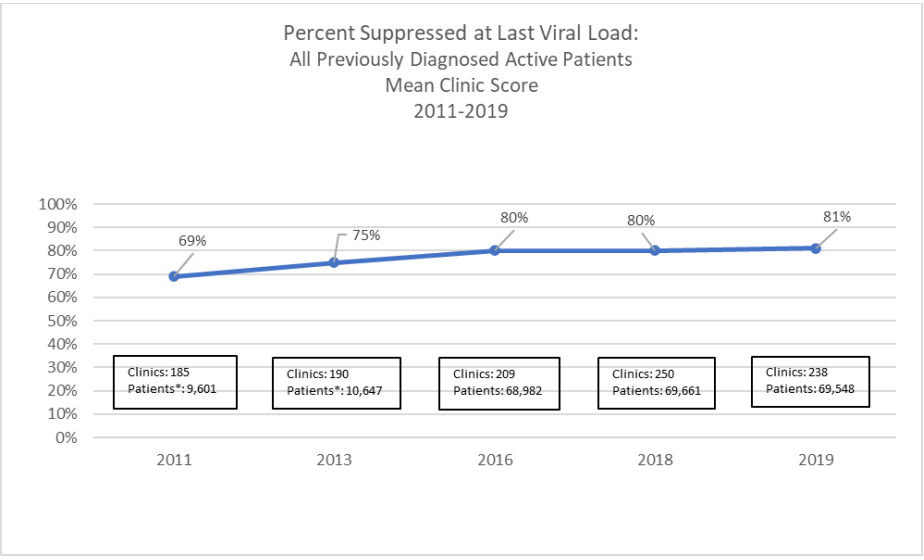
ART Trend Line: Clinic-Level Results; All Previously Diagnosed Active Patients

Since increasing in 2016, the rate of ARV prescription among all previously diagnosed active patients has remained consistently high.



VLS Trend Line: Clinic-Level Results; All Previously Diagnosed Active Patients

While the trend has slowed, we saw a further increase, from 80% to 81%, in the average clinic-level suppression rate on final VL among all previously diagnosed active patients.



Viral Load Suppression among Previously Diagnosed Active and Inactive Patients

As described throughout this report, we asked for data on ARV prescription, viral load testing, and viral load suppression regardless of the care status of each patient (excluding only those known to be deceased, receiving external care, relocated, or incarcerated). However, we understand that the HIV care clinics typically tasked with submitting these reviews may have limited access in some cases to these data for patients seen only in other parts of the medical organization. Even when such data are available, the entire medical organization may not have information about the HIV care provided to these patients. While we want to promote robust documentation and enrollment of patients in care, it is helpful to distinguish outcomes by care group and, further, especially for the "inactive" patients, to distinguish between confirmation that care was not known to be provided and complete lack of knowledge about this. The chart here makes these distinctions. (Data for patients seen at Health + Hospitals clinics are excluded as some distinctions are not possible for those patients.)

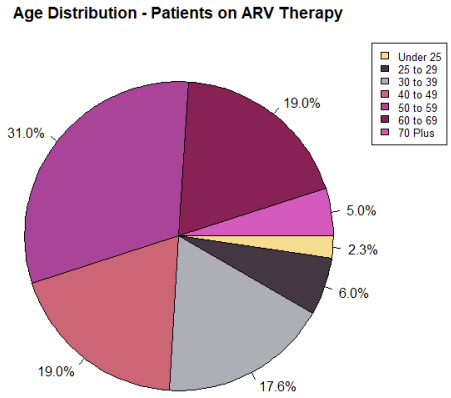
Also of note, this chart makes clear that the overall rate of suppression is typically higher than the mean clinic score. This reflects an overall tendency toward higher suppression rates at larger clinics and, potentially, the effects of random variation among the smaller clinics. In particular, the suppression rate on final viral load among all established active patients included by participating NYS providers was 87.6% (including both patients receiving and not receiving ART therapy in 2019) while the mean clinic rate for these patients was 83.3%. In 2019, at least, it appears that this correlation between clinic size and suppression rate is driven by other factors; see the logistic regression analysis and appendices for additional information about the patient- and facility-level factors associated with suppression.

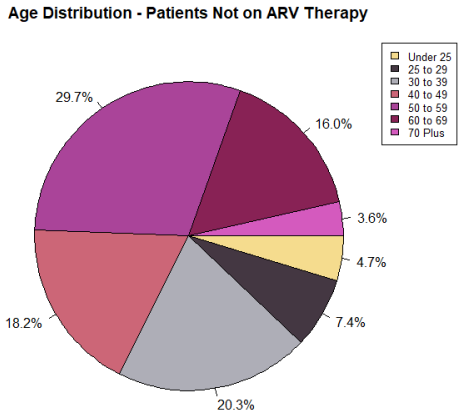
		Established Active Patients		Other New to Care Patients		Eligible Non-Enrolled Patients*	
		Documented Suppression	Not Suppressed or Unknown	Documented Suppression	Not Suppressed or Unknown	Documented Suppression	Not Suppressed or Unknown
On ART		51,218		5094		6802	
	VL obtained	45,239 (88.3%)	5186 (10.1%)	3819 (75.0%)	1078 (21.2%)	2493 (36.7%)	819 (12.0%)
	No known viral load		793 (1.5%)		197 (3.9%)		3490 (51.3%)
Not on ART		875		249		1510	
	VL obtained	423 (48.3%)	248 (28.3%)	112 (45.0%)	75 (30.1%)	181 (12.0%)	150 (9.9%)
	No known viral load		204 (23.3%)		62 (24.9%)		1179 (78.1%)
ART Unknown		10		<10		11,279	
	VL obtained	<10	<10	<10	<10	915 (8.1%)	706 (6.3%)
	No known viral load		<10		<10		9658 (85.6%)

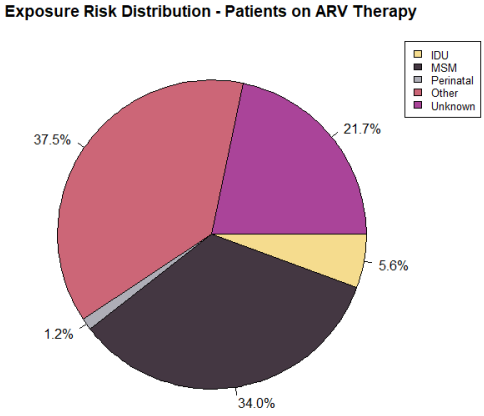
* Patients who died during the review period or were known to be in care elsewhere, relocated outside NYS or incarcerated as of the end of the review period were ineligible and are excluded.

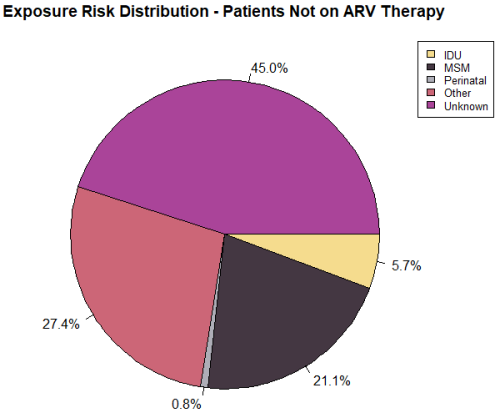
Previously Diagnosed Active Patient Demographic Data by on-ART Status

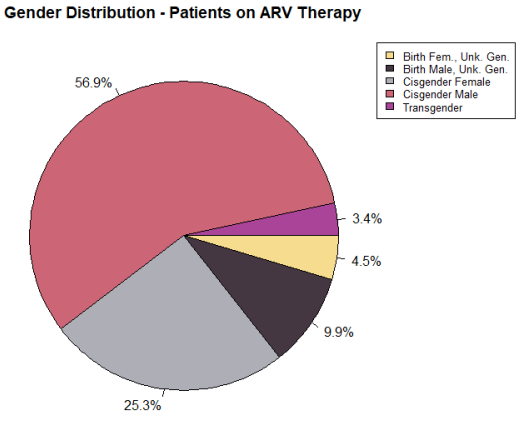
In these charts, we revisit the distribution of previously diagnosed active patients (including Health + Hospitals patients) by various categorizations, this time comparing those on ART (n=69,108; 97.9%) and those without documented ART (n=1440; 2.1%). Besides the marked differences in "unknown" for most classifications, the most prominent differences are by age, where relatively more of the patients who were not prescribed ART in 2019 were under 25 years old, and insurance, where relatively few patients among those not prescribed ART had ADAP as primary insurance (as expected, given the intention of this program).

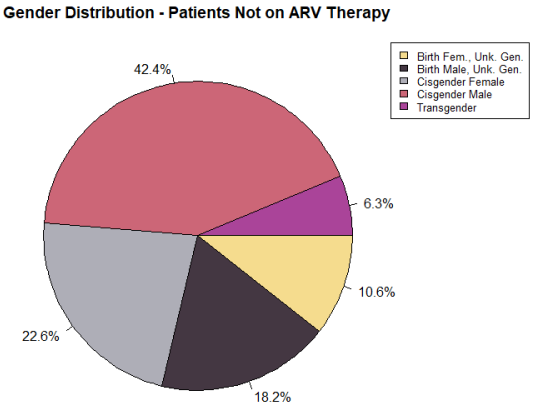


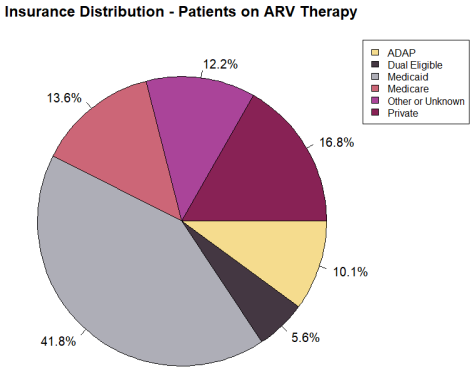


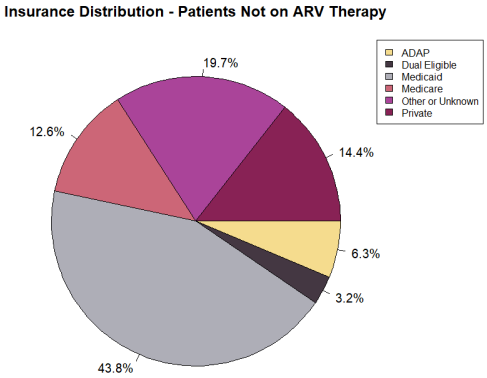


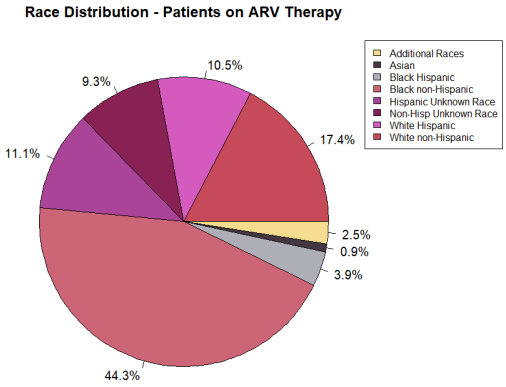


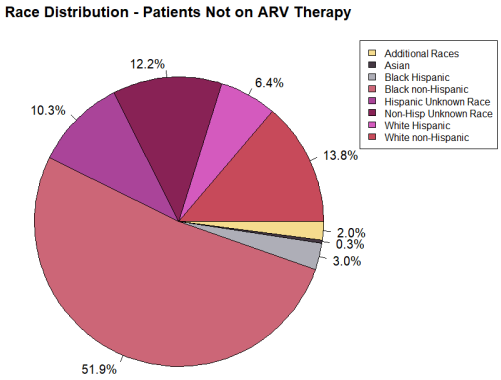












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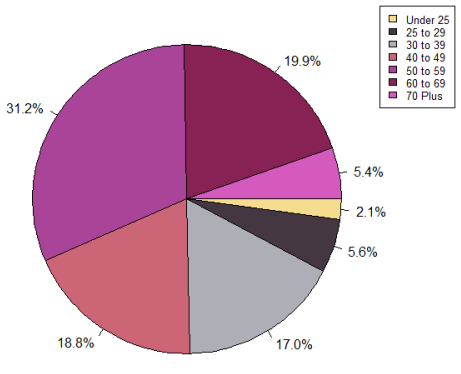
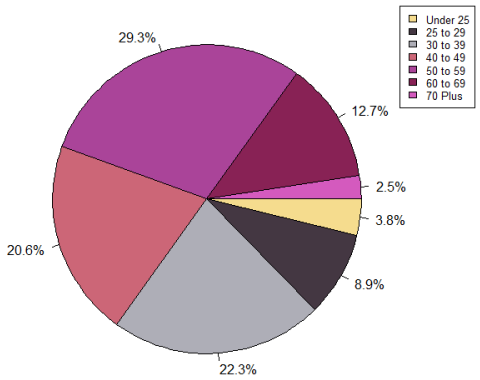
Previously Diagnosed Active Patient Demographic Data by VL Suppression Status

In these charts, we compare the distribution of previously diagnosed active patients (including Health + Hospitals patients) for patients suppressed on final VL (n=60,000; 86.3%) with that for those who were not (n=9548; 13.7%). The proportions are notably higher in the unsuppressed group for younger patients (all age groups under 50 years old); perinatal or IDU exposure risk; transgender patients and patients identified as male at birth but of unknown current gender; patients covered by Medicaid; and Black patients (Hispanic and non-Hispanic). See the logistic regression analysis for a more detailed examination of the factors associated with suppression failure.

