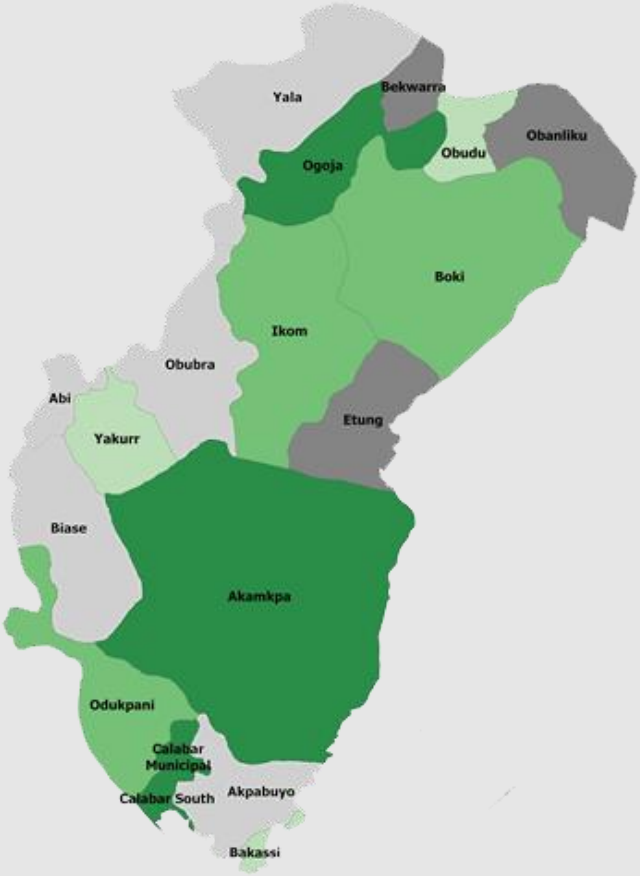

NIGERIA INFORMATION PRODUCT

Improving Patient Retention on Antiretroviral Treatment through High-Frequency Reporting in Cross River State

NOVEMBER 2020

PEPFAR

USAID FROM THE AMERICAN PEOPLE

Data.FI Data for Implementation

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Background

Retention of patients in HIV care is essential to controlling the HIV epidemic. Patients retained in care with undetectable viral loads are no longer infectious, breaking the HIV transmission cycle. Understanding who is lost to follow-up (LTFU) is essential for targeting tailored HIV programming to bring those patients back into care with differentiated models of service that meet their needs.

The challenge to retaining patients in care is multi-faceted, with treatment fatigue, quality of care, and stigma contributing to estimated LTFU, in addition to data quality and record keeping. A better understanding of the data can help to describe the problem with the appropriate demographic and geographic stratifications to assist implementing partners (IPs) to improve patient retention while also focusing on new treatment initiations.

High-frequency reporting (HFR) data provides an opportunity to conduct retention analysis across USAID-supported facilities in Nigeria. Program data from various IPs' facilities are uploaded to the Automated Partner Performance Reporting (APPR) platform via IPs' District Health Information System 2 (DHIS2) instances weekly. The indicators reported in the HFR are either weekly or monthly indicators. Weekly indicators collected in the HFR include HTS_TST, HTS_TST_POS, TX_NEW, TX_CURR, TX_PVLS_D, and TX_PVLS_N.

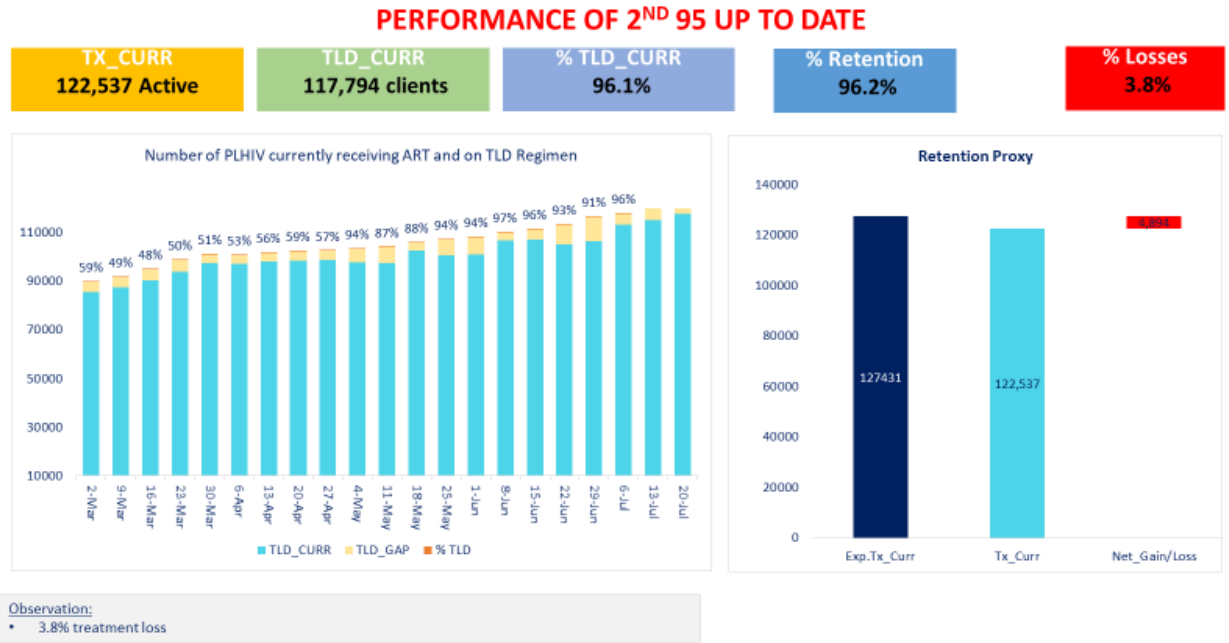
Key PEPFAR indicators of interest

TX_CURR: Number of adults and children currently receiving ART.

