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Global Health Sciences

All Kids Count

Results of a Quality Improvement Collaborative to Improve Pediatric and Adolescent HIV Care Across 67 Facilities in Nigeria

January 2019



EXECUTIVE SUMMARY

Background

This report summarizes the results of the expanded phase of All Kids Count (AKC), a quality improvement collaborative (QIC) with the aim of improving HIV case identification, linkage to care, ART initiation, and viral load monitoring and suppression among children and adolescents (<19 years) living with HIV in Akwa Ibom, Benue, Cross River, Federal Capital Territory (FCT), Lagos, Nasarawa, and Rivers States, Nigeria. AKC was co-led by AIDS Prevention Initiative Nigeria (APIN), Henry M. Jackson Foundation (HMJF), FHI360, and Institute for Human Virology Nigeria (IHVN) with technical support from HEALTHQUAL at the University of California, San Francisco (UCSF-HEALTHQUAL) and its subcontractor, the Institute for Healthcare Improvement (IHI). AKC activities were supported by funding from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) as part of the Health Resources and Services Administration's (HRSA) Quality Improvement Capacity for Impact Project (QICIP) award #U1NHA08599. The contents are the responsibility of UCSF-HEALTHQUAL and do not necessarily reflect the view of the U.S. Government.

Key Findings

- Average testing coverage across all service delivery points increased from 55.2% to 65.8%, with the most significant increase seen in inpatient units (52.0% vs. 82.9%).
- AKC-wide case identification across all service delivery points (as measured by monthly average of newly identified patients) was indistinguishable between baseline and AKC implementation (87.6 vs. 87.3). However, significant variation among states was noted, with Benue State showing a marked improvement in case identification (38.7 vs. 49.1).
- Despite increases in testing coverage, average HIV testing yields decreased between baseline and AKC implementation (0.8% vs. 1.2%), indicating no improvement in testing efficiency. Testing yields were highest in TB clinics (2.3%) and lowest in inpatient units (0.9%).
- Linkage to care, as approximated by average rates of ART initiation within the same month as diagnosis, did not improve between baseline and AKC implementation (82.1% vs. 81.4%). Among patients for whom time to ART initiation was reported, 72.3% were initiated on the same day as diagnosis, and 93.6% were initiated within one week.
- Viral load monitoring improved by greater than two-fold between baseline and AKC implementation (16.7% vs. 36.0%). High variability between participating states was observed, with Benue State having notably low performance due to system-level challenges with transport and processing of patient specimens.
- Viral load suppression rates remained unchanged during AKC implementation (64.3% vs. 60.9%). Disaggregation of suppression rates by age and sex revealed notable disparities in outcomes, with males aged 1-4 and females aged 15-19 having, respectively, the lowest and highest rates of viral suppression (45.5% vs. 67.3%).

Conclusions

Results of AKC activities indicate improvements in testing coverage and viral load monitoring, but minimal improvements in testing yield and viral load suppression. While encouraging, these results underscore a need to intensify improvements to reach UNAIDS' 90-90-90 targets through the following recommended activities:

- Optimize HIV testing coverage in high-yield service delivery areas and states
- Strengthen facility-level data systems and capacity to generate accurate and timely data on viral load monitoring eligibility and viral load suppression
- Build capacity to disaggregate viral load suppression data by sex, age, and other variables, and target QI activities to identified disparities
- Strengthen accountability and monitoring of site-level quality management programming.
- Foster sharing of QI implementation successes—and, importantly, failures—among facilities and implementing partners as a means to promote peer learning and co-creation of implementation strategies
- Continue to build implementing partners' capacity to manage quality management activities and lead QICs

INTRODUCTION

Of the estimated 256,995 children (<15 years) living with HIV in Nigeria in 2017, only 58,000 (23%) were receiving antiretroviral therapy (ART).¹ Despite high testing volumes to address these gaps, testing yields remain low. Of 824,682 children who received HIV testing in PEPFAR-supported sites in 2017, only 10,715 (1.2%) were newly identified as HIV-positive. Among those newly diagnosed, 84.9% were initiated on ART. Population-level data on viral load monitoring (VLM) coverage and viral load suppression (VLS) among children in Nigeria are not readily available, but estimates from programmatic data analyzed by UCSF-HEALTHQUAL in FY2017 as part of a pilot quality improvement (QI) initiative indicated suboptimal performance.² Collectively, these data point to significant gaps in the pediatric and adolescent HIV treatment cascade, prompting a need to investigate and implement tailored approaches to improve case finding, linkage to care, ART initiation, VLM, and VLS.

Diagnosing HIV-positive children and adolescents and maintaining them on life-long ART is critical to minimizing HIV-related morbidity and mortality, and reaching UNAIDS' 90-90-90 targets for Nigeria. With funding through the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) as part of the Health Services and Resources Administration's (HRSA) Quality Improvement Capacity for Impact Project (QICIP), HEALTHQUAL at the University of California, San Francisco (UCSF-HEALTHQUAL) partnered with the Institute for Healthcare Improvement (IHI), AIDS Prevention Initiative Nigeria (APIN), FHI360, Henry M. Jackson Foundation (HMJF), and Institute for Human Virology Nigeria (IHVN) to implement All Kids Count (AKC), a quality improvement collaborative (QIC) with the aim of improving case identification, linkage to HIV care, ART initiation, VLM, and VLS among children and adolescents (<19 years) living with HIV in Nigeria. Launched in December 2017 and concluded in October 2018, AKC spanned 67 facilities across PEPFAR-designated scale-up Local Government Areas (LGA) in Akwa Ibom, Benue, Cross River, Federal Capital Territory (FCT), Lagos, Nasarawa, and Rivers States, Nigeria. Implementation of AKC was guided by lessons learned from a PEPFAR-supported pilot QIC that was led by UCSF-HEALTHQUAL between January 2017 and November 2017 in FCT, Lagos and Nasarawa States.

This report summarizes the design, implementation, and results of AKC from its inception in December 2017 to its formal conclusion in October 2018. Specifically, it highlights the adaptation of the QIC model to the Nigerian context, summarizes lessons learned from the pilot QIC, and presents QIC-wide performance measurement results, tested interventions, and key implementation challenges. The report concludes with a summary of implementation plans and recommend activities for sustainability of AKC activities in FY2019 and beyond following the conclusion of UCSF-HEALTHQUAL support.

BACKGROUND

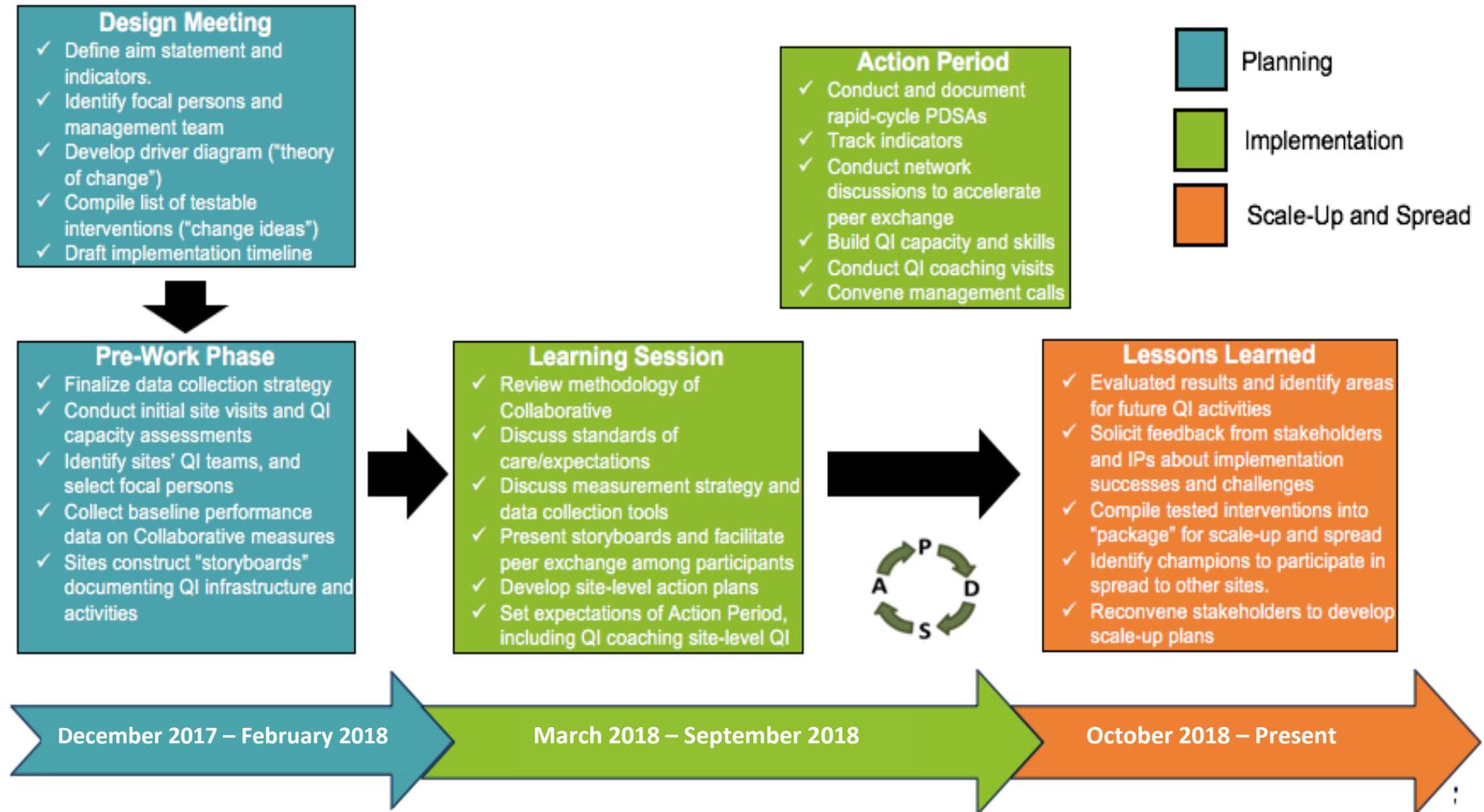
Quality Improvement Collaborative Approach

The design of the AKC QIC was adapted from IHI's Breakthrough Series (BTS) Model (**Figure 1**), an improvement science methodology in which participating sites are convened to apply proven QI methods (e.g., the Model for Improvement, cascade analysis, process mapping) to the identification and improvement of gaps in a specific area of healthcare service delivery. Unlike traditional QI approaches

¹ PEPFAR Nigeria, *Country Operational Plan 2018 Strategic Direction Summary*. March 2018.

² UCSF-HEALTHQUAL. *All Kids Count Final Report*. February 2018.

Figure 1. AKC QIC Structure and Timeline

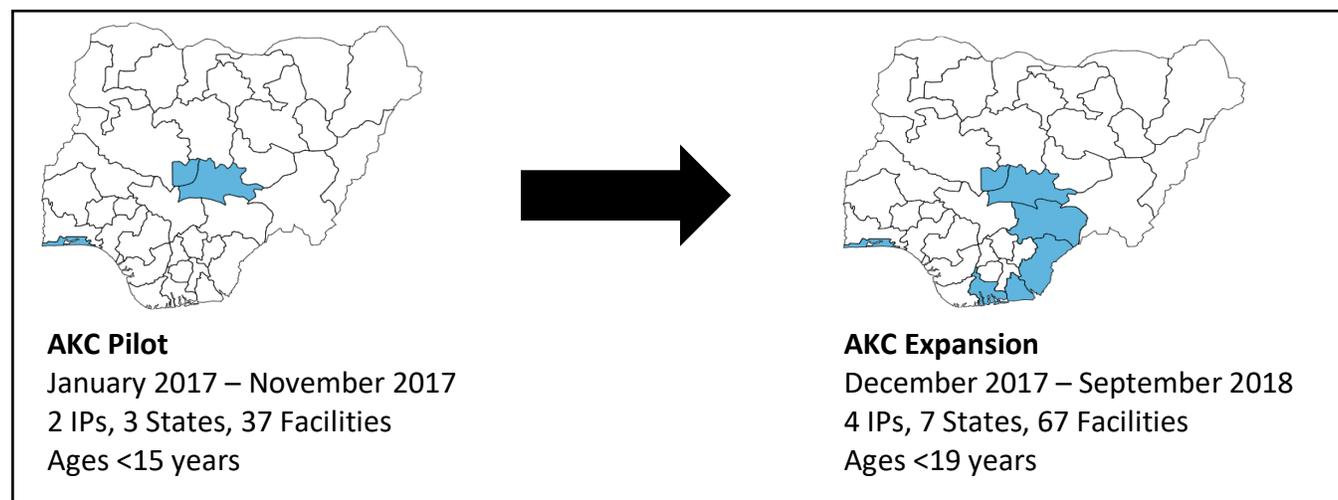


in which individual projects are implemented and evaluated at individual sites over a period of months, QICs features more frequent performance measurement and smaller-scale tests of interventions, enabling sites to test multiple interventions and share experiences with peers over a compressed period of time. Through the QIC approach, accumulation of evidence-based interventions and performance improvements are therefore significantly accelerated, leading to the compilation of a “package” of proven interventions and a sustainable network of peer-to-peer learning in which “all [participants] teach, and all learn.” **Figure 1** outlines the structure and timeline of the AKC QIC.

Lessons Learned from Pilot QIC

Between January and November 2017, UCSF-HEALTHQUAL partnered with IHVN and APIN to implement a pilot QIC with the primary aim of identifying and initiating 100% of HIV-positive children on treatment and promoting VLS in FCT, Nasarawa, and Lagos States. Secondary aims of the pilot QIC included development of site-level proficiency in QI methods, mapping of loci of treatment and referral networks, capacity-building of IPs to implement QICs, and creation of a working change package of successful interventions for use in scale-up activities. Implemented in 10 hub-and-spoke networks across three states, the pilot QIC led to improvements in testing coverage and case identification, but revealed ongoing challenges with performance in the second and third 90s. Applying lessons learned from the pilot, design of the expanded AKC was driven by the explicit aim of **increasing uptake of pediatric and adolescent ART in selected sites by 50% and improving treatment cascade outcomes**. As a result, site selection criteria were modified to prioritize high-volume treatment sites (“hubs”) as opposed to primary health centers (“spokes”). Differences between the pilot QIC and AKC are summarized in **Figure 2**.

Figure 2. Differences between pilot QIC and AKC



Indicators

Indicators for AKC were selected by CDC-Nigeria, UCSF-HEALTHQUAL, APIN, FHI360, HMJF, and IHVN stakeholders, and reflect definitions outlined in the Federal Ministry of Health’s National Guidelines for HIV Prevention, Treatment, and Care (2016). To identify high-yield service delivery points, measures for client testing rate and yield were reported by testing site or modality (e.g., inpatient units, provider-initiated testing and counseling (PITC), TB clinics, index case testing). Finally, to facilitate identification

and actionability of disparities in treatment outcomes, the indicator for viral load suppression was disaggregated by age and sex. **Table 1** provides definitions of these measures.

Table 1. AKC Indicators

Indicator	Definition
1. Client testing rate	Proportion of eligible children and adolescents of unknown HIV status who received an HIV test
2. Client testing yield	Proportion of children and adolescents of unknown HIV status who received an HIV test with a positive result
3. ART initiation	Proportion of children and adolescents newly identified as HIV-positive who were initiated on ART within the month of diagnosis
4. Time to ART initiation	Number of days between date of diagnosis and date of ART initiation among newly identified children and adolescents
5. Viral load monitoring	Proportion of eligible children and adolescents on ART who received a viral load test
6. Viral load suppression	Proportion of children and adolescents on ART who received a viral load test result indicating a suppressed viral load (<1,000 copies/mL)

Site Selection

67 facilities in FCT and Akwa Ibom, Benue, Cross River, Lagos, Nasarawa, and Rivers States participated in AKC. All participating facilities were located within PEPFAR-designated scale-up local government areas (LGA). Sites were selected by implementing partners on the basis of disease burden as estimated by TX_CURR, with high-volume sites receiving priority for inclusion. The 15 listed facilities with asterisks represent those which participated in both the pilot and expanded phases of implementation.

Table 2. AKC Participating Sites

State	IP (Number of Facilities)	Facility Names
Akwa Ibom	FHI360 (4)	Ikot Ekpene General Hospital Ituk Mbang Methodist General Hospital Oron General Hospital University Teaching Hospital
Benue	DoD (1)	161 Nigeria Airforce Hospital
	APIN (11)	Adikpo General Hospital Bishop Murray Medical Center Federal Medical Center – Makurdi Gboko East Comprehensive Health Center NKST Hospital – Anyiin NKST Hospital – MKAR NKST Hospital – Zaki Biam Northbank General Hospital Oturkpo General Hospital Sankera General Hospital St. Anthony’s Hospital – Zaki Biam

Table 2. AKC Participating Sites (Continued)

State	IP (Number of Facilities)	Facility Names
Benue	APIN (6)	St. Monica’s Hospital – Adikpo St. Thomas Hospital – Ihugh St. Vincent’s Hospital – Aliade Ugba General Hospital Vandeikya General Hospital Wannune General Hospital
Cross River	FHI 360 (6)	Calabar General Hospital Dr. Lawrence Henshaw Memorial Hospital Holy Family Catholic Hospital Ogoja Catholic Maternity Hospital Ogoja General Hospital University of Calabar Teaching Hospital
FCT	DoD (1)	Defense Headquarters Medical Center Abuja
	IHVN (10)	Asokoro General Hospital Bwari General Hospital Garki General Hospital Gwarinpa General Hospital Karshi General Hospital Kubwa General Hospital* Maitama General Hospital National Hospital Abuja Nyanya General Hospital University of Abuja Teaching Hospital*
Lagos	DoD (1)	69 Nigerian Army Reference Hospital
	FHI 360 (4)	Ajeromi General Hospital Badagry General Hospital Massey Street Children’s Hospital Nigerian Institute of Medical Research
	APIN (9)	Alimosho General Hospital* Ifako General Hospital* Ifako Primary Health Center* Ojodu Primary Health Center* Palm Avenue Primary Health Center* Rauf Aregbesola Primary Health Center* Mushin General Hospital* Lagos State University Teaching Hospital* Lagos University Teaching Hospital*
Nasarawa	IHVN (6)	Aygaragu Primary Health Center* Akwanga General Hospital Dalhatu Araf Specialist Hospital* Doma General Hospital* Federal Medical Center – Keffi* Main Town Primary Health Center

Table 2. AKC Participating Sites (Continued)

State	IP (Number of Facilities)	Facility Names
Nasarawa	IHVN (3)	Mararaba Gurku Medical Center Nasarawa Eggon General Hospital Our Lady of Apostles Hospital
Rivers	DoD (1)	Military Hospital Port Harcourt
	FHI 360 (4)	Ahoada General Hospital Churchill Model Primary Health Center Pope John Paul Clinic University of Port Harcourt Teaching Hospital

KEY ACTIVITIES***Launch Meeting***

On November 16, 2017, a launch meeting was convened in Abuja, Nigeria, by CDC-Nigeria with stakeholders from UCSF-HEALTHQUAL, APIN, FHI360, IHVN, and DoD. During the meeting, attendees discussed the proposed scope, geographic focus, and duration of the QIC. In addition, meeting attendees selected indicators to track AKC’s progress on a monthly basis, reviewed existing QI coaching capacity, and discussed an approach to forming QI coaching teams.

Pre-Work Period

The pre-work period began following the conclusion of AKC’s launch meeting in November 2017. During this period, sites were selected, regional QI coaching teams were identified, and initial site visits were completed. In addition, participating sites identified AKC focal persons, collected baseline performance data on AKC indicators, and began construction of “storyboards” of existing QI activities in preparation for Learning Sessions. Finally, sensitization meetings and basic QI trainings for participating facilities, and state and federal stakeholders were convened by implementing partners with support from IHI improvement advisors. QI trainings were interactive, and featured modules on the Model for Improvement, QIC indicators, problem identification and prioritization, process mapping, root cause analysis, change ideas, and Plan-Do-Study-Act (PDSA) cycle planning and evaluation. The timing of pre-work activities was highly variable across and within IPs owing to differences in experience implementing QI in general and QICs in particular, with FHI360 facilities and APIN facilities in Benue State taking the longest to initiate QI activities (**Table 3**). As DoD had only 4 facilities participating in AKC, it did not convene IP-specific activities, instead opting to join activities led by IPs in the states where DoD-supported facilities are located (Benue, FCT, Lagos, Rivers).

Table 3. Timeline of key activities by IP

Activity	APIN	IHVN	FHI360
Sensitization meeting	April 2018	February 2018	April 2018
Basic QI training	April 2018	April 2018	May 2018
Learning sessions	June 2018	July 2018	July 2018

Learning Sessions

In-person and virtual Learning Sessions were convened by implementing partners with guidance from IHI improvement advisors (**Table 3**). During the Learning Sessions, teams from participating sites presented storyboards that summarized their baseline performance data and described the results of preliminary root cause analyses and PDSA planning. Follow-up discussions and peer exchange were facilitated by CQI team leads and IHI improvement advisors. The meeting concluded with teams' development of implementation plans for the Action Period.

Action Period

During the Action Period, participating sites conducted rapid tests of change using QI methods to identify problems and improve their existing systems and processes. Data were collected, analyzed, and reported on a monthly basis to track the results of their interventions, and discussed during site-level CQI committee meetings. QI coaches from implementing partners conducted monthly visits to their assigned sites to provide ongoing support to teams in their planning, execution and evaluation of PDSA cycles. WhatsApp groups among participating sites and central QI teams were also established to facilitate rapid sharing of successful change ideas and solutions to common implementation challenges. Finally, IHI improvement advisors provided ongoing mentoring support to QI coaches on an as-needed basis, and assisted central CQI staff with analysis of site-level results.

AKC-Wide Exchange Meetings

To facilitate learning among implementing partners, three AKC-wide exchange meetings were convened by UCSF-HEALTHQUAL. Each two-hour meeting was convened virtually, and featured presentations from IPs and group discussion of common implementation challenges and successes. The first meeting, held on April 30, 2018, focused on data collection and quality. During the second meeting on June 4, 2018, IPs shared successful change ideas and examples of facility-level PDSA cycles. In the third and final exchange meeting, held on September 20, 2018, participants shared successes of AKC implementation and discussed plans for sustainability of AKC activities. Slide presentations from these meetings are available in [Dropbox](#).

RESULTS

This section summarizes performance measurement data reported by AKC sites between March 1, 2018, and September 30, 2018. Moreover, this section reports baseline performance data collected as part of pre-work activities (September 1, 2017-February 28, 2018), and summarizes change ideas that were adopted during AKC implementation.

Data Reporting, Analysis, and Presentation

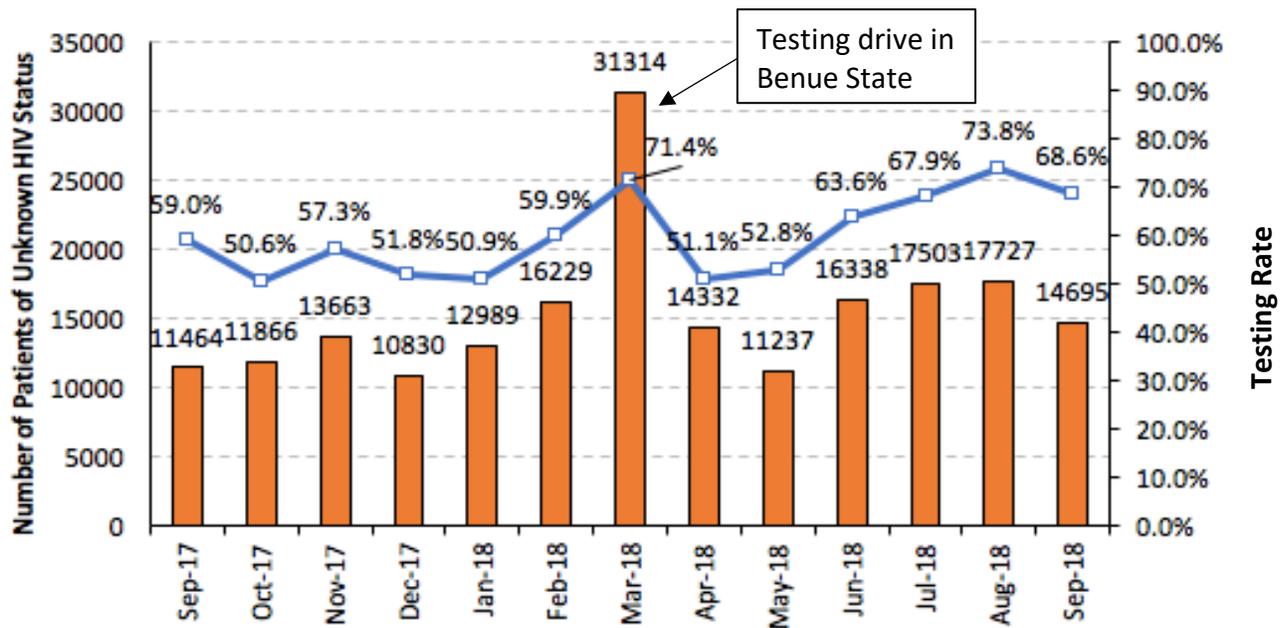
Performance measurement data for the six AKC indicators were submitted by sites to their designated QI coaches on a monthly basis. Following submission, these were reviewed by QI coaches for quality and consistency, and aggregated to reflect state-level rates. Following analyses of trends, QI coaches met with IHI improvement advisors on a monthly basis to identify focus areas for subsequent PDSAs, and target sites with low performance and/or data quality issues for immediate follow-up. Both formal and

informal mentoring was provided by IHI improvement advisors, most often by weekly calls supplemented by steady email and WhatsApp exchange. In this report, performance rates for all measures have been calculated according to definitions detailed in **Table 1**, and are visualized month-to-month alongside their corresponding denominators. Unless otherwise specified, all analyses reflect pre- and post-implementation comparisons of cross-sectional panels of patients, and therefore do not intend to imply longitudinal improvements to a single cohort. Moreover, it should be noted that all data are self-reported by participating sites and are not externally validated. Finally, unless otherwise specified, all comparative analyses are reported for descriptive purposes only, and are not intended to imply statistical significance.

