Annual Report 2014

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eHealth AFRICA

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01 / Letter from the Directors

2014 has been a year of incredible growth for eHealth Africa. We have grown in the scope of our programs & capabilities; we have grown in the number of countries we work with & the number of staff that make up our family; and we have grown in our relationships with our partners & government agencies.

The eHealth Africa team faced significant challenges this year, but through the hard work and dedication of our staff, we saw many incredible successes. With polio on the brink of eradication in Nigeria, we increased the magnitude and scope of our polio projects to help ensure that we maintained momentum on vaccination coverage. We saw vaccine noncompliance rates drop and the number of polio cases in Nigeria significantly decrease. We developed a new Emergency Response Program in order to provide support to the Ebola outbreak response in West Africa. We also created a Health Delivery Systems Program to help strengthen the health system beyond campaigns & crises. We expanded our reach to 3 new countries (Sierra Leone, Liberia, and Guinea) and grew the eHealth family three-fold.

The entire eHA team is driven by and committed to our mission — to build stronger health systems through the design & implementation of data-driven solutions that respond to local needs and provide underserved communities with tools to lead healthier lives — and 2014 demonstrated our commitment to improving health systems around the world. We also know that one of the biggest impacts we can have on a health system is to providing training and capacity-building support to our amazing staff. This year, in addition to tripling our capacity, we have introduced new internal human resource programs, trainings, and events to ensure that we are each growing our individual potential and pursuing a standard of excellence both in the office and beyond.

We're proud of what we have achieved in 2014, yet recognize that there is much work ahead. eHealth Africa has the capacity and the commitment to develop and implement revolutionary ideas. We will continue to work with governments, NGOs, local community partners, and other industry leaders toward achieving common goals and fighting for the things that make the world a better place.

Evelyn Castle
Co-founder and Director

Adam Thompson
Co-founder and Director

02 /

Mission Statement

eHealth Africa's mission is to build stronger health systems through the design and implementation of data-driven solutions that respond to local needs and provide underserved communities with tools to lead healthier lives.

03 / 2014 Year in Review

January

eHealth Africa helps UNICEF with implementation of nationwide nutrition survey in Nigeria.

February

Berlin office opens, increasing capacity in software development.

March

First Health Camp box is deployed to Doguwa LGA in Kano state.

—

GIS Department surpasses 5 TB of satellite imagery processed.

May

Data collection for Forward Cold Chain data evaluation, in partnership with NPHCDA, begins.

August

Health Camp Box assembly line and warehouse opens, coinciding with the deployment of the 10,000th Health Camp box.

—

Nigeria's Ebola Emergency Operations Center opens in Lagos.

—

Fitness For Life initiative and Wellness Program are launched on 22 August.

September

New headquarters opens in Kano.

—

CDC asks eHealth Africa to replicate our Nigerian Ebola response assistance region-wide.

June

eHealth Africa vaccine driver Bashir Yakubu delivers 100,000th dose of vaccine distributed through Direct Delivery program.

—

First Kano Connect phones are deployed to users at health facilities and administrative offices.

July

The first case of Ebola hits Nigeria when Patrick Sawyer flies to Lagos from Liberia.

—

Bauchi Polio Emergency Operations Center opens.

—

Osioke Oarue is hired as an Administrative Coordinator at Sokoto EOC, doubling eHealth Africa's staff from 195 in January to 390 in September.

—

November

Newly-launched End Game Strategy sees a drop in total noncompliant cases from 1436 children in August to 714 children in November.

December

Health Camp team wins staff football tournament on 4 December.

—

eHA GIS team wins Best FOSS4G User at the Free and Open Source Software for Geoinformatics Conference in Bangkok, Thailand.

04 / Who we are

" If not me, who? If not now, when? "

Emma Watson, UN Women
Goodwill Ambassador

eHealth Africa was founded in 2009 to provide northern Nigeria's health infrastructure with customized technology solutions for data-driven patient & public health services.

Today, eHA plays a critical role in the fight for polio eradication in partnership with the Nigerian Emergency Operations Center, manages country-wide Ebola response projects for the US Centers for Disease Control and Prevention (CDC) in the Ebola-affected African hot zone, and boasts one of the largest Geographic Information Systems (GIS) teams in West Africa.

We develop appropriate and user-centric technology solutions that are used to manage patient information, track health system data, and analyze programmatic outcomes for large-scale public health interventions across West Africa. We work with partners and donors to bring operational and technical support to help close the access gap in the world's most vulnerable populations. We conceive and implement programs that help reshape health delivery systems in Nigeria, from delivery of vaccines and essential medicines, to on-the-ground data collection that can drive system-level decision making.

We work with our partners to solve big problems. We believe in the power of smart technology and diligent execution to make a transformational difference in health systems, and we know that when we do high-quality work, we have the opportunity to change lives in the communities we impact.

We do what we do because we believe that every community deserves access to the kinds of tools that enable them to lead healthier lives.

We are eHealth Africa.

Find out more at
ehealthafrica.org/home

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Department overviews

Geographic Information Systems

Over the last decade, Geographic Information Systems have become an essential tool in development field work. The ability to estimate population density, spatially analyze project data, and understand the topography of an area are important tools in the quest to strengthen health systems. Tracking vaccinators, connecting clinics, and containing outbreaks in the uncharted and remote regions of Northern Nigeria would be logistically infeasible if it were not for the efforts of our GIS department.

Our team of GIS technicians is one of the strongest in West Africa, providing eHA and our partners with a critical advantage in our work.

With over 25 dedicated staff, the majority of whom hold advanced geospatial technology degrees, our GIS team has a breadth of capabilities in and beyond health mapping, and a depth of expertise in how to apply geospatial information in practical and concrete ways. The GIS team works to enable eHealth Africa's field staff to navigate previously inaccessible regions by creating highly detailed maps of over half of Nigeria's territory. These maps provide context on terrain, topography, infrastructure, and points of interest. We have mapped boundaries for all administrative regions in the country, as well as the locations of 100,000 health facilities, 500,000 settlements (of which 130,000 are now named), and 200,000 kilometers of roads. These maps serve to strengthen eHA's programs and partnerships. They also make data available through our open-source platforms, allowing others to build on the tools we've cultivated. GIS data is crucial in identifying missed settlements, microplanning of vaccination campaigns, and mapping accurate routes for vaccine delivery. Leveraging our GIS team's capabilities across each program in the eHA portfolio helps us maximize synergies to provide accurate information, and reinforces our commitment to data-driven programming as a mechanism of systematically accessing some of the most remote regions of the world.