TX_NEW: Number of adults and children newly enrolled on antiretroviral treatment (ART).

TX_NET_NEW: The (quarterly) net increase or decrease in ART patients.

Figure 1. Current HFR dashboard snapshot for USAID-supported states



To track program achievements and gaps that may hinder the achievement of quarterly and annual targets, USAID conducts weekly data reviews of HFR reports with IPs. USAID and its IPs also conduct further state specific HFR data analyses to better understand sub-national trends in the HIV epidemic in states like Cross River.

The 2018 National AIDS Indicator Impact Survey (NAIIS) revealed that while the national prevalence of HIV is 1.4%, with an estimated 3.2 million people living with HIV (PLHIV) in the country as at quarter 1, 2018 (National Agency for the of Aids (NACA, more than 50% of the PLHIV are in seven of the 36 states. Cross River State, located in the southern part of Nigeria, has a prevalence rate of 2%, with an estimated burden of 75,990 PLHIV. It is bordered by the Cameroon Republic and Akwa Ibom State to the east, Benue state to the north, and Ebonyi and Abia states to the west. It is one of the oil-producing states in Nigeria. Cross River consists of 18 local government areas (LGAs), and its capital city, Calabar, hosts the yearly Calabar Carnival/Festival over the Christmas period. This and other attractions — such as the Obudu Mountain Resort, Afi Mountain Wildlife Sanctuary, and Cross River National Park — coupled with its rich cultural heritage, increases its commercial activities due to tourism.

Objectives

This brief will provide USAID and its IPs detailed information using HFR-reported data at the facility and LGA level to target retention interventions by:

- Comparing trends in retention at the facility, LGA, and state levels over time, identifying improving facilities/programs. Retention indicators include:
  - TX_NET_NEW by age and gender disaggregation
  - TX_NET_NEW ratio as a retention proxy
  - Unexplained gain/loss
- Differentiating high- and poor-performing facilities to identify possible sources of best practices and emphasize areas for targeted retention support
- Identifying any spatial relationships for retention through GIS analysis

Methodology

Data source

All USAID IPs report their program data quarterly into the agency's platform, Data for Accountability, Transparency and Impact (DATIM). USAID required IPs to submit HFR reports following the commencement of surge activities in April 2019 and began formalizing weekly data reporting for effective program management following the success of frequent program measurement from the surge activities. Following the setup of the APPR on the DHIS platform in July 2019, all backlogs of HFR reports submitted by IPs were uploaded into the APPR, and subsequent submissions were made through the same platform.

Data cleaning and restructuring

Data.FI restructured the HFR data into a format most useful for analysis, removing facilities with no/very few populated records or facilities with low average TX_CURR values (average values in the lowest 10% quintile) to prevent these facilities from skewing the final analyses. The dataset was then checked for missing values, with missing TX_CURR values being substituted with the most prior TX_CURR value and missing TX_NEW values being assumed to have a value of zero. The HFR data contains two age groups — less than 15 years old and greater than 15 years old. This disaggregation was used where applicable.

Data grouping

The cleaned dataset was adapted to report over four-week periods as compared to weekly periods. This was done to increase the change in variable values over time, to reduce the number of potential undefined or infinite indicator results that would result from zero weekly change. The adaption process required TX_NEW values at the end of the period to be the summation of all weekly TX_NEW values within the period.

Indicator analysis

Following the grouping process, two further variables were included for each considered period before indicators could be calculated — TX_CURR_PREV (the TX_CURR at the end of the last period) and TX_NET_NEW (defined for this analysis as the difference in TX_CURR between two consecutive periods). Given the new variable set, two new indicators were calculated — a TX_NET_NEW ratio as a proxy for retention, as well as a value representing the unexplained gain/loss for the period (see box for formulas used). The retention proxy was used to ensure that the result was positive and could be compared across all sites; retention proxy values can range between 0 and infinity, although most are around the value of 1.

Key PEPFAR indicators of interest

TX_CURR: Number of adults and children currently receiving ART.

TX_NEW: Number of adults and children newly enrolled on antiretroviral therapy (ART) within the quarter.

TX_NET_NEW: The differences in TX_CURR between two consecutive periods.

Formulas used

TX_NET_NEW = $TX\_CURR_{present} - TX\_CURR_{previous}$

Retention proxy = $TX\_CURR_{present} / (TX\_CURR_{previous} + TX\_NEW)$

Unexplained loss or gain = TX_NET_NEW – TX_NEW

The described indicators were then considered over time to potentially highlight trends in performance, and the retention proxy was mapped to determine if there is any correlation between retention and location.

Mapping

Using the results from the retention proxy analysis, the Inverse Distance Weighted (IDW) tool was used to create an interpolation surface of retention proxy for the state using the mean “retention proxy" variable. The IDW tool determines cell values by using a linearly weighted combination of health facility locations (ESRI). It assumes that the facilities that are close to one another are more alike than those that are far apart, inferring that patients tend to attend a clinic closest to their residence to receive treatment (Mcintosh, A.I et al, 2018). The result of the interpolated map was presented using a four-class manual classification break and a green-to-red color scheme to highlight the variation between good and poorly performing facilities.

Potential limitations of the analysis

HFR data does not provide detailed age breakdown information, limiting the analysis to results described only in terms of state, LGA or facility by broad age groups and sex.

Also, missing data for some facilities could lead to inaccurate findings.