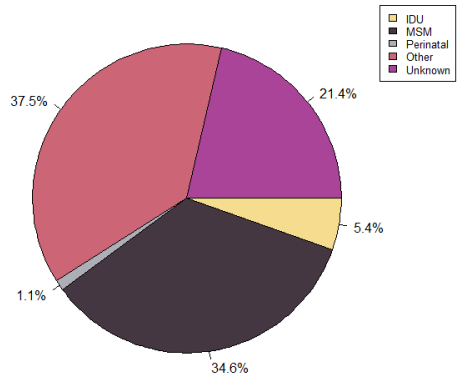
Age Distribution - Suppressed on Final VL



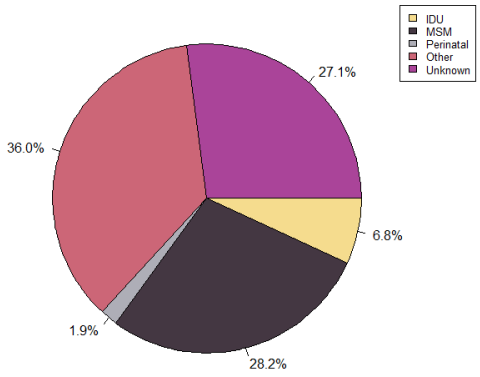
Age Distribution - Not Suppressed or Unknown



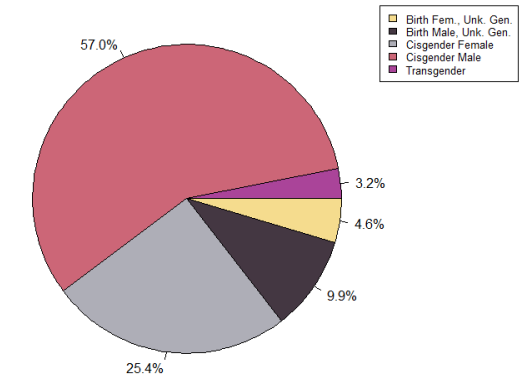
Exposure Risk Distribution - Suppressed on Final VL



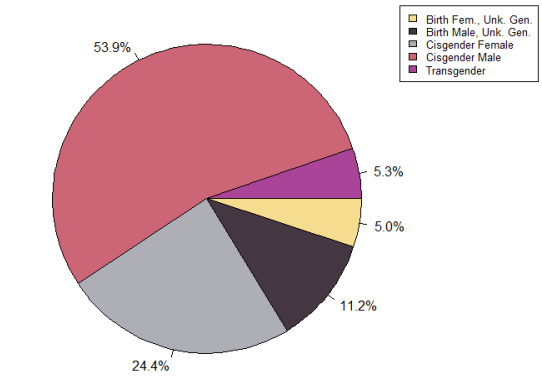
Exposure Risk Distribution - Not Suppressed or Unknown

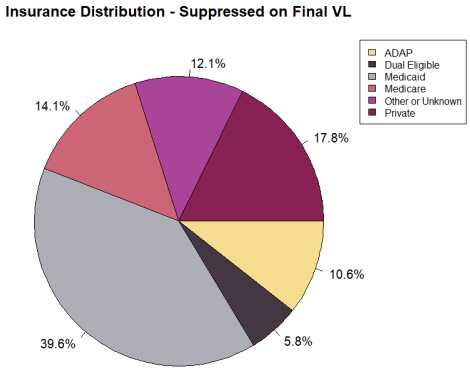


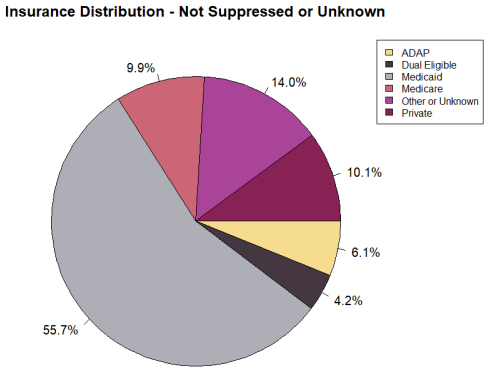
Gender Distribution - Suppressed on Final VL

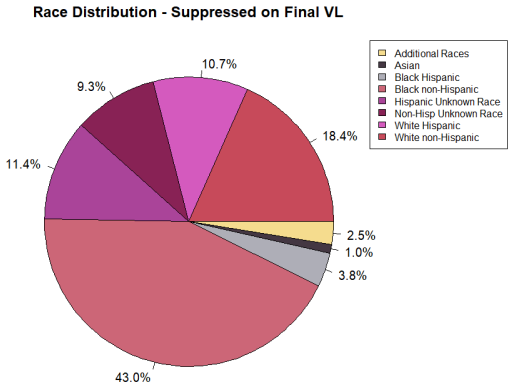


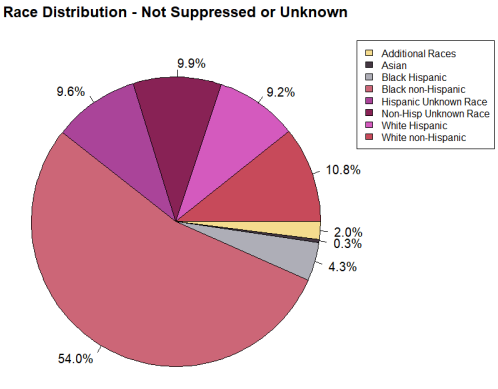
Gender Distribution - Not Suppressed or Unknown











Clinic-Level VLS Rates for All Previously Diagnosed Active Patients by Race – 2018 v. 2019

This table provides a more detailed analysis of the variation in viral load suppression by race/ethnicity, comparing results from 2018 with those seen in the current review period. See Appendix 1 for details regarding classification of patients by race and ethnicity.

	2018					2019				
Race	Pts.	Clinics	Mean	25th Pct.	75th Pct.	Pts.	Clinics	Mean	25th Pct.	75th Pct.
ALL PATIENTS	69,661	250	80%	76%	92%	69,548	238	81%	77%	92%
Asian	523	58	95%	100%	100%	603	66	93%	100%	100%
Black - Hispanic	2981	139	84%	75%	100%	2715	168	85%	77%	100%
Black – non-Hispanic	30,770	229	79%	74%	90%	30,933	222	81%	77%	91%
Unknown - Hispanic	6772	99	79%	73%	96%	7737	115	81%	79%	97%
Unknown – non-Hispanic	8668	100	74%	68%	94%	6541	104	82%	78%	100%
White - Hispanic	6672	172	84%	81%	100%	7277	185	83%	77%	100%
White – non-Hispanic	11,816	207	80%	75%	100%	12,038	197	84%	80%	100%
Additional Races	1459	119	82%	80%	100%	1704	131	85%	85%	100%

Mapping of Results

In the past, knowing that the demographics of NYS vary by region, we have analyzed treatment cascade data and other previous HIV quality review data using the location of the participating providers. This year, for the first time, ZIP Code information was also provided for each patient's last known address in 2019. In addition to facilitating matching of active and inactive patients as described above, this provided a powerful tool for the understanding of social determinants of health. In this section, we look at the geographic variation of VLS rates among the previously diagnosed active patients. Later in this report and in two of the appendices, this information is also used in a formal regression analysis of VLS among these patients (with those from Health + Hospitals excluded from that analysis due to gaps in other information).

VLS and Income by Zip Code

To compare viral load suppression rates with community-level income, we prepared and merged two data sets. The first was a table of viral load suppression rates by ZIP Code among the previously diagnosed active patients within the approved 2019 organizational treatment cascade submissions. The second was a table by NYS ZIP Code with the percentage of all NYS individual tax returns for 2018 that reported an adjusted gross income less than $25,000 (i.e., not just for patients in the treatment cascades, where income was not reported). We excluded patients receiving care in NYS but living outside NYS and ZIP Codes without corresponding IRS data (see below). Finally, to reduce the impact of random effects among small populations, we restricted the data to ZIP Codes with at least 10 previously diagnosed active patients. The final data set included 64,559 patients residing in 462 NYS ZIP Codes in 2019 (172 in New York City (NYC) and 290 outside NYC).

Limitations

Location of Submitting Clinics

The data used for the maps are constrained by the set of providers who participated in the 2019 organizational treatment cascade review. Eighty two organizations submitted approved data for 69,548 previously diagnosed active patients who received care at a total of 238 HIV clinics. Most of these clinics are in the NYC metropolitan region, and most patients reside there. Consequently, large areas of the state had fewer than 10 reported patients per ZIP Code. See the cover page of this report for a map that specifies the location of the participating clinics.

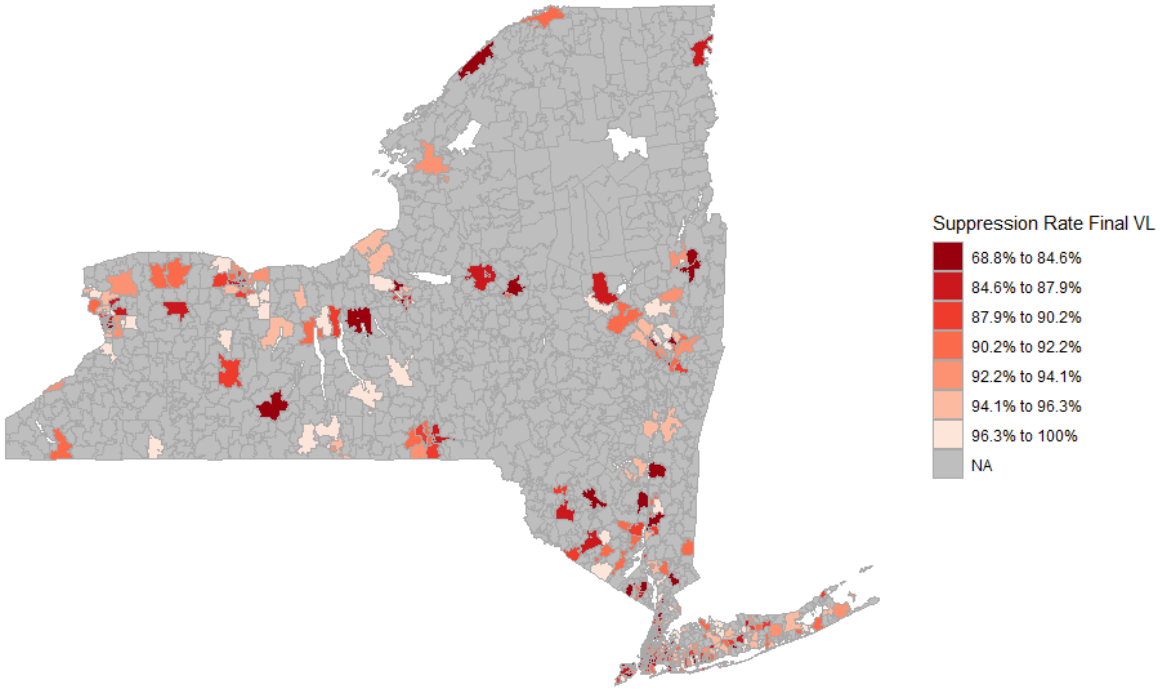
Patients without NYS ZIP Codes

Of the 69,548 initially included patients, 1030 were reported as residing in one of 514 ZIP Codes outside NYS (most in the NYC metropolitan region). An additional 1566 patients had no known address, and 14 patients were reported with illegitimate ZIP Codes. The remaining 66,938 patients resided in one of 1278 NYS ZIP Codes in 2019.