Software

Our application of technology to health systems work represents more than simple expedience or aesthetics;

it is fundamentally an ethical stance. We believe that access to well-engineered tools is a matter of equity. eHealth Africa's software division is built on this belief, and exists to deliver cutting-edge engineering to the most difficult of contexts.

Technology is no longer an accessory to functioning systems. Rather, in most successful cases, it is part of the system's DNA. The software we build, in close partnership with our users, leverages and interoperates with a host of open-source and community-led technologies to provide powerful, tailored solutions for all parts of the health systems in which we work — from national response centers to remote health clinics.

2014 was an inflection year for the eHealth Africa software team. We started with a handful of developers and projects at the outset of the year, and expanded our capacity to 28 technical staff working on 4 distinct program areas, opening a new development office in Berlin to complement our cadre of in-country staff. Our team has designed and deployed software across all our program areas -- from working on the Kano Connect platform that digitally connects all health facilities in Kano State, to contributing to the global Ebola response by building and supporting contact tracing software in Liberia, to designing data collection tools used to assess the status of malnutrition in Nigerian children. We maintain a dedication to building software with a ground-up, design-oriented methodology, seeing the technology we deploy as integrated products which are built in and for the last-mile contexts eHealth Africa is dedicated to serving.

Research & Evaluation

Our data-driven approach and wide breadth of activities have enabled eHealth Africa to accumulate an expertise in data collection. When combined with the toolkits offered by eHA's Software and Geographic Information Systems teams, our Research & Evaluation department is uniquely positioned to evaluate the

effectiveness and assess the impact of different public health interventions in some of the world's most challenging healthcare systems.

Since its creation in June 2014, the R&E department has capitalized on institutional resources to assist multiple projects, from evaluating a proposed introduction of electronic data collection tools aimed at prevention of mother-to-child HIV transmission, to supporting the development of novel GIS techniques to model and estimate population density, age ranges, and gender breakdowns across northern Nigeria. These research initiatives fall under eHealth Africa's broader mandate to advance our understanding of programmatic interventions and contribute to the public health evidence base. To foster the relationship between eHealth Africa and external partners, the R&E department provides consulting services in the areas of designing studies, evaluating different sampling strategies, and collecting, managing & analyzing data.

In addition to providing consulting services externally, the R&E department also serves as the center for monitoring and evaluating (M&E) for eHA's program areas. Our M&E team provides projects with data support from inception to endline with the goal of helping projects ensure they are achieving programmatic impact. Through defined metrics and indicators, eHealth Africa strives to guide our programmatic decisions with an eye on the data.

In 2014, the R&E department managed a portfolio of approximately $300,000 in research grants, delivering value to our partners in Nigeria and around the world through research services, data collection, and technological capacity.

06 /

Polio program

In 1988, the World Health Organization and partners acknowledged that the end of polio was in sight, and committed to the worldwide eradication of the disease. In 2014, as a result of a sustained global effort, only 3 countries remain polio-endemic, never having stopped transmission of wild poliovirus.

eHealth Africa works with national, state, and local governments in Nigeria as they complete the final push in eradicating polio from the African continent. eHA contributes to eradication efforts in Nigeria through a suite of complementary activities and projects aimed at bettering data, improving coordination, and streamlining operations. The program is focused on helping vaccinators reach their intended targets, collecting smart data and utilizing geospatial information to streamline and strengthen immunization activities. Vaccinators are also given the tools and skills necessary to report results in near-real-time while maintaining data fidelity.

A key component of the overall polio eradication effort is the measurement of progress. This is done through robust data gathering with technology designed to provide accurate, field-based measurements for communities to visualize where they are in meeting the immunity threshold of 80%+ of children under five. eHealth Africa remains committed to working with our partners to provide data, coordinate logistics, and support vaccinators, leading to the total eradication of polio in Nigeria and worldwide.

131,099

Number of settlements identified and named to maps by eHealth Africa's GIS team.

Polio Emergency Operations Centers

Health systems are challenged with creating a productive and collaborative space for partners to come together to foster the change needed to improve the system. In emergency response, the challenge is magnified due to the dizzying array of players involved and the criticality of the tasks at hand. Polio response in northern Nigeria is a joint effort spearheaded by the Nigerian government in partnership with UNICEF, Rotary International, the World Health Organization, the U.S. Centers for Disease Control & Prevention, USAID, and the Bill and Melinda Gates Foundation. To facilitate their integration, in 2012 the Gates Foundation proposed building Emergency Operations Centers (EOCs) in northern states with the highest infection rates, and a National Polio EOC in Abuja to coordinate activities between state governments and national agencies. eHealth Africa was contracted to build & manage these EOC facilities.

Nigeria's Polio EOCs are designed to provide health officials with a fully-equipped working space and the fastest Internet speed in Nigeria — oftentimes, a challenge for agencies in insecure or remote regions. Dedicated eHA staff manage the Centers, ensuring that technology and supply needs can be met with expediency.

The EOC paradigm has created a culture of collaboration, starting with polio and translating to broader health system needs. Prior to the launch of the EOC program, Nigeria saw 122 confirmed cases of polio in 2012. In 2013, just after the inception of the first 2 EOCs and subsequent expansion of the program, Nigeria saw 53 confirmed polio cases nationwide. Through the ongoing efforts of the Nigerian government, its partners, and eHealth Africa, and through continued growth of the EOC program to include 8 centers nationwide, 2014 saw a dramatic reduction in case burden, with only 6 children contracting the virus.

The Emergency Operations Centers have proven to be a useful tool in driving conversations and coordinating complex initiatives. As Nigeria edges closer to the eradication of polio, the EOC model is contributing to other public health successes, including expansion of routine immunization programs and outbreak response for other infectious diseases.

Microplanning & Geodata Collection

Nigeria has a large and rapidly growing population, many of whom inhabit the vast areas throughout the north that are often disconnected from the digital world. Without an adequate understanding of population, terrain, and transportation, large numbers of inhabited settlements are unaccounted for, and can be regularly missed by polio vaccinators.

"When it comes to global health, there is no 'them'... only 'us'."

Global Health Council

Using over 10 TB of satellite imagery that has been captured and organized by our GIS team, eHA data collectors travel to undocumented settlements, often in insecure and remote regions, with a GIS-equipped tablet in hand. Each data collector has extensive training in navigation techniques, community relations, and population estimation. In addition to their technical skills, our data collectors have an intimate understanding of the areas in which we work, and often hail from the communities that they travel to.