HIV Testing Rate

From March 2018 through September 2018, 123,146 pediatric and adolescent patients of unknown HIV status presented to the 67 participating AKC sites across all service delivery points (**Figure 3**). Among these, 81,052 (65.8%) received an HIV test, compared to 55.2% during the six-month baseline period. During implementation, the average testing rate was highest in TB clinics (96.2%) and among cases eligible for Bandason³ screening in outpatient departments (OPDs) (97.0%) (**Figure 4**). The greatest increase in testing rate by service delivery point occurred in inpatient units—82.9% of eligible patients were tested in the post-AKC period compared to 52.0% during the baseline period. A dramatic increase in testing was observed in March 2018, and was attributable to an HIV testing drive across facilities in Benue State. Among states, Benue showed the largest improvement in HIV testing coverage, improving from an average rate of 48.4% during baseline to 90.4% during AKC implementation (**Figure 5**). Month-by-month performance in HIV testing rates across states is displayed in the **Appendix**.

Figure 3. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, All States, September 2017 – September 2018



³ Refers to screening for HIV testing eligibility among children and adolescents using tool presented in Bandason T, McHugh G, Dauya E, et al. Validation of a screening tool to identify older children living with HIV in primary care facilities in high HIV prevalence settings. *AIDS*. 2016;30(5):779-785.

Figure 4. Average Testing Rate by Service Delivery Point—Pre- and Post-AKC Implementation, September 2017 – September 2018⁴

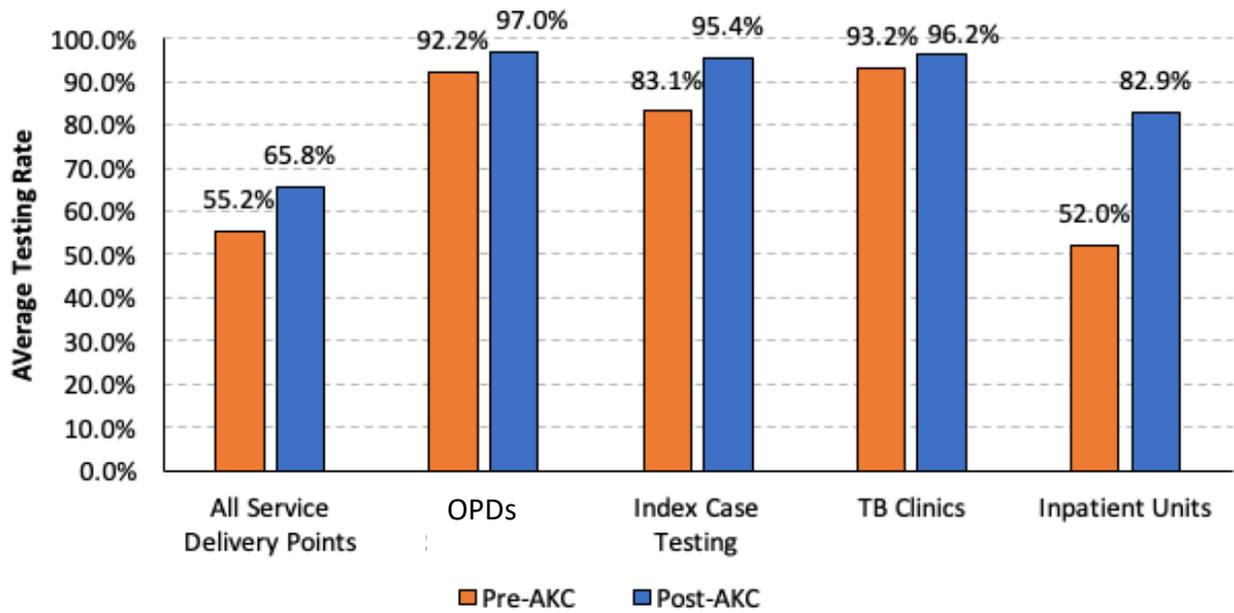
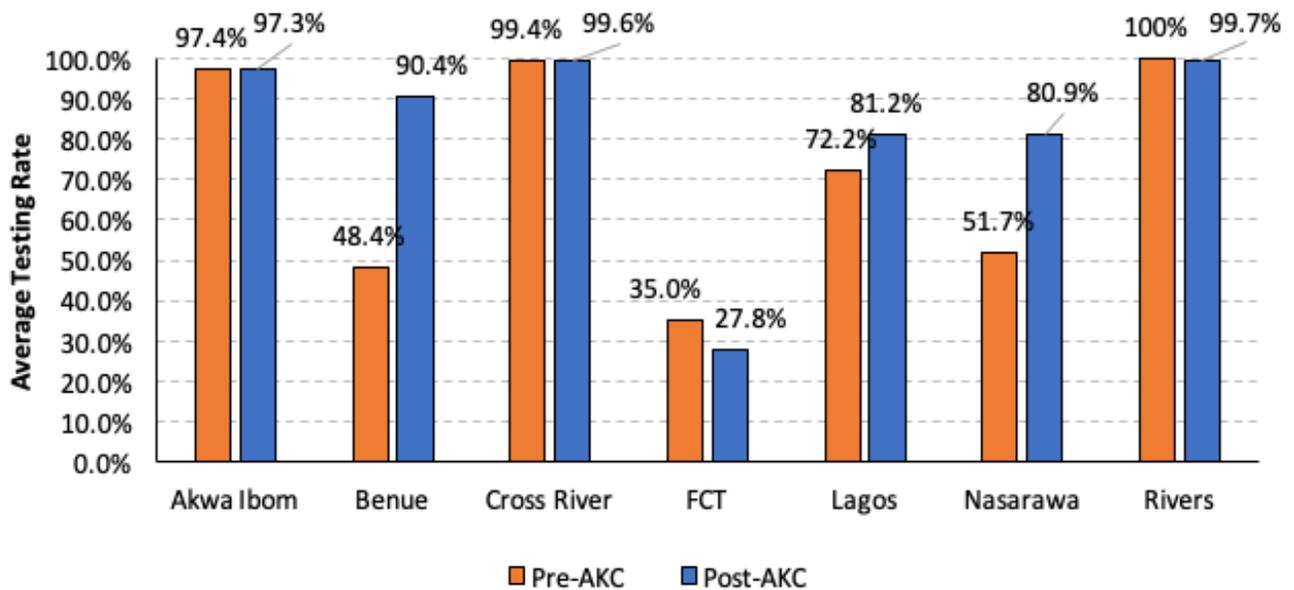


Figure 5. Average Testing Rate by State—Pre- and Post-AKC Implementation, September 2017 – September 2018



⁴ Performance in “All Service Delivery Points” refers to coverage of testing in which the denominator is *all* children and adolescents with unknown HIV status who present to a given facility. As unknown HIV status does not, in itself, constitute eligibility for HIV testing, it is reasonable to note relatively lower coverage in “All Service Delivery Points” despite high coverage in outpatient departments through Bandason screening, index case finding, TB clinics, and inpatient units.

HIV Testing Yield

Of 81,052 pediatric and adolescent patients who received an HIV test during AKC implementation, 611 (0.8%) were newly identified as HIV-positive, compared to 525 (1.2%) during the six-month baseline (Figure 6), indicating no QIC-wide improvement in testing efficiency despite high variability across states (Figure 7). Average yields across service delivery points during AKC implementation varied from a low of 0.9% for inpatient units to a high of 2.3% in TB clinics (Figure 8). The average number of children and adolescents newly identified as HIV-positive per month was indistinguishable between the 7 months of AKC implementation relative to the 6-month baseline period (87.3 vs. 87.6). Month-by-month performance in HIV testing yield across states is displayed in the Appendix.

Figure 6. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield—All Service Delivery Points, All States, September 2017 – September 2018

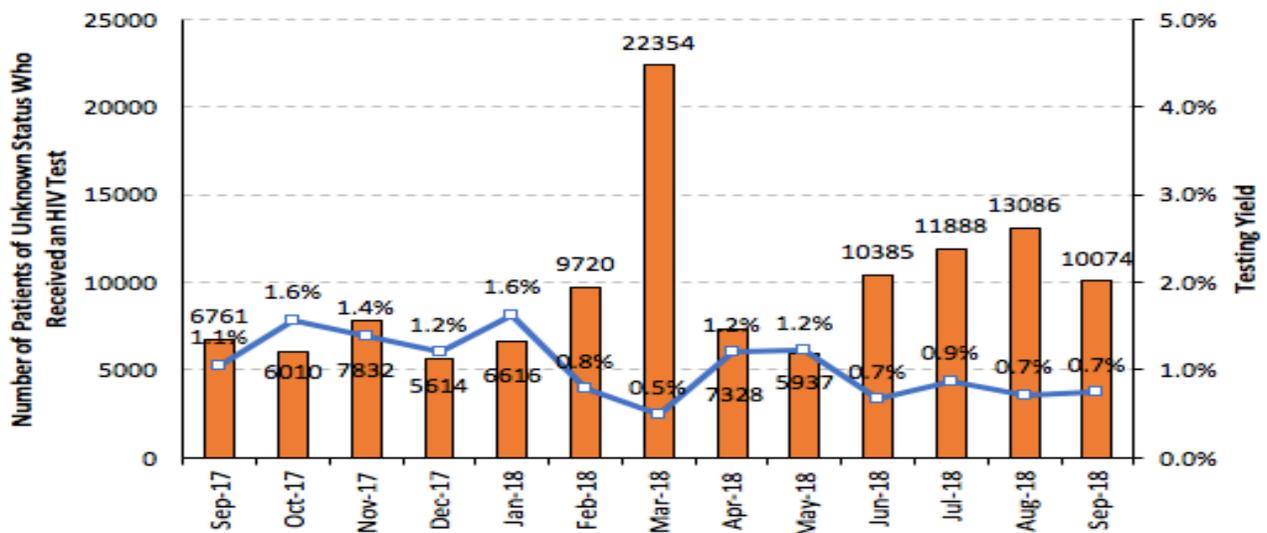


Figure 7. Average Testing Yield by State—Pre- and Post-AKC Implementation, September 2017 – September 2018

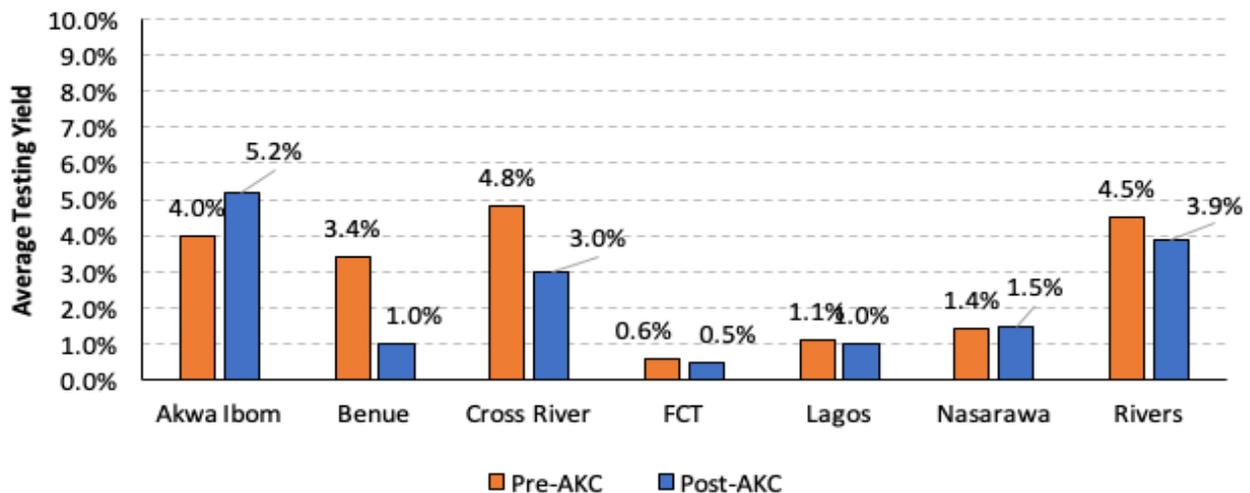


Figure 8. Average Testing Yield by Service Delivery Point—Pre- and Post-AKC Implementation, September 2017 – September 2018

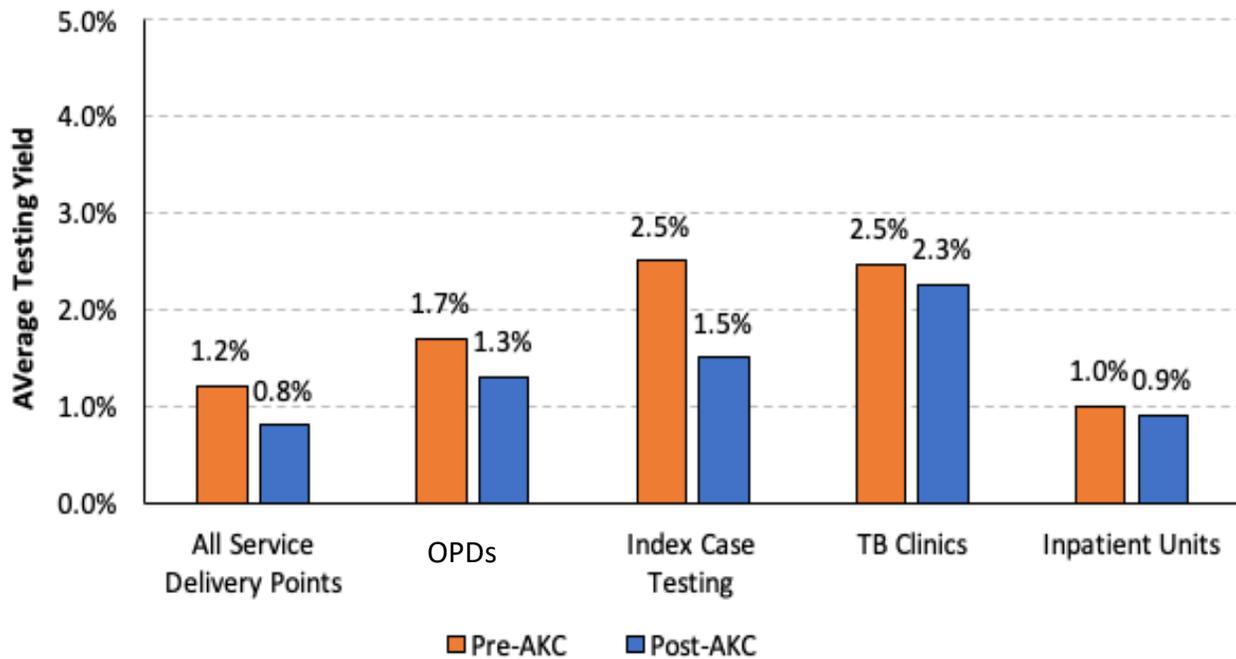
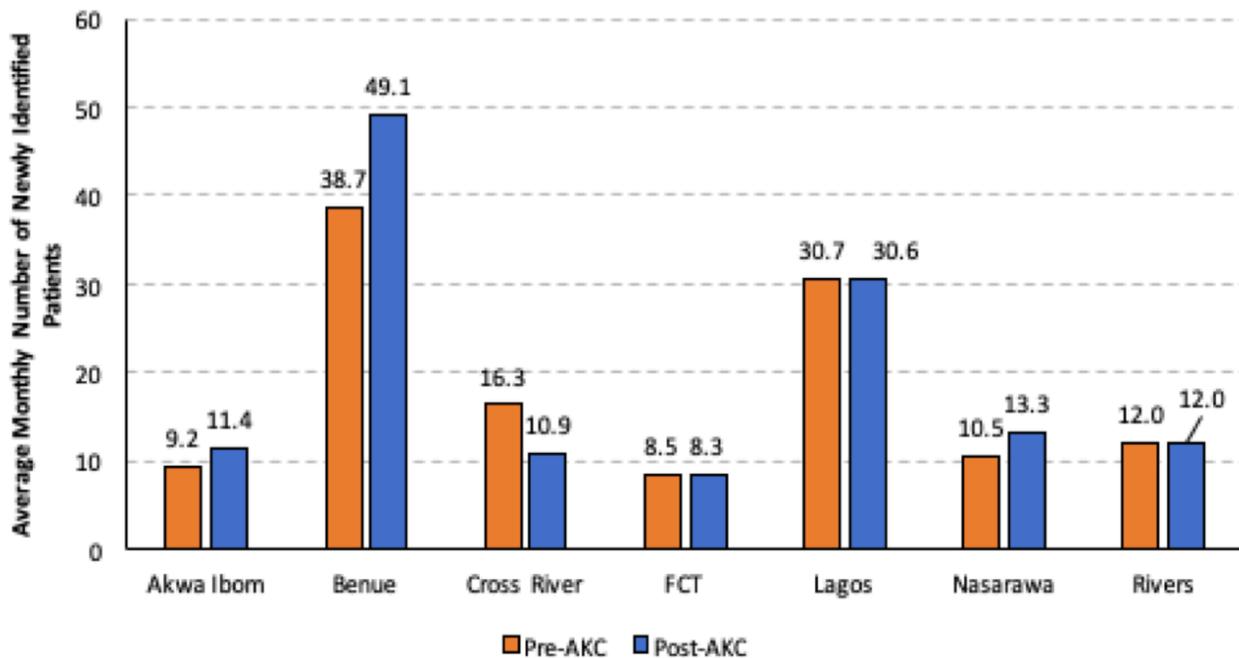


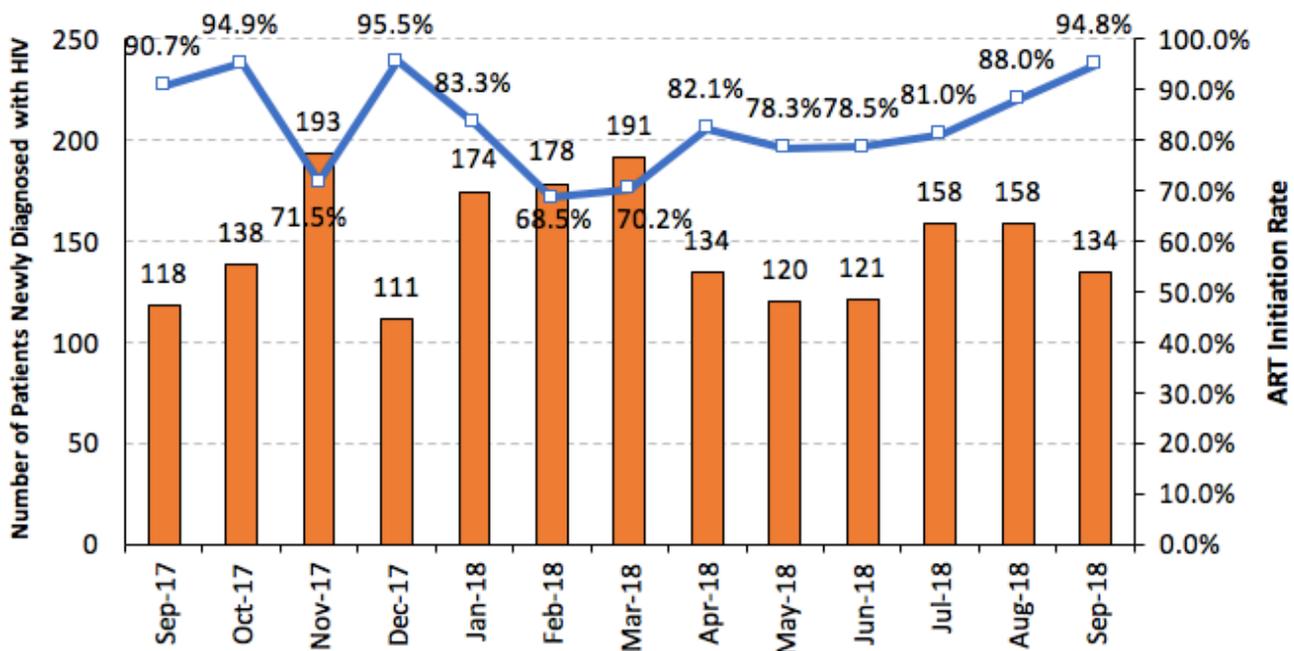
Figure 9. Average Monthly Number of Newly Identified Patients by State—Pre- and Post-AKC implementation, September 2017 – September 2018



ART Initiation/Time to ART Initiation

From March 2018 through September 2018, 1,016 patients newly identified as HIV-positive were eligible for ART initiation at AKC sites.⁵ Among these eligible patients, 827 (81.4%) were initiated on ART within the same month as diagnosis, compared to 82.1% during the six-month baseline period (**Figure 10**), with little variability across states (**Figure 11**). The average number of patients initiated each month decreased slightly (8%) between pre-AKC and post-AKC (127 vs. 117). In the absence of additional data, the extent to which the gap in ART initiation may be attributed to pre-initiation loss to follow-up, mortality, or transfer is unclear. Encouragingly, however, among 548 newly identified patients for whom data on time to initiation were reported, 72.3% were initiated on the same day as diagnosis, and 93.6% were initiated within one week. No time to ART initiation data were reported by FHI360 facilities. As time to ART initiation was not routinely collected prior to AKC, no baseline comparison is available. In comparisons of data from the pilot and expanded phases of AKC, there were significant increases in the number of patients newly diagnosed with HIV as well as the number of patients initiated on ART (**Figure 12**). It should be noted, however, that the number and type of facilities were significantly different between AKC’s two phases, which complicates attempts to make direct comparisons in performance between the pilot and expanded phases of AKC (see **Figure 2**). Month-by-month performance in ART initiation across states is displayed in the **Appendix**.

Figure 10. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—All States, September 2017 – September 2018



⁵ This includes patients who tested HIV-positive at other facilities and were subsequently referred for ART initiation at AKC sites.