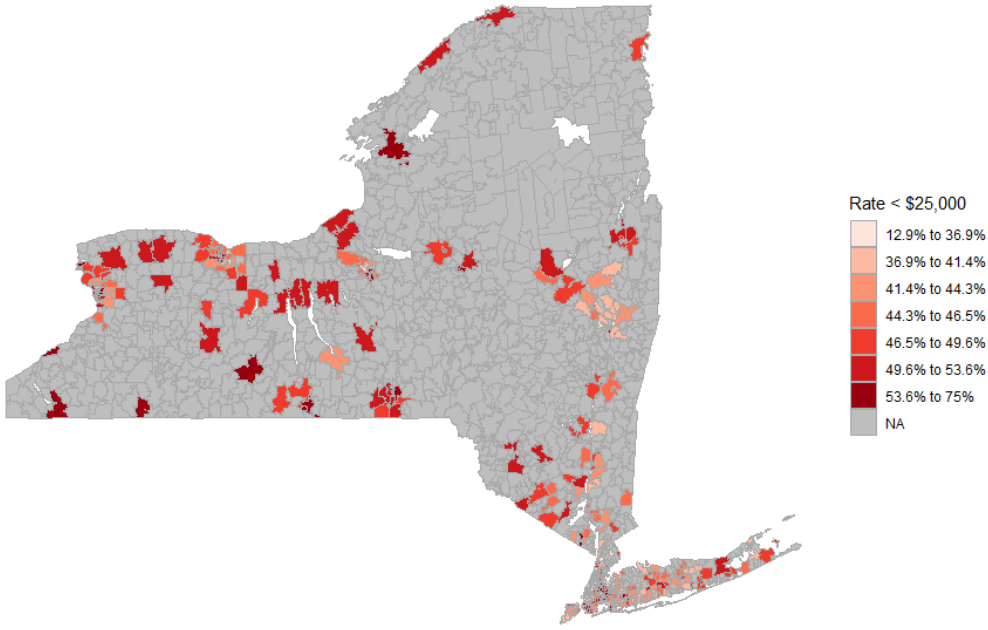
Use of Internal Revenue Service (IRS) Data

Publicly available IRS data provide information income data at ZIP Code-level by tax year. We used the 2018 NYS income data set (based on reports filed in 2019; IRS, Statistics of Income Division, Individual Master File System, August 2020). For each included ZIP Code, the data set specifies the number of returns with reported adjusted gross income in various brackets. We selected the data for individual returns, rather than joint returns. This perhaps better captures "personal income" across the state, but it is also possibly affected by the rate of couples filing jointly by ZIP Code. Some individuals do not file any income tax return each year, and that could also vary geographically. Our selection of the lowest income bracket focused the analysis on the rate of relatively poor people; separate influences for the rate of particularly affluent patients may have been missed. Finally, restriction of the analysis to the included ZIP Codes removed 135 ZIP Codes and 418 patients from the analysis.

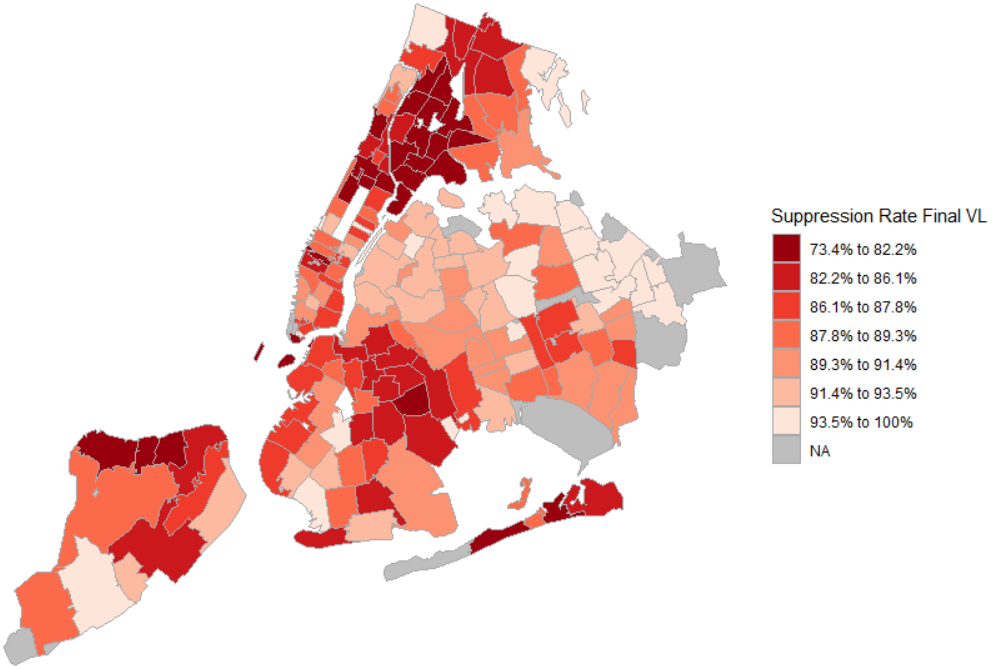
2019 NYS Org. Tx. Cascacde VLS Rates by ZIP Code - Previously Dx. Active Pts. (at Least 10 in ZIP Code)



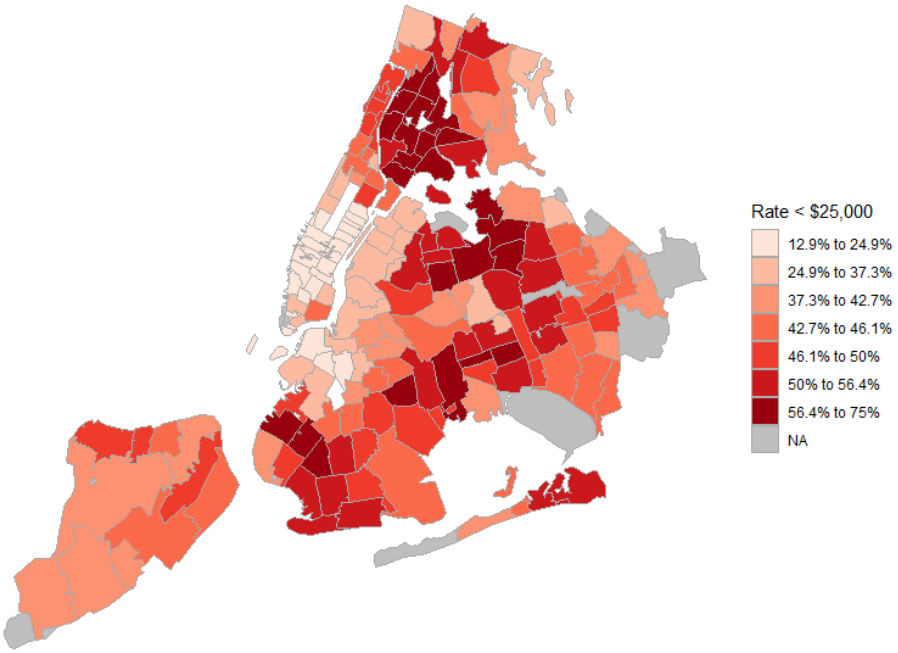
2018 All-NYS Adjusted Gross Income (Reported in 2019) - ZIP Codes with at Least 10 Pts.



2019 NYS Org. Tx. Cascacde VLS Rates by ZIP Code in NYC - Previously Dx. Active Pts. (at Least 10 in ZIP Code)



2018 All-NYC Adjusted Gross Income (Reported in 2019) - ZIP Codes with at Least 10 Pts.



Correlation of VLS and Income at Zip Code Level

While the maps provide immediate insight into areas of low viral load suppression rates and high rates of community impoverishment, only an intuitive sense of the correlation between suppression and income is possible. We therefore calculated the Pearson correlation coefficient between these ZIP Code-level rates for these variables and the associated p values. Interestingly, the correlation when data from all NYS are included is not as strong as when only looking at ZIP Codes either within or outside New York City. This is understandable, however, in that the cost of living is considerably higher in NYC and, therefore, the same percentage of residents reporting an income under $25,000 is suggestive of a greater degree of local impoverishment in NYC than outside NYS. In all cases, the correlation is statistically significant at the conventional $p < 0.05$ threshold (and in most cases for $p < 0.005$). Of note, the mean ZIP Code rates here are higher than the overall suppression rate for NYS, implying that lower suppression rates are seen in ZIP Codes with more patients.

Region	Included ZIP Codes	Variable	Mean ZIP Code Rate	Std. Dev.	Minimum ZIP Code Rate	Maximum ZIP Code Rate	Correlation (p > |r|)
All New York State (NYS)	462	VLS (Cascade Pts.)	90.8%	5.7%	68.8%	100%	-0.1327 (0.0043)
		Inc. < $25K (All Residents)	44.8%	9.8%	12.9%	75.0%	
New York City (NYC)	172	VLS (Cascade Pts.)	88.2%	5.3%	73.4%	100%	-0.20953 (0.0058)
		Inc. < $25K (All Residents)	42.7%	13.3%	12.9%	75.0%	
NYS excluding NYC	290	VLS (Cascade Pts.)	92.3%	5.4%	68.8%	100.0%	-0.23054 (<0.0001)
		Inc. < $25K (All Residents)	46.0%	6.5%	30.1%	71.3%	

[Report continues next page.]

Viral Load Suppression Regression Analysis

To evaluate the variation in viral load suppression rates among previously diagnosed active patients (excluding patients treated at Health + Hospitals facilities where limited patient characterizing data were available), 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 2019 were treated as unsuppressed. See Appendix 3 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 = 0.329 to 0.504) and organizational level (95% CI for standard deviation of intercept = 0.416 to 0.725).

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, new v. established patient status, and, using linked IRS data, percentage of residents in the patient's ZIP Code filing an individual income return in 2019 (for 2018) with an adjusted gross income (AGI) under $25,000); (iii) fixed effects at the clinic level (clinic active patient caseload and percentage of residents in the facility's ZIP Code reporting an AGI under $25,000); and (iv) interactive effects at the patient and clinic levels but not between 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 categorization of primary insurance status was reduced to ADAP, Dual Eligible, Medicaid, Medicare, None, Private, Other or Unknown, 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 and enrollment status (new v. established in care) but not for gender/risk, housing status, insurance status, race, or community income:

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)	2.428E-7
Neighborhood Income (Percent of Residents in Patient's ZIP Code with AGI < $25,000)	0.503
Enrollment Status ("Established" v. New to Care)	8.228E-6
Gender/Exposure Risk* (All Combinations of Gender and Risk Described Elsewhere in this Report except Cis-gender Female and MSM)	1.000
Housing Status (Stable, Temporary, Unstable, Unknown)	0.1158
Insurance Status (ADAP, Dual Eligible, Medicaid, Medicare, None, Private, Other or Unknown)	0.9999
Race/Ethnicity* (Asian, Black-Hispanic, Black-non-Hispanic, White-Hispanic, White-non-Hispanic, Unknown-Hispanic, Unknown-non-Hispanic, Additional Races)	0.8403

*See notes about demographic groups in the first appendix to this report.

