

**Lessons from taking a
pilot project to scale:
Using data science to predict
interruption in treatment and
implementing proactive interventions
to prevent a missed appointment**

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Success Story

At a glance

Partners/Client:

- Non governmental organisation
- Vantage Health Technologies

Technology:

Vantage Patient Retention Solution

Technology Partners:

Microsoft

Location:

Nigeria

- 5 pilot sites
- Scale-up to 38 sites

NIGERIA

The Partners

A leading non-governmental organization (NGO) in Nigeria that focuses on the provision of prevention, care and treatment services to patients with diseases of public health significance such as HIV/AIDS, Tuberculosis and Malaria. The NGO also provides technical assistance to relevant government agencies to strengthen the delivery of reproductive health, maternal, new born and child health, and laboratory services.

Vantage Health Technologies creates solutions to the world's most complex health challenges. We provide decision support, operational tools and step-by-step workflows to empower healthcare workers across the spectrum to achieve predictable, cost-effective and improved health outcomes – at scale.

The Challenge

Nigeria's HIV burden is ranked 4th in the world, and the country has the highest burden in the West and Central African sub-region, accounting for approximately 38% of new infections in the region.¹ In addition, Nigeria has one of the highest rates of AIDS-related deaths of any country in the world. According to the Nigerian National HIV and AIDS Strategic Framework 2021-2025 – which provides guidance on HIV care and treatment in the country – Nigeria reported an AIDS-related mortality rate of 21.7 per 100,000 population in 2019. In the same year, an estimated 44,719 persons living with HIV died from AIDS-related causes.²

An understanding of the country's HIV epidemic allows for efficient investments in the response to HIV. The updated UNAIDS targets for 2025 aim for 95% of those living with HIV to know their status, 95% of those who know their status to be on treatment and 95% of those on treatment to be virally suppressed. Nigeria has made great strides on their

treatment targets across the HIV cascade, achieving 90% on the first and second 95s in 2021³. However, in the same year, the country achieved only 85% viral suppression – indicating that challenges remain particularly for the third 95; around ensuring adherence to scheduled clinic appointments and Antiretroviral Therapy (ART) and optimizing outcomes for people living with HIV (PLHIV).

A solution that considers People, Process, and Technology

The Vantage Patient Retention Solution was developed by Vantage Health Technologies to identify patients who are in the process of disengaging from treatment in order to allow healthcare workers to pre-emptively intervene to ensure these patients' adherence to their clinic appointment. Being able to focus efforts on these patients improves health outcomes, and it allows for more efficient use of scarce resources; preventing a missed appointment also saves the cost of bringing a lost patient back to care.



¹ Global AIDS monitoring, 2020. Nigeria: Country progress report. Available online at: www.unaids.org/sites/default/files/country/documents/NGA_2020_countryreport.pdf

² The National HIV and AIDS Strategic Framework (2021-2025). Available online at: naca.gov.ng/wp-content/uploads/2022/03/National-HIV-and-AIDS-Strategic-Framework-2021-2025-Final.pdf

³ UNAIDS, 2021. Country Factsheets : Nigeria 2021. Available online at: www.unaids.org/en/regionscountries/countries/Nigeria

The context of this implementation

A leading non-governmental organisation, thanks to donor funding, has been implementing a project that set out to improve appointment adherence by using the Predictive List generated by the Vantage model as a tool to prioritize high-risk patients to receive personal attention ahead of their scheduled clinic appointment.

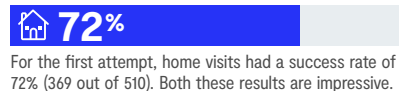
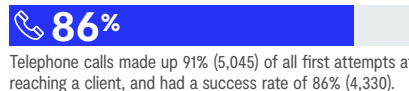
The organization had observed an average 73%* appointment adherence rate in the States they supported in the three months (Nov 2021 – Jan 2022) leading up to the implementation of this new intervention to proactively address challenges around missed appointments. Initially a test-phase was run in 5 sites identified as having a particular challenge with retention across 4 states in Nigeria. A scale-up process then followed, and the Patient Retention Solution was eventually introduced and implemented in 38 supported sites.

This sets out to document the real-life experience of using Vantage's predictive outputs as a tool to prioritize proactive and targeted engagement with patients ahead of their scheduled appointment or medicine pick-up. We look at the different interventions deployed, and how well they worked. This also shares reflections from moving from a pilot project to a scaled implementation, as well as important lessons and considerations for future implementations.

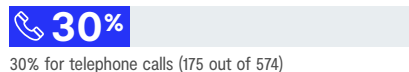
What interventions were implemented, and what were their success rates?

Two interventions were implemented, namely telephone calls and home visits. Success in the context of the findings below is defined as having reached the client.