Figure 11. Average ART Initiation Rate by State—Pre- and Post-AKC Implementation, September 2017 – September 2018⁶

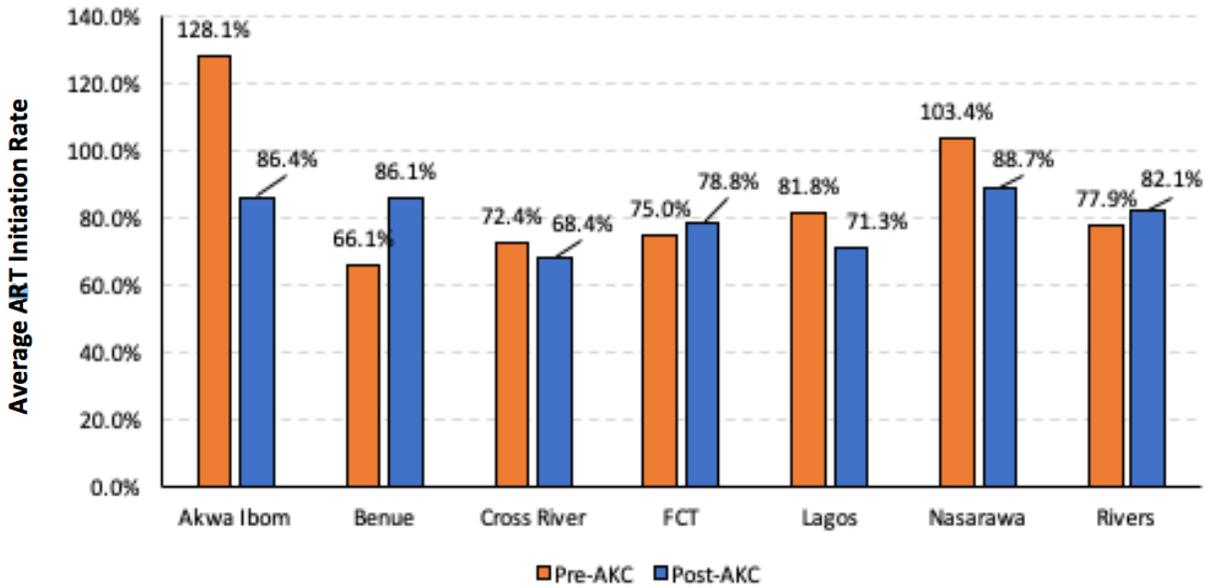
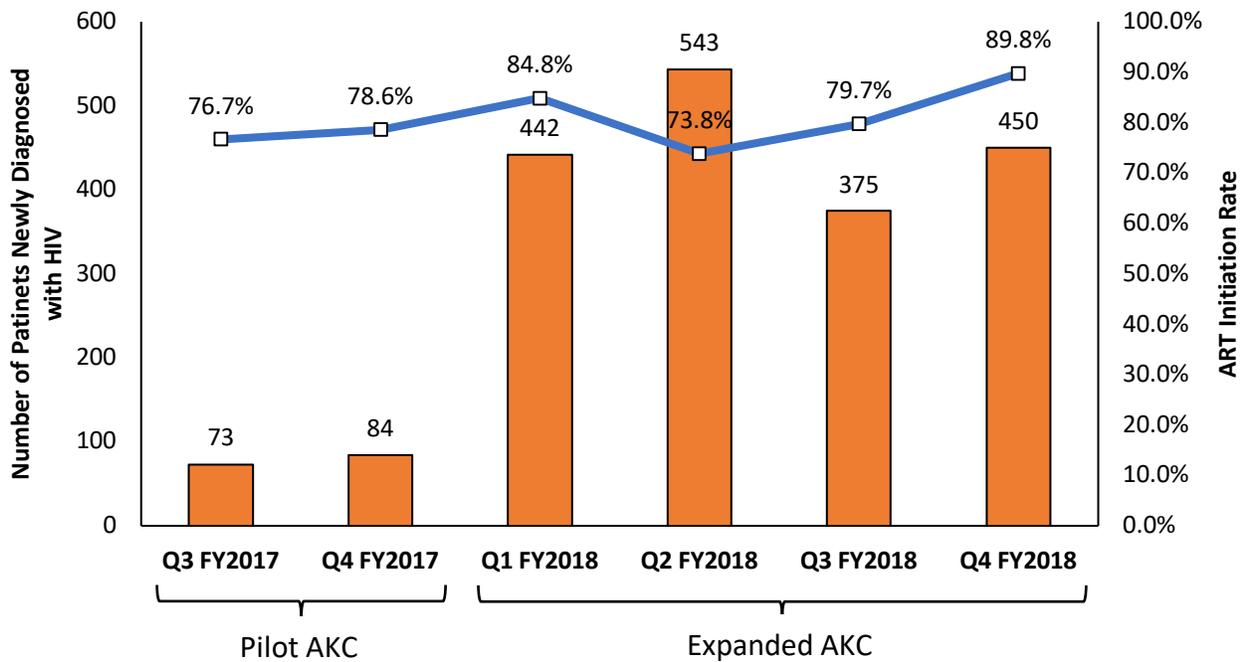


Figure 12. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate by Quarter, April 2017 – September 2018



⁶ Values may equal over 100% due to carryover from previous months of reporting and/or transfers from referring facilities. For example, if facility X reports 10 patients diagnosed at the facility during the calendar month (denominator) and 11 ART initiations (numerator), it is inferred that the additional patient was either diagnosed in the previous month or transferred in from another facility.

Viral Load Monitoring

During AKC implementation, 25,304 patients were determined to be eligible for VLM. Among these, 9,101 (36.0%) received monitoring, compared to 16.7% during the six-month baseline period, corresponding to a two-fold increase in VLM coverage (**Figure 13**). Performance across states was highly variable, with facilities in Benue State having the lowest coverage both before and after AKC implementation (**Figure 14**). Promisingly, VLM coverage improved in 5 of 7 implementing states, with the largest increases seen in Cross River and FCT. Following the commencement of AKC implementation in March 2018, a gradual decline in viral load monitoring eligibility was noted, driven by rapid improvements in viral load monitoring rates. Although improvement was achieved among facilities in Benue State, these facilities faced significant system-level challenges associated with transport and processing of patient specimens, civil and political conflict, and transition to new health information systems. In an adjusted analysis, with Benue facilities removed, rates of viral load monitoring increased 11.3% (67.2% vs. 78.5%) between baseline and AKC implementation. Month-by-month performance in ART initiation across participating states is displayed in the **Appendix**.

Figure 13. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate—All States, September 2017 – September 2018

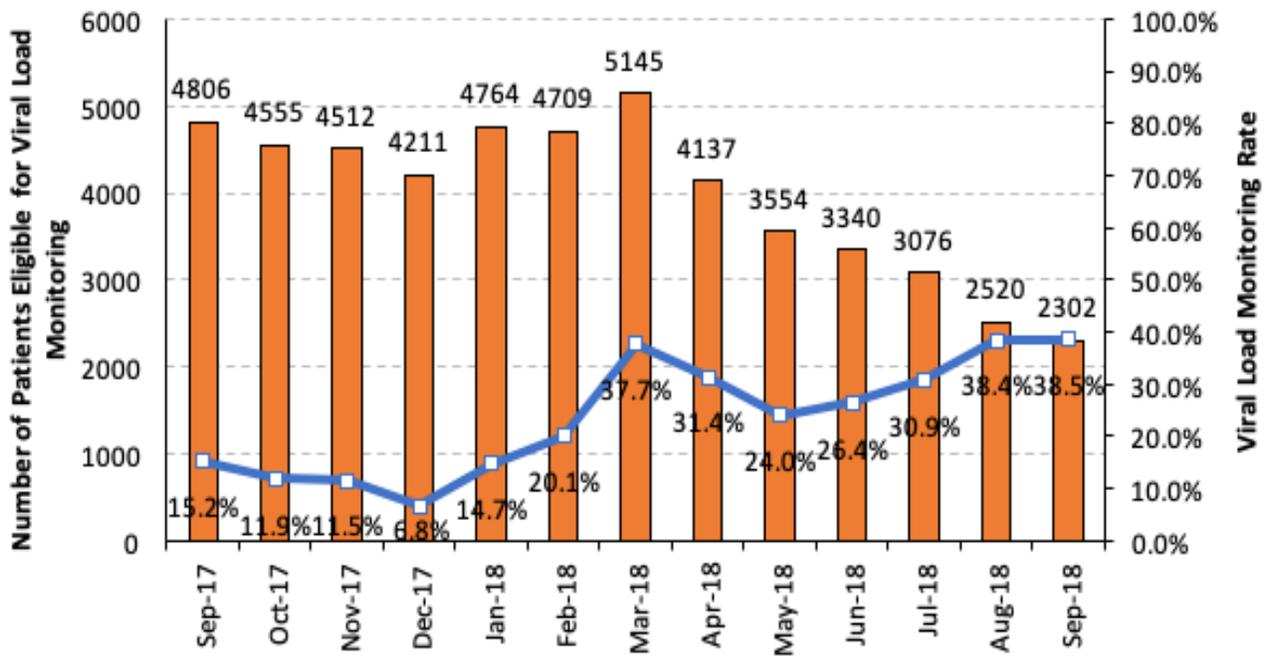
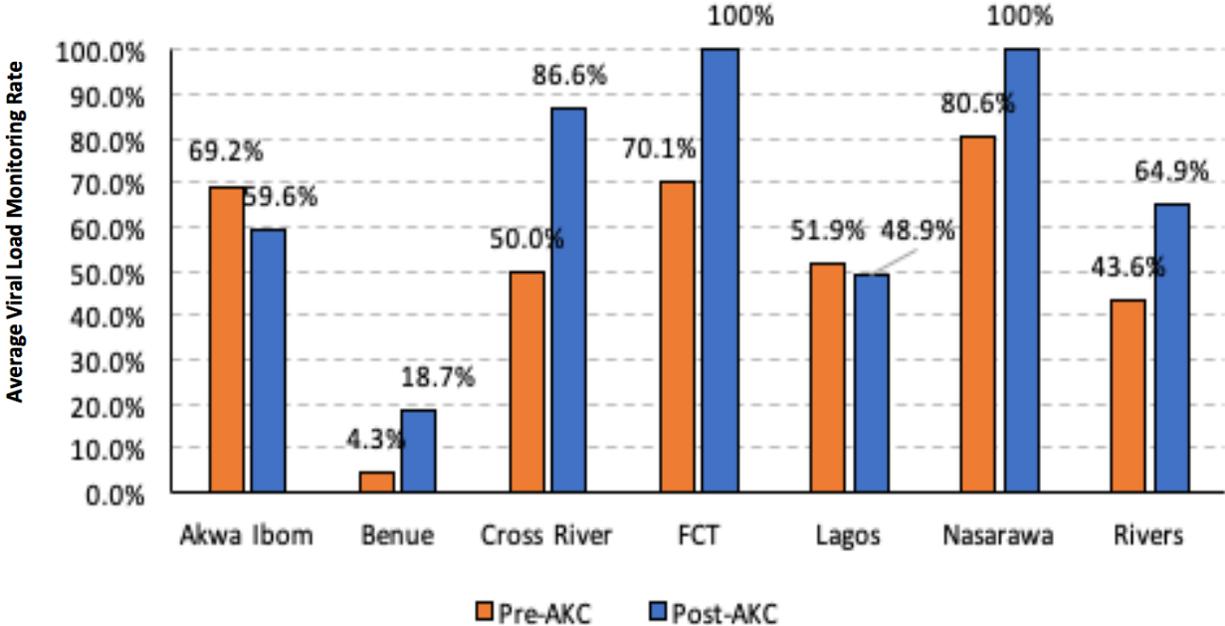


Figure 14. Average Viral Load Monitoring Rate by State—Pre- and Post-AKC Implementation, September 2017 – September 2018



Viral Load Suppression

Between March 2018 and September 2018, 5,152 viral load tests were returned to AKC sites. Among these, 3,139 (60.9%) indicated a suppressed viral load, compared to 64.3% during the six-month baseline period (Figure 15). Notably, in March 2018 an increase was observed in the number of viral load test results received, corresponding to a sharp increase in rates of VLM. Although there was high variability in the magnitude of observed improvements across states (Figure 16), performance was far below UNAIDS’ 90-90-90 targets, showing consistency with published estimates of treatment outcomes among children and adolescents in Nigeria and in other low- and middle-income settings.^{7,8} An analysis of VLS outcomes among 6,433 viral load tests received between September 2017 and September 2018 by age and sex revealed significant disparities (Figure 17). Overall, females had slightly higher rates of VLS relative to males (59.3% vs. 53.7%), a difference that was observed across all age bands. Across all age-sex groups, males aged 1-4 had the lowest rates of VLS (45.5%), while females aged 15-19 had the highest (67.3%). As these data do not reflect a representative cohort, due caution should be exercised in interpreting these results. In particular, it remains unclear whether observed performance was truly representative of the clinical population, and not unduly distorted by oversampling of children and adolescents with ongoing treatment failure.

⁷ Boerma RS, Boender TS, Sigaloff KC, et al. High levels of pre-treatment HIV drug resistance and treatment failure in Nigerian children. *J Int AIDS Soc.* 2016;19(1):21140.

⁸ Arpadi SM, Shiao S, Pimental De Gusmao E, Violari A. Routine viral load monitoring in HIV-infected infants and children in low- and middle-income countries: challenges and opportunities. *J Int AIDS Soc.* 2017;20 Supply 7.

Figure 15. Number of Viral Load Test Results Received and Viral Load Suppression Rate—All States, September 2017 – September 2018

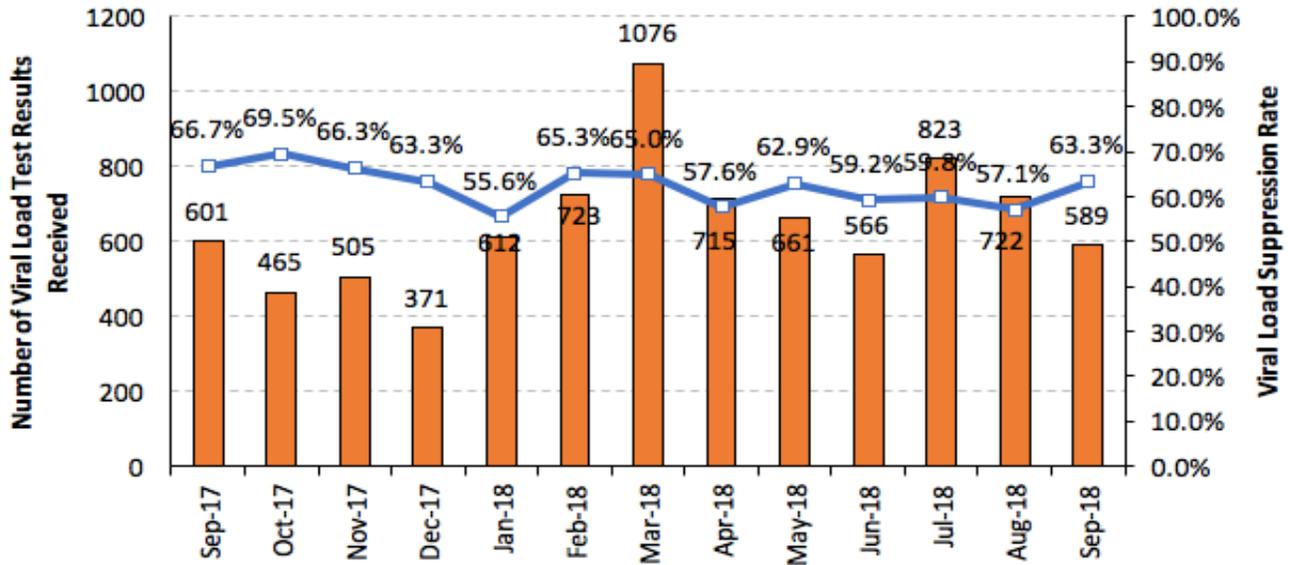


Figure 16. Average Viral Load Suppression Rate by State—Pre- and Post-AKC Implementation, September 2017 – September 2018

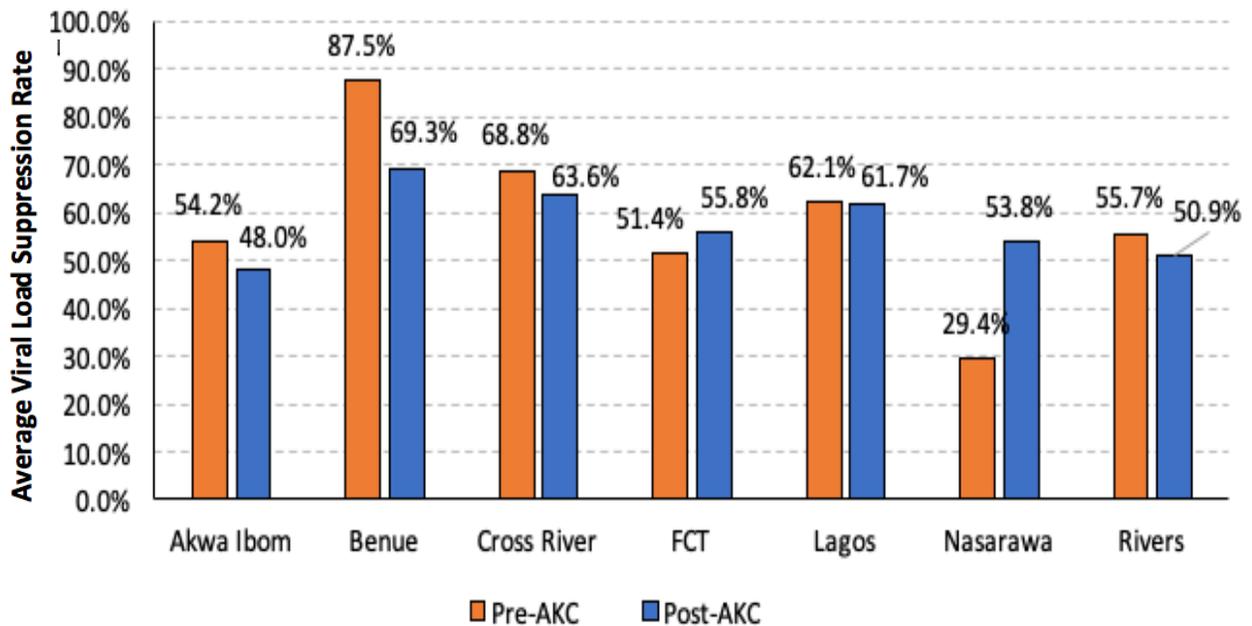
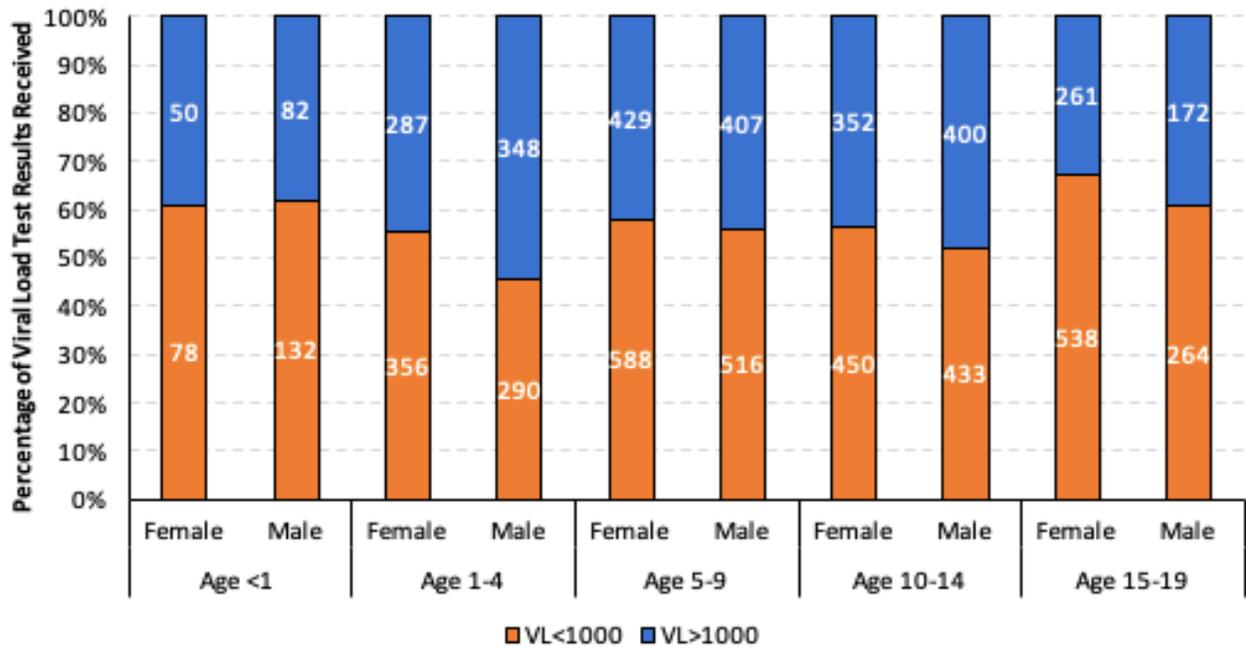


Figure 17. Viral Load Suppression Rate by Age and Sex—All States, September 2017 – September 2018



Adopted Change Ideas

The success of the change ideas listed was assessed using run chart analysis. A run chart is a graphical display of data of an indicator as it evolves over time. Run chart analysis entails the evaluation of change ideas through detection of shifts and trends. A shift occurs when six or more consecutive data points all perform better than the baseline median performance. A trend is said to have occurred when five or more data points all move in the same direction, all up or all down, and is interpreted as improvement if the trend is moving in the desired direction. **Table 4** summarizes change ideas that were adopted during AKC by measure. DoD did not report a summary of adopted change ideas.

Table 4. Summary of Adopted Change Ideas by Measure

Measures	Change Ideas	IP
Client testing rate/ Client testing yield	Offering of HIV testing at high-yield delivery points (e.g., POPD, EPU, inpatient units)	APIN, FHI360, IHVN
	Routine updating of contact information of index clients to aid in tracing	IHVN
	Reminder calls for index case testing by adherence counselors 24-72 hours prior to clinic visit	APIN
	Use of Bandason screening tool to determine eligibility for HIV testing	APIN, FHI360, IHVN
	Task-shifting of HIV testing from laboratory staff to nurses, doctors, and volunteers in OPD and inpatient units	FHI360, IHVN
	Offering index case testing during holidays, weekends, and school vacations	APIN, IHVN
	Home-based testing for children and siblings of newly identified clients	IHVN
	Use of small index cards indicating “index client” to fast-track HIV testing without need for hospital registration	APIN
	Re-design of clinic organization and client flow to improve testing rates (e.g., testing prior to weighing in OPD)	APIN, IHVN
ART initiation/time to ART initiation	Escort of newly identified HIV-positive clients to ART initiation by case managers or peer navigators	APIN, FHI360, IHVN
	Education of pediatricians on the importance of timely ART initiation	APIN
	Increasing number of days per week in which ART initiation is provided	APIN, FHI360, IHVN
	Utilization of a readiness-to-start checklist to lesson number of pre-initiation counseling sessions	FHI360
	Establishing a “one-stop shop” model of pediatric ART services to ensure prompt linkage to care	IHVN
	Waving baseline investigations/subsidizing baseline investigations for indigent patients	IHVN
	Reminder calls to patients not initiated on ART within 72 hours	APIN, IHVN

Viral load monitoring	Monthly line listing and reminder calls, SMS, and/or home visits for patients eligible for viral load monitoring	APIN, FHI360, IHVN
	Use of sticky notes on patient files to alert clinicians of viral load monitoring eligibility	FHI360, IHVN
	Health talks and one-on-one client education on the importance and timing of viral load monitoring	APIN, IHVN
	Increasing number of phlebotomy points for patients to reduce waiting times	FHI360
	Increasing number of days per week in which viral load monitoring is provided	APIN, IHVN
	Synchronizing clinic visits, pharmacy pick-ups with viral load monitoring visits	APIN, IHVN
	Sensitization, mentorship of clinicians on importance of prompt viral load monitoring	APIN, IHVN
	Offering viral load monitoring during adolescent adherence club meetings	APIN
	Engagement of treatment support specialists and mentor mothers to escort patients to laboratory	IHVN
	Training of laboratory personnel on pediatric sample collection (i.e., patients <5 years)	IHVN
	Viral load suppression	Provision of pediatric dosing charts and routine re-weighing of clients to ensure optimal dosing
Line listing and tracking of unsuppressed patients for adherence counseling and targeted viral load testing		IHVN
Involvement of more than one caregiver during adherence counseling sessions		IHVN
Sticker and play station reward system to promote adherence/viral load suppression		APIN
Counseling of parents and caregivers of adolescent patients on HIV status disclosure		FHI360, IHVN
Adolescent clubs and peer education to promote adherence to ART and engagement in care		APIN, FHI360
Education of parents and caregivers of unsuppressed patients on home-based directly observed therapy		IHVN
Follow-up call from adherence counselor for all unsuppressed lab results prior to filing in patient chart		APIN
Monthly ART pick-ups for unsuppressed clients to ensure compliance and administer adherence counseling		APIN, IHVN
Peer mentorship of parents and caregivers of unsuppressed clients from those of suppressed clients		IHVN
Convening ART committee meetings twice monthly to ensure timely switches to second-line therapy		IVHN

IMPLEMENTATION CHALLENGES

Like many quality improvement initiatives, the expanded AKC faced a number of system-level implementation challenges that were encountered during the pilot AKC. These challenges spanned three broad domains: commodities/supply chain, human resources, and data systems (**Table 5**).