Demographic information obtained by eHA's data collectors contributes to microplanning activities used by local governments and partners for immunization campaigns in Kano and Bauchi states. Our GIS team provides partners and vaccination teams with geodata to help generate and refine target settlements and target daily vaccination quotas of children under five necessary to achieving polio population immunity over time. During immunization campaigns, vaccinators carry GPS-enabled mobile phones that allow them to passively report their location and route. This information is matched against GIS-based route coverage plans, with missed settlements promptly identified and revisited. This reinforces a data-driven feedback loop that ensures that more children are covered against the potentially debilitating virus.

Data collectors also record information on settlement characteristics and local health facilities. In Kano state, data collectors have gathered the official names for 782 previously undocumented hamlet settlements, ensuring that these settlements will be visited during future vaccination campaigns. In 2014 alone, our data collectors have helped paint a clear picture of the landscape of available care by collecting the coordinates, names, and identifying information of 4,028 health facilities across northern Nigeria. Without the work of our data collectors & GIS field team, many more children would be left vulnerable against polio.

Vaccinator Tracking

The Nigerian National Emergency Operations Center (EOC) recognizes the need for a holistic data-driven tracking system and values the geodata that eHealth Africa helps organize and provide. Thus, they asked eHA to steer the implementation of a mobile phone-based tracking system for field vaccinators that monitors staff's coordinates and activities to insure that no settlement is neglected.

We work in partnership with Novel-T to operate a custom Vaccinator Tracking System (VTS) & dashboard to enable administrators to monitor the movements of vaccinators, view the percentage of area covered, and identify missed settlements. The software is built to identify instances in

432,000,000

Number of doses of polio vaccine tracked during Immunization Plus Days campaigns.

which vaccinators spend the adequate amount of time necessary to vaccinate a child and detect events that may indicate a missed household. We supply each vaccinator with an Android-based mobile phone equipped with a custom tracking application. At the end of each day of the four-day polio vaccination campaign, the vaccinators' "tracks" are uploaded to a server, missed areas are identified, and new locations are scheduled for campaign "mop-up" days. This system becomes a positive feedback loop, and gives administrators the data needed to modify strategy, adjust resources, and rectify noncompliance, to ensure that transmission of polio stops.

In 2014, we doubled the capacity of our vaccinator tracking team to concurrently support twice as many local governments during each campaign. During each monthly Immunization Plus campaign, eHA provides mobile phones to 12,000 vaccinator teams. Additionally, eHA now harnesses data from 80 local government areas (LGAs) across Northern Nigeria, up from the 2013 maximum capacity of 40 LGAs per campaign. The project's geographical expansion

has allowed us to leverage synergies across districts and improve the quality of our geodata. Ultimately this leads to the identification of additional children who were likely previously missed by vaccination teams.

Hard-to-Reach

For some rural Nigerian communities, accessing healthcare can mean trekking over ten kilometers on poor roads through harsh terrain in order to reach the nearest clinic. For these remote communities, access to basic health services is a luxury. To combat these challenges, WHO and UNICEF created the Hard-to-Reach community health project. With support from our Operations staff and GIS department, WHO-UNICEF's mobile health teams travel to remote communities, often using creative forms of transportation and navigating challenging infrastructure, to supply families with routine vaccines and basic care services. The broad objective of the Hard-to-Reach Project is to increase basic healthcare services, create touchpoints to the health system for families, and drive increased compliance and access to lifesaving vaccines, including polio.

These difficult-to-access communities bear a disproportionate burden of vaccine-preventable disease; a WHO analysis found that 48% of the 53 Nigerian polio cases in 2013 were among children who resided in a Hard-to-Reach area.

Hard-to-Reach visits and vaccination drives are not confined to the regularly-scheduled Immunization Plus

campaigns; they occur year-round. Equipped with our Android-based phones, vaccination teams from local government administrative offices record the start time, end time, and GPS coordinates for each settlement they vaccinate using electronic forms created on Open Data Kit, increasing data fidelity and lowering the likelihood of transcription error. The phones also capture health register summary data, which is uploaded daily to WHO-UNICEF accessible data files, vastly improving the reporting time for WHO-UNICEF administrators.

In order to achieve the goal of total eradication of polio in Nigeria and worldwide, every community must have access to appropriate vaccines and adequate care. The sustained focus on the most vulnerable communities ensures that the weakest links in Nigeria's health system can be strengthened, both lowering disease burden and bringing these children one step closer to thriving.

8

Number of states that host a regional polio Emergency Operations Center in Nigeria.

End Game Strategy

With the eradication of polio in Nigeria in sight, the Nigerian government and partners have stepped up efforts to ensure that focus remains high and no child gets missed. Often, a mistrust of the health system or a lack of awareness of the benefits of polio vaccination will lead to a family or entire settlement to reject intervention. A 2014 analysis by the Kano Emergency Operations Center of the year's reported polio cases revealed that all newly-diagnosed victims had been previously identified as residents of noncompliant households or resided in settlements that rejected the polio vaccine. In response, the Kano EOC created the End Game Strategy Project in August.

Convincing noncompliant parents and local leaders to accept the polio vaccine after initial refusal is difficult, and requires a multifaceted solution rooted in a deep understanding of a community and its culture. Traditional leaders and government administrators at the district, village, and LGA level work together, both to build trust in the vaccine by disseminating effective and accurate information, and by providing additional incentives of small household goods to families that accept vaccine. eHealth Africa supplies the End Game Strategy team with a comprehensive list generated from immunization campaign data of all noncompliant settlements and households, so that officials from the Emergency Operations Center can target noncompliant hotspots.

An important pillar of the End Game Strategy is leveraging the influence of traditional leaders. In August 2014, his Royal Highness, the Emir of Kano, visited Tudun Fulani, the ward with the highest vaccine rejection rate in Kano state. He demonstrated the safety of the vaccine by standing on a podium and taking oral droplets of vaccine himself. The following month, noncompliance cases went from 108 households involving 151 children to 5 households involving 8 children during the September campaign.

Thanks to the work of our partners, the End Game Strategy has recorded tremendous success in both reducing cases of noncompliance and resolving such cases when they occur. 1436 missed children were recorded in the August vaccination campaign; through End-Game techniques and a sustained commitment to ensuring that every child has the chance at a polio-free future, only 714 children were identified as missed due to noncompliance in November.

4,097,000

Sachets of sugar distributed as incentives for introduction of Inactivated Polio Vaccine (IPV).