Finally, incorporating the significant random slopes, we allowed for the possibility of interactive effects between patient- and clinic-level predictors. 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 variables and interactive effects with an overall p-value (Type II Wald chi-square test) below 0.05, with most values much smaller than that. P-values were also estimated for specific values of each variable using the Wald test. See Appendix 3 for a complete table of these results.

Type II Wald Tests of Fixed Effects on VLS for Final Model (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)	184.799	1	<2.2E-16
Percent in ZIP Code with AGI < $25,000	25.671	1	4.048E-7
Enrollment Status (“Established” v. New to Care)	140.940	1	<2.2E-16
Gender/Exposure Risk	245.106	23	<2.2E-16
Housing Status	153.103	3	<2.2E-16
Insurance Status	304.153	7	<2.2E-16
Race/Ethnicity	144.990	7	<2.2E-16
Age * Enrollment Status	13.481	1	0.000241
Age * Race/Ethnicity	17.918	7	0.012346
Housing * Insurance	44.954	21	0.001756
Housing * Enrollment	18.813	3	0.000299

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 housing status, insurance status, and the interaction between the two variables:

Factor(s)	Levels		Regression Coefficient Estimate
Housing	Stable Housing*		0 [Default]
	Temporary Housing		-0.5930
	Unstable Housing		-0.0601
	Unknown Housing		0.1387
Insurance		ADAP*	0 [Default]
		Dual-Eligible	-0.3594
		Medicaid	-0.4809
		Medicare	-0.3337
		Private	0.1016
		None	-0.3805
		Other	-0.4887
		Unknown Insurance	-1.1164
Housing * Insurance	Temporary Housing	Dual-Eligible	-0.0363
		Medicaid	0.0029
		Medicare	0.1142
		Private	0.5151
		None	0.2778
		Other	0.7220
		Unknown Insurance	1.3758
	Unstable Housing	Dual-Eligible	-0.2883
		Medicaid	-0.6007
		Medicare	-0.5833
		Private	-0.6108
		None	-1.0639
		Other	-0.2866
		Unknown Insurance	-1.3784
	Unknown Housing	Dual-Eligible	0.1705
		Medicaid	-0.3210

		Medicare	-0.0681
		Private	-0.2656
		None	-0.6084
		Other	1.1759
		Unknown Insurance	0.1649

*Interactive effects for default values (Stable Housing and ADAP coverage) are not shown as these are all automatically assigned a value of zero during model optimization.

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 temporarily housed patient with Medicare coverage is -0.5930 + -0.3337 + 0.1142 = -0.8115 and the sum of these coefficients for a stably housed patient covered through ADAP is 0. Therefore, the odds of suppression (probability of being suppressed divided by probability not suppressed) for the second patient are approximately 2.25 (i.e., $e^{(0-(-0.8115))}$) times those of the first patient in this case. Among patients covered through private/commercial insurance, the odds of suppression for a stably housed patient are only approximately 1.08 (i.e., $e^{(-0.5151-(-0.5930))}$) times those of a temporarily housed patient, as the interactive effect mitigates against the difference in outcomes by housing status. 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 perinatally infected cis-gender female non-Hispanic white patient with who was previously diagnosed but newly enrolled in care at the organization, on private insurance and receiving care at a "typical" clinic in a ZIP Code where 50% of residents reported an adjusted gross income for 2018 of less than $25,000 is approximately 74.5%, while the probability for a similar non-Hispanic Black patient is approximately 66.9%. This corresponds to an odds ratio of approximately 2.92/2.02 = 1.44, compared to a suppression probability ratio of 0.745/0.669 = 1.11.

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.

[Report continues next page.]

Appendices

Appendix 1: Reporting Conventions and Glossary

The NYS organizational treatment cascade reviews have a lexicon that has developed over the past several years and is, in some cases, particular to the reporting conventions for these reviews. A close examination of this terminology and any differences from other uses of similar terminology is essential to understanding the scope of the review and the outcomes presented in this report.

General Terminology

Active Patients: Patients who received medical services in the HIV program of the organization during the measurement year and were not "excusable" as defined below.

Established Active Patients: Active patients who also received HIV care (medical visit or viral load test) at the reporting organization at any time during the two years immediately preceding the measurement year .

"Excused" Patients: Patients not included in the denominator for ARV therapy, VL testing or VL suppression indicators because they were known to be incarcerated at the end of the measurement year, deceased by the end of the measurement year, or confirmed to be relocated outside NYS or in-care elsewhere in NYS at the end of the measurement year. All "excused" patients were still reportable for patient-matching purposes, and if newly diagnosed within the organization in 2019 these patients were still eligible for the linkage to care indicator.

Linkage to Care: A newly diagnosed patient is considered to have been linked to medical care if the individual, on or after the date of initial HIV diagnosis, either received an ARV prescription or attended a routine HIV medical visit. Timely linkage is within three calendar days of the diagnosis date, but other intervals are also assessed.

Measurement Year: Calendar year 2019 (1/1/2019 through 12/31/2019).

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

Non-Active Patients: Patients who had contact with a healthcare organization during the measurement year but were not seen by the HIV clinical program during that year or who were "excusable" as defined above.

Open Patients: Previously diagnosed patients were (1) not new to care in 2019 or returning after an absence of at least two years (no visits or viral loads) and (2) not "excusable" as defined above. Includes both "Established Active" and "Open Non-Active" patients.

Open Non-Active Patients: Previously diagnosed patients who were neither established in care at the reporting organization nor "excusable" as defined above (i.e., current HIV care status is unknown).

Other New to Care Patients: Patients who were (1) diagnosed prior to the review period but were new to an organization's HIV program or (2) were seen for HIV care prior to 2017, not seen (nor viral load reported) in 2017 or 2018, but then returned in 2019; excludes those who were "excusable" as defined above.

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

Relationship between Care Status Categories and Indicator Eligibility

Care Status Categories for Indicator Eligibility						
			Diagnosis			
			Internally diganosed during the review period	Externally diganosed during the review period	Diagnosed prior to the review period	Unknown
Enrollment	Active	New to clinic during review period, continuing in program	(a) "Newly diagnosed active - linkage eligible"	(b) "Newly diagnosed active - linkage ineligible"	(c) "Other new to care"	
		Seen in clinic prior to the review period, continuing in program	Not Allowed		(d) "Established active"	
	Non-active	Died during the review period	(e) "Linkage only"	(f) "Excused - newly diagnosed"	(g) "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 organization as of the end of the review period				
		Other (or unknown) status, not enrolled at reporting organization	(h) "Newly diagnosed of unknown status - linkage eligible"	(i) "Newly diagnosed of unknown status - linkage ineligible"	(j) "Open non-active"	

Indicator	Included Categories
ARV Therapy - Previously Diagnosed Open Patients	(d) and (j)*
VL Testing - Previously Diagnosed Open Patients	(d) and (j)*
VL Suppression - Previously Diagnosed Open Patients	(d) and (j)*
ARV Therapy - Established Active Patients	(d)*
VL Testing - Established Active Patients	(d)*
VL Suppression - Established Active Patients	(d)*
ARV Therapy - "Other New to Care" Patients	(c)*
VL Testing - "Other New to Care" Patients	(c)*
VL Suppression - "Other New to Care" Patients	(c)*
ARV Therapy - All Previously Diagnosed Active Patients	(c) and (d)
VL Testing - All Previously Diagnosed Active Patients	(c) and (d)
VL Suppression - All Previously Diagnosed Active Patients	(c) and (d)
ARV Therapy - Newly Diagnosed Patients	(a), (b), (h) and (i)**
VL Testing within 91 Days - Newly Diagnosed Patients	(a), (b), (h) and (i)**
VL Suppression within 91 Days - Newly Diagnosed Patients	(a), (b), (h) and (i)**
Linkage to Care within 3 Days - Internally Diagnosed Patients	(a), (e) and (h)**
Resistance Testing - Newly Diagnosed Active Patients	(a) and (b)

* Health + Hospitals patients excluded due to inability to distinguish categories (c) and (d).

** Health + Hospitals patients excluded due to limited data on date of diagnosis and initiation of HIV care.

Patient Characterizing Groups Used in this Report

Participating organizations submitted data using a structed Excel template that included fields for basic demographic information as well as some of the key information typically collected for HIV+ patients such as their most likely HIV exposure risk. These data presented various options for reporting, and decisions made in this report reflect various objectives:

1) Make use of the results of an initial regression analysis regarding the factors most significantly associated with viral load suppression.
2) Meaningfully address the absence of information about some patients ("unknown" race, gender, etc.).
3) Keep the number of categorizations manageable and number of patients in each group above thresholds for statistical significance and suppression of data for small subpopulations.

The sections below detail how the main groupings were ultimately made.

Race/Ethnicity

Data were submitted for Race, Asian Subtype (if applicable), Ethnicity (Hispanic or non-Hispanic), and Hispanic Subtype (if applicable). Providers could enter more than one response for these fields except Ethnicity. While the data for Hispanic Subtype were very sparse, Asian Subtype was frequently used.

Patients were assigned to a racial group as follows:

1) If Asian = "Yes", one or more values were entered for Asian Subtype, and no other values were entered for Race, the patient was classified as "Asian."
2) If Black = "Yes" and no other values were entered for race:
    a. If Ethnicity = "Hispanic", then the patient was classified as "Black - Hispanic."
    b. If Ethnicity = "non-Hispanic" or "Unknown", then the patient was classified as "Black - non-Hispanic."
3) If White = "Yes" and no other values were entered for race:
    a. If Ethnicity = "Hispanic", then the patient was classified as "White - Hispanic."
    b. If Ethnicity = "non-Hispanic" or "Unknown", then the patient was classified as "White - non-Hispanic."
4) If no values were entered for Race, then the patient was classified as "Unknown."
5) All other patients, including those with "NHPI" (Native Hawaiian/Pacific Islander) or "AIAN" (American Indian/Alaskan Native) and multi-race patients, were classified as being in "Additional Races."

Gender

Data reported included Sex (at Birth) and (Current) Gender. "Unknown" was allowed for either, but not both. Options for current gender included male, female, transgender woman, transgender man, and transgender other/nonconforming/non-binary.

Patients were assigned to a gender group as follows:

1) If Sex = "Female" and Gender = "Female" then the patient was classified as "Cis-gender Female."
2) If Sex = "Male" and Gender = "Male" then the patient was classified as "Cis-gender Male."
3) If Sex = "Female" and Gender = "Unknown" then the patient was classified as "Unknown, Female at Birth."
4) If Sex = "Male" and Gender = "Unknown" then the patient was classified as "Unknown, Male at Birth."
5) All other patients were classified as "Transgender."

Exposure Risk

A single field was used, but providers could enter a string of multiple values.

The following hierarchical classification scheme was used:

1) If Risk = “Unknown” was reported, then the patient was classified as “Unknown Risk.”
2) If Risk = “PERI” (perinatal infection) was included, then the patient was classified as “Perinatal.”
3) If Risk = “IDU” (injecting drug user) was included, then the patient was classified as “IDU.”
4) If Risk = “MSM” (men who have sex with men) was included, then the patient was classified as “MSM.”
5) All other patients (including those reporting heterosexual exposure, blood transfusion risk, or hemophilia risk) were classified as “Other Risk.”

Insurance

A single field was provided for entry of the patient’s last known primary insurance payer in 2019, and only one value was allowed per patient. Classification, therefore, simply entailed pooling of some less frequently used options (“VA” for Veteran’s Administration and “OP” for Other Plan) into a single “Other Insurance” category.

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Appendix 2: Viral Load Suppression Heat Map

All sites with approved 2019 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 (dark green), high performing (yellow-green), low performing (light red) and very low performing (dark red) sites.

On the following pages, we provide a key that shows how this color coding is used for these brackets throughout the maps. The table below 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, all of the clinics at or above the 90th percentile for unadjusted VLS have rates of 100%. 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. 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 a newly enrolled (but previously diagnosed) patient being suppressed at a clinic that falls at the 75th percentile for performance in suppression particular to these patients are 1.19 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 1.43.

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 age 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 1.698, and when comparing a 90th percentile clinic to a 10th percentile one, the relative odds would have increased to 2.637. However, since clinics scored better for some of these factors than others, the observed odds ratios for the combined effects are lower: 1.536 and 2.374, respectively. See Appendix 3 for additional details.