Table 5. Summary of Implementation Challenges

Domain	Implementation Challenge
Commodities/supply chain	<ul style="list-style-type: none"> ✓ Stock-outs of HIV testing kits – Occasional stock-outs of kits led to declines in HIV testing rates ✓ HIV testing targets – Facilities are given HIV testing targets that, once met, disincentivize further testing until new targets are set ✓ Transport of samples – In Benue State, in particular, facilities were faced with long delays in return of viral load results
Human resources	<ul style="list-style-type: none"> ✓ Dependence on community-based organizations for HIV testing services – For some facilities, CBOs provide HIV testing at select service delivery points. In the absence of these CBOs, some facility staff are resistant to providing HIV testing services on their own ✓ QI coach turnover – Frequent transfers and leaves of absence among assigned coaches have led to occasional discontinuities in site-level support, and interruptions in improvement activities ✓ Facility staff turnover – Resignations, transfers, and promotions have led to the fragmentation of QI teams at some facilities, which has necessitated re-orientations of new staff to AKC activities ✓ Facility hierarchies and bureaucracies – Need for formal approval from multiple departments impeded implementation of some PDSAs, particularly in large facilities ✓ Strikes – Some facilities faced strikes which negatively impacted data collection efforts and the progress of QI activities ✓ Civil and political unrest – Conflict in Benue State led to interruption of QI activities and delays in data collection and reporting ✓ Data numeracy and QI capacity of facility staff – At several facilities, staff are unable to independently generate and visualize performance data. Moreover, adequate documentation of QI activities is variable, and highly sensitive to perceived workload and previous exposure to QI
Data systems	<ul style="list-style-type: none"> ✓ Disaggregation of testing data by service delivery point – As many sites only collect and report facility-wide testing rates, data collection for AKC to disaggregate these data negatively affected the timeliness of reporting ✓ Determination of VLM eligibility – Some sites do not have precise targets of those eligible for VLM, instead using PEPFAR’s Tx_Curr indicator divided by 12 as a rough estimate of monthly eligibility ✓ Challenges disaggregating VLS by age and sex – While these data are available, they are not routinely analyzed by facility staff

PLANS FOR SUSTAINABILITY OF AKC ACTIVITIES

In September 2018, stakeholders from APIN, IHVN, FHI360, IHI, UCSF-HEALTHQUAL, HRSA and CDC-Nigeria convened a virtual meeting to discuss plans for sustainability of AKC activities in FY2019 and beyond, covering the areas of performance measurement, quality improvement, coaching, and knowledge management (Table 6). Representatives from DoD were not present at the meeting, and therefore did not present a plan for sustainability.

Table 6. Summary of Plans for Sustainability by Implementing Partner (APIN, FHI360, IHVN)

IP	Plans for Sustainability
APIN	<ul style="list-style-type: none"> ✓ Data on AKC measures will continue to be collected and integrated into planned QI collaborative on patient retention in FY2019 ✓ State QI officers will provide ongoing coaching and mentoring under supervision of APIN QI lead ✓ QI journals and Excel-based coaching logs will continue to be used to document QI activities and on-site mentoring ✓ Data review and peer exchange meetings will continue on a monthly basis to review QI activities and scale effective interventions ✓ Quarterly pediatric and adolescent ART review meetings will be leveraged to share successful change ideas with attendees
FHI360	<ul style="list-style-type: none"> ✓ AKC measures have been integrated into program monitoring and evaluation and have prompted alterations to existing EMR to facilitate more granular reporting ✓ QI coaches will continue to visit sites at least once monthly to provide technical support to site quality management teams ✓ Routine program reports and weekly action reports will be used to document interventions and evaluate improvements ✓ Peer exchange will be facilitated through virtual learning sessions, and documentation will identify interventions for broad dissemination ✓ CQI, QMAP, and SIMS site assessments will be used to inform priorities for capacity building activities
IHVN	<ul style="list-style-type: none"> ✓ AKC measures will continue to be collected and analyzed using Excel-based workbooks ✓ IHVN QI coaches and technical associates will continue to meet with facility-level CQI committees on a monthly basis to review performance and discuss progress ✓ Facilities will continue to submit monthly summaries of CQI meetings and changes tested using IHVN templates ✓ The Institute for Healthcare Improvement’s QI self-assessment tool will be used by facilities to prioritize QI capacity-building needs ✓ Effective interventions will be shared with other facilities through QI coaches, virtual and in-person learning sessions, and quarterly program review meetings

CONCLUSION AND RECOMMENDATIONS

Improving performance across the cascade of pediatric and adolescent HIV treatment is crucial for reaching the UNAIDS' 90-90-90 targets for Nigeria. Implementation of All Kids Count across 67 facilities in Federal Capital Territory, Akwa Ibom, Benue, Cross River, Lagos, Nasarawa, and Rivers States led to notable improvements in site-level QI capacity, testing coverage, and viral load monitoring, but uncovered ongoing performance gaps, particularly in viral load suppression. Taken together, these findings indicate an ongoing need to improve the quality of HIV service delivery for children and adolescents in Nigeria, with a focus on the following recommended activities:

- **Optimize HIV testing coverage in high-yield service delivery areas and states.** Results of AKC revealed a near-saturation of HIV testing coverage in high-yield service delivery points (e.g., TB clinics, index case testing, and OPDs), and marked improvements in coverage in inpatient settings. Although *overall* testing efficiency did not improve as a result of AKC, consistently high yields according to specific service delivery points (e.g., TB clinics) and states (e.g., Akwa Ibom, Cross River, and Rivers) reinforce a need to achieve—and, importantly, maintain—full testing coverage in these areas. Moreover, while facilities in Benue State experienced a three-fold decline in testing yield during AKC implementation, these same facilities nevertheless reported a 21.2% increase in the monthly average of children and adolescents of newly identified as HIV-positive. This figure underscores a need to intensify scale up of targeted HIV testing in Benue State, amid declining testing efficiency, to maintain and build upon gains in case identification.
- **Strengthen facility-level data systems and capacity to generate accurate and timely data on viral load monitoring eligibility.** Data mapping and quality improvement activities conducted as part of AKC revealed several key gaps in sites' capacity to produce accurate and timely data to improve VLM. First, several sites reported use of PEPFAR's Tx_Curr indicator to calculate eligibility for VLM. Regrettably, this method not only fails to account for newly diagnosed patients, but it also fails to account for patients eligible for targeted monitoring as a result of suspected treatment failure. The latter is of particular significant in the Nigerian context, where pre-treatment drug resistance is highly prevalent, even among newly identified children without exposure to PMTCT regimens.^{9,10} Second, while electronic medical record systems at some sites have the capacity to generate accurate lists of patients eligible for routine and targeted VLM, many facility staff are heavily reliant on IPs to query these systems. Taken together, these gaps greatly hinder sites' capacity to appropriately monitor pediatric and adolescent patients in accordance with national guidelines, and call into serious question the representativeness of VLS data. To narrow the gap in VLM, there is a crucial need to build capacity of site-level staff to *autonomously* query eligibility data that are accurate, timely, and actionable to guide clinical decision-making and QI activities.

⁹ Boerma RS, Boender TS, Sigaloff KC, et al. High levels of pre-treatment HIV drug resistance and treatment failure in Nigerian children. *J Int AIDS Soc.* 2016;19(1):21140.

¹⁰ Inzaule SC, Osi SJ, Akinbiyi G, et al. High prevalence of HIV drug resistance among newly diagnosed infants aged < 18 months: results from a nationwide surveillance in Nigeria. *J Acquir Immune Defic Syndr.* 2018;77(1):e1-e7.

- **Build capacity to disaggregate viral load suppression data by sex, age, and other variables, and target QI activities to identified gaps.** Prior to implementation of AKC, rates of VLS were not routinely disaggregated and analyzed by sites according to age and sex to identify underlying disparities. While aggregate VLS rates remained below UNAIDS' targets throughout AKC implementation, these figures concealed significant differences in outcomes. For example, females aged 15-19 had a VLS rate that was 67.3%—nearly 25% higher than the rate for males aged 1-4. The inability to disaggregate performance data by age and sex (and other relevant variables such as time on treatment and treatment regimen) thwarts their ability to target interventions to specific sub-populations. Further work is therefore needed to build site-level capacity to disaggregate performance data by age, sex, and other variables, and act upon the findings using QI methods.
- **Strengthen accountability and monitoring of site-level quality management programming.** While many participating sites had QI committees prior to AKC implementation, sensitization activities conducted by IHI improvement advisors revealed that many were not optimally functional (i.e., did not meet regularly, did not routinely review performance data). As QI committees form the basis of organizational support and direction for sustainable site-level QI activities, there is a need to continue to monitor, and encourage, site-level QM programming to ensure that QI activities remain active with minimal external support.
- **Foster sharing of implementation successes—and importantly, failures—as a means to promote peer learning and co-creation of implementation strategies.** Routine convening of participating facility teams as part of learning sessions—and IPs as part of AKC-wide exchange meetings—provide fora for stakeholders to discuss implementation successes, challenges, and approaches. Through presentations and interactive discussions, participants build a community of shared accountability, co-create solutions to common challenges, and thereby rapidly accelerating implementation and improvement. These fora, whether convened in-person or virtually, are crucial to the success of QICs, and should be promoted as a means to rapidly build and disseminate QI knowledge.
- **Continue to build IP capacity to manage site-level quality management activities and lead QICs.** Following the termination of AKC activities, formal QI coaching and mentoring provided by UCSF-HEALTHQUAL and IHI will no longer be available to IPs. At present, significant variation exists in QI capabilities among the participating IPs that should be monitored and strengthened to assure ongoing focus on the quality of care provided to children and adolescents living with HIV. Access to experienced QI mentors may be essential to ensure sustainability of quality management programs and an ongoing focus on measurement and use of data to drive improvement. Areas of priority to ensure agency-wide commitment to quality management include:
 1. Development and annual updating of a QM plan
 2. A formal work plan detailing activities to implement the QM plan
 3. Leadership support, oversight, and monitoring of QI activities
 4. Routine, frequent measurement of performance across all sites supported by IPs
 5. Processes to evaluate, assess, and follow up on HIV quality measurement findings and use of these data to identify gaps and set priorities for improvement
 6. Data systems that routinely produce relevant QI measures

7. A formal structure with roles and responsibilities for individuals defined as part of the agency's QM program
8. A functional QI committee that meets regularly to oversee quality throughout the agency
9. Involvement of staff representing all areas of agency in planning and committee activities
10. Involvement of consumers representing all affected populations in care within the agency network in planning and committee activities
11. QI projects implemented routinely to address quality issues
12. Active staff development through capacity building to conduct QI initiative and activities at site level
13. Coaching and mentoring of sites that includes monitoring of QI activities

APPENDIX

HIV Testing Rate

Figure A1. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Akwa Ibom State, September 2017 – September 2018

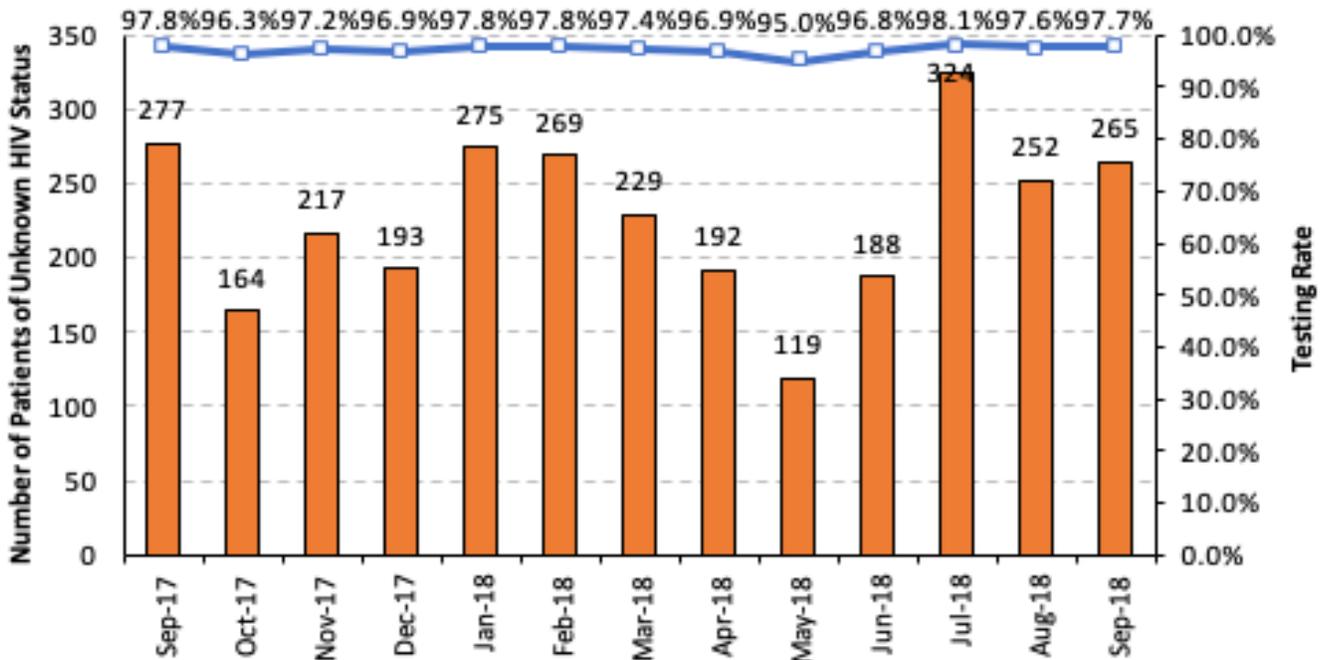


Figure A2. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Benue State, September 2017 – September 2018

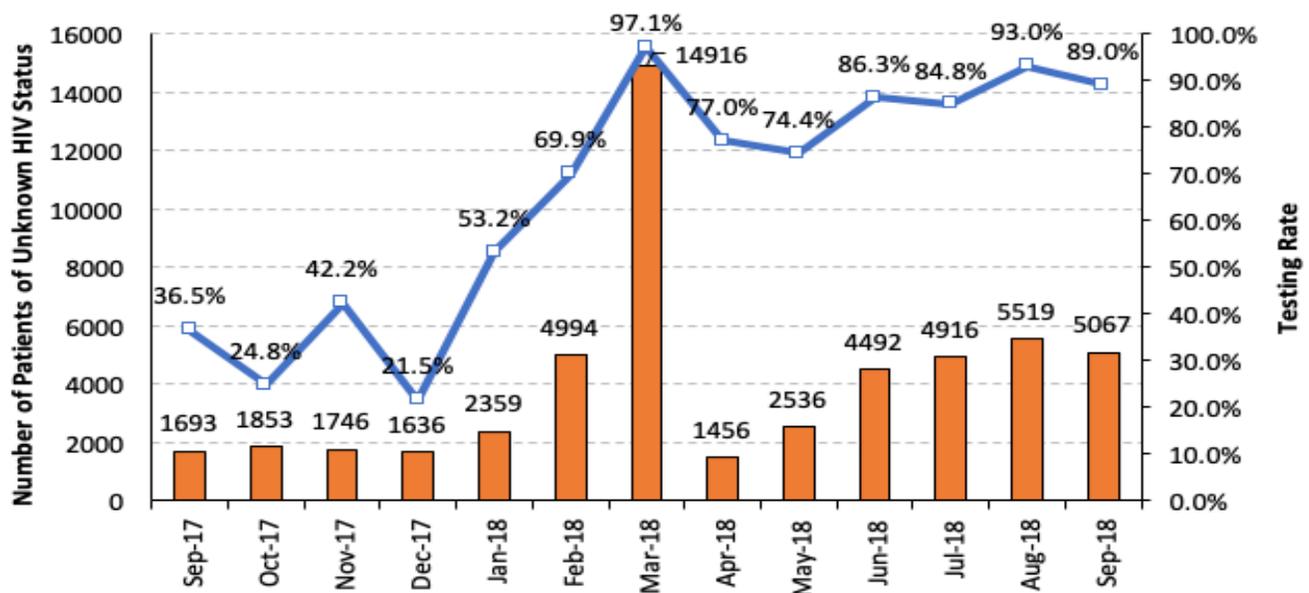


Figure A3. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Cross River State, September 2017 – September 2018

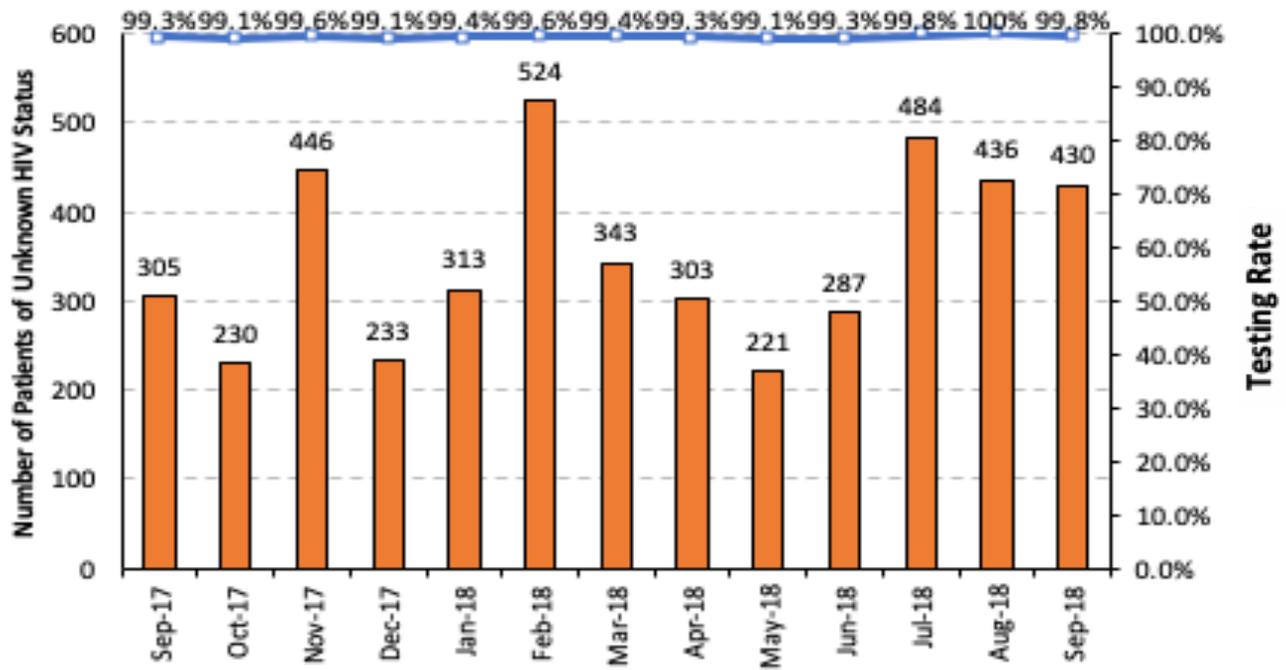


Figure A4. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Federal Capital Territory, September 2017 – September 2018

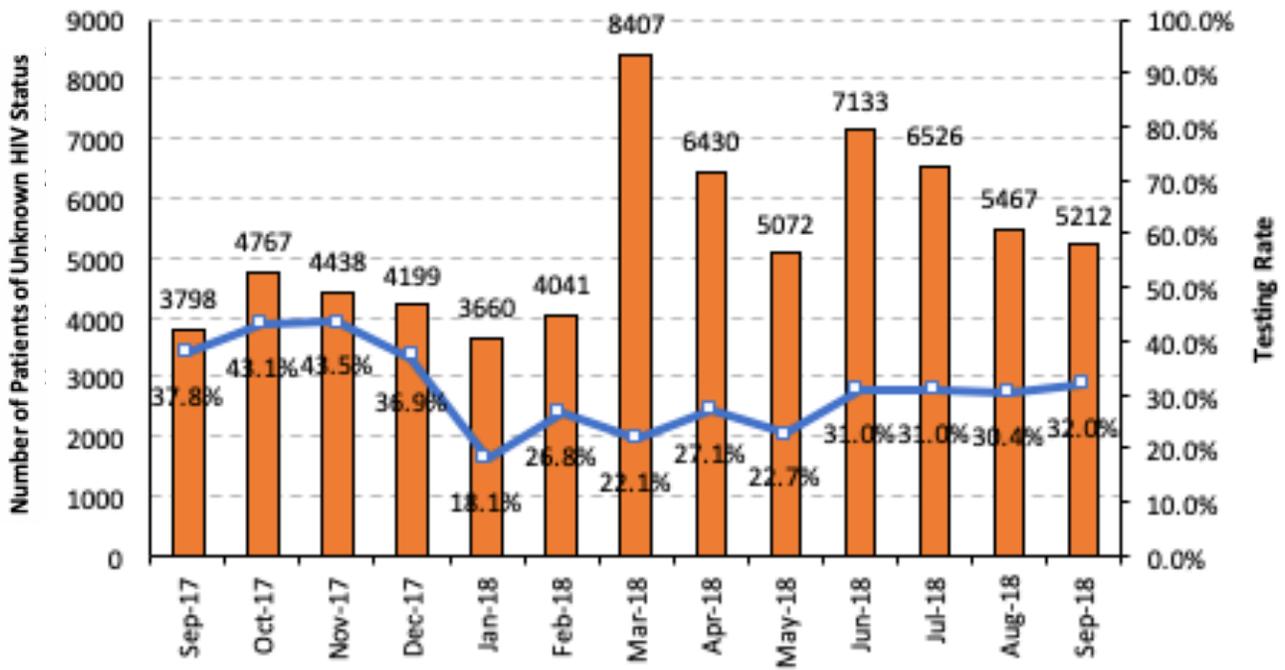


Figure A5. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Lagos State, September 2017 – September 2018

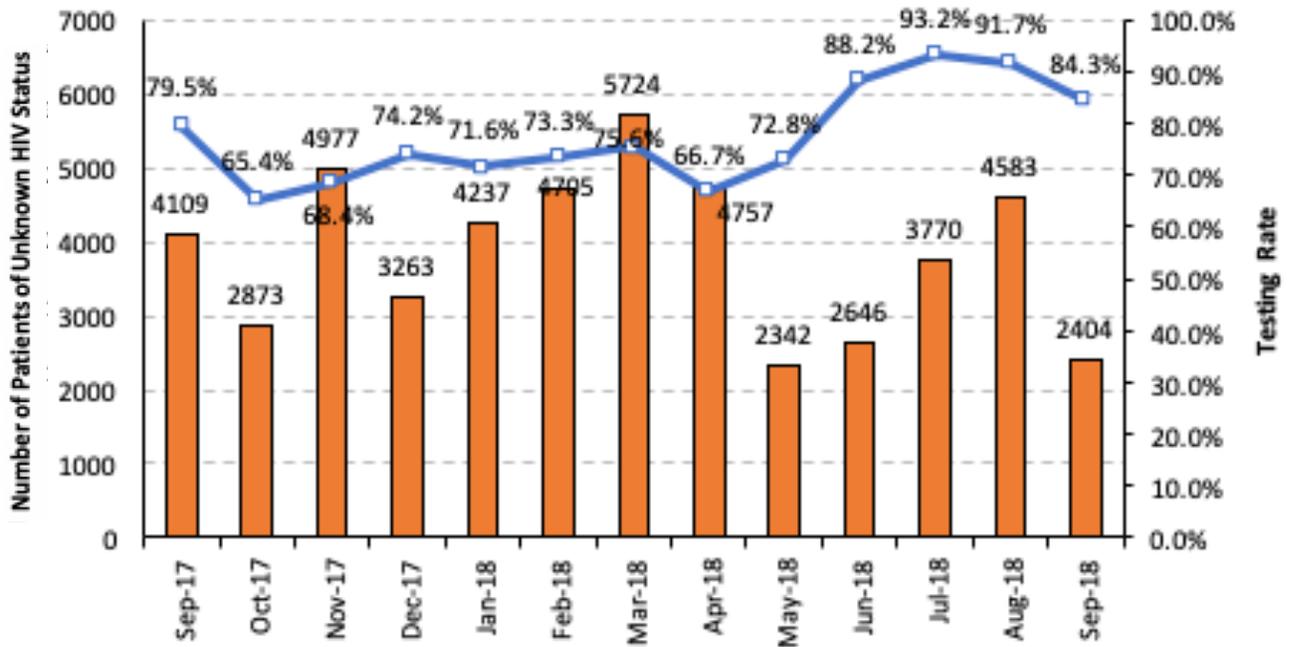


Figure A6. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Nasarawa State, September 2017 – September 2018