07 / Health delivery systems program

"Another world is not only possible, she is on her way. On a quiet day, I can hear her breathing."

Arundhati Roy

Health delivery systems are the people and organizations, markets and finances, processes, and technologies involved in getting medical products and services to those who need them. The success of a delivery system is not measured by its funding or reach alone, but by the value it creates for society. Delivery systems, whether for health education, essential medicines, or vaccines, are engines of access and equity.

We began the Health Delivery Systems program to apply our technological capabilities and data-driven approach at the systems level. Building on momentum from our polio program in Nigeria, we have focused on routine immunization with integrated research, communications, design, and delivery initiatives to improve the quality and availability of information, supplies, and services to the last mile.

We have aligned our work in Nigeria with the National Routine Immunization Strategic Plan and serve as partners on national and state working groups. We support country priorities through our long-term initiatives and fulfill a range of country requests. This year those requests have included support for the national Effective Vaccine Management Assessment and extensive cold chain resource mapping across Nigeria's embattled northeastern zone.

As we enter 2015, we are excited by the transformation of routine immunization in Nigeria, the reinvention of health delivery through systems-minded research & development, and continued integration of our efforts with those of partners and government.

Health Camps

In many areas of northern Nigeria there is limited access to medical care, hampered by both cost and geographic accessibility of healthcare facilities. When combined with a low level of medical knowledge, and a climate of mistrust in foreign medical interventions, these challenges are causing Nigerians in the most vulnerable segments of society to fall severely ill with preventable and treatable diseases.

Health Camps were started as a tool to increase visibility of the formal health sector and build trust among communities for health interventions such as vaccination. The goal of the Health Camp Project is to improve overall community health in Kano State by increasing access to basic health care, providing appropriate referrals, and strengthening the effectiveness of public health campaigns. eHealth Africa works with government partners to supplement vaccination campaigns with reliable, high-quality, and desirable medicines and medical supplies through the provision of Health Camp boxes.

Each Health Camp is supplied with a minimum of one portable box of essential drugs, which can be easily prescribed by trained community health workers aided by a specially-designed diagnosis guide. The drugs provided are purchased from local and international suppliers. They are independently tested for quality by a third-party laboratory. It is essential that the drugs be of the highest quality, not only to ensure safety, but also to build confidence in the health system overall. Gained trust creates a ripple effect which increases compliance for vaccinations and encourages further health-seeking behaviors. Camps are staffed by local health workers who are permanent fixtures in the state's health system, ensuring that families develop a familiarity with the formal health sector between camps and subsequent referrals and clinical visits. In addition to providing essential medicines and supplies, eHealth Africa and our partners work with traditional community leaders, who provide critical support and lend credibility to broader health systems strengthening efforts.

Health Camp attendance is high; an average of 100 patients are treated per Health Camp Box. The project has provided medical supplies to an estimated 2,278,246 patient visits since March, in areas where many of the patients depend on the project as their primary source of healthcare.

As we enter 2015, eHealth Africa is launching a training initiative to build capacity among vaccinators and community health workers. We are working with Nigerian health workers to elevate their skills in

performing safe injection practices, conducting rapid field diagnoses, delivering treatment, and teaching community health programs. Health Camps will continue to be an important outreach tool to improve patient and family outcomes, and to further strengthen the fabric of the health system beyond vaccination campaigns.

Kano Connect

The proliferation of information and communications technology holds much promise for strengthening routine immunization and other core dissemination activities in the primary health system. The functionality, usability, and affordability of new-generation smartphone devices make a new level of connectivity possible in Kano.

Kano Connect is an initiative conceived and funded by the Gates Foundation and Dangote Foundation, in partnership with the Kano State government, to build a primary health care communications service platform in Kano. The goal of the program is to strengthen health systems and facilitate improved communication and information flow across all levels of the Kano State health care systems. These objectives ultimately aim to increase coverage of health services across target populations. The program includes the procurement, programming, and support for Android-enabled smartphones, in addition to a closed user group cellular network, training, and technical support for each of Kano's 1200+ routine immunization-specific health workers. Additionally, it provides a robust unified data architecture to expand the state's capacity to manage routine immunization programs through an mHealth platform.

34,188
Boxes of essential medicines and health commodities delivered to Health Camps in 2014.

Dedicating each device to a position at each level of the PHC system, from state to ward, allows for highly intelligent applications at all tiers of the health system. System-wide connectivity can improve responsiveness, facilitate rapid message dissemination (including formal & informal, group, and targeted messaging), and the visibility to collect, track, and act on key performance indicators.

In 2014, Kano Connect distributed 884 devices to Primary Health Care Management Board (PHCMB) health workers, focusing on key players at all levels involved in routine immunization. The program has also trained health workers who have received devices on smartphone literacy and electronic data collection methods, including SMS surveys and Open Data Kit (ODK). Kano Connect is enabling the state to continually improve tactical responsiveness and operational strategies, while collecting and managing the data necessary to shape longer-term system strengthening investments.

Sense: Last-mile Information Management

The computerization of health information systems and digitization of health data are unlocking new possibilities across Africa. Unfortunately, data management at the last mile still relies largely on handwritten paper records. There are limits to the extent paper instruments can reflect and support increasingly complex service delivery: they represent an intrinsically one-sided data flow, are attended by frequent data quality issues and are nearly impossible to transfer and aggregate in a timely fashion. This last mile has historically been the weak link frustrating the visibility and analytics needed to support quality health service delivery.

Through advances in technology and design practices, we believe it is now possible to build better tools for the last-mile that support health workers and enable faster exchange of higher quality data. This year our Software and Health Delivery Systems teams began development of an open-source last-mile information management platform called Sense. It is a smartphone application stack for workflow facilitation and offline-first data collection, built specifically to overcome the technical and practical hurdles of collecting and utilizing data at the last mile, and to deliver high quality information directly to users and to leading systems such as DHIS2.

Sense's first application is a suite of workflows to help healthcare facilities better manage routine immunization supplies. The app, called LoMIS, enables users to drive reordering of vaccines and dry goods through tracking of stock levels and reporting on service, performance monitoring at each level of the transport network, and analytics on supply forecasting and coverage. It also

simplifies ad hoc communications such as reporting cold chain failures; with just two taps, the application can notify system administrators of pending repair needs.

We launched LoMIS on the Kano Connect infrastructure with initial reporting from 80 health workers. We have held 15 sets of user tests to determine optimal interfaces for data input speed and accuracy. Even in its infancy, the system holds much promise in pre-empting vaccine stockouts and accelerating management's responsiveness to ensure when a mother and child seek care, they receive it.

