



B. GEO-MONITORING AND EVALUATION – PARTNERS IN HEALTH

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GP Area: Method/Tool

GP Level: Promising Practice

ABSTRACT

In this article, Partners In Health shares how the organization uses geographic information systems as a platform for increased data engagement and utilization, as well as for driving efforts for geographically-targeted improvement of service delivery. PIH describes how to establish a GIS platform, its uses for a variety of

stakeholders, and examples of GIS in action in several country settings. PIH lessons are identified such as the ethical implications of using this software.

Key Resources

ArcMap: www.esri.com/

GOOD PRACTICE NARRATIVE:

The Problem Addressed

Especially for those working in rural parts of developing countries, available data are frequently of poor quality—even if spatial data exists. In these situations, GIS can be a driver of geographically-targeted improvement of service delivery. GIS not only can help to identify gaps in programs, but it also can promote planning and strategizing on how to close the gaps and achieve quality health outcomes with equity.

The GP

Over the past several years, PIH country programs have begun to integrate the use of maps or GIS into their M&E and research activities. GIS has become a platform for increased data engagement and use, as well as a driver of geographically-targeted improvement of service delivery. In this sense, PIH considers GIS as a catalyst for action—a tool that allows staff across the organization’s country sites to identify gaps in programs—sparking planning and strategizing how to close these gaps and achieve quality health outcomes with equity. In addition, GIS has great potential to help drive and answer important operational research questions through the use of spatial statistics and models.

Setting Up a Geo-M&E System

To establish a functional GIS platform, collection of spatial data is necessary. Spatial data includes latitude/longitude coordinates of health facilities and patient addresses, as well as information on the boundaries of relevant service areas, such as districts or health zones. As these data are collected, the data are assembled in a hierarchy, which allows for aggregation of key service indicators at different levels. An example of Haiti’s address hierarchy is displayed in Figure 6.1. Once the hierarchical structure is complete, program data can be linked to the relevant “tier” and visualized on a map.

Because PIH often works in rural parts of developing countries, even if spatial data exist, the data are frequently of poor quality. Therefore, the bulk of the initial GIS activities in each country program have been focused on collecting reliable geographic data. In most cases,

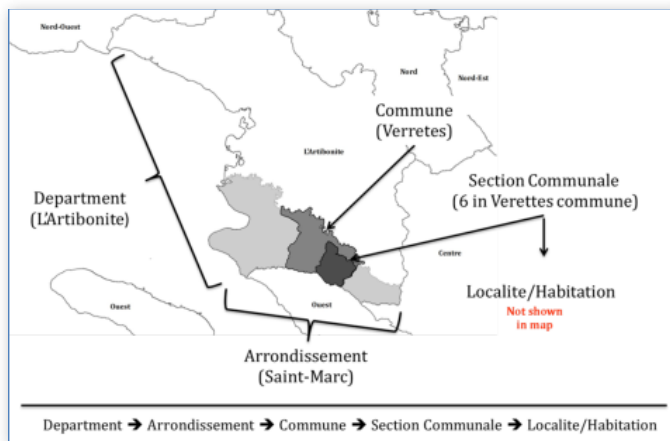


Figure 6.1—Example of Address Hierarchy in Haiti (map by Jitka Hiscox, PIH)

information on district and health zone boundaries can be obtained from the national government or ministries of statistics. However, up-to-date and high-resolution data on patient addresses—i.e., villages (or localities/habitations in the Haiti example above)—is typically unavailable. To collect this information, local staff in PIH countries have been trained in the use of standard Global Positioning System (GPS) units procured in the U.S. All country programs, as well as the PIH headquarters M&E team, use ArcMap software as their main GIS platform.

Program implementers and planners require flexibility to visualize information in different ways, which is possible with a carefully constructed and well-maintained geographic database as described above. For example, in the case of infectious diseases, such as malaria or cholera, staff may choose to view a time-series of maps showing infection levels over a period of weeks or months. It may also be important to visualize the location of clusters or “hot-spots” across space (e.g., district catchment area) during a single time period, indicating focal points of disease outbreak. Such information, plainly communicated through a map, can help staff allocate resources where needed in a time-sensitive manner. Visualizing other features, such as water sources, may aid program planners in identifying areas that may be at high risk for future outbreaks.