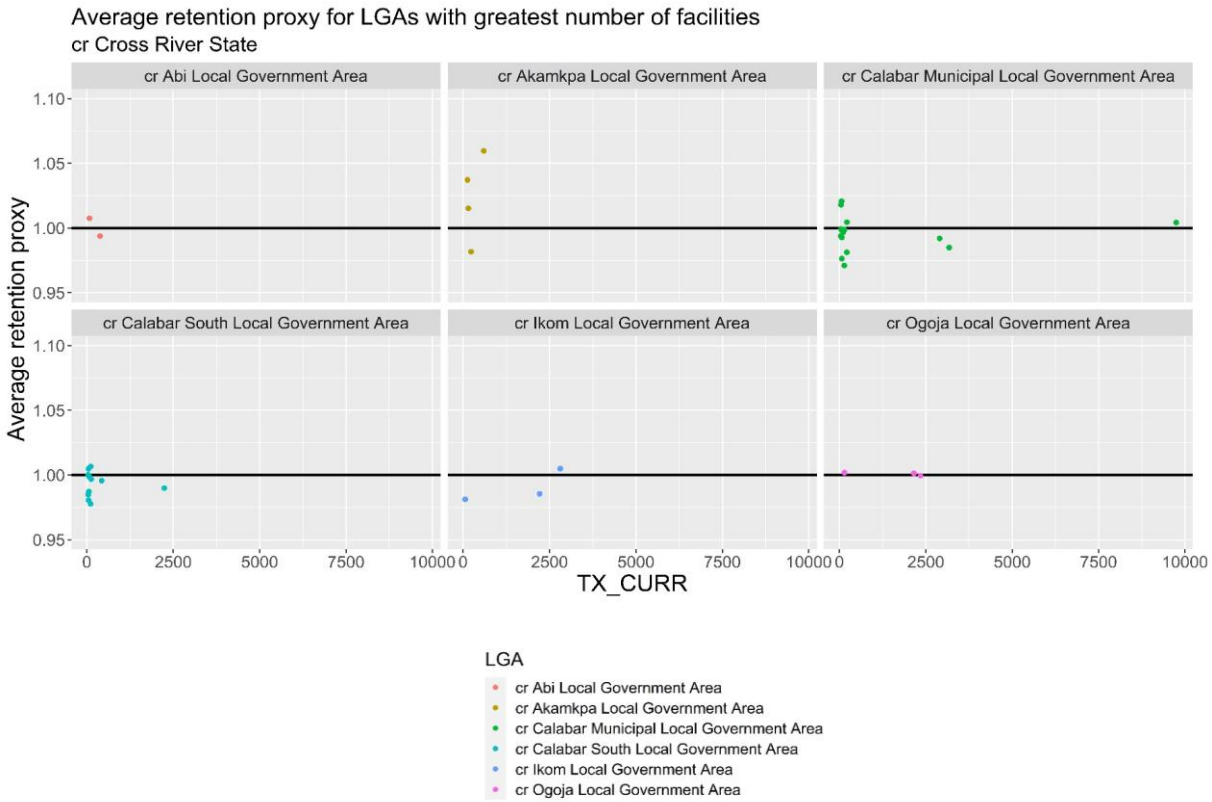
Findings

1. LGAs with retention issues identified by comparing facility-level retention in care using proxy

Figure 2 below presents the average retention proxy for each four-week interval over the time period (FY19 Week 40 – FY20 Week 23) for the top six LGAs with the most facilities (70.4% of included facilities for Cross River). Retention proxy is plotted against TX_CURR, allowing for a comparison in performance between relatively large and small facilities. The static black line represents a retention proxy equal to 1. The plots also compare the LGA performance.

Figure 2 does not highlight any clear correlation between TX_CURR and average retention. Plotting TX_CURR does, however, provide an overview of the general size of the facility cohorts and highlights a facility in the Calabar Municipality LGA that is much larger than the others considered (Calabar Municipal KP One Stop Shop). In the figure, there are no clear LGAs that were performing worse compared to other LGAs. Three out of the four facilities in Akamkpa LGA have an average retention above 1, which suggests this LGA did well to retain patients. When considering this LGA's performance, the fact that the facilities tend to have low TX_CURR numbers should be kept in mind.

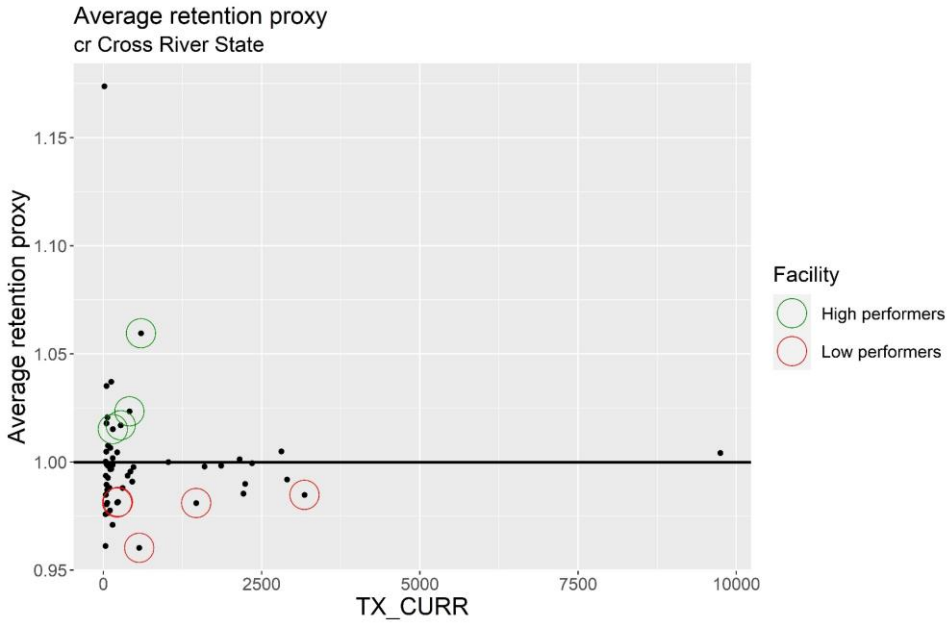
Figure 2. LGA-level TX_NET_NEW ratio as retention proxy



2. Facilities with good and poor retention pinpointed, with further examination needed

Figure 3 below plotted the retention proxy against TX_CURR for all facilities in the state over the whole data time period (FY19 Week 47 – FY20 Week 23). Circled in the plot are the top and bottom four facilities with the highest TX_CURR with an overall retention below 0.985 or above 1.005, respectively.