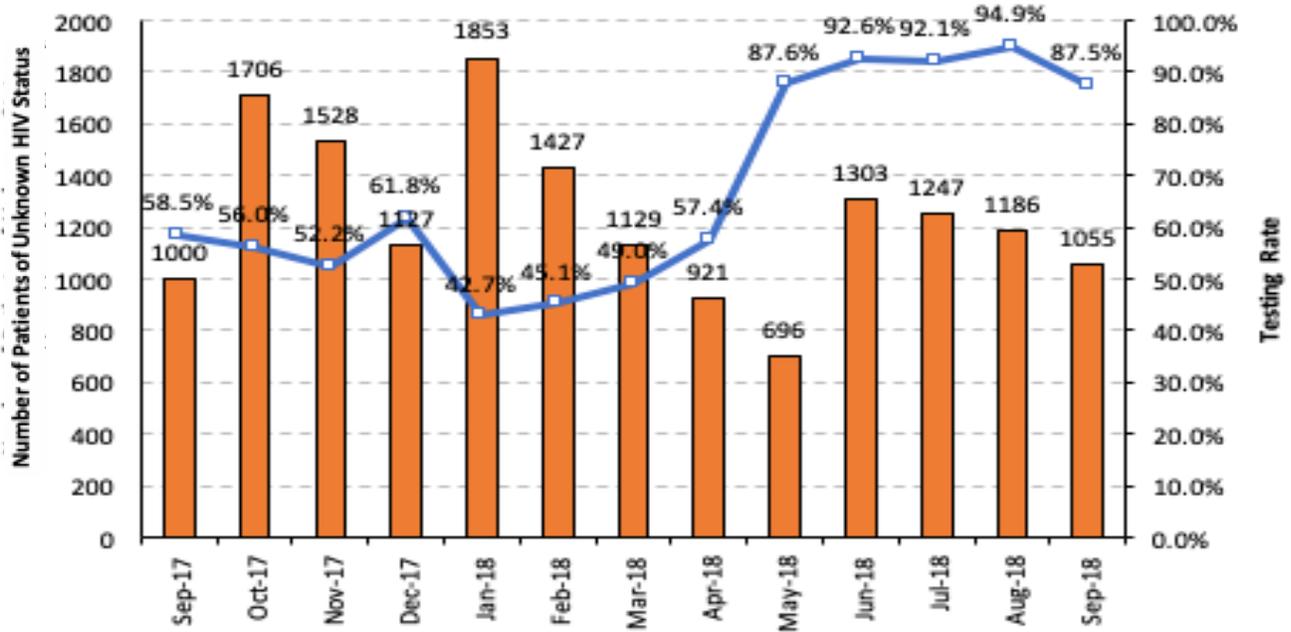
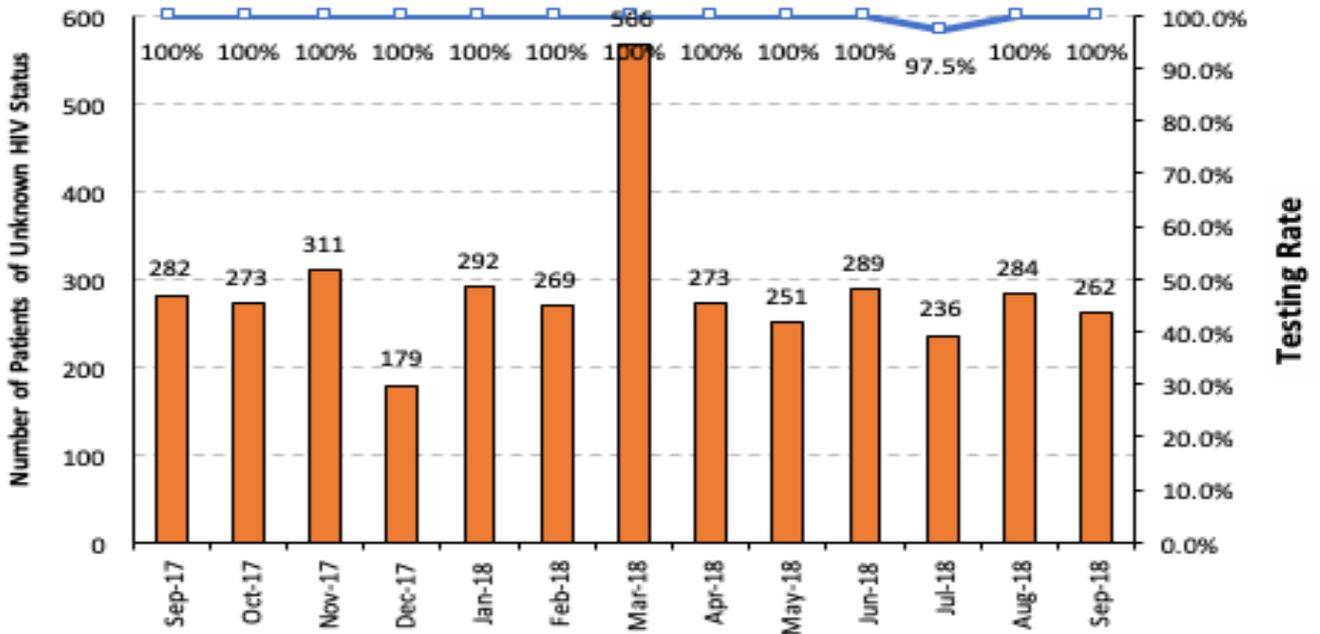


Figure A7. Number of Patients of Unknown HIV Status and Testing Rate—All Service Delivery Points, Rivers State, September 2017 – September 2018



HIV Testing Yield

Figure A8. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield—All Service Delivery Points, Akwa Ibom State, September 2017 – September 2018

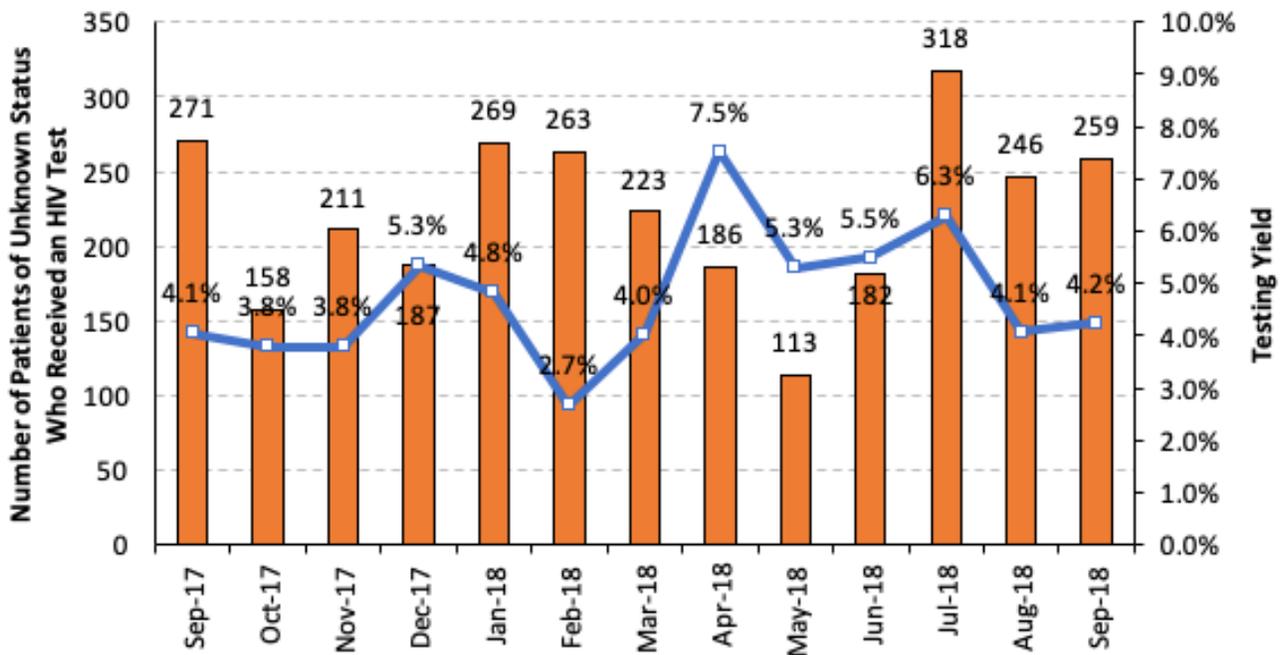


Figure A9. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield —All Service Delivery Points, Benue State, September 2017 – September 2018

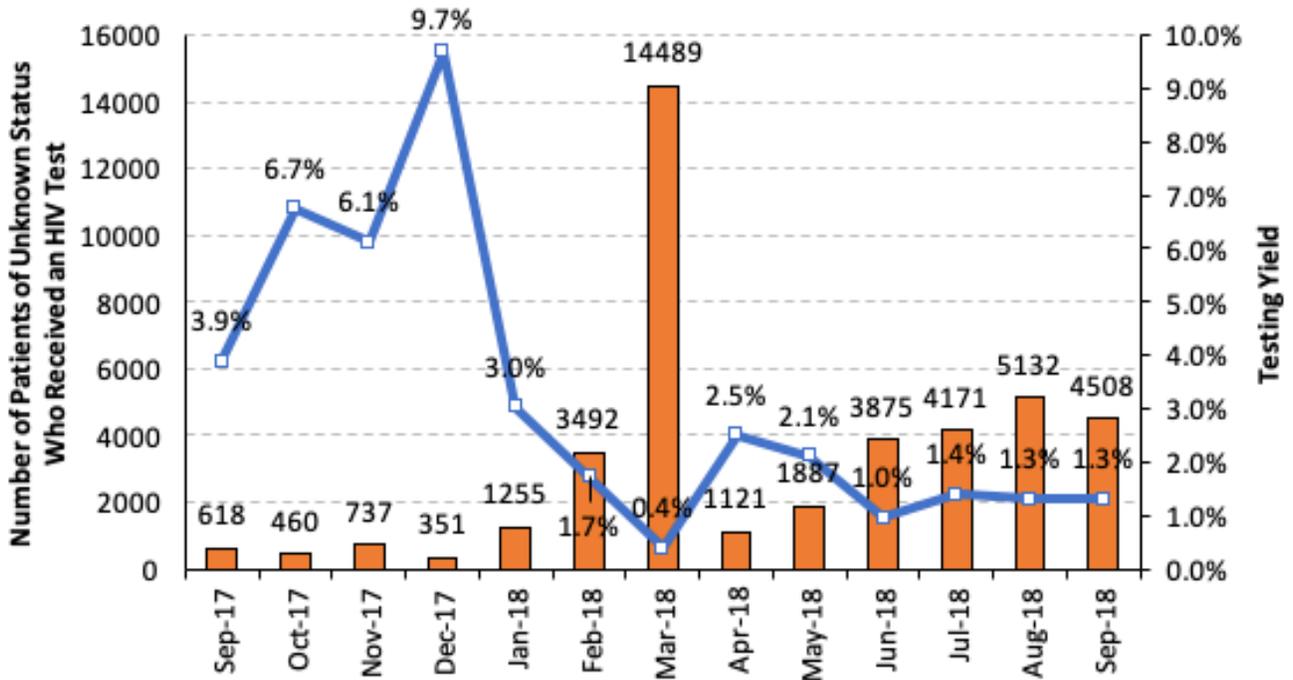


Figure A10. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield — All Service Delivery Points, Cross River State, September 2017 – September 2018

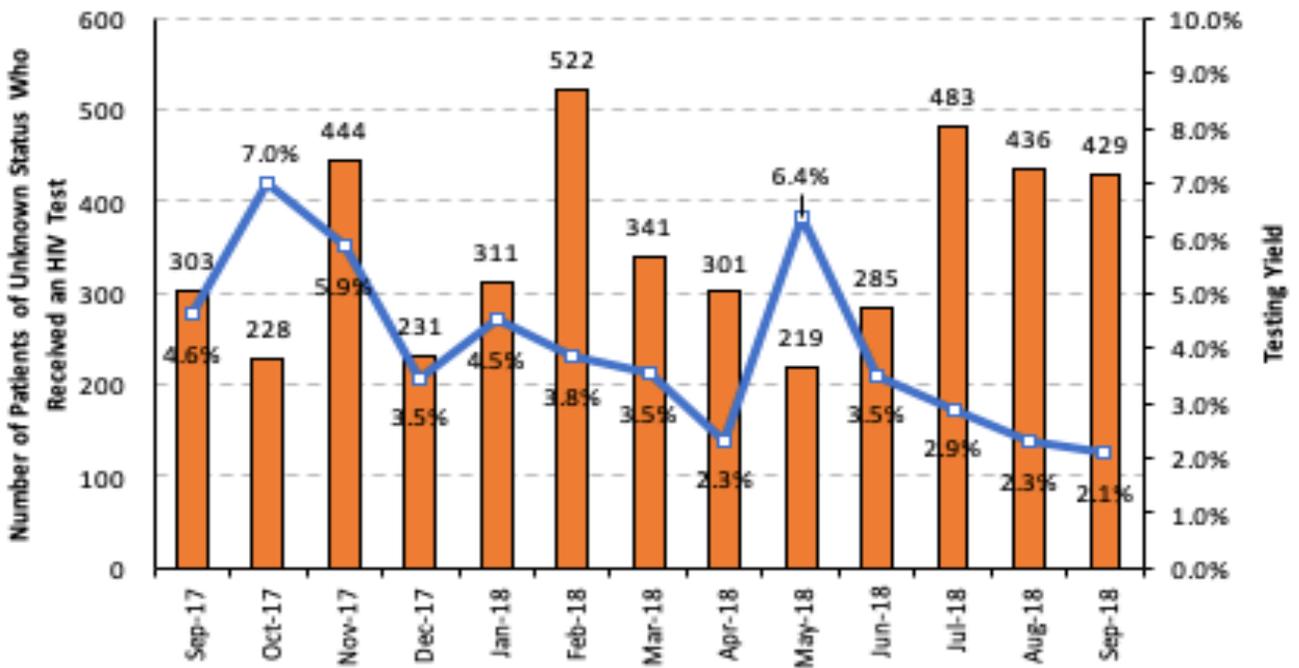


Figure A11. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield — All Service Delivery Points, Federal Capital Territory, September 2017 – September 2018

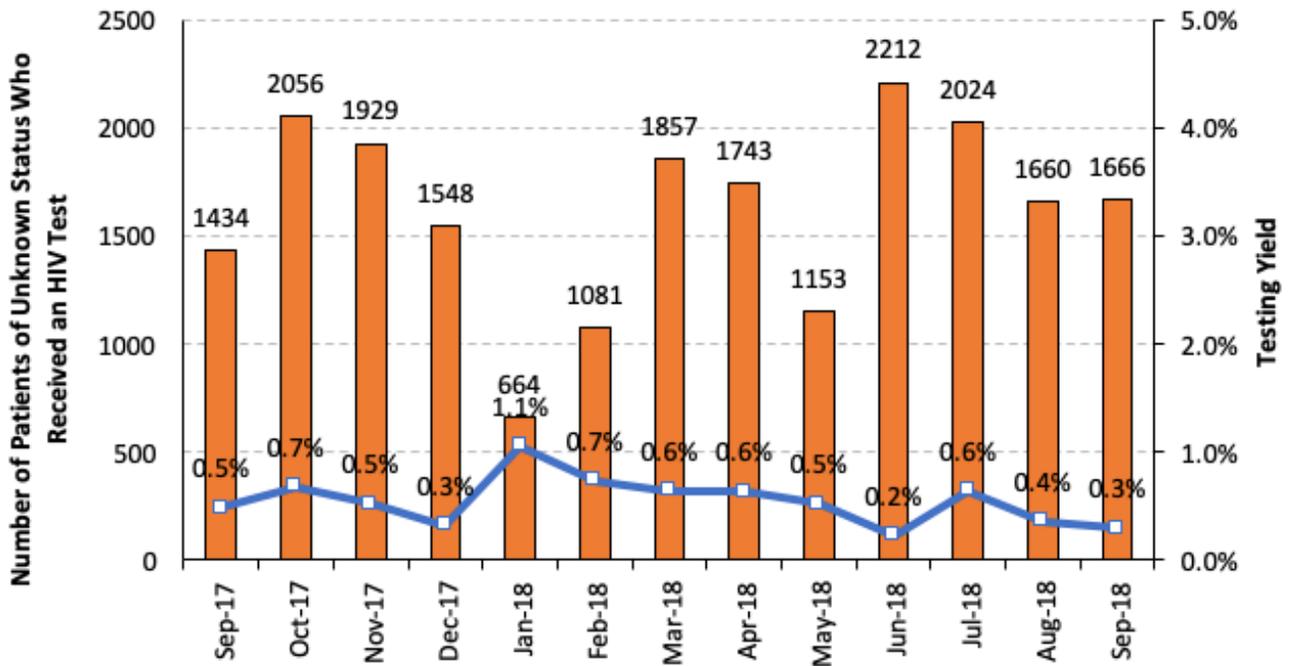


Figure A12. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield — All Service Delivery Points, Lagos State, September 2017 – September 2018

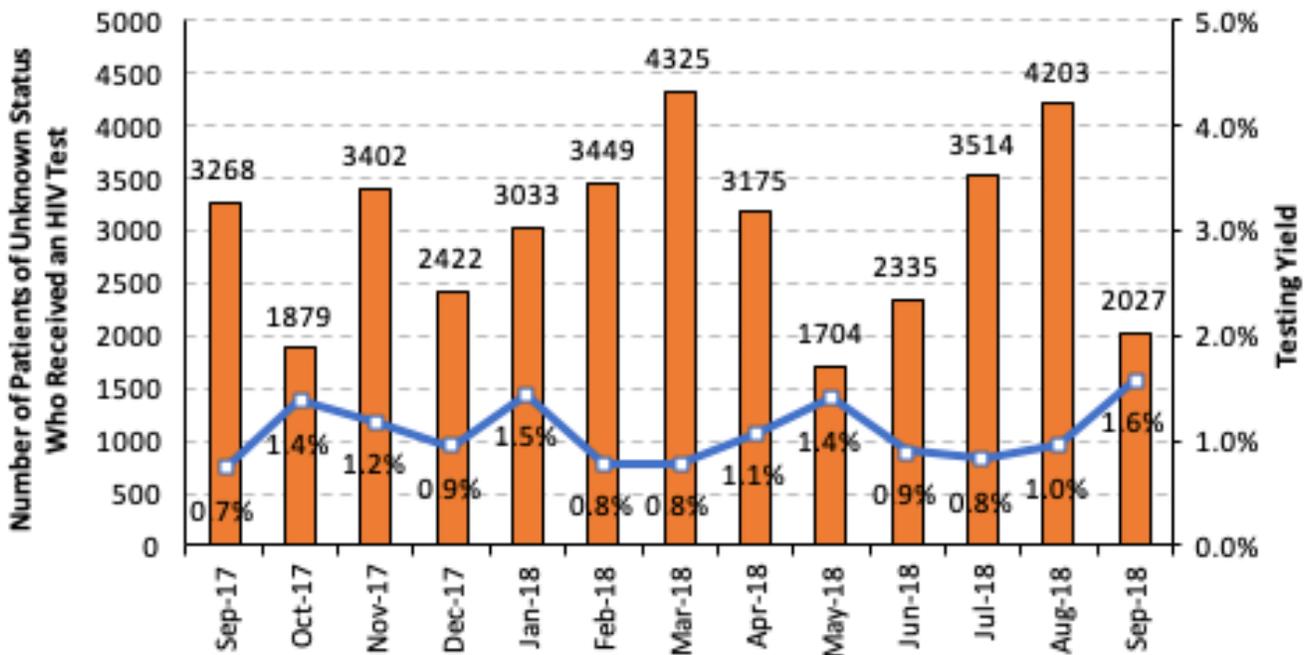


Figure A13. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield — All Service Delivery Points, Nasarawa State, September 2017 – September 2018

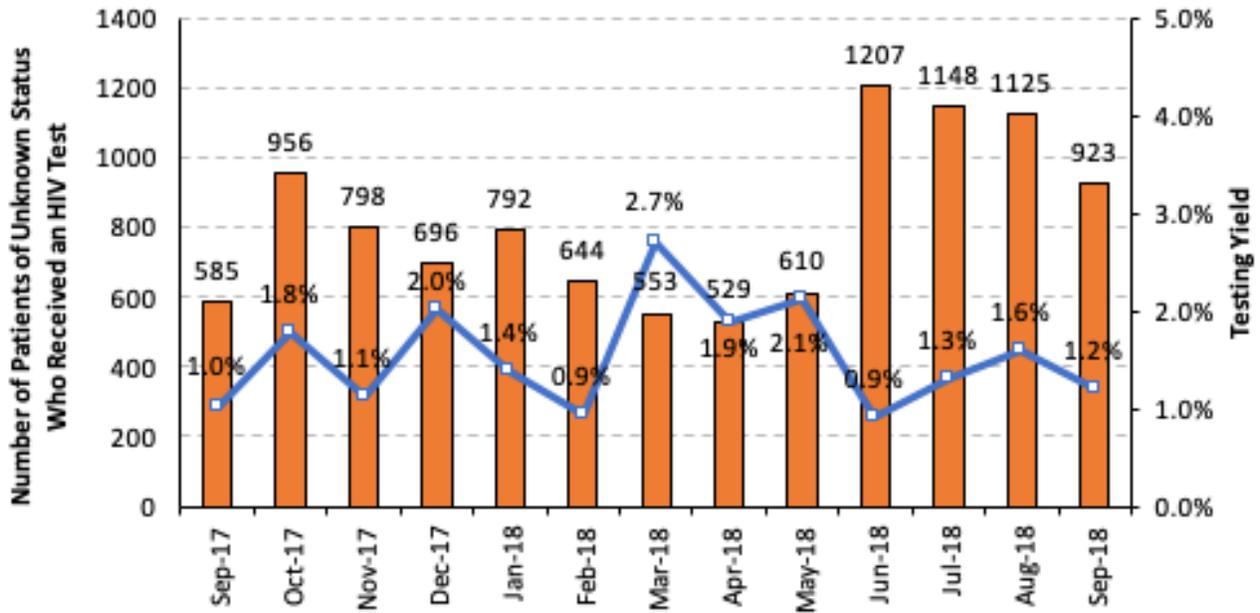
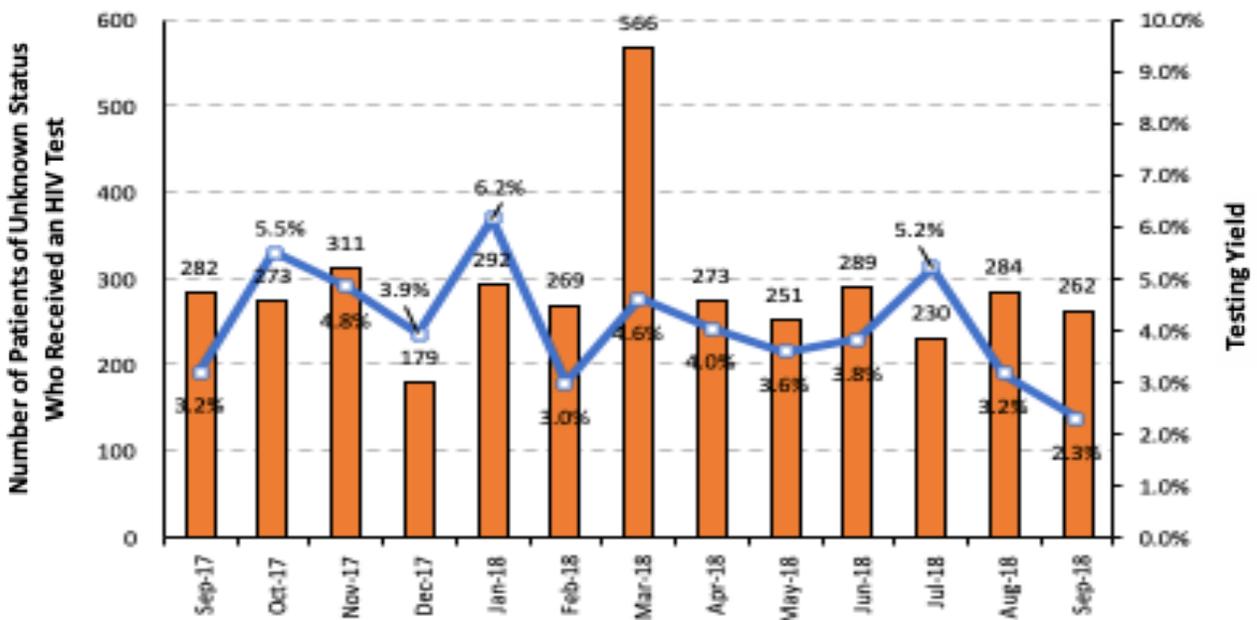


