HITSystem: a tool for combating HIV

Dr Sarah Finocchario-Kessler and Brad Gautney describe the ways in which their novel tool aims to overcome the system-level challenges that prevent early diagnosis and treatment of HIV-positive infants in East Africa.

Could you introduce the HIV Infant Tracking System (HITSystem) and explain the motivation behind its creation?

BG: When we were in the trenches of early infant diagnosis (EID) programmes back in 2008 in Haiti and East Africa, we recognised that there was a need for an innovative tool that could help us fill the gaps through which so many HIV-positive (HIV+) mothers and babies were falling. We came up with the HITSystem based on our knowledge of these gaps in existing EID programmes.

What are the specific challenges currently hindering EID programmes aimed at reducing infant HIV/AIDS mortality in East Africa?

SFK: The EID system in East Africa is hampered by significant structural barriers that contribute to the late and sporadic testing of HIV-exposed infants, lost or delayed test results from the laboratory, and the absence of a reliable system to notify mothers of test results or the need to return to the hospital. Consequently, only about a quarter of HIV-exposed infants are retained in EID care until 18 months of age, and only about one-third of infants with a confirmed HIV+ diagnosis begin treatment.

How does the HITSystem work to facilitate EID in resource-poor settings?

SFK: The HITSystem is a web-based, automated intervention designed to overcome barriers with current EID services by using basic technology to track HIV-exposed infants who present for testing. The HITSystem is accessed online via a computer, using mobile broadband modems that respond to cellular signals rather than hardwired internet access, making its implementation feasible even in remote areas. Using the infant’s date of birth, the HITSystem triggers electronic action alerts for both EID providers and lab technicians when time-sensitive EID interventions are due. These alerts facilitate infant tracking so that those who default from care can be easily identified and quickly targeted for outreach. Alerts are only resolved once the specified action has been taken and recorded in the HITSystem by the EID provider. A built-in text messaging system sends messages to mothers’ mobile phones when test results are ready or follow-up visits are required. The system identifies receipt of test messages and absorbs all SMS costs.

Infants enrolled into the HITSystem are tracked until they are either conclusively determined to be HIV negative at 18 months and thus discharged from EID; determined to be HIV+ and initiated on antiretroviral therapy (ART); transferred to another health facility, or confirmed deceased. The primary goals of the HITSystem are to reduce turnaround time for the testing cycle, facilitate early ART initiation for infants identified as HIV+ and improve EID retention.

Are you working with other projects and organisations to deliver holistic healthcare for HIV-affected individuals?

BG: One of the most important lessons we have learned over the years is that we cannot do this work by ourselves. We proactively look for other like-minded organisations to partner with in our fight against HIV/AIDS. We strongly feel that partnering with capable organisations allows you to make a stronger impact on the objectives set before you.

Early diagnosis and treatment

A collaboration between Global Health Innovations, Kenya Medical Research Institute, the Walter Reed Program and the University of Kansas Medical Center has been established to help save the lives of infants exposed to HIV in resource-poor settings.

EVERY YEAR IN Kenya, an estimated 13,000 infants are infected with HIV via mother-to-child transmission. Without access to early diagnosis and antiretroviral therapy (ART), around half of these babies will not live to see their second birthday.

The establishment of effective early infant diagnosis (EID) and treatment programmes has been shown to reduce infant mortality associated with HIV/AIDS by 75 per cent. However, these programmes are working against the clock, as they are most effective when administered within the infant’s first 12 weeks of life. Often, system-level challenges – including late testing, lost or delayed test results, an unreliable system for communicating the results with the mother, and low retention rates – significantly reduce the ability of EID programmes to operate within this timeframe. Until this changes, infants will continue to die needlessly, and the world will not achieve an AIDS-free generation.

A NOVEL TOOL

It was these limitations that led Brad Gautney, President and Medical Director of Global Health Innovations (GHI), to collaborate with OnTarget...
Dr. Samoel Khamadi (far left) and Vincent Okoth (middle, back) with the HITSystem team at Kapsabet County Hospital in Kenya.

on the development of the HIV Infant Tracking System (HITSystem), GHI has since partnered with Dr. Samoel Khamadi (Walter Reed U.S. Military HIV Research Program) and Vincent Okoth (Kenya Medical Research Institute) to further develop and implement the System in Kenya, Tanzania, and Malawi. KUMC researcher Dr. Sarah Finocchiaro-Kessler has been leading efforts to evaluate and adapt the HITSystem to meet evolving needs on the ground.