Figure 3. Facility-level TX_NET_NEW ratio as retention proxy



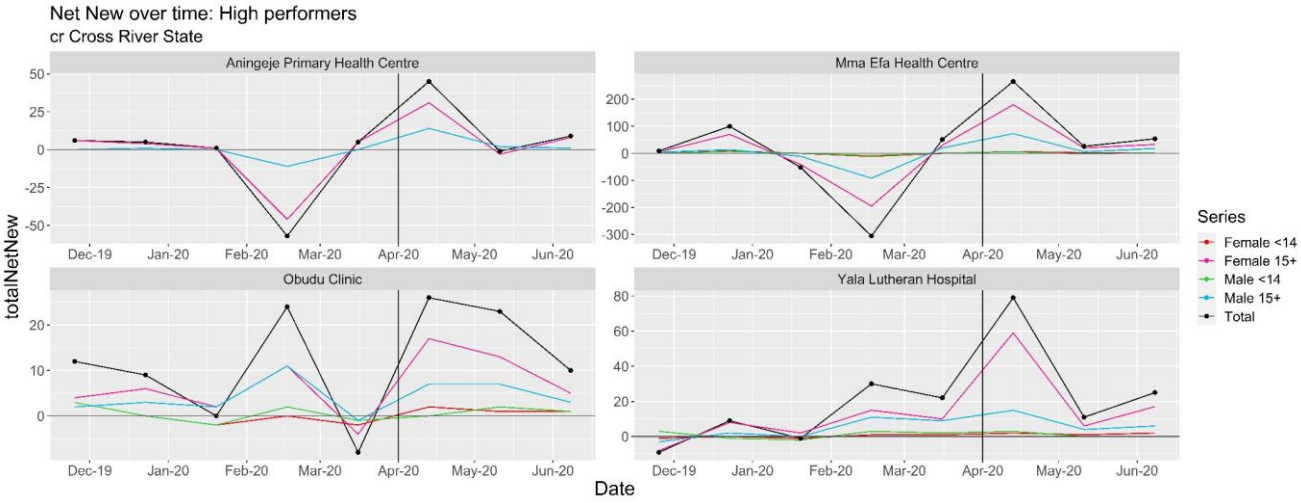
Further analysis is required for the top- and low-performing facilities to determine potential reasons for change. This is particularly important for the low-performing facilities because, given their TX_CURR values, a retention proxy below 1 suggests that these facilities have potentially lost a relatively large number of patients.

The top and bottom facilities' TX_NET_NEW are analyzed in more detail below.

3. TX_NET_NEW examined over time for the facilities with the highest and lowest retention performance

Figure 4 below showcases the change in TX_NET_NEW over time for facilities that performed well on retention. The graph presents the total TX_NET_NEW over time, as well as the TX_NET_NEW disaggregated by age and gender categories available in the HFR. It should be noted that the facilities have TX_CURR values within the upper 50% but do not necessarily have large TX_CURR numbers.

Figure 4. Change in TX_NET_NEW over time for high-traffic facilities with good retention



The four facilities in Figure 4 performed well in terms of retention given that the TX_NET_NEW values for most time periods considered were positive. Notably are downward spikes for both Aningeje Primary Health Centre (PHC) and Mma Efa Health Centre in the middle of February, and almost equal upward spikes in the middle of April. This suggests that these facilities, having experienced loss of patients at one point, worked hard to regain those patients. This is particularly important for Mma Efa Health Centre, which has the highest TX_CURR of these four facilities.

Yala Lutheran Hospital had an almost consistently increasing TX_NET_NEW, indicating that the facility consistently gained new and maintained previous patients on treatment.

All facilities show decreases in TX_NET_NEW after April, which may be a result of COVID-19.

Figure 4 also considered the age and sex breakdown for TX_NET_NEW. While these categories are broad, the total TX_NET_NEW change usually follows and is most impacted by females over the age of 15, likely because more females of this age group are in care as compared to any other group (see Figure 10 in the Appendix). A notable deviation from this trend is for Obudu Clinic in the middle of February, when TX_NET_NEW for males and females over 15 years old were almost equal (see further discussion of this below).

A similar deep-dive analysis of changes in NET_NEW over time was conducted for the subset of facilities that performed poorly on retention in Figure 5 below. The key features to look for in this graph are where, and how often, a facility has a negative TX_NET_NEW, as this indicates it has lost patients over the time period.