Figure A14. Number of Patients of Unknown HIV Status Who Received an HIV Test and Testing Yield — All Service Delivery Points, Rivers State, September 2017 – September 2018



ART Initiation

Figure A15. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Akwa Ibom State, September 2017 – September 2018

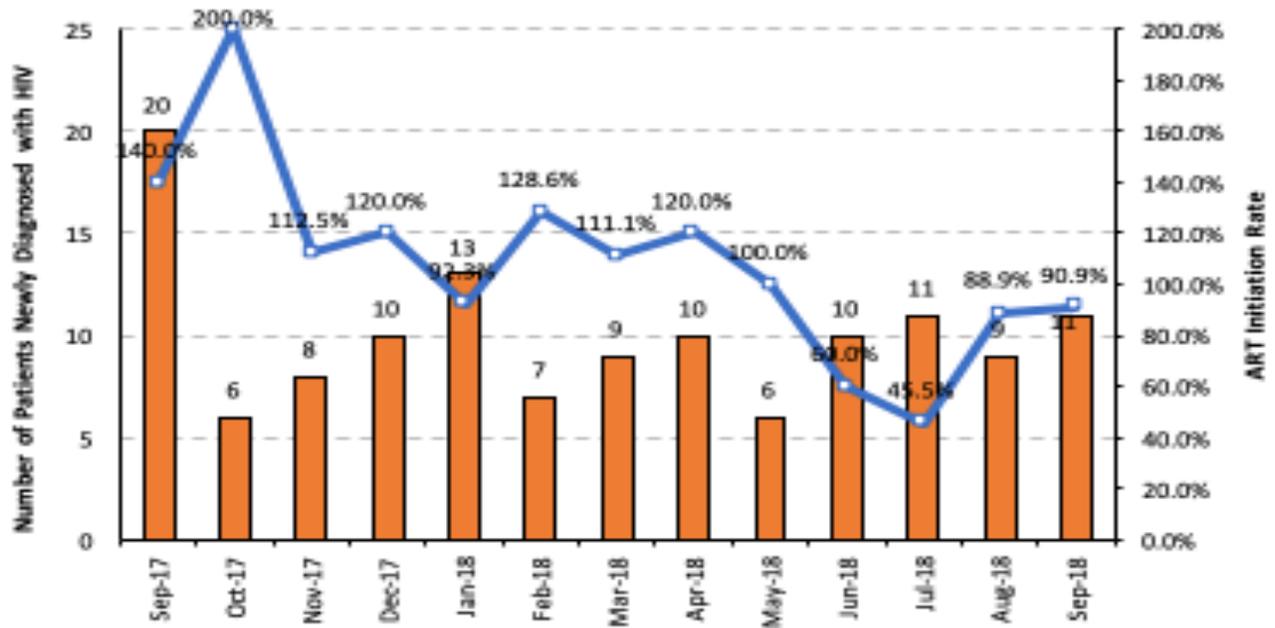


Figure A16. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Benue State, September 2017 – September 2018

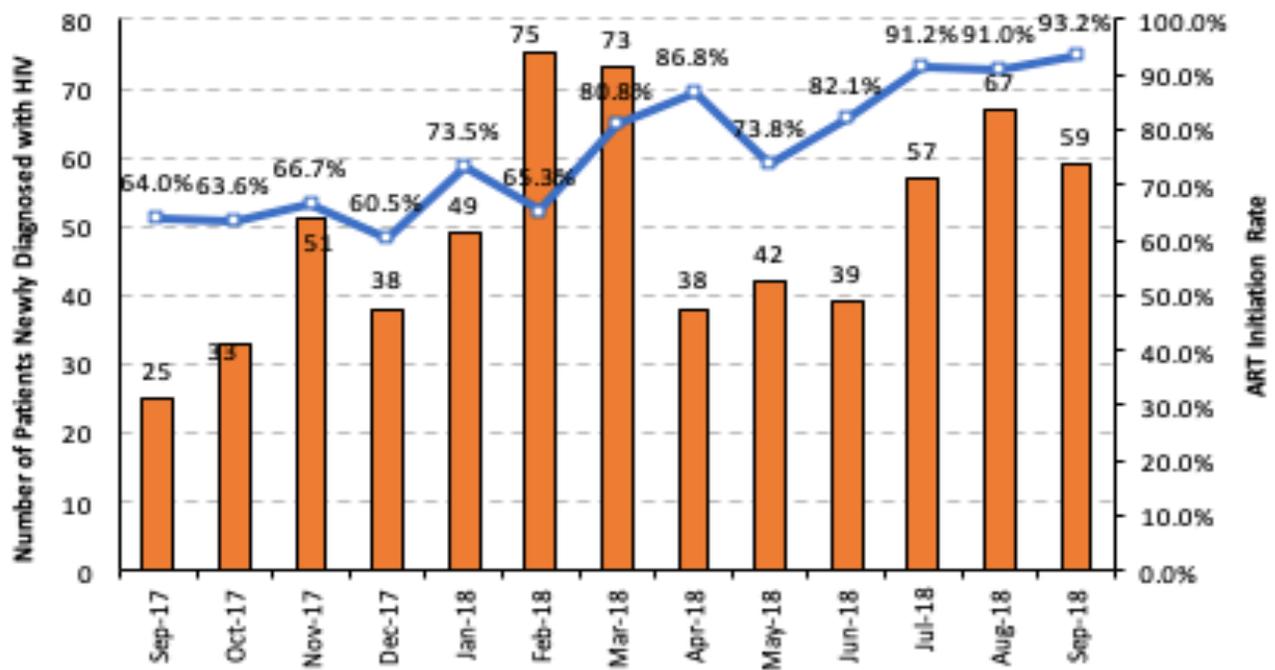


Figure A17. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Cross River State, September 2017 – September 2018

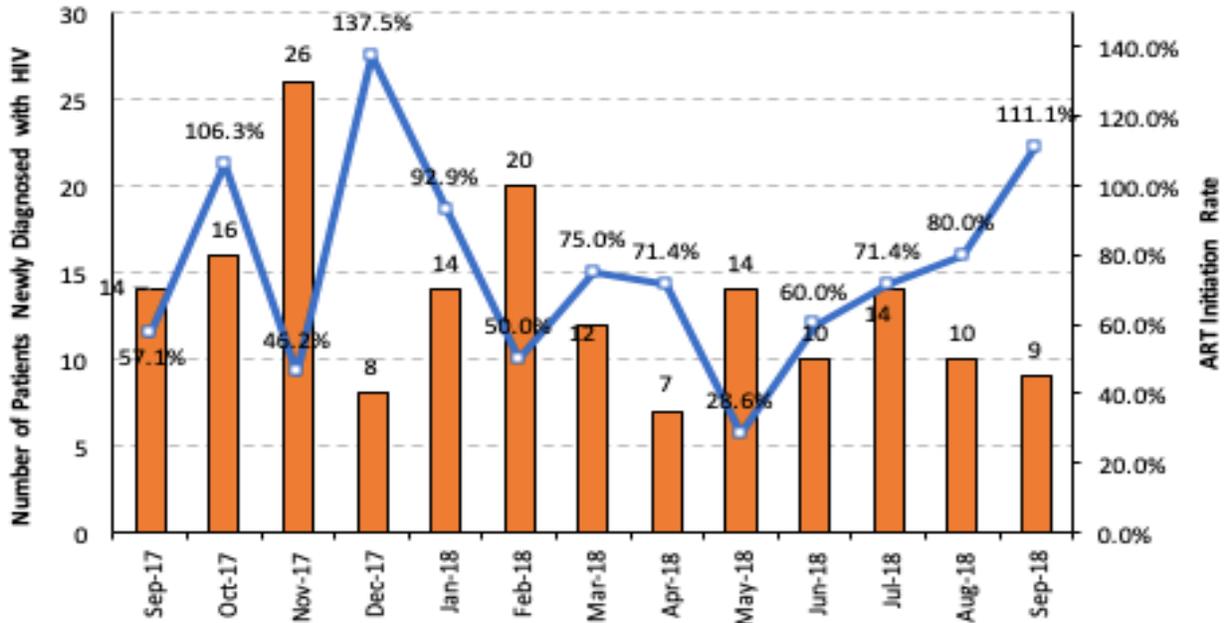


Figure A18. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Federal Capital Territory, September 2017 – September 2018

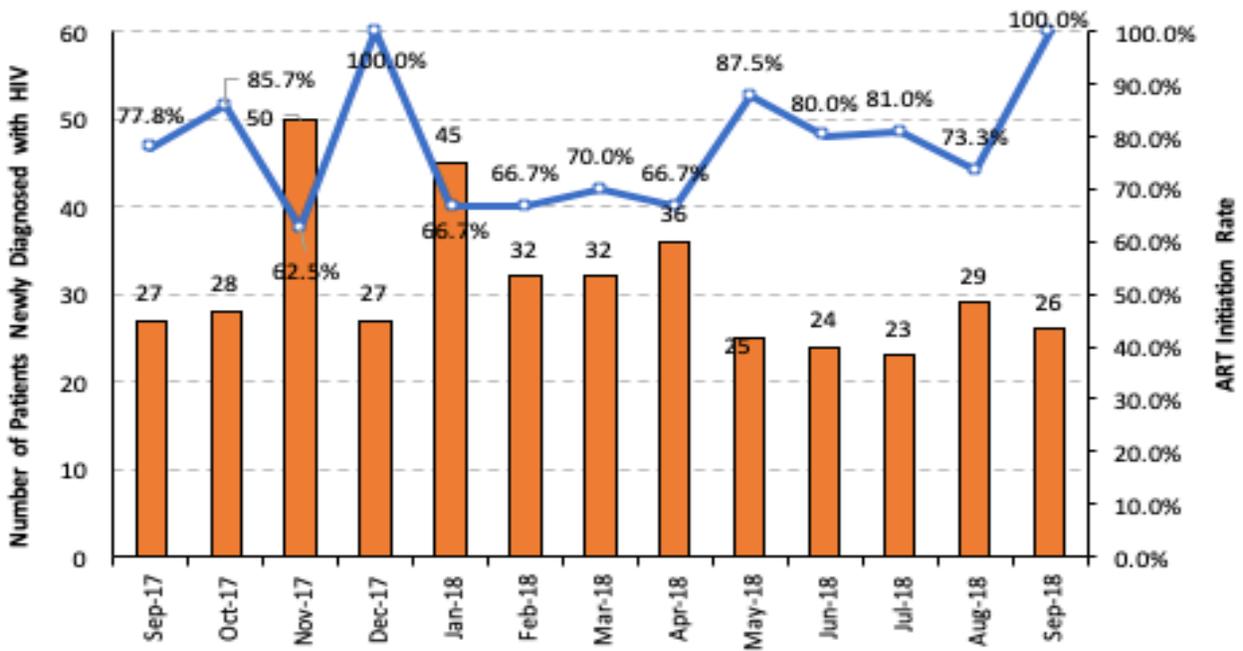


Figure A19. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Lagos State, September 2017 – September 2018

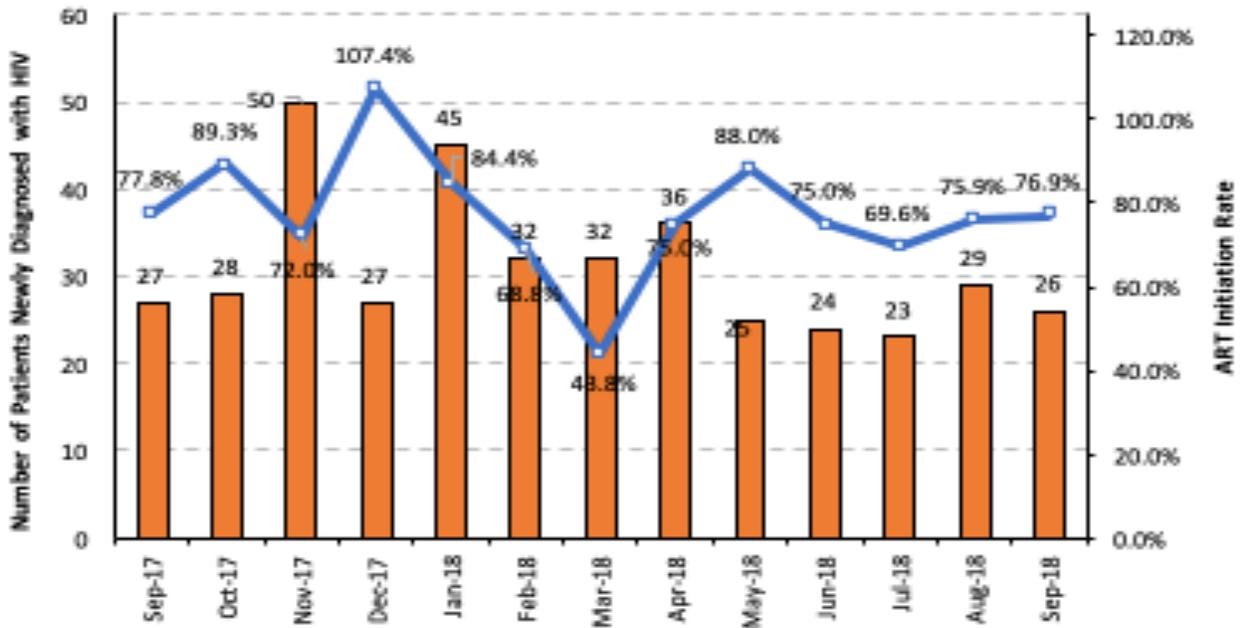


Figure A20. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Nasarawa State, September 2017 – September 2018

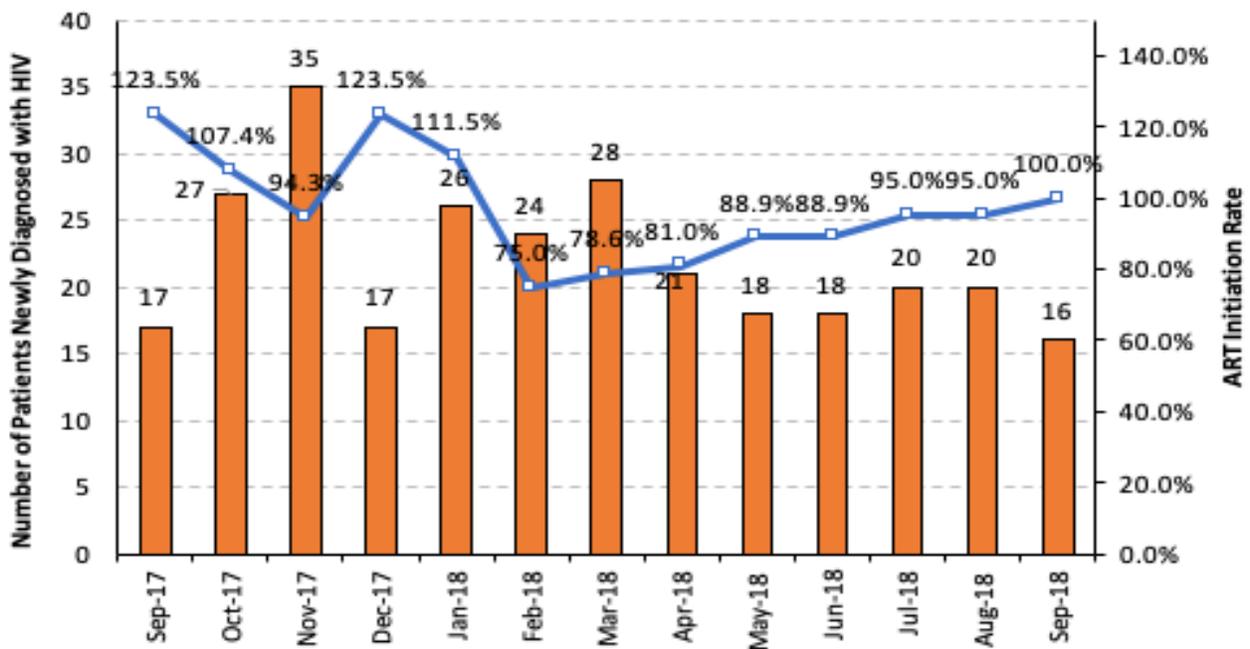
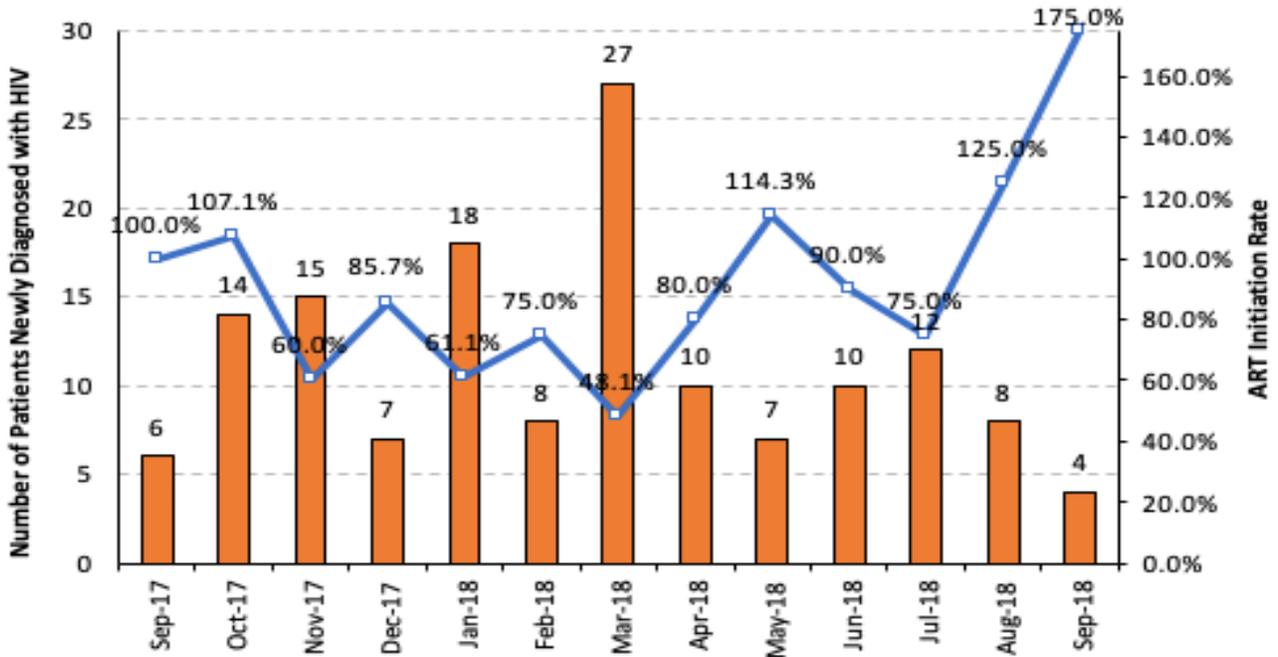


Figure A21. Number of Patients Newly Diagnosed with HIV and ART Initiation Rate—Rivers State, September 2017 – September 2018



Viral Load Monitoring

Figure A22. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Akwa Ibom State, September 2017 – September 2018

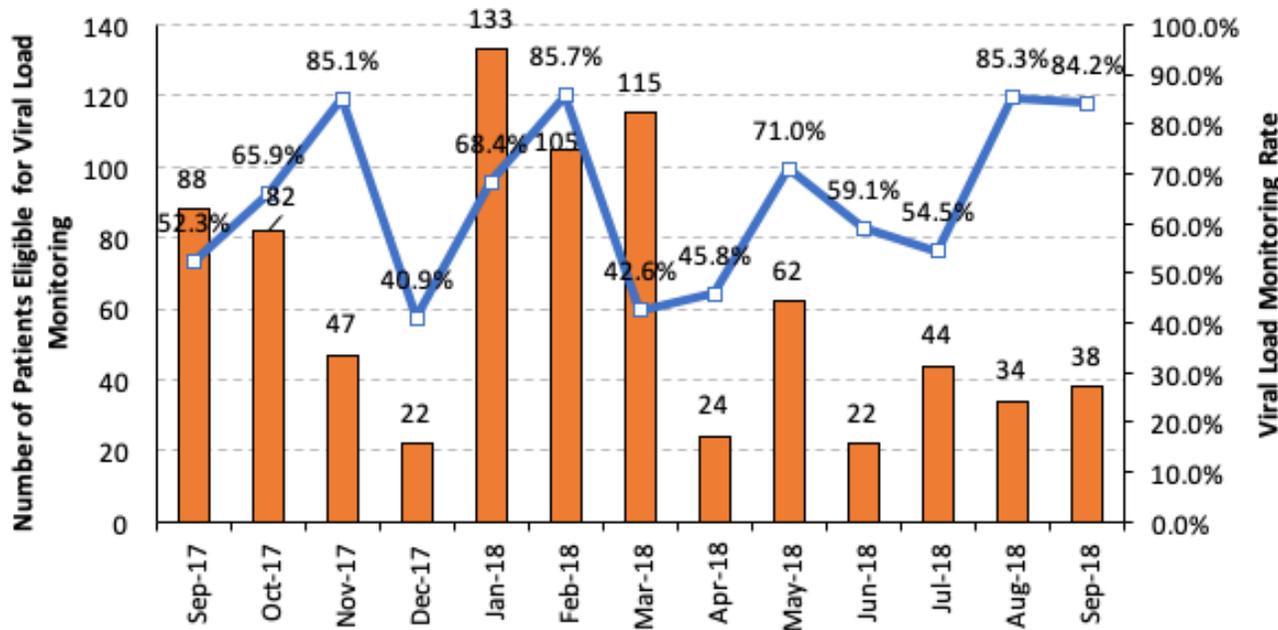


Figure A23. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Benue State, September 2017 – September 2018

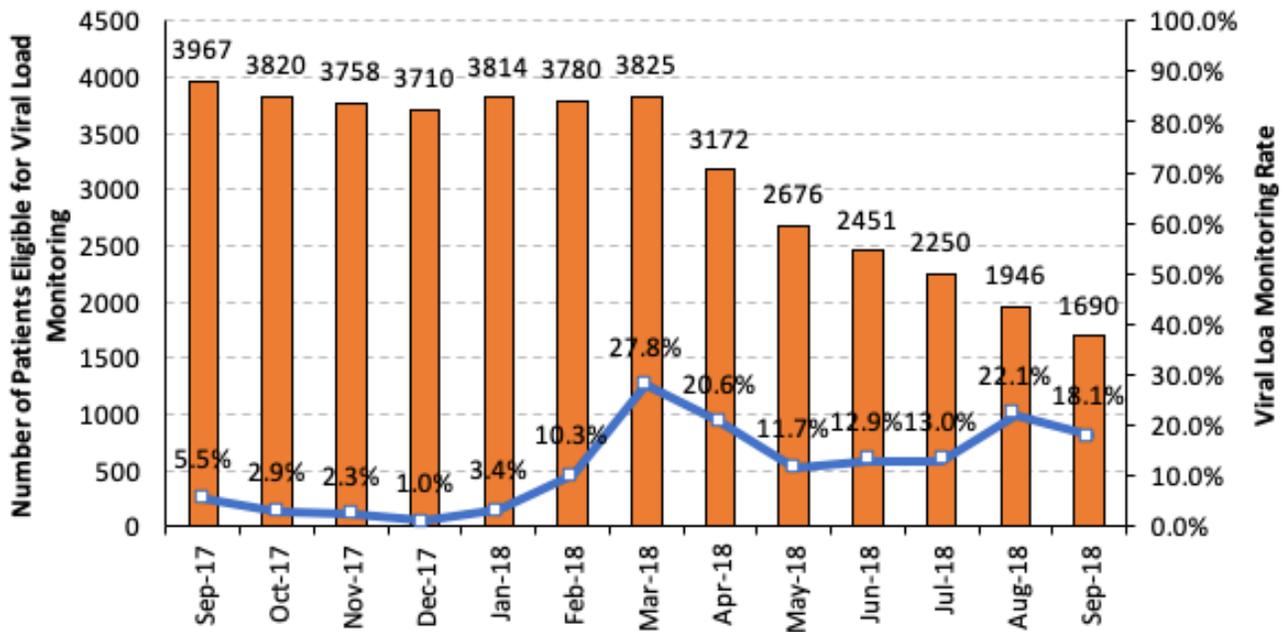


Figure A24. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Cross River State, September 2017 – September 2018