The tables on the subsquent 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 (all intercepts combined) and specific subpopulations (slopes).

Benchmarks for Unadjusted VLS Rates and Regression Model Random Effects

Percentile (Color Coding Applied to "Scores" beneath that for this Benchmark but above any Lower Thresholds*)	Unadjusted VLS Rate	Regression Model Random Effect Coefficients: Sum of Clinic- and Organizational-Level Values				Regression Model: Combined All-Patient Effects
		Age		Enrollment Status		
		All Patients	$(Age - 20)^2 / 100$	All Prev. Dx. Patients	New to Care (although Prev. Dx.)	
10th	60.0%	-0.367	-0.015	-0.194	-0.165	-0.522
25th	76.3%	-0.204	-0.008	-0.100	-0.066	-0.234
75th	91.8%	0.152	0.006	0.072	0.061	0.195
90th	100.0%	0.245	0.011	0.164	0.191	0.343
Maximum	100.0%	0.657	0.029	0.485	0.428	0.957

*For unadjusted VLS, the top 10% (exactly) of scores were 100%, and these constituted the top bracket (dark green); scores from 91.8% to just beneath 100% are colored with light green (75^{th} to 90^{th} percentiles).

Adjusted Odds Ratios in Regression Model

Adjusted Odds Ratios	All Patients (Age Intercept)	$(Age - 20)^2 / 100$ Effect (Slope)	All Patients (Enrollment Intercept)	New to Care Effect (Slope)	Combined All-Patients Effects (if Correlated)	Combined All-Patients Effects (Observed)
75^{th} Pct. / 25^{th} Pct.	1.428	1.014	1.189	1.136	1.698	1.536
90^{th} Pct. / 10^{th} Pct.	1.844	1.026	1.430	1.427	2.637	2.374

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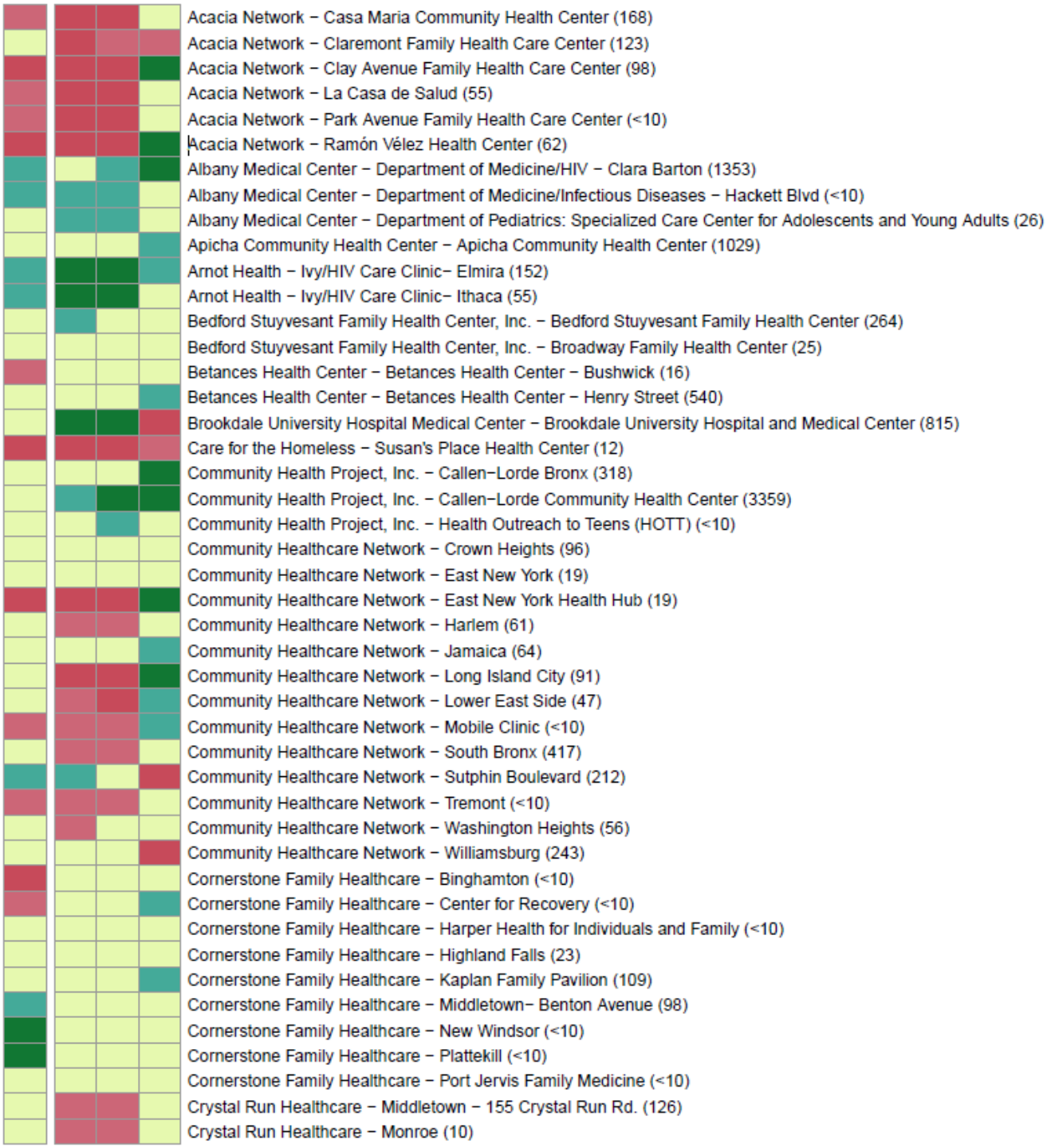
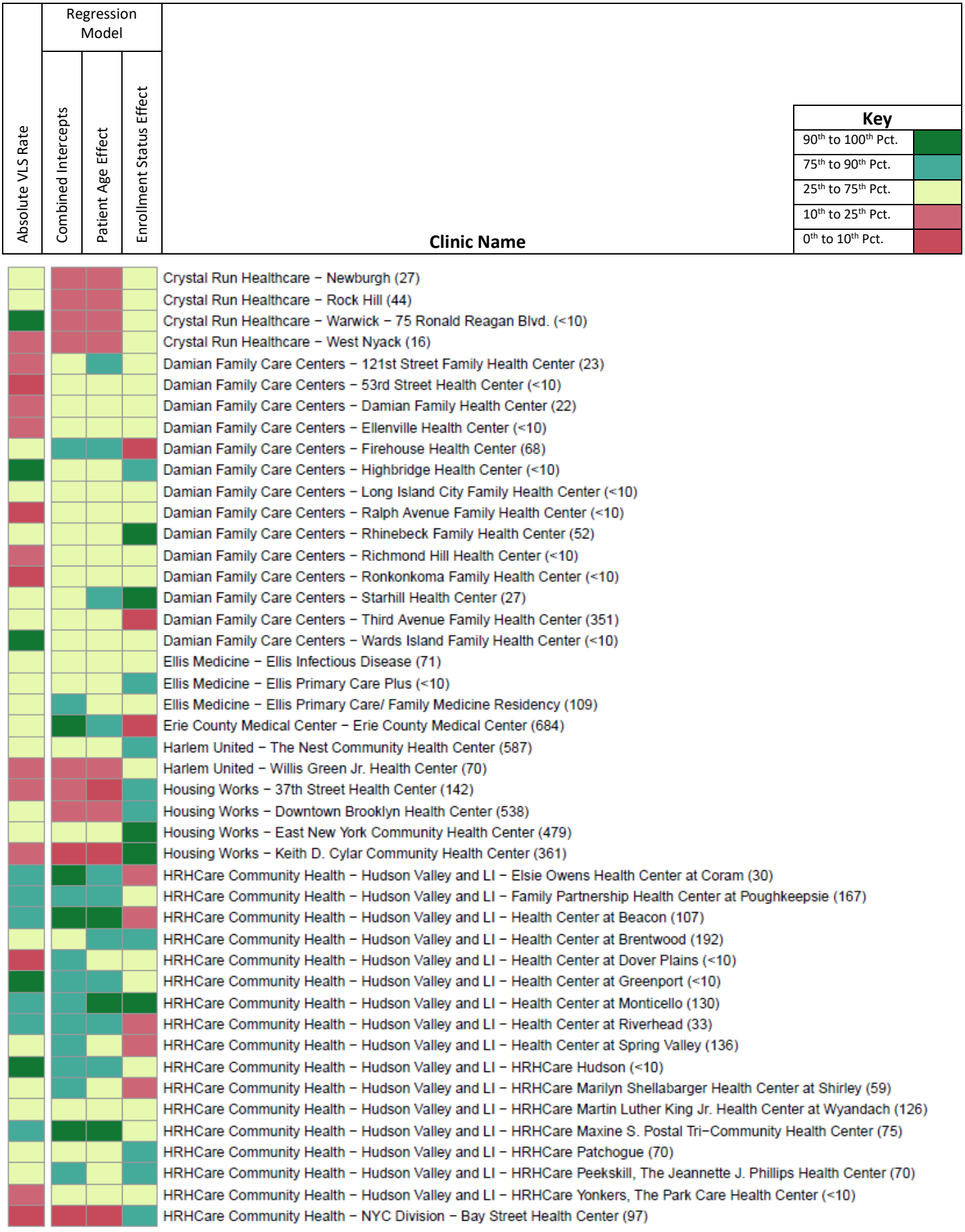
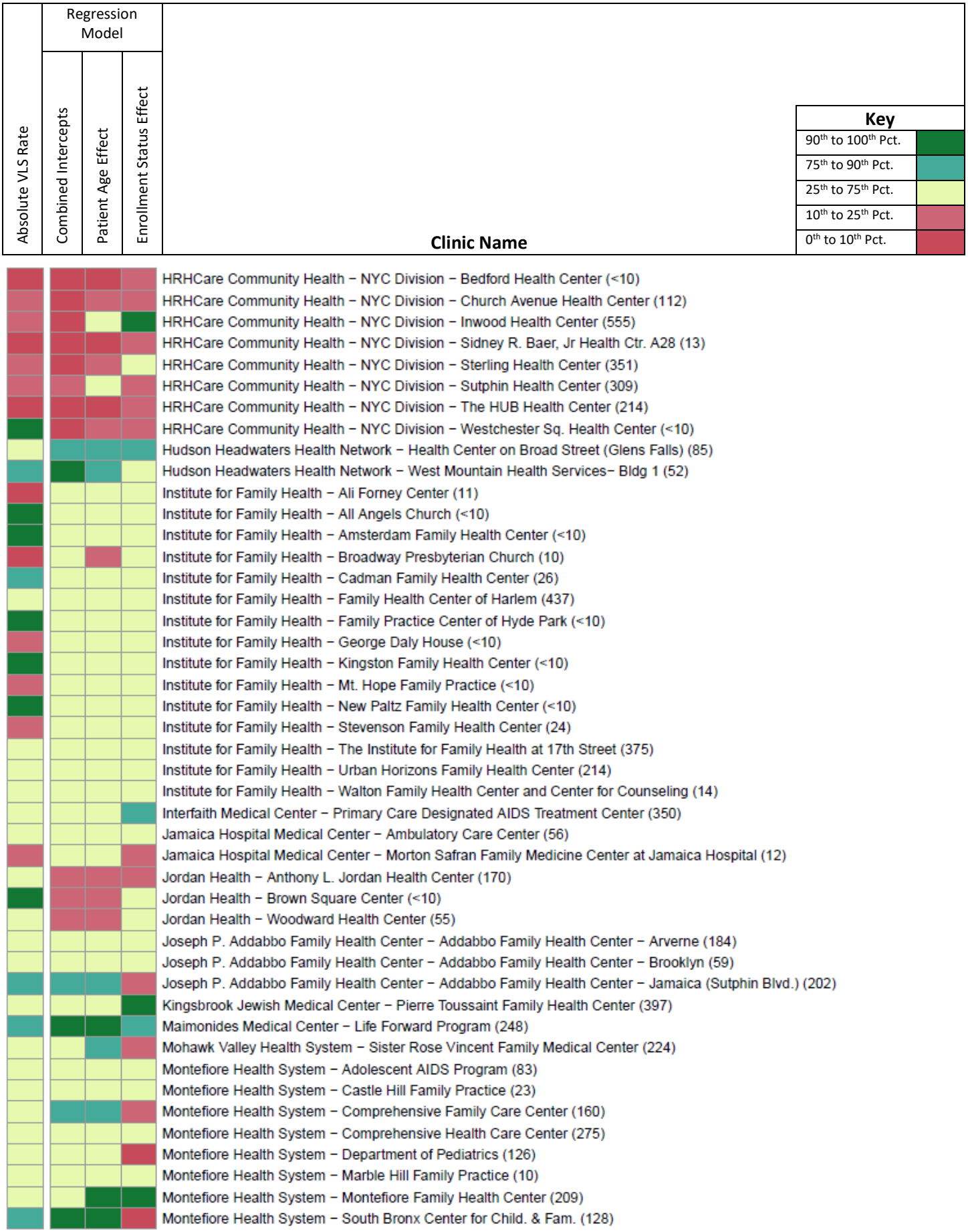
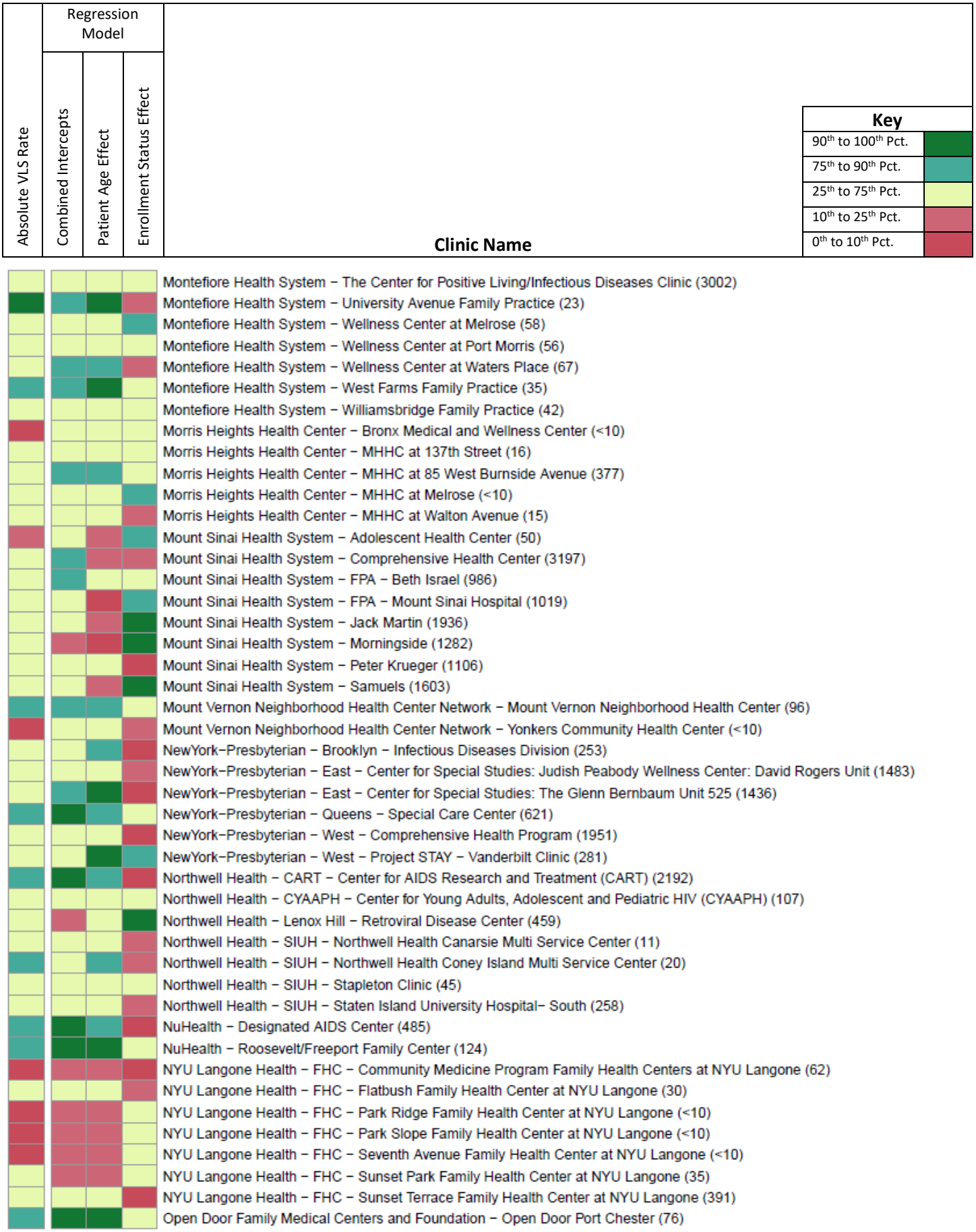