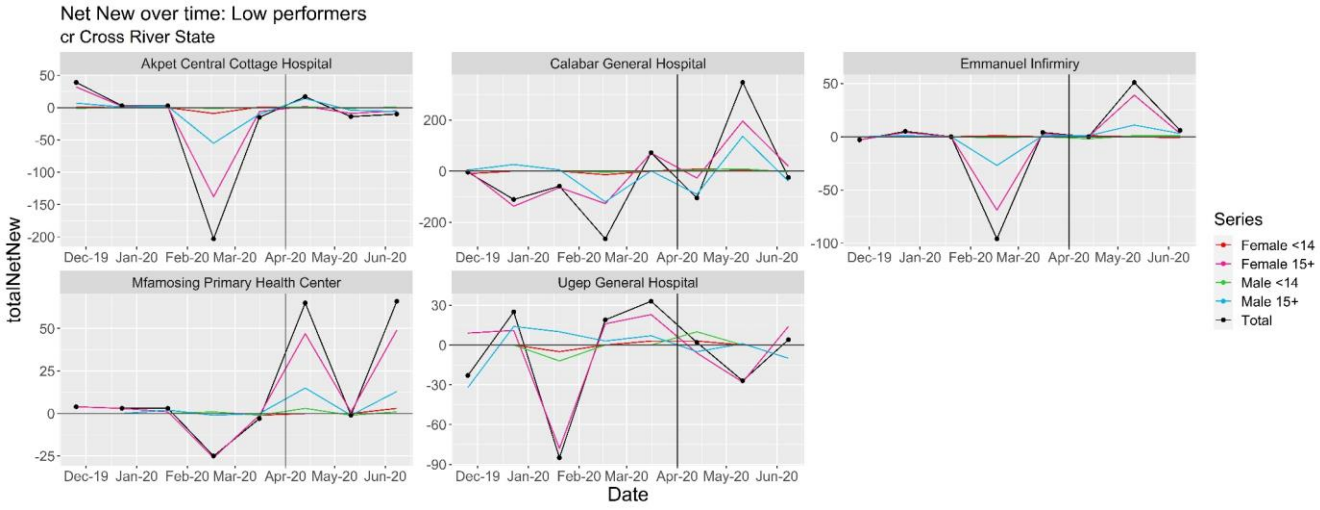
Poor-performing facilities tend to have negative TX_NET_NEW trends or significant downward spikes in TX_NET_NEW, indicating that the facilities are likely losing patients. It should also be noted that periods with positive TX_NET_NEW may not necessarily indicate that patients are not being lost. As an example, Ugep General Hospital has positive TX_NET_NEW values between February and April but had negative unexplained change for this period (see Figure 8), indicating that even though TX_CURR was increasing during this period, patients were still being lost. On the other hand, positive spikes seen for Calabar General Hospital, Emmanuel Infirmary, and Mfamosing PHC are promising for these facilities, as they indicate that some patients are being returned to care. This trend as observed for Calabar General Hospital, Emmanuel Infirmary, and Mfamosing PHC is consistently seen for all poor-performing facilities.

An interesting point noted for all facilities in Figure 5, except for Ugep General Hospital, is that drops in TX_NET_NEW occur in the middle of February. Potential reasons for this should be explored to

determine if similar decreases could be prevented in the future. Aningeje PHC and Mma Efa Health Centre had similar decreases during this time period (see Figure 4), but both recovered in the following month, which could be a source for uncovering best practices.

Considering Figure 5 in terms of age and sex also indicates that overall TX_NET_NEW tends to be most impacted by changes for females over age 15, again likely because this group makes up the largest proportion of patient in care (see Figure 11).

Figure 5. Change in TX_NET_NEW over time for high-traffic facilities with poor retention



4. Data from facilities with poor retention further analyzed to establish actionable targets for patients returned to care

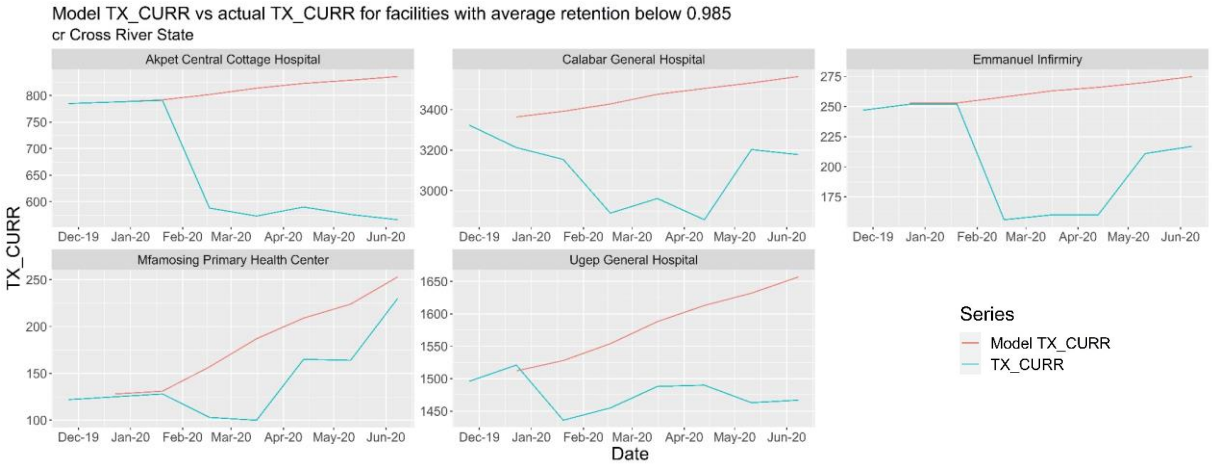
To get an accurate understanding of lower-performing facilities' retention issues over time,

Figure 6 below plots where a facility should be if it had 100% retention over the period. In the figure, the model TX_CURR is presented in red against the actual TX_CURR in blue.

Figure 6 highlights facilities that are struggling to regain previous TX_CURR values after significant drops, compared to an expected cohort size with 100% retention (increasing red line). Akpet Central College Hospital and Ugep General Hospital have struggled to regain their TX_CURR numbers after a significant drop and indicate continued patient losses despite new initiations. These two plots have significant gaps between where the final TX_CURR values are and where they should be, indicating a potential need for additional support.

Calabar General Hospital and Emmanuel Infirmary both appear to have intervened to return patients back to care in large numbers; the new initiations are minimal and steady.