A web-based tool, the HITSystem facilitates the effective and timely tracking of HIV-positive (HIV+) mothers and their newborns in resource-poor nations. The System monitors the whereabouts and progress of test samples and diagnostic results, and also contains an integrated text messaging system that automatically communicates with mothers when a result has been received or an appointment is due. What is more, the HITSystem operates in real time, delivering daily alerts to the individuals supporting the System whenever a step in the process has not been taken within the designated timeframe. Finally, in recognition of the fact that many resource-limited locations do not have access to reliable internet, the HITSystem is able to communicate via mobile broadband using cellular phone towers.

THE HITSYSTEM PILOT
Between 2011 and 2012, a pilot observational study was conducted in which the HITSystem was implemented in two Kenyan hospitals for 12 months, and the resulting EID outcomes compared with those from the preceding 12-month period. The findings were encouraging: the HITSystem was associated with a decrease in the turnaround time in processing and communicating infant test results, and significant increases in the proportion of HIV+ infants started on ART and HIV-exposed infants retained in EID care nine months after birth.

The researchers are now building upon these findings through a randomised control trial involving six hospitals in Kenya, in which each matched pair has been randomly assigned to either receive the HITSystem or function as a control. EID outcomes will be assessed after 18 months. In addition, efforts are underway to identify predictors of incomplete EID care and the time periods in which HIV-exposed infants are most likely to lose contact with the health system, as well as to evaluate the cost-effectiveness of the HITSystem. “We anticipate that the HITSystem will result in cost savings by increasing intended utilisation of testing and communication of results to impact infant care,” Finocchiaro-Kessler outlines. The trial is scheduled for completion in 2018.

Finocchiaro-Kessler and the HITSystem team are beginning a new study to adapt the system to support prevention of mother-to-child transmission efforts in Kenya. This will involve formative research with HIV+ pregnant women on ideal content and timing for text messages to support medication adherence, appointment attendance and planning for a hospital-based delivery. Using a small randomised control trial design with two hospitals, the study will provide preliminary impact data.

SPREADING THE NET
The HITSystem is now in operation at 18 sites in Kenya, 65 in Tanzania and 18 in Malawi, and the team has high hopes for expanding its reach further. To achieve this, the effective training and engagement of healthcare providers across all sites will be of tantamount importance. “The HITSystem is only as strong as the people who use it, and sometimes staff are resistant to embrace the System because they perceive it as creating more work,” Finocchiaro-Kessler acknowledges. “It is often hearing the benefit from patients that motivates them. One provider said he was sceptical until he began to see mothers coming to the hospital saying, ‘I came because I received a text message.’ That convinced him that the effort was worth it.” On the other hand, there are teams of nurses that adopt the HITSystem as their own quickly and make continual recommendations on how to modify and improve its interface.

HITSYSTEM EVALUATION TO IMPROVE EARLY INFANT DIAGNOSIS AND TREATMENT OUTCOMES IN AFRICA

OBJECTIVE
To evaluate and adapt the HIV Infant Tracking System (HITSystem) for increased and targeted implementation in low-resource settings in Africa.

KEY COLLABORATORS
Vincent Okoth, Kenya Medical Research Institute, Kenya • Dr. Samoel Khamadi, Walter Reed U.S. Military HIV Research Program, Tanzania • Terry Oehrke, Brian Hickey, OnTarget, USA • Dr. Kathy Goggin, Children’s Mercy Hospital, USA

PARTNERS
National AIDS & STD Control Programme (NASCOM), Kenya • Ministry of Health, Tanzania

FUNDING
Global Health Innovations • National Institute of Child Health and Development, R01HD075673 • National Institute of Mental Health R34MH107337 • Walter Reed U.S. Military HIV Research Program • Health Empowering Humanity

CONTACT
Dr. Sarah Finocchiaro-Kessler
Assistant Professor
University of Kansas Medical Center
3901 Rainbow Boulevard
Kansas City, KS 66160, USA
T +1 913 945 7077
E skessler2@kumc.edu
Brad Gautney
President and Medical Director
Global Health Innovations
524 Walnut Street, Suite 330
Kansas City, MO 64106, USA
www.globalhealthinnovations.org

SARAH FINOCCHIARO-KESSELLER, PHD, MPH is Assistant Professor at the University of Kansas Medical Center’s Department of Family Medicine, USA. Her research focuses on safer childbearing among people affected by HIV, safer contraception strategies for discordant couples, prevention of mother-to-child transmission, early infant diagnosis, and optimal paediatric HIV care.

BRAD GAUTNEY, PNP, MPH is the Founder and President of Global Health Innovations. He works with paediatric and maternal HIV/AIDS programmes in East Africa ensuring that HIV exposed infants are identified and receive timely and optimal HIV care. Gautney and his team designed the HITSystem, an automated tool that is changing the way babies exposed to HIV/AIDS are being cared for.