As development on the Sense platform and LoMIS application continue, eHealth Africa is eager to see them evolve and integrate deeper within the national vaccine delivery system in Nigeria.

Forward Cold Chain Evaluation

Nigeria's intensification of routine immunization and introduction of several new vaccines, including the freeze-sensitive inactivated polio vaccine (IPV) and pneumococcal conjugate vaccine (PCV), has increased the cold chain capacity needed to fully immunize a single child. The addition of these vaccines, which led to a tenfold increase in procurement cost, further heightens the importance of the country's supply-chain readiness and ongoing cold-chain quality control. The most recent Effective Vaccine Management Assessment gave Nigeria a national score of 45/100 on whether "All vaccines and diluents are stored within WHO-recommended temperature ranges." The report recommended an exhaustive temperature-monitoring evaluation at each storage level and transit link of the vaccine delivery system to ensure all vaccines arrive safely from the national store through to local community-based sessions across the country.

We worked with Nigeria's National Primary Health Care Development Agency (NPHCDA) and UNICEF to design and implement a comprehensive study using continuous temperature monitoring and comprehensive surveys at each tier of the delivery system to answer where, to what extent, and why cold-chain failures are occurring.

We conducted trainings in Kano and Edo States, coordinated the implementation of electronic data collection in 40 local governments across all 36 of Nigeria's states, and provided data management and analytics to the study team. The three-month study collected 900 surveys and over 200,000 hours of temperature data.

The study team will release a final report with recommendations for targeted strengthening interventions in the first quarter of 2015. This work will provide

a baseline against which vaccine delivery systems interventions can be measured, and we are excited to see the structure and analytics developed for the Forward Cold Chain study become valuable tools in accelerating similar initiatives in Nigeria and other countries.

Vaccine Direct Deliveries

The availability of effective vaccines is fundamental in primary health care and disease control systems. Kano State, like others in Nigeria, has relied on a "pull" delivery system to get vaccines to the field. Health workers pick up their supplies whenever they find the funds and time. Without sufficient logistic and human resource capacity and irregular operational funding, this system has struggled with stocked-out facilities, scaled-back outreach, and poor supply forecasting.

The Governor of Kano, the Bill & Melinda Gates Foundation, and the Dangote Foundation, with a team of partners including eHealth Africa, collectively redesigned the vaccine delivery system to improve availability and visibility in the state's 484 wards.

We piloted, scaled, and now manage an informed "push" transport logistics operation whereby supplies go directly from the State cold store to local health facilities. This serves 328 facilities in 300 wards across 30 local governments -- effectively managing vaccine supply for 68% of Kano's wards in the first year of the Direct Delivery program.

The operation ensures twice-a-month delivery of fifteen immunization stock items to each solar-refrigerator-equipped facility. Our work has included facility mapping, route optimization, vaccine handling training and certification for our drivers, temperature monitoring, data and stock management, and allocation forecasting.

To date, the Direct Delivery project has covered more than 10,000 km to deliver over 1.1 million doses of vaccines in 2400 deliveries, representing nearly $2 million of vaccines in management, and helped to reduce the frequency of stock-outs in Kano's health facilities by over 60%. Crucially, this service is helping unburden healthcare workers to spend less time managing supplies and more time delivering care.

eHealth Africa is working with partners and the federal government on a national rollout to see this strategy of system redesign take hold across the country.

483

Number of health facilities in Kano State connected through the Connect platform in 2014.

08 / Emergency management program

"**Eventually—though no one can say when—the Ebola fighters are going to be victorious. The fog will clear, leaving the hard truth in view: this won't be the last epidemic. And when the next one comes, the world must learn the lessons of this one: be better prepared, less fearful, less reactive. Run toward the fire and put it out together.** "

Time Magazine, December 10, 2014, "The Ebola Fighters: The Ones Who Answered The Call"

Our engagement in the Ebola Virus Disease (EVD) response effort began with Nigeria's patient zero, Patrick Sawyer, in July 2014. Based on our work in polio response in Nigeria, the Nigerian Federal Ministry of Health called upon eHealth Africa to set up Ebola Emergency Operations Centers, and to develop and implement an electronic contact tracing system. The resulting Android-based contact tracing platform helped contain the outbreak in Nigeria, corralling a potentially disastrous arrival of the virus into Africa's largest city, and limiting transmission to 20 cases. The rapid mobilization in Nigeria and effective use of technology to assist in controlling the outbreak received international praise, and acted as a catalyst for eHA's involvement with the US Centers for Disease Control and Prevention in all EVD hot zone countries.

6,407

Number of daily visits facilitated for 1,177 unique people traced with eHA tools and support during Nigeria's Ebola outbreak in 2014.

eHealth Africa is working on the ground to support the Ebola outbreak response efforts in Nigeria, Sierra Leone, Liberia, Guinea, & Mali. We have staff in-country providing logistics & data management support, reducing the response time to procure test results, and streamlining the processes of tracing & monitoring potentially infectious individuals. Our key programmatic initiatives include:

Data Management Tools: We have built a variety of custom data management tools for the Ebola response. Our contact tracing software, Sense, provides field contact tracers with real-time reporting and GPS tracking capabilities. For case management, we created an application that provides information on all current contacts and EVD cases. The case management application and dashboard synchronize with our Sense Followup app, creating a streamlined workflow for field trackers to report the symptoms of contacts and capture their GPS whereabouts within the Case Management dashboard.

Call Center Management and Applications: Ebola emergency response call lines are first-response coordination centers, charged with notifying district offices of potential new cases and hotspots, and providing callers with accurate protection information. We operate call centers in Guinea and Sierra Leone, and provide the Liberian emergency call line with our custom Ebola call center software.

Emergency Operation Center Management and Construction: Similar to polio EOCs in Nigeria, the Ebola Emergency Operations Centers provide emergency response agencies with designated workspace to coordinate and plan activities, and the informational and technological resources to effectively execute their initiatives. We provide assistance to government partners with building construction, long-term Center management, and technical support.

Logistics and Technical Support: We offer workspaces, technical support, Internet services, and power backup to partners in all of our country engagements. eHA also provides partners with rapid procurement, management, and distribution services for critical equipment including vehicles and laptops.