Absolute VLS Rate
Regression Model
Combined Intercepts
Patient Age Effect
Enrollment Status Effect
Clinic Name
Key
90th to 100th Pct.
75th to 90th Pct.
25th to 75th Pct.
10th to 25th Pct.
0th to 10th Pct.
Acacia Network – Casa Maria Community Health Center (168)
Acacia Network – Claremont Family Health Care Center (123)
Acacia Network – Clay Avenue Family Health Care Center (98)
Acacia Network – La Casa de Salud (55)
Acacia Network – Park Avenue Family Health Care Center (<10)
Acacia Network – Ramón Vélez Health Center (62)
Albany Medical Center – Department of Medicine/HIV – Clara Barton (1353)
Albany Medical Center – Department of Medicine/Infectious Diseases – Hackett Blvd (<10)
Albany Medical Center – Department of Pediatrics: Specialized Care Center for Adolescents and Young Adults (26)
Apicha Community Health Center – Apicha Community Health Center (1029)
Arnot Health – Ivy/HIV Care Clinic– Elmira (152)
Arnot Health – Ivy/HIV Care Clinic– Ithaca (55)
Bedford Stuyvesant Family Health Center, Inc. – Bedford Stuyvesant Family Health Center (264)
Bedford Stuyvesant Family Health Center, Inc. – Broadway Family Health Center (25)
Betances Health Center – Betances Health Center – Bushwick (16)
Betances Health Center – Betances Health Center – Henry Street (540)
Brookdale University Hospital Medical Center – Brookdale University Hospital and Medical Center (815)
Care for the Homeless – Susan's Place Health Center (12)
Community Health Project, Inc. – Callen–Lorde Bronx (318)
Community Health Project, Inc. – Callen–Lorde Community Health Center (3359)
Community Health Project, Inc. – Health Outreach to Teens (HOTT) (<10)
Community Healthcare Network – Crown Heights (96)
Community Healthcare Network – East New York (19)
Community Healthcare Network – East New York Health Hub (19)
Community Healthcare Network – Harlem (61)
Community Healthcare Network – Jamaica (64)
Community Healthcare Network – Long Island City (91)
Community Healthcare Network – Lower East Side (47)
Community Healthcare Network – Mobile Clinic (<10)
Community Healthcare Network – South Bronx (417)
Community Healthcare Network – Sutphin Boulevard (212)
Community Healthcare Network – Tremont (<10)
Community Healthcare Network – Washington Heights (56)
Community Healthcare Network – Williamsburg (243)
Cornerstone Family Healthcare – Binghamton (<10)
Cornerstone Family Healthcare – Center for Recovery (<10)
Cornerstone Family Healthcare – Harper Health for Individuals and Family (<10)
Cornerstone Family Healthcare – Highland Falls (23)
Cornerstone Family Healthcare – Kaplan Family Pavilion (109)
Cornerstone Family Healthcare – Middletown– Benton Avenue (98)
Cornerstone Family Healthcare – New Windsor (<10)
Cornerstone Family Healthcare – Plattekill (<10)
Cornerstone Family Healthcare – Port Jervis Family Medicine (<10)
Crystal Run Healthcare – Middletown – 155 Crystal Run Rd. (126)
Crystal Run Healthcare – Monroe (10)


Absolute VLS Rate
Regression Model
Combined Intercepts
Patient Age Effect
Enrollment Status Effect
Clinic Name
Key
90th to 100th Pct.
75th to 90th Pct.
25th to 75th Pct.
10th to 25th Pct.
0th to 10th Pct.
Crystal Run Healthcare – Newburgh (27)
Crystal Run Healthcare – Rock Hill (44)
Crystal Run Healthcare – Warwick – 75 Ronald Reagan Blvd. (<10)
Crystal Run Healthcare – West Nyack (16)
Damian Family Care Centers – 121st Street Family Health Center (23)
Damian Family Care Centers – 53rd Street Health Center (<10)
Damian Family Care Centers – Damian Family Health Center (22)
Damian Family Care Centers – Ellenville Health Center (<10)
Damian Family Care Centers – Firehouse Health Center (68)
Damian Family Care Centers – Highbridge Health Center (<10)
Damian Family Care Centers – Long Island City Family Health Center (<10)
Damian Family Care Centers – Ralph Avenue Family Health Center (<10)
Damian Family Care Centers – Rhinebeck Family Health Center (52)
Damian Family Care Centers – Richmond Hill Health Center (<10)
Damian Family Care Centers – Ronkonkoma Family Health Center (<10)
Damian Family Care Centers – Starhill Health Center (27)
Damian Family Care Centers – Third Avenue Family Health Center (351)
Damian Family Care Centers – Wards Island Family Health Center (<10)
Ellis Medicine – Ellis Infectious Disease (71)
Ellis Medicine – Ellis Primary Care Plus (<10)
Ellis Medicine – Ellis Primary Care/ Family Medicine Residency (109)
Erie County Medical Center – Erie County Medical Center (684)
Harlem United – The Nest Community Health Center (587)
Harlem United – Willis Green Jr. Health Center (70)
Housing Works – 37th Street Health Center (142)
Housing Works – Downtown Brooklyn Health Center (538)
Housing Works – East New York Community Health Center (479)
Housing Works – Keith D. Cylar Community Health Center (361)
HRHCare Community Health – Hudson Valley and LI – Elsie Owens Health Center at Coram (30)
HRHCare Community Health – Hudson Valley and LI – Family Partnership Health Center at Poughkeepsie (167)
HRHCare Community Health – Hudson Valley and LI – Health Center at Beacon (107)
HRHCare Community Health – Hudson Valley and LI – Health Center at Brentwood (192)
HRHCare Community Health – Hudson Valley and LI – Health Center at Dover Plains (<10)
HRHCare Community Health – Hudson Valley and LI – Health Center at Greenport (<10)
HRHCare Community Health – Hudson Valley and LI – Health Center at Monticello (130)
HRHCare Community Health – Hudson Valley and LI – Health Center at Riverhead (33)
HRHCare Community Health – Hudson Valley and LI – Health Center at Spring Valley (136)
HRHCare Community Health – Hudson Valley and LI – HRHCare Hudson (<10)
HRHCare Community Health – Hudson Valley and LI – HRHCare Marilyn Shellabarger Health Center at Shirley (59)
HRHCare Community Health – Hudson Valley and LI – HRHCare Martin Luther King Jr. Health Center at Wyandach (126)
HRHCare Community Health – Hudson Valley and LI – HRHCare Maxine S. Postal Tri-Community Health Center (75)
HRHCare Community Health – Hudson Valley and LI – HRHCare Patchogue (70)
HRHCare Community Health – Hudson Valley and LI – HRHCare Peekskill, The Jeannette J. Phillips Health Center (70)
HRHCare Community Health – Hudson Valley and LI – HRHCare Yonkers, The Park Care Health Center (<10)
HRHCare Community Health – NYC Division – Bay Street Health Center (97)