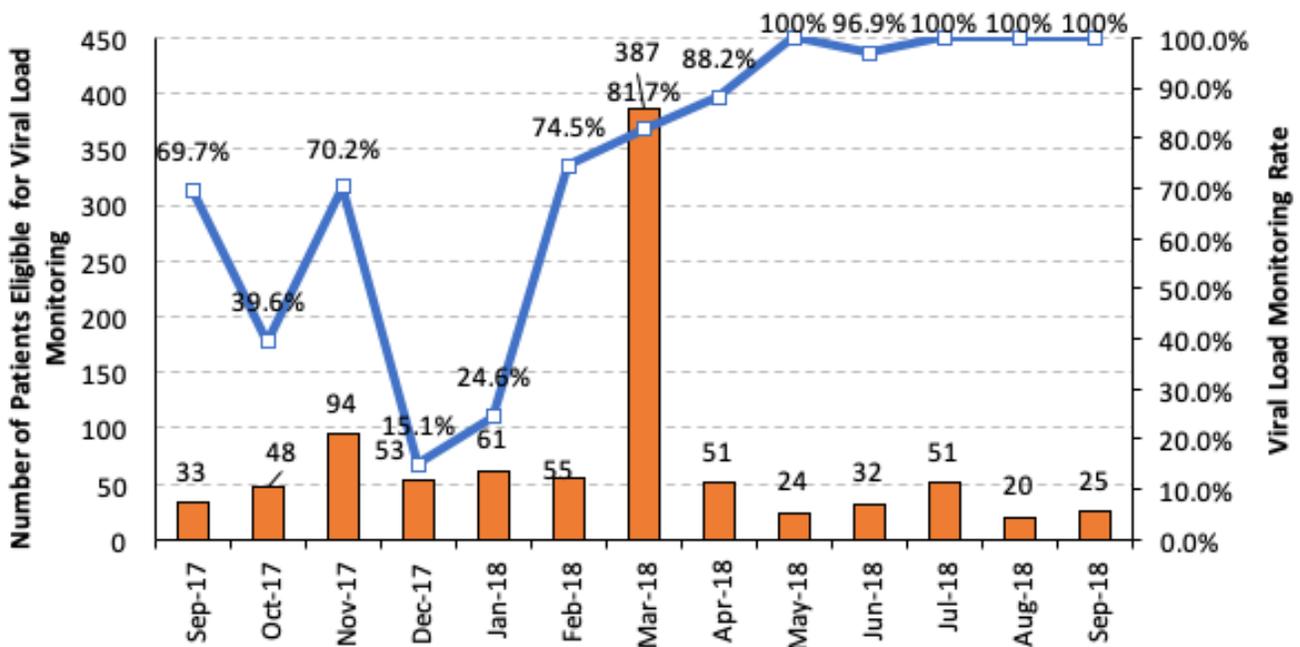


Figure A25. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Federal Capital Territory, September 2017 – September 2018

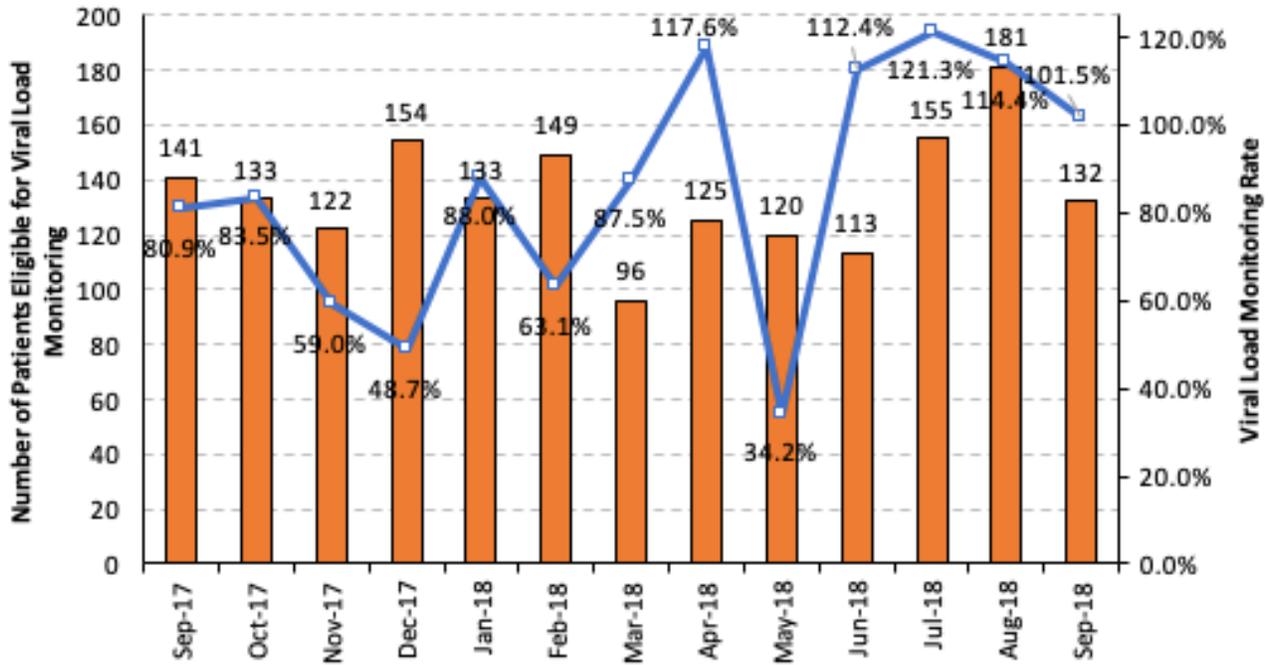


Figure A26. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Lagos State, September 2017 – September 2018

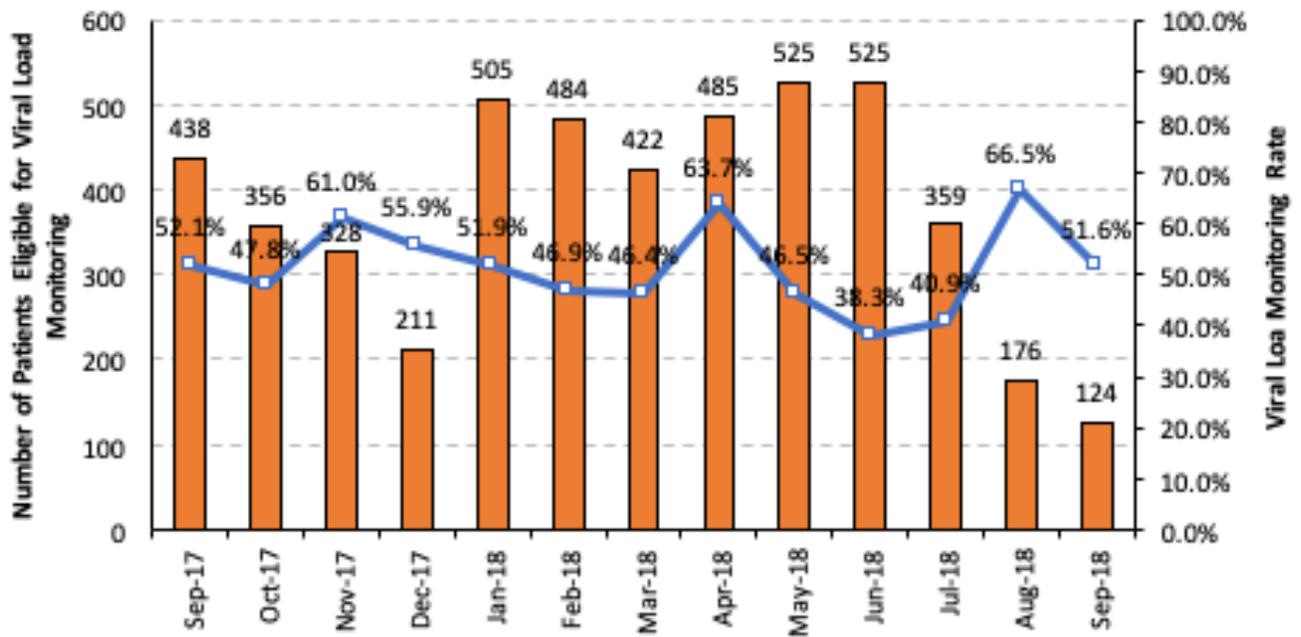


Figure A27. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Nasarawa State, September 2017 – September 2018

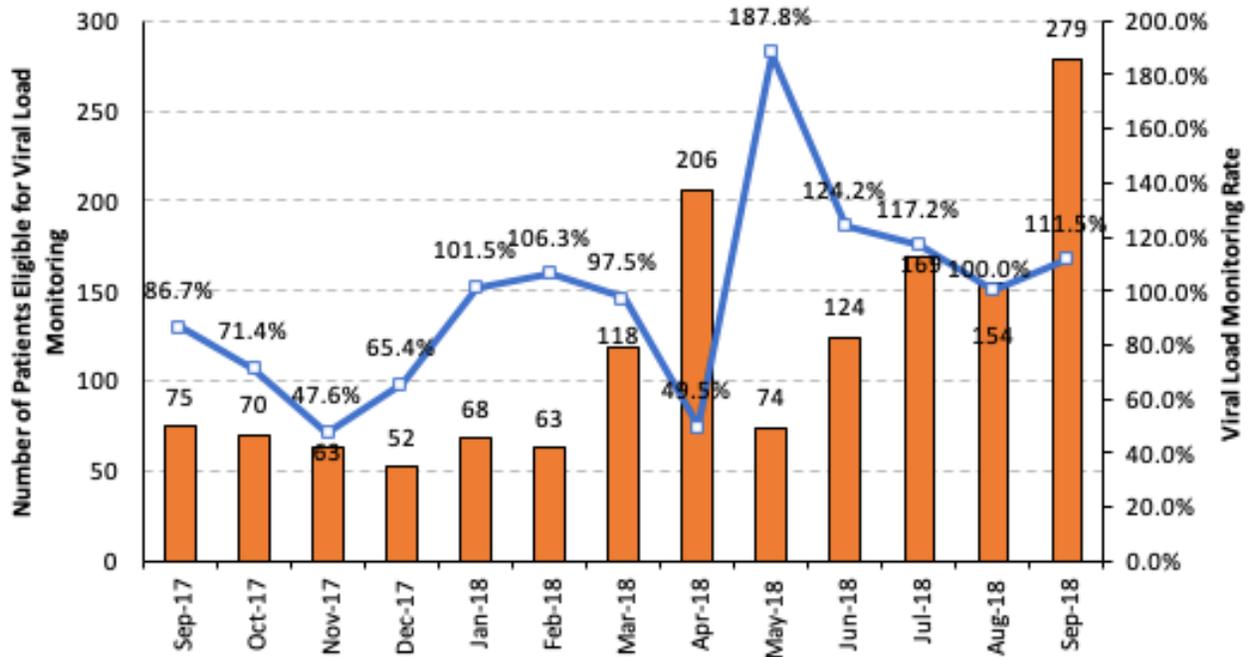
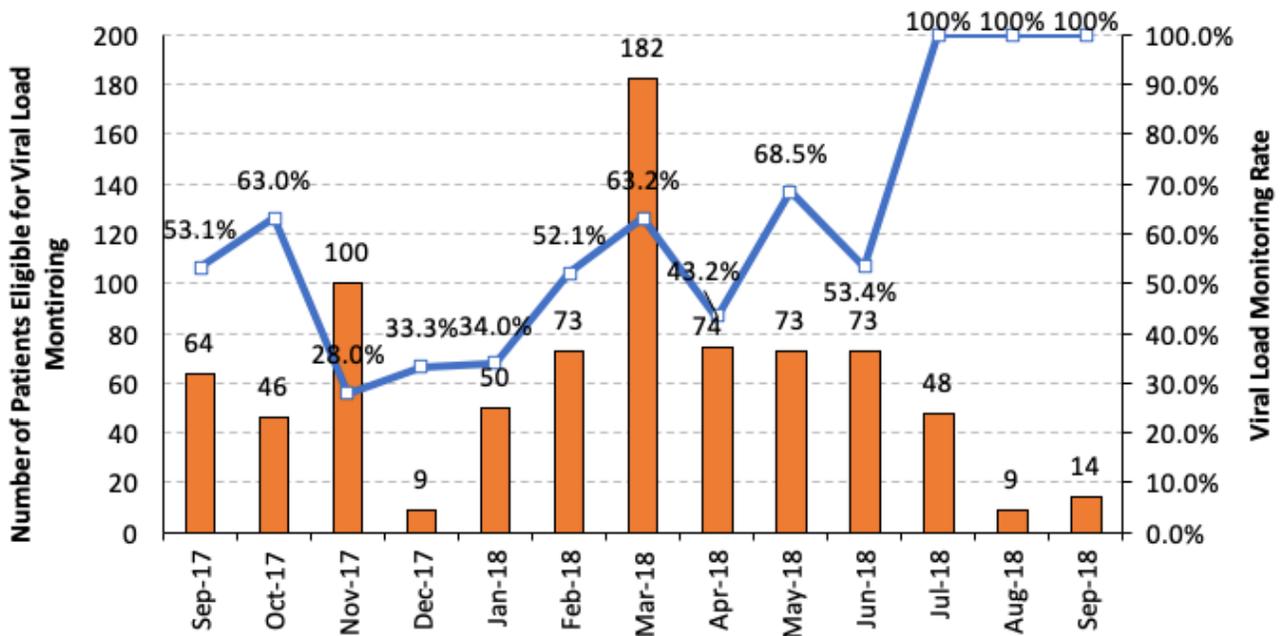


Figure A28. Number of Patients Eligible for Viral Load Monitoring and Viral Load Monitoring Rate – Rivers State, September 2017 – September 2018



Viral Load Suppression

Figure A29. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Akwa Ibom State, September 2017 – September 2018

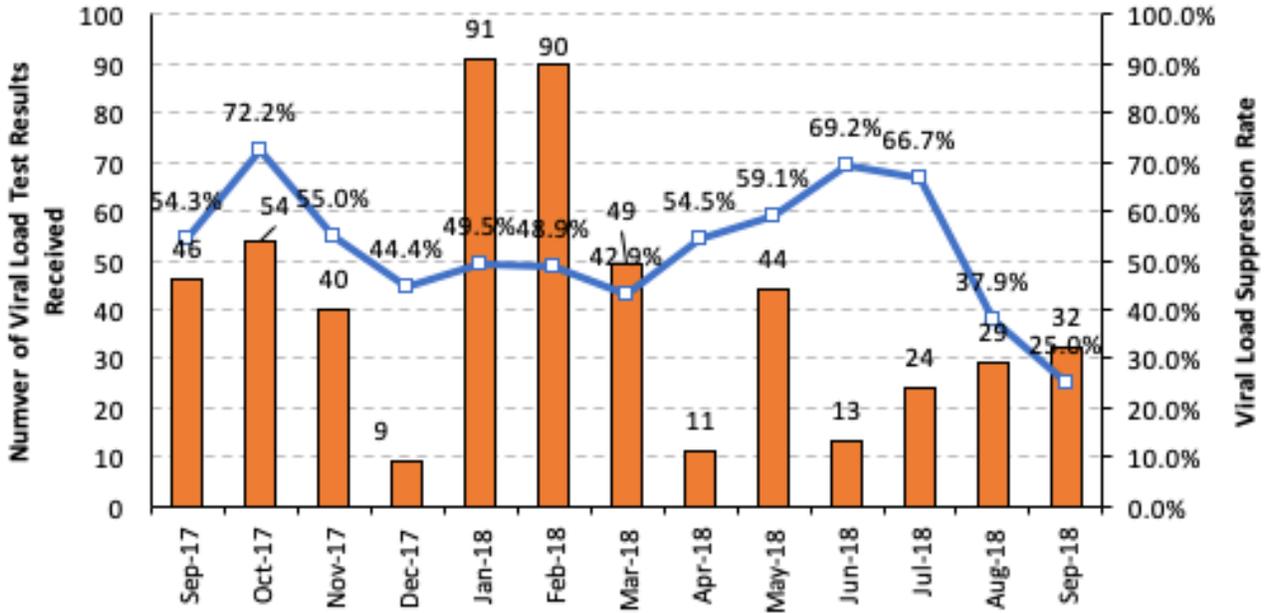


Figure A30. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Benue State, September 2017 – September 2018

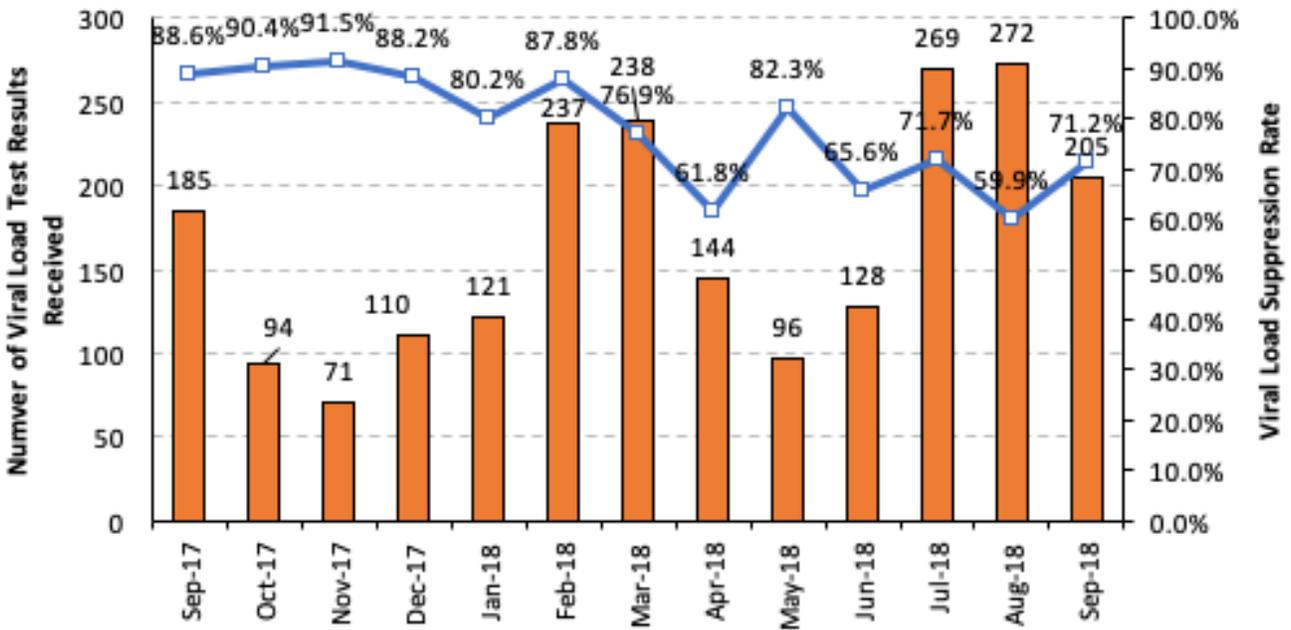


Figure A31. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Cross River State, September 2017 – September 2018

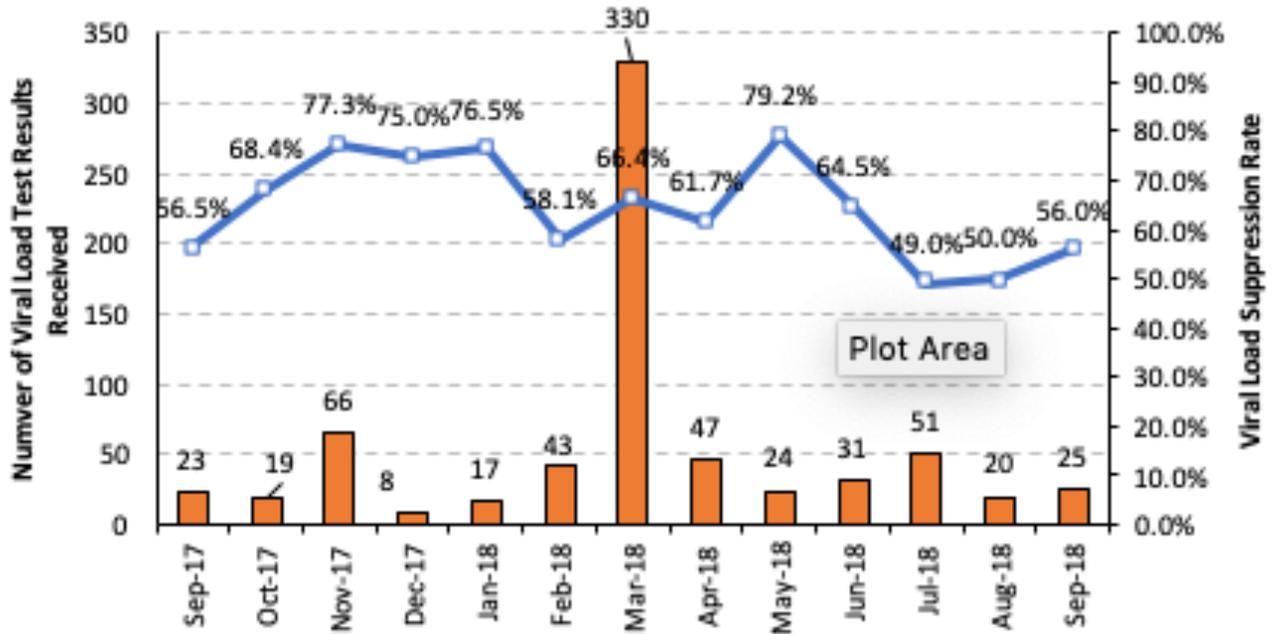


Figure A32. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Federal Capital Territory, September 2017 – September 2018

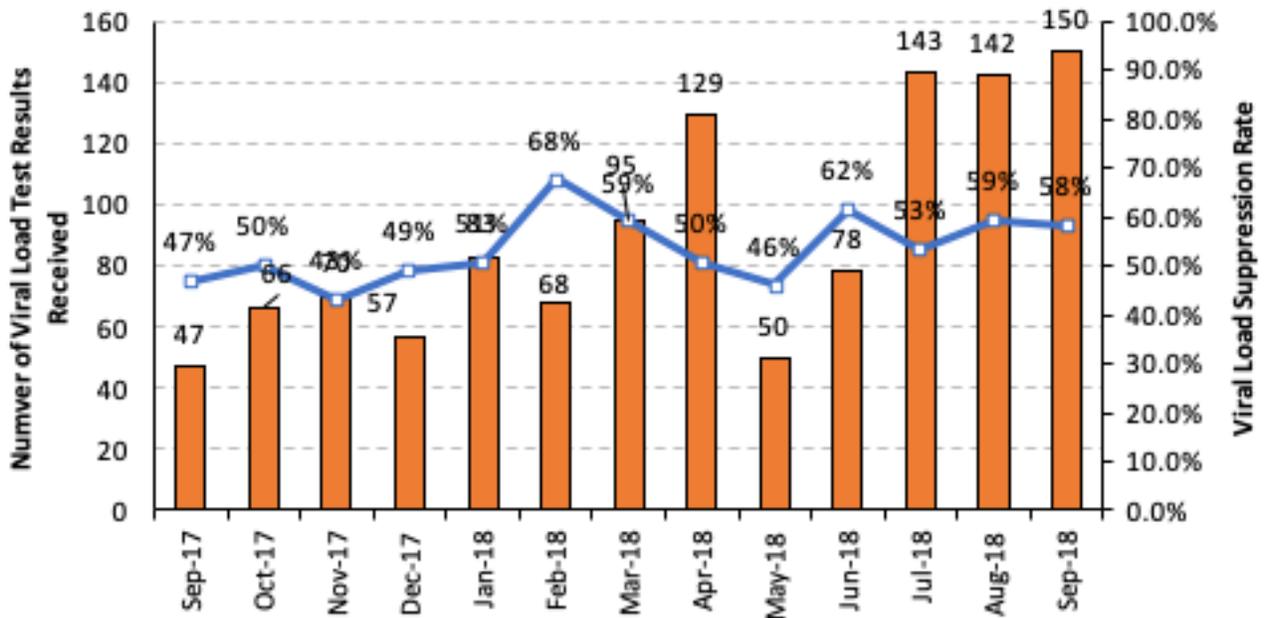


Figure A33. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Lagos State, September 2017 – September 2018