First attempt



The success rate dropped significantly for the second attempt at reaching the client:



It would be interesting to understand the context of these phone calls/visits (time of day; day of the week, script etc.) in order to increase the success rate - making second attempts more worthwhile.

* Appointment adherence is measured by comparing the next visit date in the high-risk list generated to the actual visit date. When the month's actual list is received, all patients with a next visit date in the future are seen as up-to-date.

Are interventions having an impact?

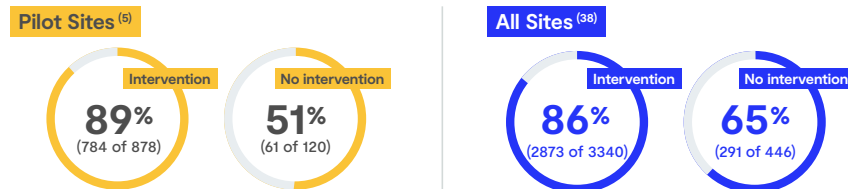
The simple answer is Yes. Overall, the appointment adherence improved from 73% to 80%.

The data indicates that proactive interventions are having an impact: Patients on the Predictive List who received an intervention were more likely to be up to date compared to patients who did not receive an intervention (Figure A)

Figure A shows that the difference in appointment adherence between the 'intervention' group and the 'non-intervention' group is largest in the pilot sites that pioneered the implementation. This could be because they had more time to fine-tune and embed the processes and disciplines introduced by the project than other sites. This could indicate that the impact becomes greater over time.

Pilot sites were chosen on account of having a particular challenge of retention; this could also help explain the very low appointment adherence rates in the non-intervention group in these sites.

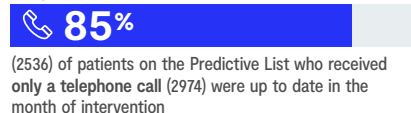
Figure A



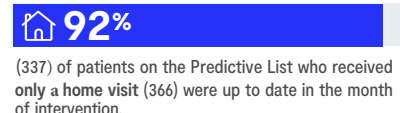
Are different interventions yielding different results?

Whilst the number of interventions differed significantly between telephonic and home visits; the data showed that home visits were more successful at ensuring that a patient was up to date at the end of the month. Home visits are of course more resource-demanding, however they offer an opportunity to issue medication at the time of seeing the patient and may be a worthwhile consideration in particularly high-risk contexts.

Telephonic



Home Visits



Addendum: Implementation Observations and Lessons for Future Implementations

| Implementation observations | Considerations for future implementations |
|--|---|
| <p>“As you add more facilities, you also add more complexity.”</p> | <p>The practicalities of managing a scale-up are complex, and this needs to be recognised at the early phases of project planning and preparations. One needs to take a methodical approach to scaling with the first phase focusing on a select group of clinics that provide a representative sample of all the clinics, and who then serve as champions for a second phase, which is full scale up.</p> <p>The benefits of starting small in order to build capacity over time, before rolling out at scale, cannot be underestimated. This approach not only serves to test what works, and what doesn't; it also provides an opportunity to implement in a way that supports the required behaviour or process change for the implementation to be sustainable and embedded into the organisation (“more on this below). There needs to be continued emphasis on equipping central teams to oversee implementation; whilst at the same time creating ownership and accountability throughout different layers of the organisation. Needless to say, there also needs to be a commitment to free up the required capacity and resources to drive success.</p> |
| <p>“This [predictive analytics] is a new way of thinking and some staff have questions around predictions and whether they are accurate.”</p> | <p>As indicated above, a phased approach that involves engagement with all levels of the organisation from the outset of the project is important for a number of reasons. Not only will this support a more appropriate solution – one that is tested and validated by the team – it also contributes to creating a common understanding of (and belief in) machine learning and predictive analytics. There is opportunity to bring in findings from the data exploration- and validation processes to relevant stakeholder to build trust. Whilst there are challenges around availability of other types of data sets (e.g. social determinants of health) combining with these data sets would both benefit the quality of the predictions – it may also help to overcome some of the reservations around this kind of technology. Same goes for the historical clinical data used to generate predictions – ensuring quality and availability of data means improved predictions.</p> |
| <p>“It is hard to determine the contribution of the interventions on appointment adherence/ retention.”</p> | <p>This will always be challenging given the complexities around fully understanding or determining the drivers of human behaviour. There is opportunity to add a qualitative layer to this, for example by engaging the clients themselves to understand what drives their behaviour towards appointment adherence.</p> |

Independent evaluation of Vantage Patient Retention Model:

An independent evaluation of the Vantage model by Dartmouth College has validated the predictive algorithm:

“The algorithm was found to be effective: individuals given a higher risk of non-adherence were more likely to subsequently deviate from their care plan.”

The evaluation also considered the impact of applying the predictive outputs by clinical teams:

“It was also found to support improved retention efforts: overall non-adherence rates declined over the study.”

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