Figure 6. Week-by-week retention proxy for lower-performing facilities

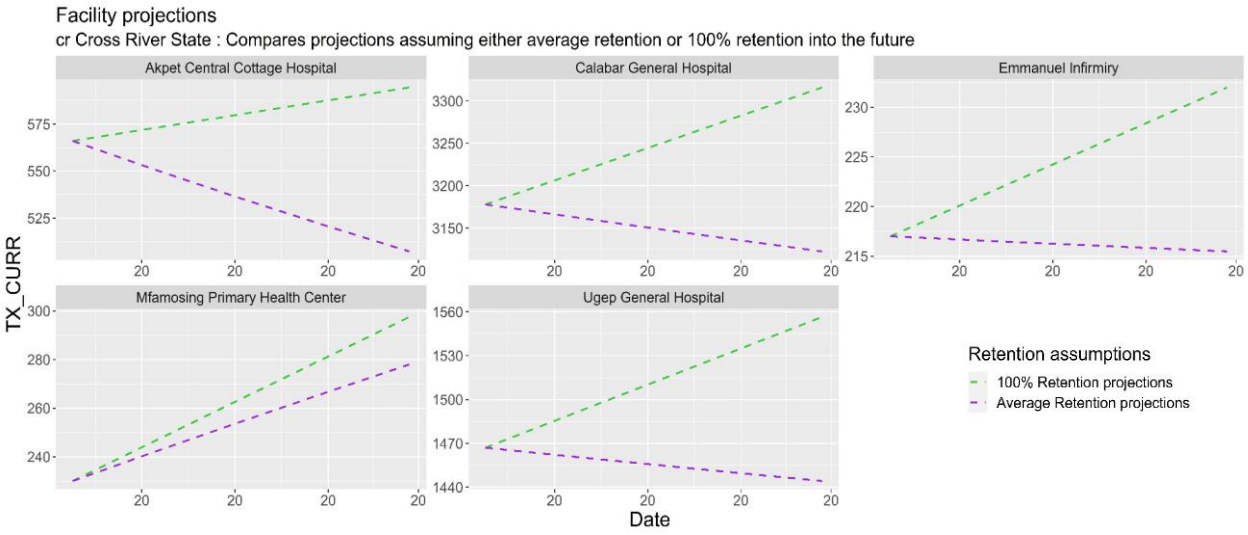


To identify the facilities most in need of technical assistance from IPs to bring patients back into care, projected TX_CURR for FY20 was plotted based on 100% retention (green dotted line) versus current average retention rates (purple dotted line). See Figure 7 below.

Facilities in

Figure 7 showing a large gap between the two projection lines, such as Calabar General Hospital, as well as those with a decreasing purple line, could require careful support from IPs moving forward to avoid continuous loss of patients and rapidly return patients to care.

Figure 7. Projections of TX_CURR assuming 100% retention



To inform planning by facilities and IPs, the number of PLHIV who would need to be returned to care by the end of FY20 was calculated, assuming the average TX_NEW and retention rate are maintained going forward (see Table 1 below).

Table 1. Summary of FY20 back-to-care targets for poor-performing facilities

#	Facility name	FY20 back-to-care targets
1	Calabar General Hospital	193
2	Ugep General Hospital	112
3	Akpet Central Cottage Hospital	87
4	Mfamosing Primary Health Center	20
5	Emmanuel Infirmary	17

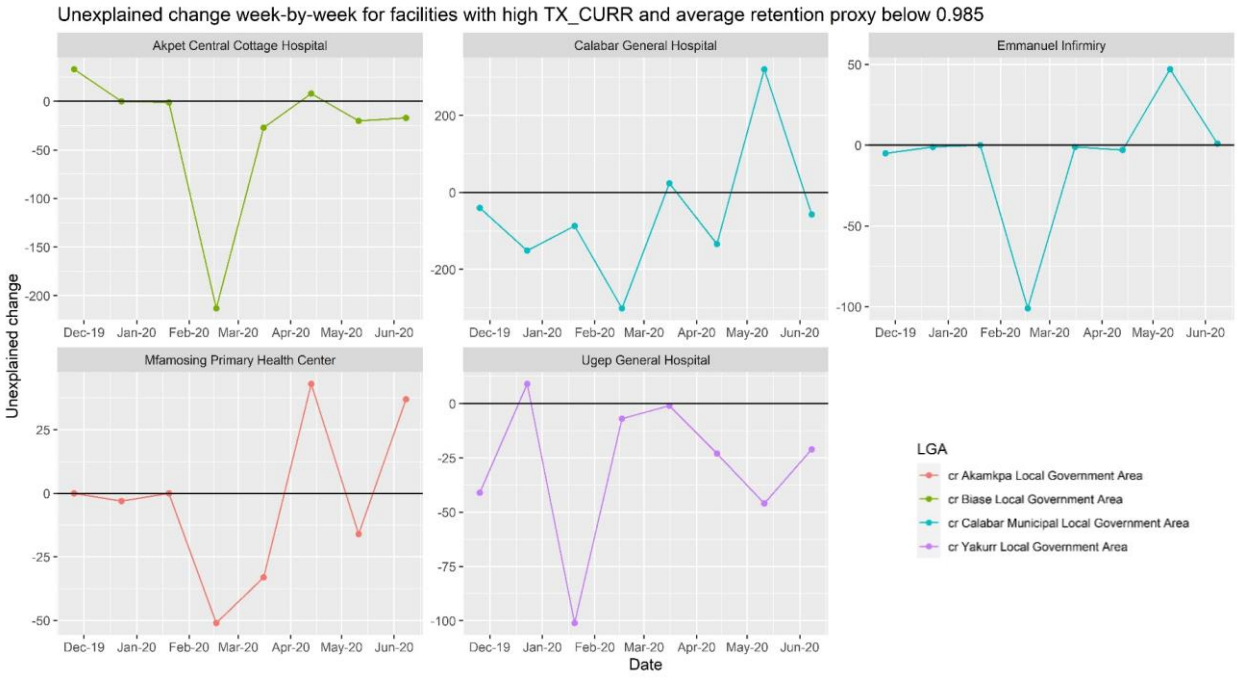
5. Unexplained gains and losses over time for low-performing facilities highlighted, with further discussion required