A legacy of civil war and political instability have left the Ebola hotspots of West Africa with weak health systems and infrastructure, creating a catastrophic situation. This outbreak serves as a reminder that investments in system building are a critical need for public health. These investments can take the form of data collection tools, communications technologies to connect facilities and health workers, or health information systems that speed the flow of data between partners. These tools

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**Number of major languages
our staff speak fluently.**

and technologies need to be coupled with additional clinics and staff, more comprehensive training for local healthcare workers and emergency response teams, and a commitment to building appropriate communications and transportation infrastructure. In the short term, we are working to manage the outbreak and contribute to emergency response. As we look forward, eHA evaluates all of our in-country programs for their capacity to strengthen national health systems. eHealth Africa's technology solutions are being coupled with a commitment to build a local presence in each affected country that our solutions are being deployed in. We aim to build systems that are designed in proximity to the environment in which they are needed, so as to close the gap between design and use. To prevent future public health events from wreaking similarly destructive outcomes, we are committed to working with governments and partners to strengthen national & local health systems and promote a formal health emergency response sector that will prevent outbreaks from turning into epidemics.

Nigeria

Nigeria is a national Ebola response success story. Declared Ebola-free by the WHO on 20 October, the Nigerian government and nongovernmental partners built on a culture of collaboration fostered by existing relationships through current polio EOCs. In addition to appropriating polio eradication health infrastructure, the response effort was also lauded for its use of information technology, both to coordinate contact tracing and to address the concerns and fears of Nigerian citizens. When containing an outbreak, expediency matters. Our custom-built contact tracing software, Sense, reduced reporting time of contact cases from 12 hours to near-real-time. Enabling swift action when new EVD exposures were identified allowed quick containment and follow-up.

eHealth Africa leveraged existing expertise to construct, manage, and support two Ebola Emergency Operations Centers in Lagos and Port Harcourt. We also called upon our GIS Department's capabilities to provide members of the EOCs with cluster mapping to monitor the most affected areas, enhancing the ability to determine resource allocation, supported by GPS response team tracking. Ultimately, the speed of the response system was the driving force in stopping the outbreak from proliferating. Before they could infect other people, sick patients were quickly identified, isolated from the public, and taken to emergency centers for treatment.

Liberia

Our team in Liberia, in support of the CDC and CDC Foundation, arrived in September 2014 to build and operationalize several key programs in the response effort. Many of our activities have focused on disseminating response infrastructure down to the regional level where outbreaks are first reported, including construction support for county-level Emergency Operations Centers that drive the local response. To further reinforce a community-based, decentralized action plan, the software we supply to Liberia's emergency call line is built to instantly direct system-generated alerts to the appropriate regional response centers. In addition to physical infrastructure, our Liberia team has also established and staffed County Support Teams to extend medical, data, and logistical support to County Health Teams, rapid response facilities, and community care centers across the country.

At the national level, our team is in the process of building the country's permanent National Emergency Operations Center in Monrovia. Once the building is constructed, we will be in charge of supplying the facility with reliable communication infrastructure and technology. As a key implementing partner for the CDC, we continue to provide operational support for the national office to procure & distribute goods and effectively utilize technology.

Given the scope of our engagement, our team has grown at an exceptional pace. Our eHA Liberia family currently contains 127 people across 6 offices, with a presence in every one of Liberia's 15 counties.

Sierra Leone

Since startup in September, our Sierra Leone team has focused on providing response coordination, logistical support, and data management assistance for an array of governmental and NGO partners. Most significantly, our partnership with regional telecom company AFCOM has led to drastic improvements in 117, the Sierra Leone Government's toll-free Ebola call line. Prior to eHealth Africa's involvement, 16 operators struggled to take 200 incoming calls per day. Now, equipped with our software and guided by our call center floor managers, a total of 150 AFCOM staff rotate into 60 operator desks, staffed 24 hours a day. This growth in capacity has increased response capacity sevenfold; the Sierra Leone Ebola call center now handles 1500 daily calls. Our call center software is also installed in all District Level Alert Centers, and automatically routes incoming database entries to the appropriate district level alert center. The immediacy of the alert decentralizes the response

system, and gives district surveillance responders and burial teams the information they need to act.

We have supported staff surge capacity for the CDC's Operation Western Area Search. eHealth Africa has brought on 450 community monitors and surveillance officers to conduct an extensive on-the-ground investigation of new cases in the Western area, one of the most persistent EVD hotspots in the country.

We continue to provide logistics, operations, and infrastructure support to the CDC and partners. Our transportation and logistical coordination faculty is also used by Royal Sierra Leone Armed Forces to support transportation of Ebola specimens from medical facilities to regional laboratories for testing.

To assist with long-term systematic capacity building, our team in Sierra Leone is invested in supporting a network of EOCs throughout the country. Commencing with a national EOC in Freetown and extending to other strategically important regions of the country in 2015, these EOCs will serve to strengthen regional health crisis management and build lasting Ebola outbreak response systems.

Guinea

Our Guinea team began building the Emergency Operations Center in Conakry in October. We continue to provide ongoing support to the EOC in the form of data management, communication infrastructure, and technological maintenance. Logistically, we are supporting the CDC response by providing procurement and management of a fleet of 100 vehicles and 325 motorcycles for EVD response fieldwork. Contact tracers, case investigators, and Ebola medical centers use the vehicles we provide to check up on potential new cases and transport sick patients.

Prior to our involvement, Guinea's national Ebola call center was ill-equipped to manage the call volume and coordination capacity necessary to respond to the scope of the crisis. With only four working phones, a majority of callers were greeted by an automated message stating, "this number is currently unavailable". With eHA's involvement, there are now 30 operator desks available 24 hours a day, responding to an average of 1000 calls daily. Our call center software will soon be installed at the prefecture level, providing district responders instant alerts of new cases and burial pickups.

In addition to our call-center alert software, prefecture coordination offices with high-speed Internet, hardware and communications equipment, staff training, and power generators for backup are planned at the prefecture level.

In 2015, eHA's Guinea team plans to consolidate partner information in a central database housed at the EOC. We are also supporting data management efforts on behalf of the World Health Organization, digitizing existing paper-based processes to allow global health administrations at WHO to make evidence-based decisions for resource allocation and a targeted response.

District level logistical and technical support will continue to be a large part of our portfolio of services in 2015.

Mali

We have a limited engagement in Mali, centered on activities to operationalize the CDC's country objectives and provide support to CDC staff on the ground. As an implementing partner, we have provided the CDC staff with office space, technology support, high-speed Internet, and transportation.

Programmatically, we have assisted with facilitating Ebola community outreach trainings, targeted to traditional religious leaders. Our software, Sense Followup, is supporting the CDC's contact tracing project.

92%
Percent of staff local to the countries in which we operate.

