



Geographic Information Systems Strengthen FHI Program Planning

SEPTEMBER 2007 ♦ Using maps to show the geographic origins of disease is nothing new in public health. As far back as 1854, British physician John Snow drew maps to help him analyze a spike in cholera deaths in London. Snow determined that all cases seemed clustered around a particular public water pump. He convinced local authorities to disable the pump, which was found to be contaminated, and thus helped end the outbreak.

Today, public health practitioners continue to apply the same scientific principles as John Snow by using maps to address the spread of infectious disease. However, technology enables them to perform much more sophisticated analyses. For Family Health International, a recent initiative using state-of-the-art geographic information systems (GIS) offers an exciting way to use data to improve outcomes in our HIV/AIDS programs.

Why is GIS a valuable public health tool?

GIS is a means of capturing, storing, and analyzing data, and using specialized software to plot it on maps or to perform advanced spatial statistical analysis. Public health practitioners use basic GIS applications to map the locations of health facilities or ART patients in a district. They can use the maps to analyze different pieces of data in relation to each other, forming and testing hypotheses about interventions that may improve services. For instance, if maps created using GIS showed most ART patients in a district lived far from facilities providing services, healthcare professionals would posit that they may need to improve patient access. Multiple maps created through GIS can be overlaid, making it easier to see relationships between different sets of data. More complex investigations using GIS data and its spatial analysis tools can predict the geographic spread of disease, demonstrate temporal disease trends, or analyze health service gaps.

"GIS helps public health professionals use resources and assets more effectively by enabling them to visualize, conceptualize, and analyze complex problems," says Joseph Veneziano of Klett Consulting Group (KCG), which is training FHI staff to use this technology.

Inoussa Kabore, MD, MPH, director of FHI's Strategic Information division in Arlington, Va., is a leader in FHI's efforts to adopt GIS. He says the clear way GIS presents data is one of the chief reasons FHI is investing in this technology.

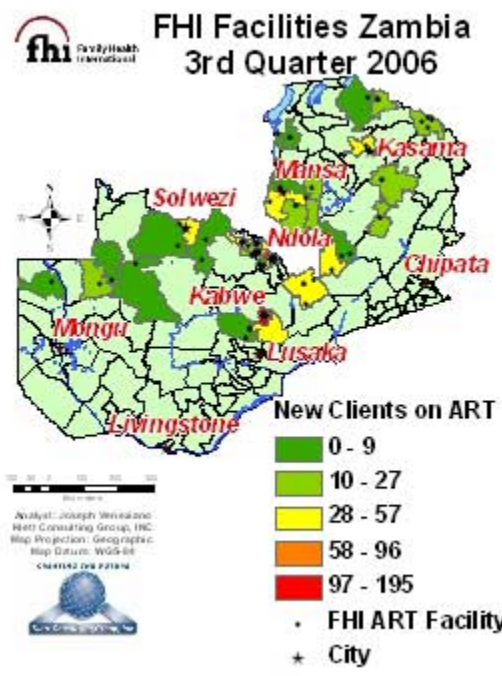
"Maps are very easy to understand, and they don't require a lot of explanation to attract someone's attention," Kabore says. "The decisionmakers and policymakers we work with are busy and often don't have a lot of time to read data. So, we can use these maps to present data to them in a different, more interesting way. We can also share them with people we work with at the community level, and we know they will be easy to follow."

Using GIS around the World

In late 2006, FHI began working with KCG to explore how GIS can be applied in our HIV/AIDS programs in Kenya, Rwanda, and Zambia (KCG is one of FHI's partners on the [TASC3](#) indefinite quantity contract). KCG staff spent three weeks traveling between these FHI country offices to install GIS software and provide in-depth training to 20 local staff responsible for data collection.

During this time, FHI and KCG visited a selection of FHI-supported health facilities in each country to map their locations using mobile Global Positioning System (GPS) software. KCG then positioned the rest of the FHI-supported facilities in each country remotely by referencing them to existing geographic and administrative features stored in a geo-database they had developed for FHI (this process is known as geolocating). Local FHI staff supported these efforts by giving KCG detailed information about services provided at each facility.

As a result of the visit, Kenya, Rwanda, and Zambia now have maps that visually represent the geographic reach of FHI's prevention and care and treatment programs. Country office staff are trained to manipulate these maps so they can be presented to stakeholders or used to help FHI decide where to best direct resources.



A map created in Zambia last fall illustrates how this could be done. As seen on the left, when a map depicting the geographic location of patients starting ART during a particular quarter is overlaid on a map showing geographic distribution of FHI-supported ART facilities, one can see the most significant increase in ART clients occurred in a part of the country where FHI supports a large cluster of facilities (southeast of Solwezi). Does this suggest that the presence of FHI increased patient uptake in this area? Along these lines, other regions of the map show smaller concentrations of facilities but higher numbers of new patients. Could these be areas where ART provision should be bolstered in the future?

GIS does not answer these questions, but it helps program managers raise them as they analyze the quality and breadth of services. "We are always looking for ways to make sure the data FHI programs generate can be used to improve programs so our work can have greater impact and, ultimately, save lives," Kabore says.

Elsewhere, other FHI offices using GIS include Indonesia, Nigeria, and Nepal. Indonesia staff map program coverage and regularly

share their findings with the National AIDS Commission and Ministry of Health. The National AIDS Commission hopes to integrate FHI's GIS work into a national HIV monitoring system by next year.

FHI's Nepal country office is perhaps most advanced in its GIS applications, having used the technology for the past three years to present information on geographic coverage of USAID programs to the National Center for AIDS and STD Control. Nepal has used GIS to monitor target group service coverage over a period of time and has, on several occasions, used GIS to significantly increase coverage through resource reallocation. Bharat Raj Gautam, monitoring and evaluation officer for FHI/Nepal, says GIS is one of the most effective planning tools his country office has.

In the past few months FHI's Nigeria office has also begun using GIS to map the locations of services and facilities. Nigeria has already used maps to illustrate the significant geographic distance between some antenatal clinics and clinics that provide prevention of mother to child transmission services.

Kabore says FHI is exploring the possibility of leveraging current funding to expand our use of GIS software to other countries.

PHOTO (courtesy KCG): Joseph Veneziano of Klett Consulting Group and FHI/Zambia staff use mobile GIS software to map a health facility site in Zambia.

◆ Mary Dallao

This page available at: http://www.FHI.org/en/CountryProfiles/Zambia/res_GIS.htm

◆ Family Health International (FHI)

Visit us at <http://www.fhi.org>