Figure 8 below highlights trends for unexplained changes in TX_CURR over time for the facilities with poor retention levels. This plot highlights that facilities with poor retention tend to have spikes of negative unexplained change, which is indicative of patients being lost from care. As previously discussed, positive spikes for Calabar General Hospital, Emmanuel Infirmary, and Mfamosing Primary Health Centre are promising, as they indicate that some patients are being returned to care.

These plots also highlight previously noticed loss of patients in mid-February.

Figure 8 also describes the facilities in terms of their LGA and shows that two out of the five considered facilities belong to the Calabar Municipal LGA.

Figure 8. Unexplained change over time for lower-performing facilities



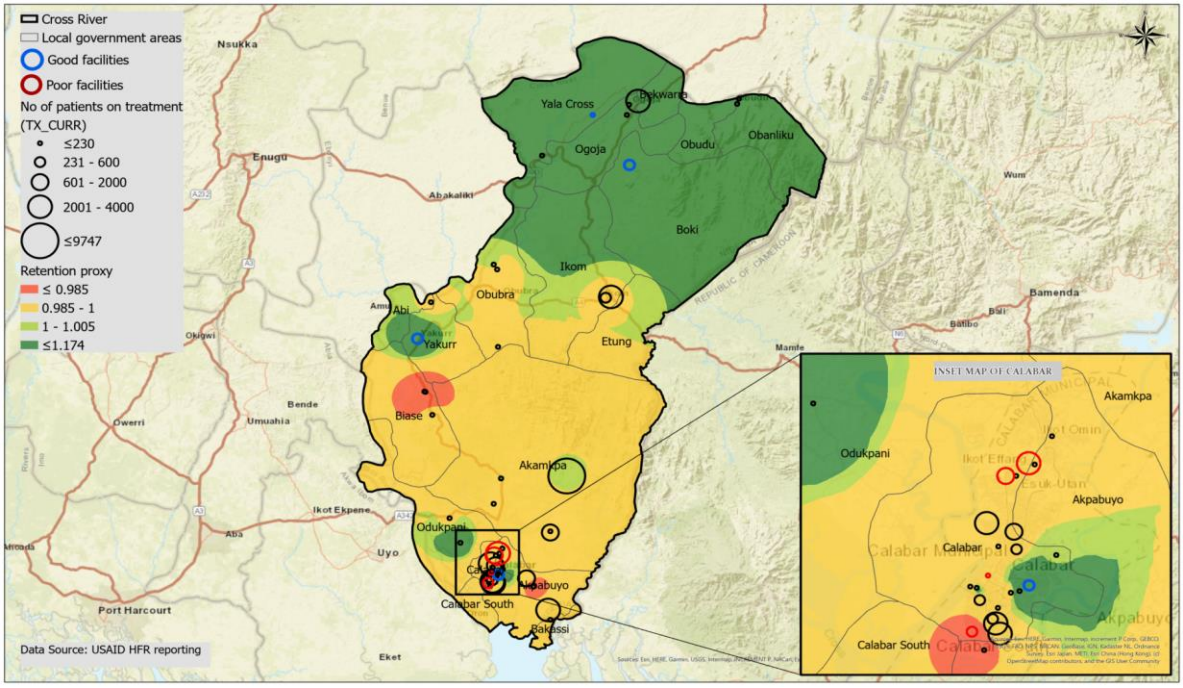
6. Retention proxy indicators mapped to visualize spatial variations

The map below highlights the spatial variation of the average retention proxy in facilities across rural and urban areas in Cross River State. Values ranged between 0.96 and 1.174, with areas in red inferring low retention proxy and areas in green inferring high retention proxy. The map shows that the northern parts of Cross River have good retention of ART clients, while the more urban area of Calabar tended to have a retention proxy lower than 1. The number of patients on treatment across

the facilities ranges between 12 and 9,747. The map indicates that in Calabar, one facility was performing well, with high TX_CURR, which could aid other facilities that are struggling with retention.

The map also shows the southern parts of the state performing poorly in retaining clients in care, which could be due to high commercial activities within the region and proximity to a neighboring country. High migration of people into and out of the region could be responsible for this poor retention, as clients could abscond or miss appointments due to their engagement in other commercial activities.

Figure 9. Map of retention proxy for Cross River State



Potential takeaways and recommendations based on the analysis

The weekly HFR dashboards provide a snapshot of retention and brief categorization of facilities based on that week's data. Examining trends in retention using the weekly data can provide additional insight into program interventions.

In Cross River State, **several top-performing facilities show mostly consistent positive TX_NET_NEW trends**. These should be model facilities for retention, and a deep dive should be done to determine what is working for them. These best practices could then be disseminated through participatory workshops or a peer-to-peer mentoring program. A caveat with respect to sharing best practices is that the largest of these top performers only has a final TX_CURR of around 600 individuals. As such, there are potential limitations in how well best practices might scale up for larger facilities.

Another notable pattern was observed for the **time period around mid-February**, during which drops were noted for both high- and low-performing facilities. It is important to identify potential reasons for these drops to help plan for preventive measures in the future. Decreases toward the end of April and beginning of May are also seen for many facilities, potentially related to COVID-19 lockdown measures.