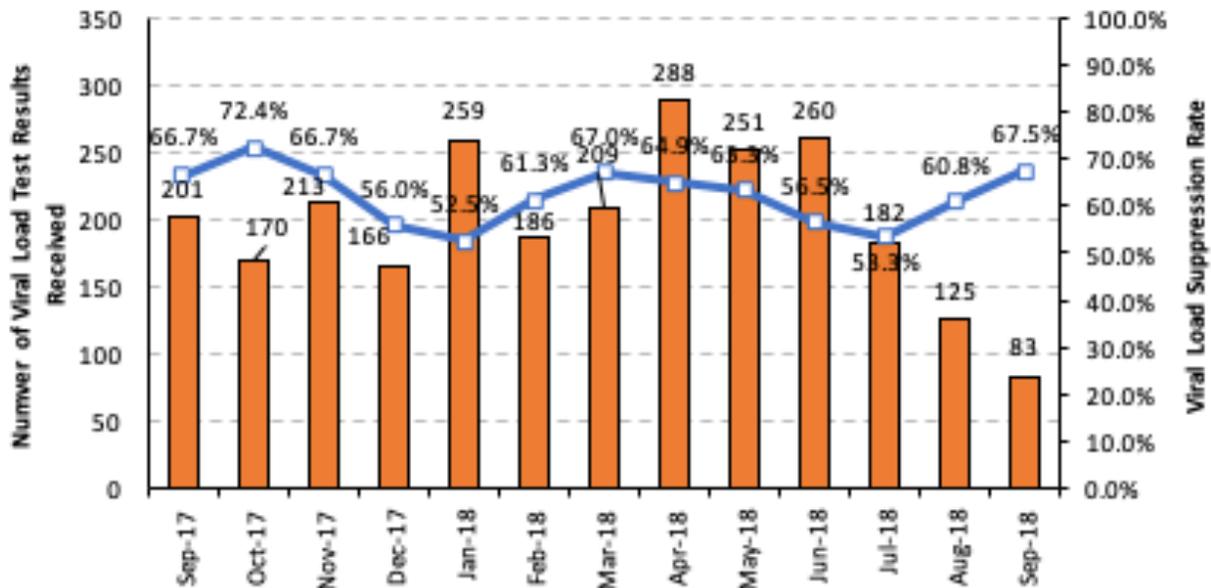


Figure A34. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Nasarawa State, September 2017 – September 2018

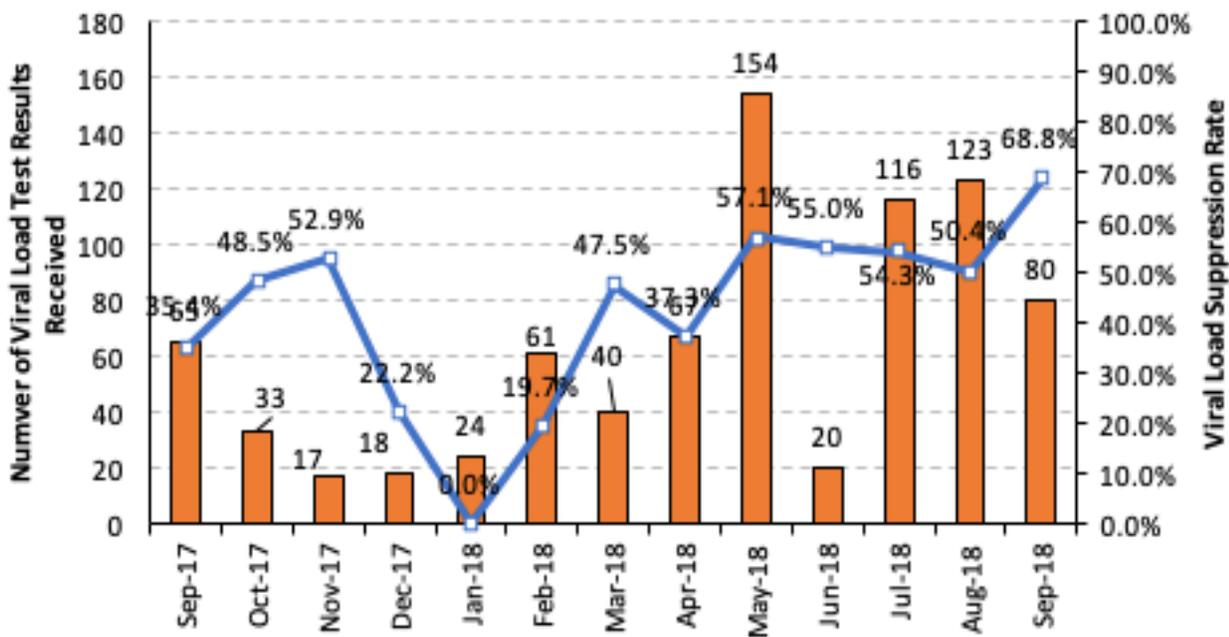
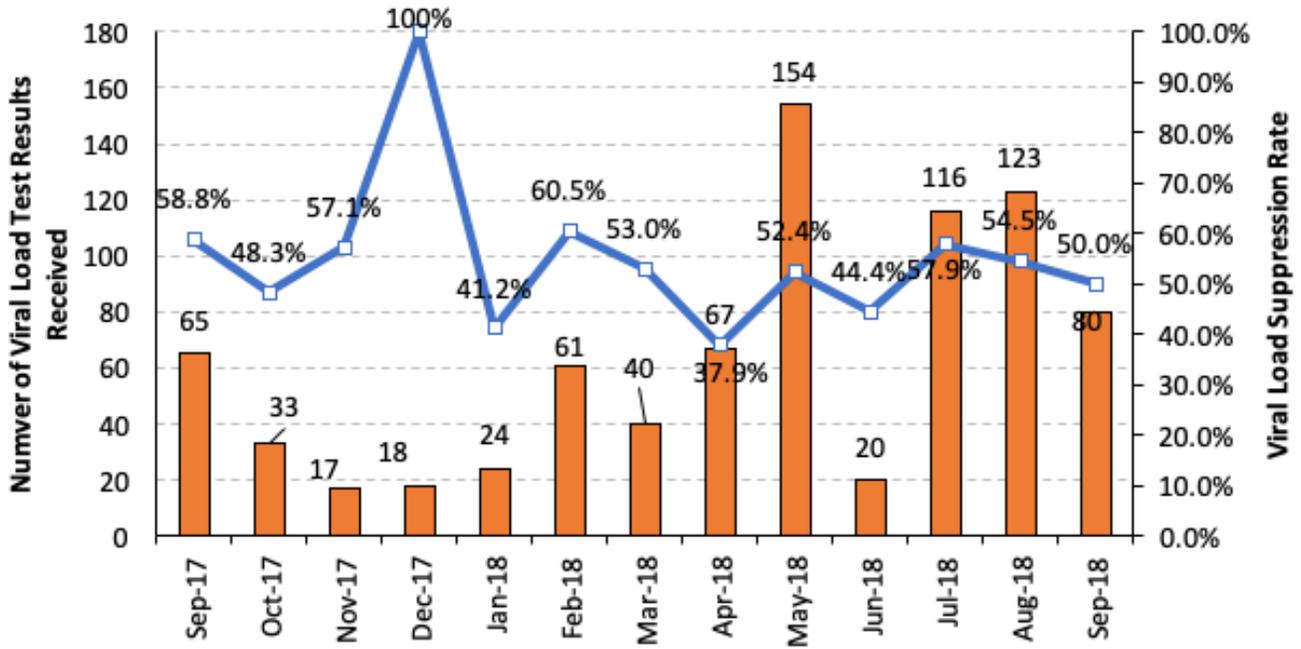


Figure A35. Number of Viral Load Test Results Received and Viral Load Suppression Rate—Rivers State, September 2017 – September 2018



Viral Load Suppression by Age and Sex

Figure A36. Viral Load Suppression Rate by Age and Sex—Akwa Ibom State, September 2017 – September 2018

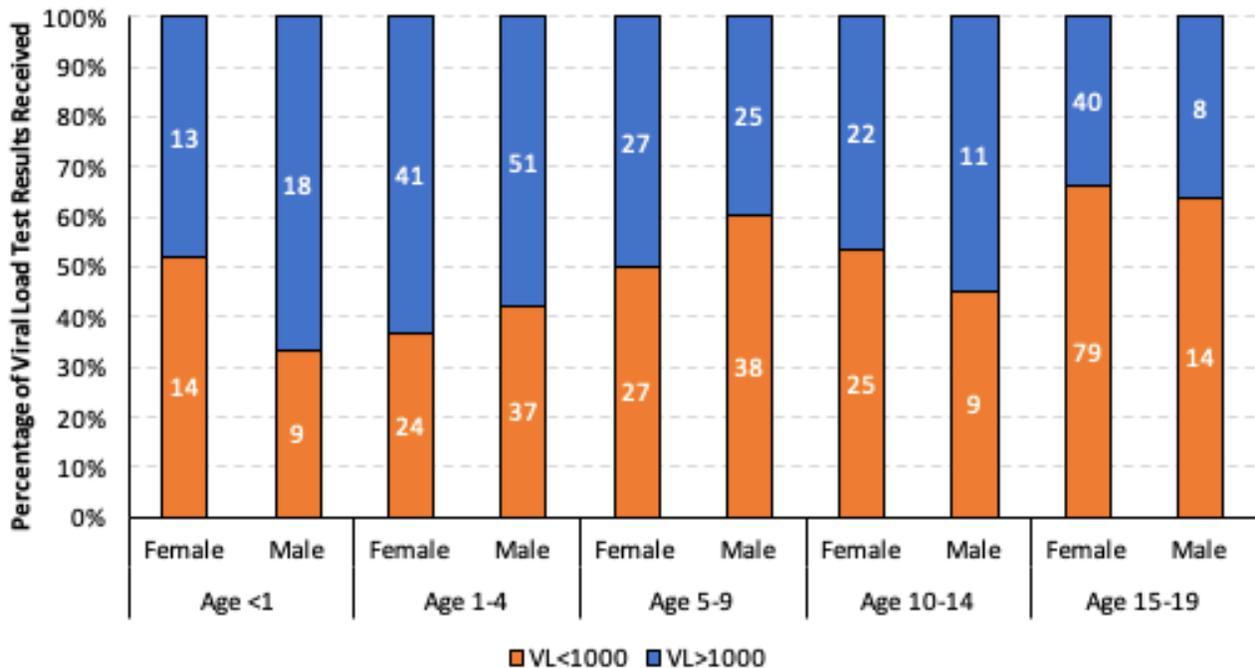


Figure A37. Viral Load Suppression Rate by Age and Sex—Benue State, September 2017 – September 2018

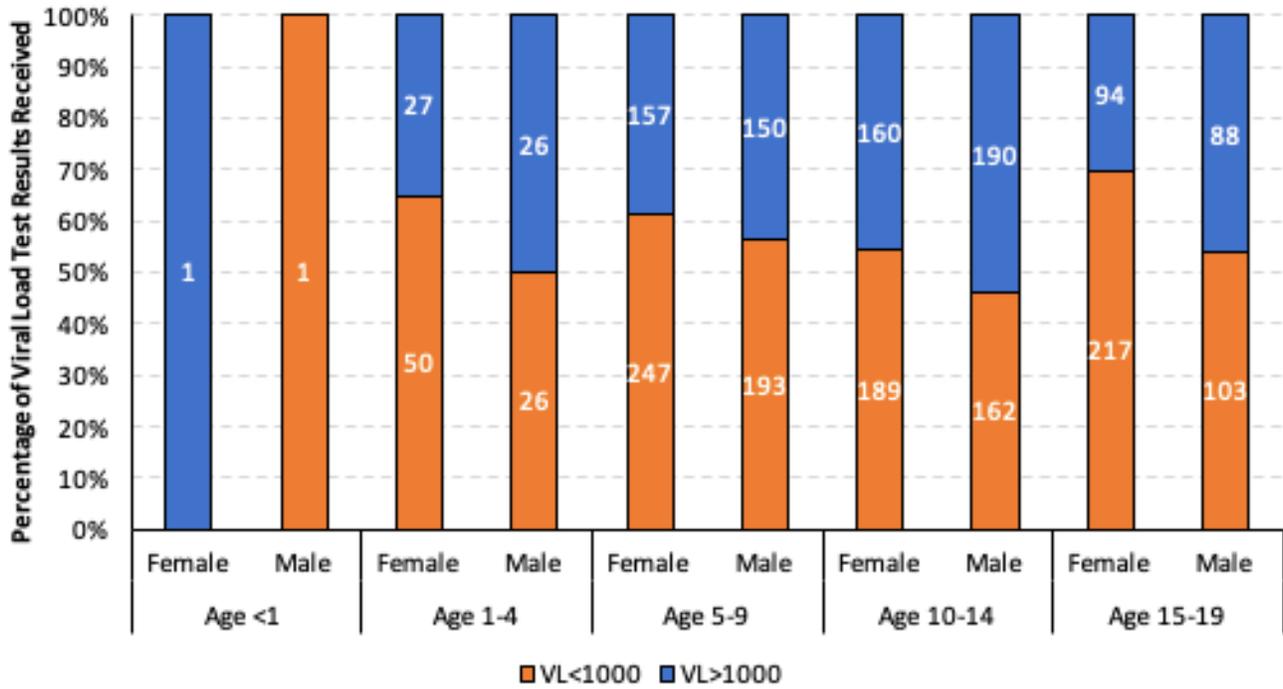


Figure A38. Viral Load Suppression Rate by Age and Sex—Cross River State, September 2017 – September 2018

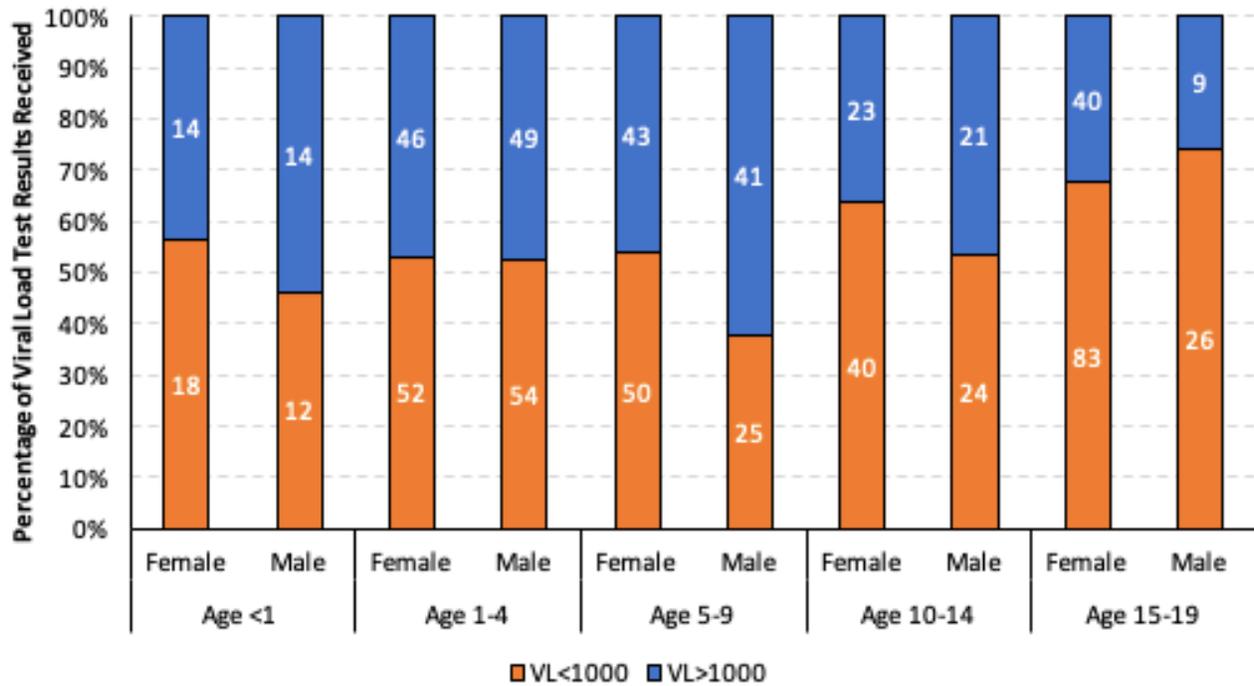


Figure A39. Viral Load Suppression Rate by Age and Sex—Federal Capital Territory, September 2017 – September 2018

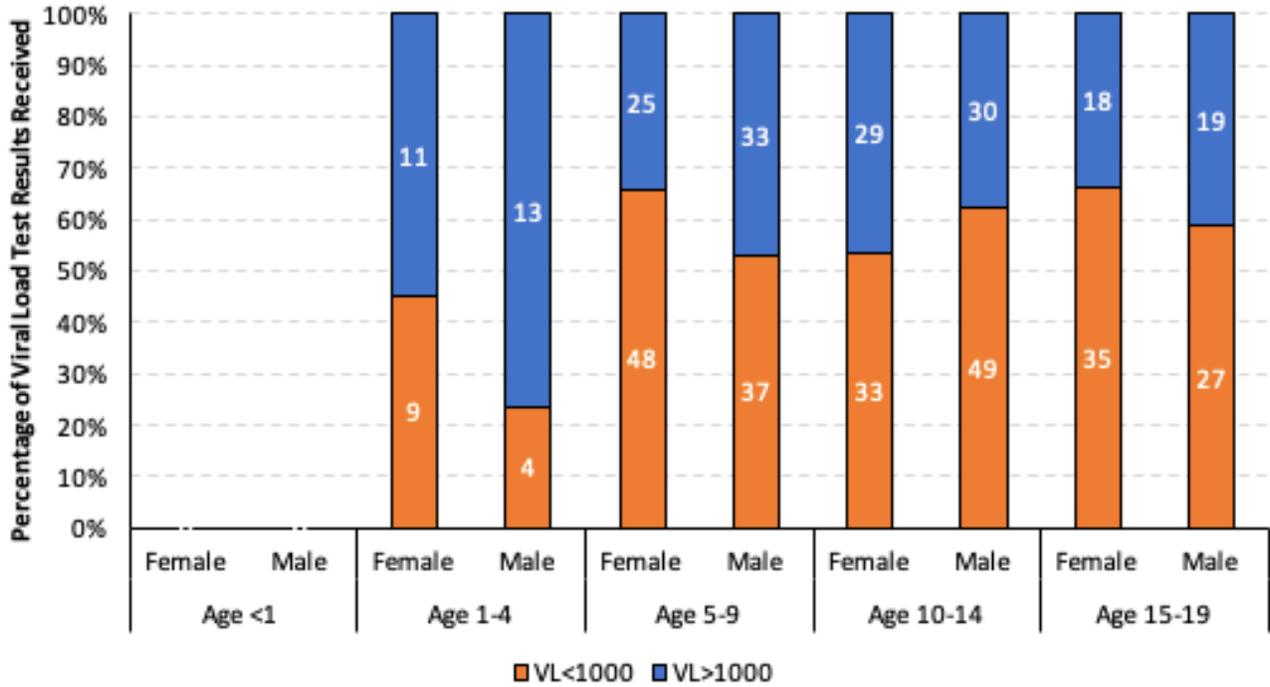


Figure A40. Viral Load Suppression Rate by Age and Sex—Lagos State, September 2017 – September 2018

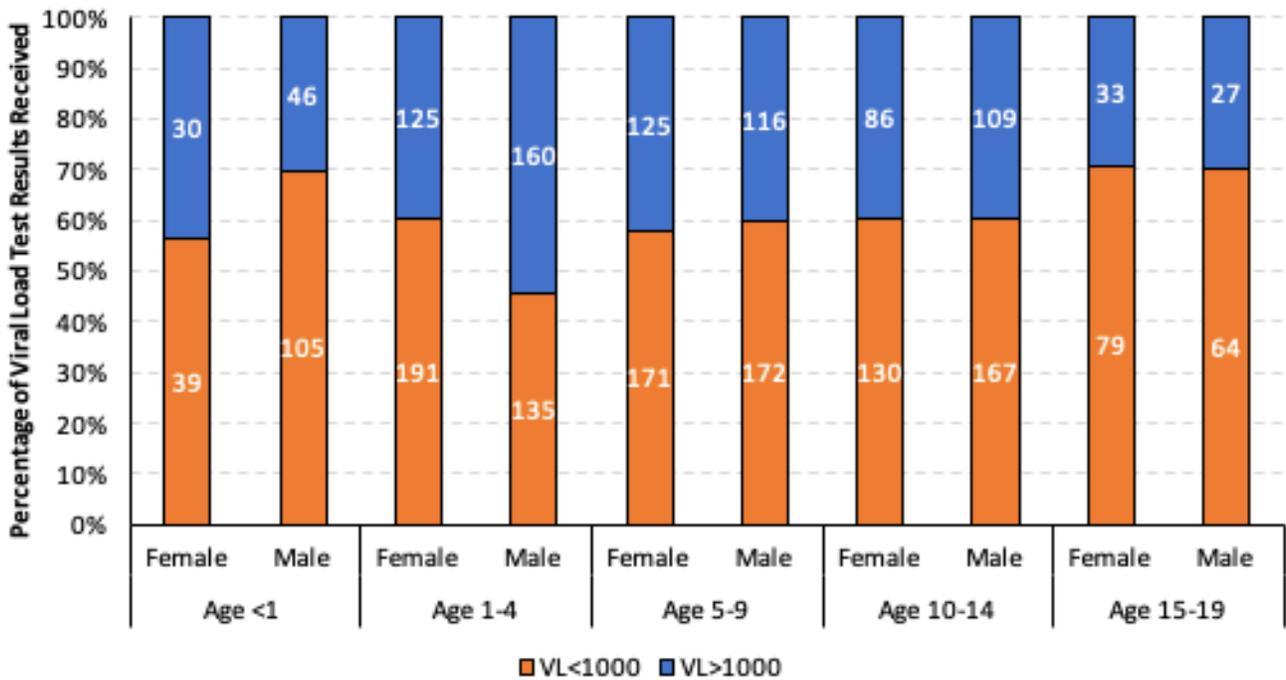


Figure A41. Viral Load Suppression Rate by Age and Sex—Nasarawa State, September 2017 – September 2018

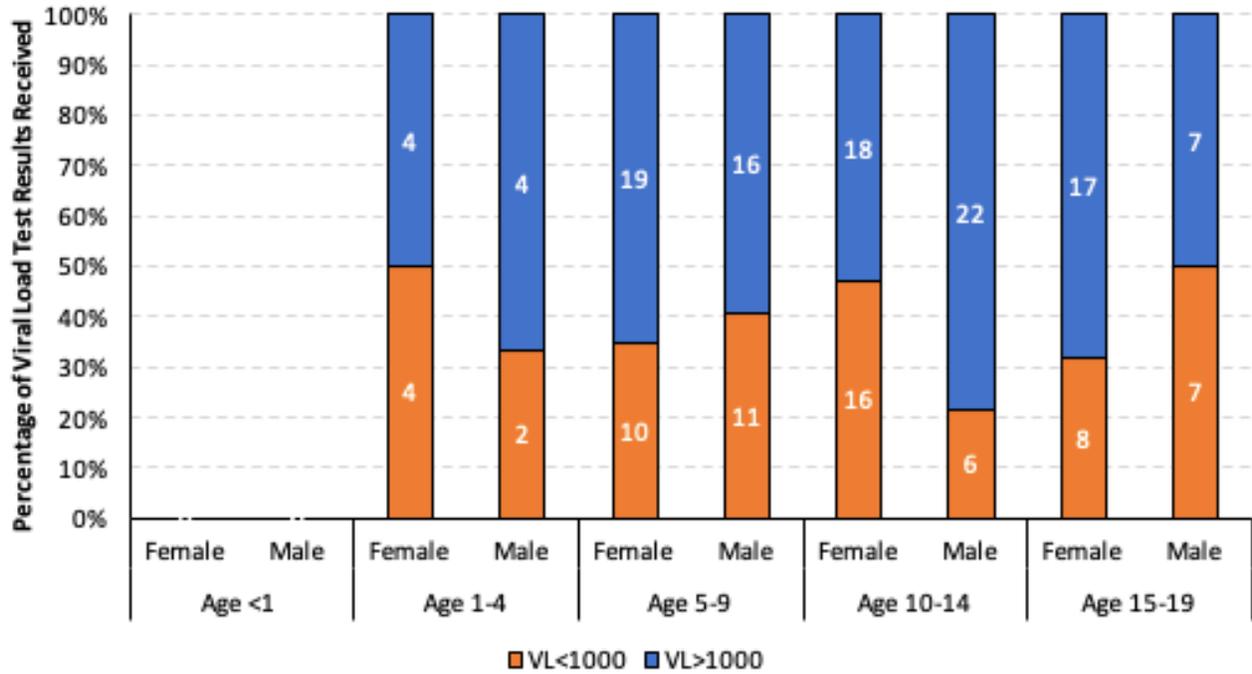


Figure A42. Viral Load Suppression Rate by Age and Sex—Rivers State, September 2017 – September 2018