09 / Our donors and partners

- Bill & Melinda Gates Foundation
- Kano State Primary Health Care Management Board
- Dangote Foundation
- National Primary Health Care Development Agency, Nigeria (NPHCDA)
- Ministry of Health, Nigeria
- Nigeria Emergency Operations Centers
- Centers for Disease Control & Prevention (CDC)
- CDC Foundation
- UNICEF
- WHO
- UN Foundation
- Clinton Health Access Initiative (CHAI)
- CORE Group
- USAID
- Novel-T
- Global Alliance for Vaccines & Immunization (GAVI)
- Population Council
- Biostat Global Consulting
- WorldPop

10 / Our financials

eHealth Africa's cash, cash equivalents and short-term investments as of December 31, 2014, totaled approximately $3.6 million. Total donor revenue, comprising of contracts and grants, for the twelve months ending December 31, 2014 was approximately $26.2 million. Over the same period, total expenses for the organization were approximately $24.5 million. The funding growth in the second quarter of 2014 was primarily attributable to an increased focus on polio eradication in Nigeria. The funding growth in the forth quarter of 2014 came in response to the emergency response operations for the Ebola outbreak in West Africa. Funding trends are highlighted on page 27.

During 2014, eHealth Africa continued to increase the number of Polio Emergency Operations Centers in Nigeria and expanded the geographic reach of our Health Camp boxes into rural areas of Northern Nigeria. In addition, eHA established extensive Ebola support operations in Sierra Leone, Liberia, and Guinea. To support the additional work we were awarded in 2014, the organization increased staffing from approximately 200 employees at December 31, 2013 to over 900 employees spanning five countries across West Africa and Europe at the end of 2014.

During 2014, eHealth Africa continued to receive generous support from our donors, which include the Bill & Melinda Gates Foundation, the Centers for Disease Control and Prevention, the CDC Foundation, UNICEF, United Nations Foundation, World Health Organization, and others.

In addition, eHA has developed partnerships with the Governments of Nigeria, Sierra Leone, Liberia, and Guinea in support of preventative vaccination programs, health systems strengthening initiatives, and emergency response operations.

eHealth Africa is in compliance with all financial reporting requirements from all domestic and international government and private donors. With the addition of several awards received during 2014, eHealth made significant infrastructure investments across the organization to ensure accurate and timely reporting of financial and operational data. These investments, combined with centralization of executive management, program management, and supporting staff allows us to maximize efficiency. eHA will continue to apply a highly disciplined approach to future expansion and will prioritize programs where it can utilize its existing network and staff to assist governments and partners in building stronger health systems.

eHealth Africa's Board of Directors, management team, and staff are committed to capably delivering on our mission to build stronger health systems through the design & implementation of data-driven solutions that respond to local needs and provide undeserved communities with tools to lead healthier lives. Sustained funding to ensure the success of our initiatives is essential, and we continue to advocate for increased funds from existing donors and pursue new sources of support to efficiently achieve our goals.

Financial highlights
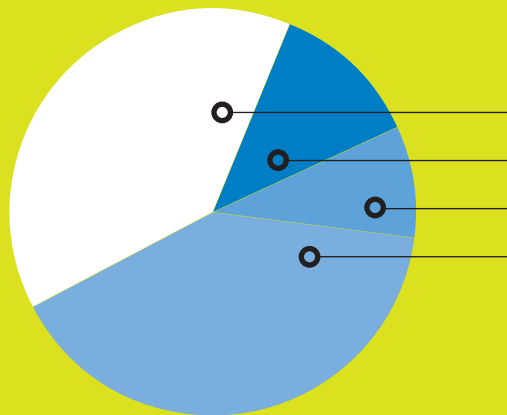
Assets

— Cash and equivalents: $3.6 million

— Accounts receivable: $1.1 million

— Pre paid expenses and other current assets: $0.8 million

— Property and equipment: $3.7 million (net)

— Total Assets: $9.2 million
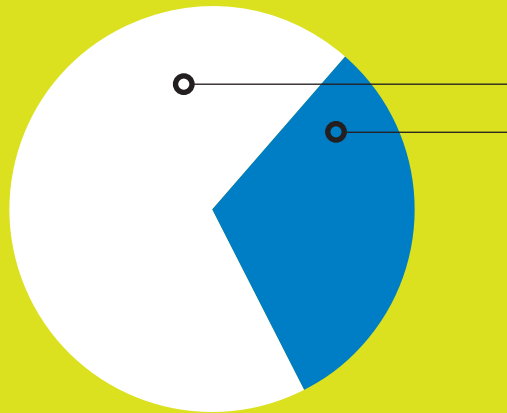
Liabilities

— Accounts payable and accrued expenses: $3.1 million

— Grant advances and deferred revenue: $1.4 million

Net Assets

Unrestricted Net Assets	$4.7 million
Total Liabilities and Net assets	$9.2 million

Contract and Grant Growth

Q1 Revenue

Q2 Revenue

Q3 Revenue

Q4 Revenue

2014 Total

$0m $5m $10m $15m $20m $25m $30m
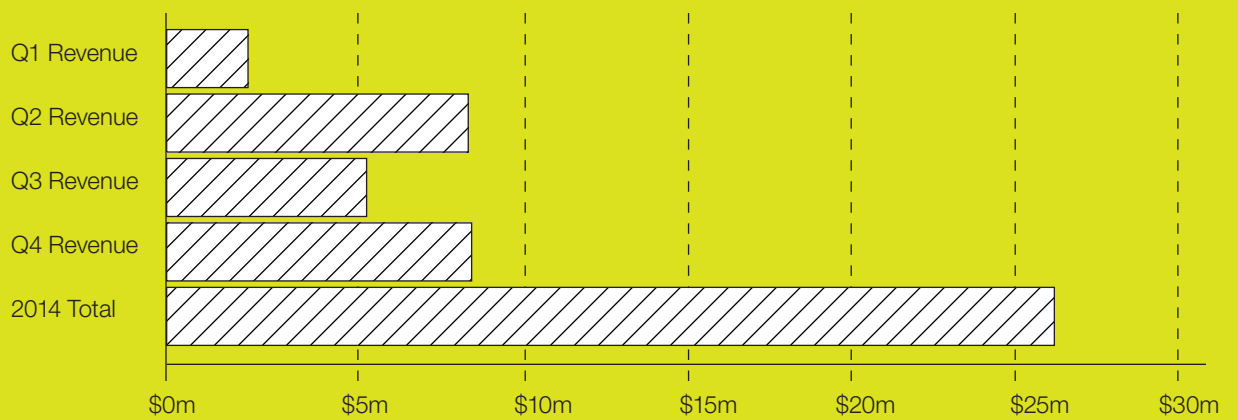
Note: The presentation of financials is preliminary, pending a full financial audit and fiscal year closeout activities. At the time of printing, eHealth Africa has not finalized or audited its 2014 financials.