From the visual analysis conducted, there was **no clear correlation between TX_CURR and retention proxy.** In terms of the **age-gender split**, the data showed no real marked difference because the age breakdowns are too coarse, and females appear to be majority of the cohort. Trends appeared to be the same for both genders.

As part of this analysis, facilities that performed poorly were provided **back-to-care targets for FY20**, which can be broken up into weekly targets and checked within the HFR weekly reporting. IPs should leverage this analysis to provide more targeted support and assist facilities to use these targets as a tool to track performance.

Mapping of facilities based on their retention performance shows spatial variation and depicts what appears to be small pockets of poor-performing areas, while the northern parts of Cross River were generally gaining patients, as the retention proxy was greater than 1. Retention interventions, including communication strategies, can be targeted to the southern parts of the state.

When considering findings from all three states that were analyzed (Akwa Ibom, Cross River, and Lagos), some interesting overall patterns emerged. Lagos did not have a clear pattern of retention over time, while Akwa Ibom experienced a drop in numbers around the Christmas period, and Cross River saw a drop in February.

Data protection and data use agreements

All data used for this analysis was provided by USAID. HFR data is stored on the secure APPR database platform, which has user-authentication access. The data used was aggregated facility-level HFR data, which did not include any personal identification information. Data use agreements are already in place between USAID, Palladium, and Right to Care for the use of HFR data.

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Appendix 1. Visual analysis of patients on ART by age and sex

Figure 10 below presents the age and sex distribution over time for facilities deemed to have good retention, while Figure 11 presents facilities with poor retention. These plots show that females over age 15 make up the biggest proportion of TX_CURR for each of these facilities, indicating why the TX_NET_NEW values are most impacted by the TX_NET_NEW for this group.

Figure 10: Age and sex distribution of TX_CURR for facilities with good retention

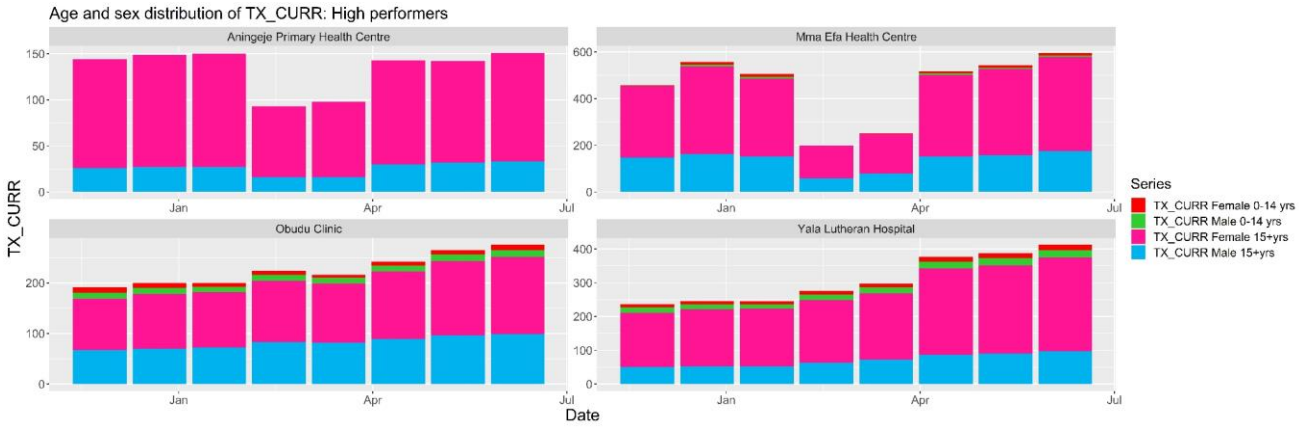
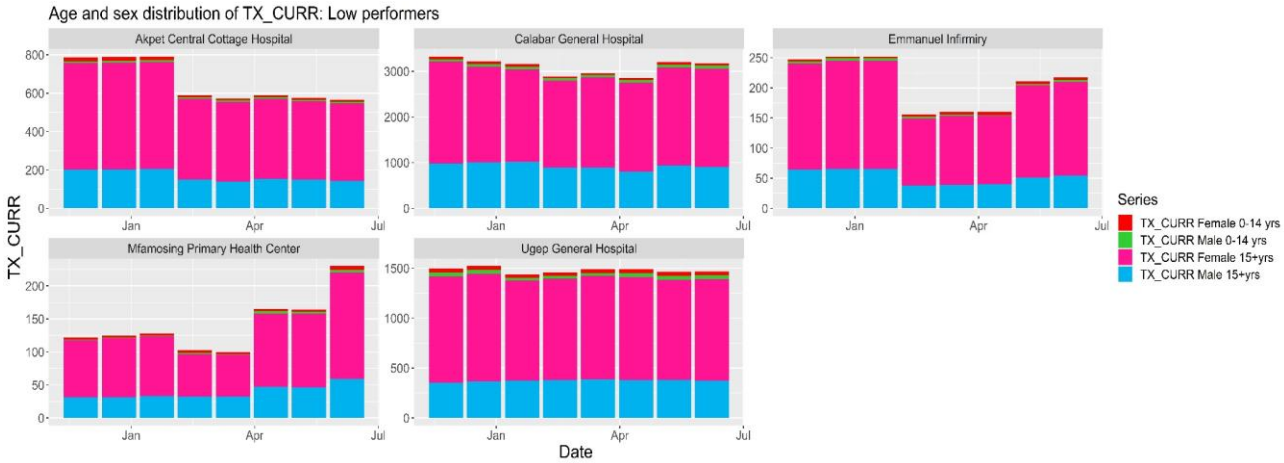


Figure 11: Age and sex distribution of TX_CURR for facilities with poor retention



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