Absolute VLS Rate
Regression Model
Combined Intercepts
Patient Age Effect
Enrollment Status Effect
Clinic Name
Key
90th to 100th Pct.
75th to 90th Pct.
25th to 75th Pct.
10th to 25th Pct.
0th to 10th Pct.
HRHCare Community Health – NYC Division – Bedford Health Center (<10)
HRHCare Community Health – NYC Division – Church Avenue Health Center (112)
HRHCare Community Health – NYC Division – Inwood Health Center (555)
HRHCare Community Health – NYC Division – Sidney R. Baer, Jr Health Ctr. A28 (13)
HRHCare Community Health – NYC Division – Sterling Health Center (351)
HRHCare Community Health – NYC Division – Sutphin Health Center (309)
HRHCare Community Health – NYC Division – The HUB Health Center (214)
HRHCare Community Health – NYC Division – Westchester Sq. Health Center (<10)
Hudson Headwaters Health Network – Health Center on Broad Street (Glens Falls) (85)
Hudson Headwaters Health Network – West Mountain Health Services– Bldg 1 (52)
Institute for Family Health – Ali Forney Center (11)
Institute for Family Health – All Angels Church (<10)
Institute for Family Health – Amsterdam Family Health Center (<10)
Institute for Family Health – Broadway Presbyterian Church (10)
Institute for Family Health – Cadman Family Health Center (26)
Institute for Family Health – Family Health Center of Harlem (437)
Institute for Family Health – Family Practice Center of Hyde Park (<10)
Institute for Family Health – George Daly House (<10)
Institute for Family Health – Kingston Family Health Center (<10)
Institute for Family Health – Mt. Hope Family Practice (<10)
Institute for Family Health – New Paltz Family Health Center (<10)
Institute for Family Health – Stevenson Family Health Center (24)
Institute for Family Health – The Institute for Family Health at 17th Street (375)
Institute for Family Health – Urban Horizons Family Health Center (214)
Institute for Family Health – Walton Family Health Center and Center for Counseling (14)
Interfaith Medical Center – Primary Care Designated AIDS Treatment Center (350)
Jamaica Hospital Medical Center – Ambulatory Care Center (56)
Jamaica Hospital Medical Center – Morton Safran Family Medicine Center at Jamaica Hospital (12)
Jordan Health – Anthony L. Jordan Health Center (170)
Jordan Health – Brown Square Center (<10)
Jordan Health – Woodward Health Center (55)
Joseph P. Addabbo Family Health Center – Addabbo Family Health Center – Arverne (184)
Joseph P. Addabbo Family Health Center – Addabbo Family Health Center – Brooklyn (59)
Joseph P. Addabbo Family Health Center – Addabbo Family Health Center – Jamaica (Sutphin Blvd.) (202)
Kingsbrook Jewish Medical Center – Pierre Toussaint Family Health Center (397)
Maimonides Medical Center – Life Forward Program (248)
Mohawk Valley Health System – Sister Rose Vincent Family Medical Center (224)
Montefiore Health System – Adolescent AIDS Program (83)
Montefiore Health System – Castle Hill Family Practice (23)
Montefiore Health System – Comprehensive Family Care Center (160)
Montefiore Health System – Comprehensive Health Care Center (275)
Montefiore Health System – Department of Pediatrics (126)
Montefiore Health System – Marble Hill Family Practice (10)
Montefiore Health System – Montefiore Family Health Center (209)
Montefiore Health System – South Bronx Center for Child. & Fam. (128)


Absolute VLS Rate
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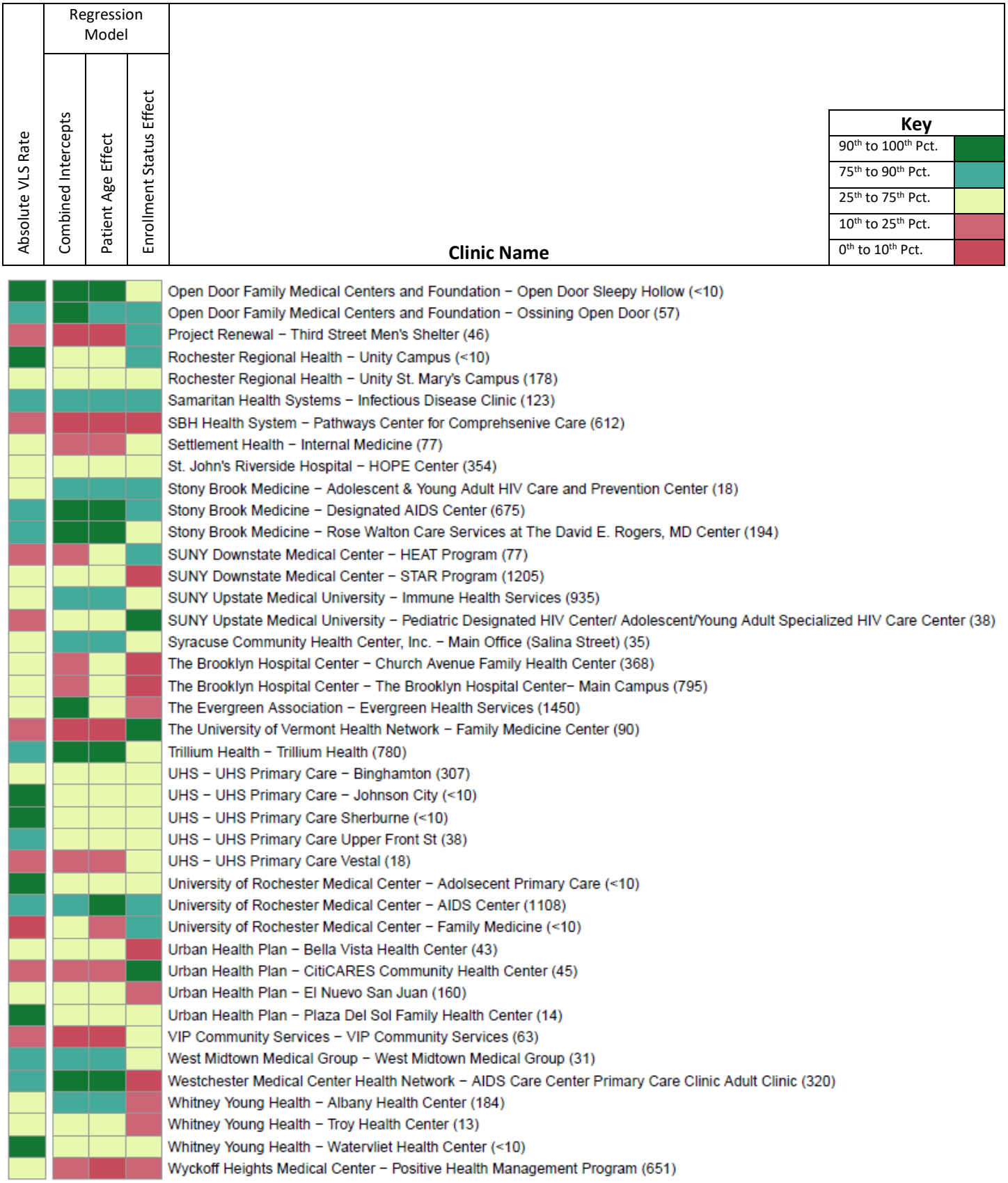
Combined Intercepts
Patient Age Effect
Enrollment Status Effect
Clinic Name
Key
90th to 100th Pct.
75th to 90th Pct.
25th to 75th Pct.
10th to 25th Pct.
0th to 10th Pct.
Montefiore Health System – The Center for Positive Living/Infectious Diseases Clinic (3002)
Montefiore Health System – University Avenue Family Practice (23)
Montefiore Health System – Wellness Center at Melrose (58)
Montefiore Health System – Wellness Center at Port Morris (56)
Montefiore Health System – Wellness Center at Waters Place (67)
Montefiore Health System – West Farms Family Practice (35)
Montefiore Health System – Williamsbridge Family Practice (42)
Morris Heights Health Center – Bronx Medical and Wellness Center (<10)
Morris Heights Health Center – MHHC at 137th Street (16)
Morris Heights Health Center – MHHC at 85 West Burnside Avenue (377)
Morris Heights Health Center – MHHC at Melrose (<10)
Morris Heights Health Center – MHHC at Walton Avenue (15)
Mount Sinai Health System – Adolescent Health Center (50)
Mount Sinai Health System – Comprehensive Health Center (3197)
Mount Sinai Health System – FPA – Beth Israel (986)
Mount Sinai Health System – FPA – Mount Sinai Hospital (1019)
Mount Sinai Health System – Jack Martin (1936)
Mount Sinai Health System – Morningside (1282)
Mount Sinai Health System – Peter Krueger (1106)
Mount Sinai Health System – Samuels (1603)
Mount Vernon Neighborhood Health Center Network – Mount Vernon Neighborhood Health Center (96)
Mount Vernon Neighborhood Health Center Network – Yonkers Community Health Center (<10)
NewYork–Presbyterian – Brooklyn – Infectious Diseases Division (253)
NewYork–Presbyterian – East – Center for Special Studies: Judish Peabody Wellness Center: David Rogers Unit (1483)
NewYork–Presbyterian – East – Center for Special Studies: The Glenn Bernbaum Unit 525 (1436)
NewYork–Presbyterian – Queens – Special Care Center (621)
NewYork–Presbyterian – West – Comprehensive Health Program (1951)
NewYork–Presbyterian – West – Project STAY – Vanderbilt Clinic (281)
Northwell Health – CART – Center for AIDS Research and Treatment (CART) (2192)
Northwell Health – CYAAPH – Center for Young Adults, Adolescent and Pediatric HIV (CYAAPH) (107)
Northwell Health – Lenox Hill – Retroviral Disease Center (459)
Northwell Health – SIUH – Northwell Health Canarsie Multi Service Center (11)
Northwell Health – SIUH – Northwell Health Coney Island Multi Service Center (20)
Northwell Health – SIUH – Stapleton Clinic (45)
Northwell Health – SIUH – Staten Island University Hospital– South (258)
NuHealth – Designated AIDS Center (485)
NuHealth – Roosevelt/Freeport Family Center (124)
NYU Langone Health – FHC – Community Medicine Program Family Health Centers at NYU Langone (62)
NYU Langone Health – FHC – Flatbush Family Health Center at NYU Langone (30)
NYU Langone Health – FHC – Park Ridge Family Health Center at NYU Langone (<10)
NYU Langone Health – FHC – Park Slope Family Health Center at NYU Langone (<10)
NYU Langone Health – FHC – Seventh Avenue Family Health Center at NYU Langone (<10)
NYU Langone Health – FHC – Sunset Park Family Health Center at NYU Langone (35)
NYU Langone Health – FHC – Sunset Terrace Family Health Center at NYU Langone (391)
Open Door Family Medical Centers and Foundation – Open Door Port Chester (76)