11 /

Growth in 2014

Nigeria:

— Dec 2013 staff: 195

— Dec 2014 staff: 427

— Office expanded to large five building campus

— New departments

Guinea:

— Staff: 226

— New office

Liberia:

— Staff: 145

— New office

Sierra Leone:

— Staff: 88

— New office

Berlin:

— Staff: 19

— New office

Somalia/Nairobi:

— 2015 project planned

■ = New office
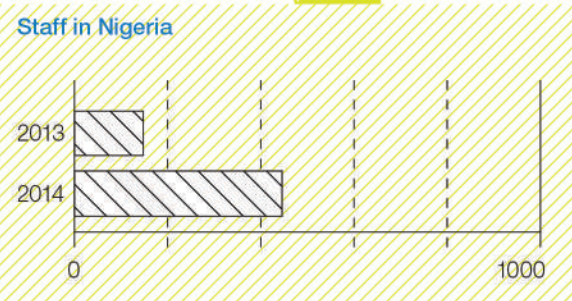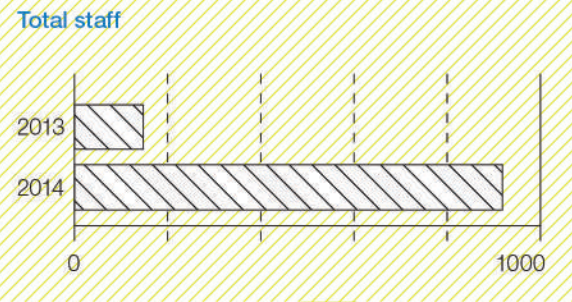
■ = Existing office

□ = New operation

■ Berlin

■ Guinea

■ Sierra Leone

■ Liberia

■ Nigeria

○ Somalia/Nairobi

Total staff

2013

2014

0   1000

Staff in Nigeria

2013

2014

0   1000

People

Staff capacity grew by 364% in the past year. A tremendous annual increase was essential to meet the scope of the Ebola response effort and the expanded role played by eHealth Africa in the Nigerian public health sphere.

Geography

Our programmatic impact expanded to four additional countries in 2014. In addition to West Africa, we also opened our first European office in Berlin.

Facilities

2014 saw the creation of nine new working facilities and the construction of our new Headquarters campus in Kano, Nigeria. The new five-building campus houses staff offices, a new Health Camp Box warehouse and assembly line unit with a green roof, drivers' quarters and break areas, a kitchen and outdoor patio, and state-of-the-art conference facilities.

Departments

Our organizational capacity expanded with the growth and formalization of our Software department, Research & Evaluation department, Health Delivery Systems program, and Emergency Management program. Increasing the size of the organization as well as the capabilities of our staff ensures that eHealth Africa can continue to be a strong partner to the health systems and governments with which we work, providing support in both existing and evolving programmatic areas.

12 / Looking forward to 2015

Population Modeling in Nigeria

The Bill and Melinda Gates Foundation has asked eHealth Africa to play a role in the WorldPop project's global open access population assessment. Our contribution will focus on Nigeria, where we join a team of world-class statisticians and population modelers in crafting an accurate & operationally-adaptable population estimate map. This is an ambitious project in Africa's most populous country, and requires our dedicated team of data collection experts to travel to remote settlements to obtain information that is unavailable with satellite imagery alone. eHA is excited to be a partner in the process and contribute our data collection expertise to generate better information that can be leveraged in current and future health projects.

Nutrition Program and the mNutrition UNICEF Dashboard

2015 will mark the start of eHealth Africa's newest program, Nutrition. We are working with UNICEF to launch an mNutrition dashboard to better assess nutrition status of communities in Africa. This new application and dashboard will digitize UNICEF's paper nutrition survey through a mobile phone application built to track GPS coordinates and monitor for anthropometric data error. Collecting geodata allows health administrators and agencies to identify malnutrition hotspots, better target interventions, and more efficiently allocate limited supplies to elevate the health of communities. With our customizable software, UNICEF administrators will be able to configure and edit survey questions to meet country-specific queries of interest, while working within an established UNICEF framework. A unified framework will enable UNICEF to conduct comparative country research and preserve data fidelity. In 2015, UNICEF/Somalia will be the first country to launch the project, with consultations for a Nigerian program rollout also underway. The project will be eHealth Africa's first foray into East Africa.

Expanding Vaccine Direct Deliveries

Our Kano-based Direct Delivery project has seen early success in ensuring that communities are consistently stocked with the vaccines they need to care for their children. Based on the success of the program, eHealth Africa is working with additional states to assess the feasibility of program expansion. Scaling vaccine delivery across multiple locations enables us to gather high-fidelity data on vaccination usage rates and help build a more responsive vaccination system that can forecast supply, prevent stockouts, and more efficiently distribute supplies.

VAN Initiative

We are proud to partner with Accenture Development Partners, Village Reach, JSI, PATH, BroadReach Healthcare, and the Clinton Health Access Initiative (CHAI) as part of the Visibility and Analytics Network (VAN). The VAN is a joint effort between developing country Ministries of Health, donors, supply chain and logistics experts, and public health implementing partners, like eHealth Africa, to develop blueprints for the transformation of health commodity delivery systems.

This consortium of partners will adapt, localize, and implement a collection of industry best practices focused on data collection and quality, policies and procedures, analysis, and continuous system improvement in several African countries, including Nigeria.

eHA's participation in VAN will leverage our experience designing and managing large-scale data collection and knowledge base in stock, logistics, and change management, to inform the design and implementation of a visibility and analytics platform in Nigeria. Closely related to the GAVI Data for Management working group and PATH's Better Immunization Data initiative, VAN is a critical step in an emerging global recognition of the importance and power of data - and the policies and people that create and use data - in the success of health delivery systems.

"Humanity does not have to live in a world of plagues, disastrous governments, conflicts, and uncontrolled health risks. The coordinated action of a group of dedicated people can plan for and bring about a better future. The fact of smallpox eradication remains a constant reminder that we should settle for nothing less."

William Foege, former Director of the Centers for Disease Control

Find out more at www.ehealthafrica.org

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