Regression Model
Absolute VLS Rate
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Patient Age Effect
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90th to 100th Pct.
75th to 90th Pct.
25th to 75th Pct.
10th to 25th Pct.
0th to 10th Pct.
Open Door Family Medical Centers and Foundation – Open Door Sleepy Hollow (<10)
Open Door Family Medical Centers and Foundation – Ossining Open Door (57)
Project Renewal – Third Street Men's Shelter (46)
Rochester Regional Health – Unity Campus (<10)
Rochester Regional Health – Unity St. Mary's Campus (178)
Samaritan Health Systems – Infectious Disease Clinic (123)
SBH Health System – Pathways Center for Comprehsenive Care (612)
Settlement Health – Internal Medicine (77)
St. John's Riverside Hospital – HOPE Center (354)
Stony Brook Medicine – Adolescent & Young Adult HIV Care and Prevention Center (18)
Stony Brook Medicine – Designated AIDS Center (675)
Stony Brook Medicine – Rose Walton Care Services at The David E. Rogers, MD Center (194)
SUNY Downstate Medical Center – HEAT Program (77)
SUNY Downstate Medical Center – STAR Program (1205)
SUNY Upstate Medical University – Immune Health Services (935)
SUNY Upstate Medical University – Pediatric Designated HIV Center/ Adolescent/Young Adult Specialized HIV Care Center (38)
Syracuse Community Health Center, Inc. – Main Office (Salina Street) (35)
The Brooklyn Hospital Center – Church Avenue Family Health Center (368)
The Brooklyn Hospital Center – The Brooklyn Hospital Center– Main Campus (795)
The Evergreen Association – Evergreen Health Services (1450)
The University of Vermont Health Network – Family Medicine Center (90)
Trillium Health – Trillium Health (780)
UHS – UHS Primary Care – Binghamton (307)
UHS – UHS Primary Care – Johnson City (<10)
UHS – UHS Primary Care Sherburne (<10)
UHS – UHS Primary Care Upper Front St (38)
UHS – UHS Primary Care Vestal (18)
University of Rochester Medical Center – Adolsecent Primary Care (<10)
University of Rochester Medical Center – AIDS Center (1108)
University of Rochester Medical Center – Family Medicine (<10)
Urban Health Plan – Bella Vista Health Center (43)
Urban Health Plan – CitiCARES Community Health Center (45)
Urban Health Plan – El Nuevo San Juan (160)
Urban Health Plan – Plaza Del Sol Family Health Center (14)
VIP Community Services – VIP Community Services (63)
West Midtown Medical Group – West Midtown Medical Group (31)
Westchester Medical Center Health Network – AIDS Care Center Primary Care Clinic Adult Clinic (320)
Whitney Young Health – Albany Health Center (184)
Whitney Young Health – Troy Health Center (13)
Whitney Young Health – Watervliet Health Center (<10)
Wyckoff Heights Medical Center – Positive Health Management Program (651)

Appendix 3: Regression Model 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 = $e^{(\alpha + B_1 + B_2 + \ldots + B_N)}$, 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 – probability of suppression), and algebraic rearrangement yields the following equation for the probability of suppression: probability = odds / (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 all clinic and organization-level "random" effects that apply to all patients ranged from approximately -1.289 to 0.957. Adding these to the original intercept and fixed-effects regression parameters is equivalent to multiplying the odds of suppression by $e^{-1.289}$ or $e^{0.957}$, respectively. Therefore, the odds for suppression for the "default" patient (Black, Hispanic, stably housed, cis-gender female with IDU exposure risk history, ADAP coverage, established in care by 2019, 20 years old, and living in a ZIP Code with median community income) seen at a typical facility are approximately 3.6 times those at the lowest performing site, and the odds at the highest performing site are about 2.6 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 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 2.

Random Effects

Intercepts

Key Finding: The odds of suppression depended significantly on where patients were treated in 2019. These parameters combine the organization- and clinic-level "random" effects for all patients.

Benchmark	Combined Parameter Estimate	Odds Relative to Typical (Median) Site
Minimum	-1.289	0.271
10th Percentile	-0.522	0.585
25th Percentile	-0.234	0.779
75th Percentile	0.195	1.197
90th Percentile	0.343	1.388
Maximum	0.957	2.566

Slopes

Key Finding: Some clinics did significantly better than others in mitigating the effect of being new to care at the organization or enhancing the effect of patient age on the odds of viral load suppression. Of note, the relative odds for age are for one unit of the calculated value, which equates to a 30-year-old (or 10-year-old) patient: $(30 – 20)^2 / 100 = 1$. A full understanding for any clinic requires combining this effect with the "random" intercepts for patients of all ages described in the preceding section. See the heat map in Appendix 2.

Benchmark	New to Care		$(Age – 20)^2 / 100$	
	Combined Parameter Estimate	Odds Relative to Typical (Median) Site	Combined Parameter Estimate	Odds Relative to Typical (Median) Site
Minimum	-0.821	0.442	-0.039	0.962
10th Pct.	-0.165	0.852	-0.015	0.985
25th Pct.	-0.066	0.940	-0.008	0.992
75th Pct.	0.061	1.068	0.006	1.006
90th Pct.	0.191	1.215	0.011	1.011
Maximum	0.428	1.540	0.029	1.029

[Report continues next page.]

Fixed Effects

Key Finding: Significantly lower odds of suppression ($p < 0.05$; highlighted below in red) were seen for newly enrolled patients, younger patients, Black patients, patients in temporary housing, and patients covered though Medicaid or Medicare or without any known insurance. Some gender/risk status combinations were also significant predictors of suppression failure. Patients living in ZIP Codes with higher percentages of residents reporting adjusted gross income of under $25,000 in 2018 were less likely to be suppressed on final viral load while the ZIP Code of the facility where they received care was not a significant predictor of suppression in this analysis. Many of these factors also significantly interacted with others as highlighted in the table.

Notes:

- Racial/ethnicity groups were defined based on information that elucidated differences in outcomes. "Non-Hispanic" includes patients whose ethnicity was undocumented.
- As gender and exposure risk are related (cis-gender women cannot be classified as men who have sex with men), these factors were combined to prevent confounding.
- See the first appendix for a description of the classification scheme used for each of these factors.

Effect	Risk/Gender	Race/Ethnicity	Housing	Insurance	Enrollment	Estimate	Prob. > |z|
Intercept	-	-	-	-	-	1.56730	<2.00E-16
$(Age - 20)^2 / 100$	-	-	-	-	-	0.07093	1.81E-15
Percent Under $25K in Pt. ZIP Code	-	-	-	-	-	-0.62981	4.05E-7
Risk/Gender	Cis Gen Fem/IDU	-	-	-	-	0.00000	-
Risk/Gender	Cis Gen Fem/Perinatal	-	-	-	-	0.15048	0.35141
Risk/Gender	Cis Gen Fem/Other Risk	-	-	-	-	0.34210	0.00053
Risk/Gender	Cis Gen Fem/Unknown Risk	-	-	-	-	-0.04775	0.70021
Risk/Gender	Cis Gen Male/IDU	-	-	-	-	-0.13780	0.20456
Risk/Gender	Cis Gen Male/MSM	-	-	-	-	0.48163	1.17E-6
Risk/Gender	Cis Gen Male/Perinatal	-	-	-	-	-0.02932	0.86192
Risk/Gender	Cis Gen Male/Other Risk	-	-	-	-	0.20668	0.03861
Risk/Gender	Cis Gen Male/Unknown Risk					0.06124	0.57211
Risk/Gender	Transgender/IDU	-	-	-	-	-0.64210	0.00919
Risk/Gender	Transgender/MSM	-	-	-	-	0.01282	0.91720
Risk/Gender	Transgender/Perinatal	-	-	-	-	0.27555	0.69044
Risk/Gender	Transgender/Other Risk	-	-	-	-	0.05272	0.72435
Risk/Gender	Transgender/Unknown Risk	-	-	-	-	-0.06985	0.65893
Risk/Gender	Unknown Gen Fem at Birth/IDU	-	-	-	-	-0.86501	0.02434
Risk/Gender	Unknown Gen Fem at Birth/MSM	-	-	-	-	0.17435	0.76250
Risk/Gender	Unknown Gen Fem at Birth/Perinatal	-	-	-	-	-0.36180	0.32159
Risk/Gender	Unknown Gen Fem at Birth/Other Risk	-	-	-	-	0.24757	0.16866
Risk/Gender	Unknown Gen Fem at Birth/Unknown Risk	-	-	-	-	0.06613	0.70606
Risk/Gender	Unknown Gen Male at Birth/IDU	-	-	-	-	-0.02506	0.92615

Risk/Gender	Unknown Gen Male at Birth/MSM	-	-	-	-	0.15220	0.27120
Risk/Gender	Unknown Gen Male at Birth/Perinatal	-	-	-	-	0.65965	0.23969
Risk/Gender	Unknown Gen Male at Birth/Other Risk	-	-	-	-	-0.13536	0.43953
Risk/Gender	Unknown Gen Male at Birth/Unknown Risk	-	-	-	-	-0.2120	0.10443
Race/Ethnicity	-	Asian	-	-	-	1.17240	0.00030
Race/Ethnicity	-	Black-Hispanic	-	-	-	0.00000	-
Race/Ethnicity	-	Black-non-Hispanic	-	-	-	-0.05162	0.56796
Race/Ethnicity	-	White-Hispanic	-	-	-	0.24691	0.02023
Race/Ethnicity	-	White-non-Hispanic	-	-	-	0.31969	0.00244
Race/Ethnicity	-	Additional Races	-	-	-	0.30922	0.04638
Race/Ethnicity	-	Unknown Race-Hispanic	-	-	-	0.31295	0.00427
Race/Ethnicity	-	Unknown Race-non-Hispanic	-	-	-	0.12405	0.28781
Housing	-	-	Stable	-	-	0.00000	-
Housing	-	-	Temporary	-	-	-0.59303	0.00576
Housing	-	-	Unstable	-	-	-0.06007	0.78064
Housing	-	-	Unknown	-	-	0.13866	0.28694
Insurance	-	-	-	ADAP	-	0.00000	-
Insurance	-	-	-	Dual-Eligible	-	-0.35940	3.05E-5
Insurance	-	-	-	Medicaid	-	-0.48088	<2.00E-16
Insurance	-	-	-	Medicare	-	-0.33365	7.58E-6
Insurance	-	-	-	Private	-	0.10160	0.15718
Insurance	-	-	-	Other	-	-0.48873	0.00074
Insurance	-	-	-	None	-	-0.38048	0.00354
Insurance	-	-	-	Unknown	-	-1.11640	2.24E-6
Enrollment	-	-	-	-	Established	0.00000	-
Enrollment	-	-	-	-	New to Care	-0.54097	2.01E-12
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	Asian	-	-	-	-0.05339	0.08427
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	Black-non-Hispanic	-	-	-	-0.02460	0.00551
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	White-Hispanic	-	-	-	-0.01985	0.04888
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	White-non-Hispanic	-	-	-	-0.03077	0.00194
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	Additional Races	-	-	-	-0.03069	0.04959
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	Unknown Race-Hispanic	-	-	-	-0.03152	0.00234
$(Age - 20)^2 / 100$ * Race/Ethnicity	-	Unknown Race-non-Hispanic	-	-	-	-0.04162	0.00016
$(Age - 20)^2 / 100$ * Race/Enrollment	-	-	-		-	-0.01972	0.00024
Housing * Insurance	-	-	Temporary	Dual-Eligible	-	-0.03633	0.90949
Housing * Insurance	-	-	Unstable	Dual-Eligible	-	-0.28826	0.33677
Housing * Insurance	-	-	Unknown	Dual-Eligible	-	0.17047	0.44733
Housing * Insurance	-	-	Temporary	Medicaid	-	0.00290	0.98954
Housing * Insurance	-	-	Unstable	Medicaid	-	-0.60074	0.00654
Housing * Insurance	-	-	Unknown	Medicaid	-	-0.32100	0.01402
Housing * Insurance	-	-	Temporary	Medicare	-	0.11419	0.69330
Housing * Insurance	-	-	Unstable	Medicare	-	-0.58335	0.03568
Housing * Insurance	-	-	Unknown	Medicare	-	-0.06808	0.66186
Housing * Insurance	-	-	Temporary	Private	-	0.51510	0.11743
Housing * Insurance	-	-	Unstable	Private	-	-0.61080	0.04202
Housing * Insurance	-	-	Unknown	Private	-	-0.26561	0.07261
Housing * Insurance	-	-	Temporary	Other	-	0.72199	0.08024
Housing * Insurance	-	-	Unstable	Other	-	-0.28661	0.53538
Housing * Insurance	-	-	Unknown	Other	-	1.17590	0.27411

Housing * Insurance	-	-	Temporary	None	-	0.27782	0.62915
Housing * Insurance	-	-	Unstable	None	-	-1.06390	0.00317
Housing * Insurance	-	-	Unknown	None	-	-0.60843	0.04179
Housing * Insurance	-	-	Temporary	Unknown	-	1.37578	0.05663
Housing * Insurance	-	-	Unstable	Unknown	-	-1.37838	0.05887
Housing * Insurance	-	-	Unknown	Unknown	-	0.16493	0.61689
Housing * Enrollment	-	-	Temporary	-	New to Care	0.16550	0.24723
Housing * Enrollment	-	-	Unstable	-	New to Care	0.44623	0.00033
Housing * Enrollment	-	-	Unknown	-	New to Care	-0.16560	0.13277