Stakeholder Engagement Through GIS

Although PIH uses GIS for internal M&E, research, and quality improvement activities, it is important to note that maps themselves are important communication tools

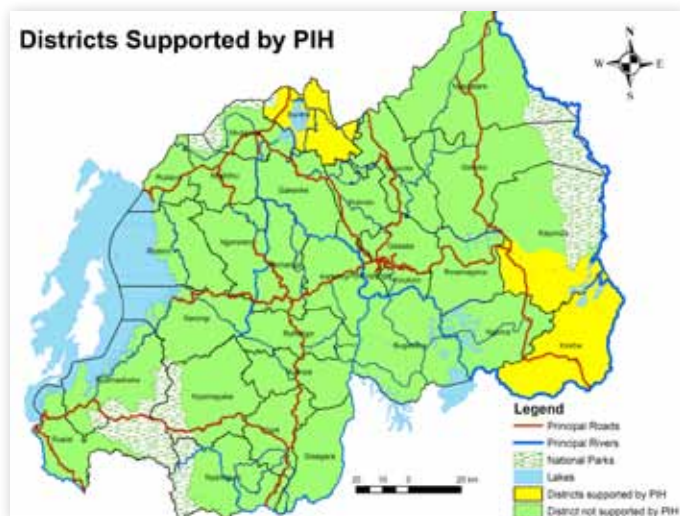


Figure 6.2—PIH-Rwanda Supported Areas (map by Fabien Munyaneza, IMB)



Figure 6.3—PIH-Haiti Supported areas (map by Jitka Hiscox, PIH)



Figure 6.4—PIH-Malawi Supported Area (map by Jitka Hiscox, PIH)

for other stakeholders. For data consumers at all levels, including community health workers, data on maps can be easily interpreted. Those with lower literacy or numeracy have an easier time with maps than other tools. Maps also tell important stories to donors of service delivery, can effectively communicate information via web or other social media, and can assist in infrastructure or facility planning.

In several countries where PIH works, the local government partners have not only expressed keen interest in using PIH maps for their own activities but have also been integral in the production of such maps. In Rwanda for example, PIH is not authorized to independently create administrative district maps; therefore, government collaboration was essential. In Rwanda and elsewhere, the simple act of producing large, laminated administrative maps for government partners has allowed them to become more engaged and supportive of PIH's work, while serving to assist local decision-makers by providing updated geographic information.

Country Examples

PIH makes use of GIS in many different ways across its country sites. Below are examples of current and future planned GIS activities by country.

Rwanda—Inshuti Mu Buzima (IMB)

1. Community Health Worker Supervisors conducted comprehensive mapping of all villages, health facilities, schools, and administrative buildings in the three District Hospital catchment areas which are supported by PIH (S. Kayonza, Kirehe, and Burera)
2. Administrative maps were produced and distributed at the village level for all Mayors, Medical Directors, local officials, and schools.
3. PIH collaborated with Ministry of Health partners on using GIS data for monitoring, evaluation and research and ongoing mapping of the following:
 - a. C-section rates and neonatal mortality
 - b. Surgical cases by type to assess service access and examine trends
 - c. Potable water sources to determine areas of highest need
 - d. Cases of severe diarrhea in hospitalized children
 - e. Results of a community census of malnutrition in children under age five

- f. Proportions of underweight HIV patients to support program outreach
- g. Impact of HIV service decentralization on patient care adherence
- h. All cases of under-five mortality in two districts to assess regional differences
- i. Network analysis of all roads and major pathways to estimate true travel time (walking) to health facilities for access of services



photo by Partners In Health

Haiti—Zamni Lasante (ZL)

- 1. Ongoing creation of high-resolution geographic database (village-level) based on existing government data and planned primary GPS collection
- 2. Mapping of service delivery for possible use in other projects, such as cholera vaccine distribution and other research activities

Lesotho—Bo-Mphato Litsebeletsong tsa Bophelo

- 1. Ongoing creation of high-resolution geographic database (village-level) based on existing government data and planned primary GPS collection
- 2. Pilot of mobile data collection linked to village GPS coordinates to assess coverage and activities of community health workers

Malawi—Abwenzi Pa Za Umoyo (APZU)

- 1. Comprehensive mapping conducted by APZU GIS assistant of all villages, health facilities, administrative buildings and community-based organizations in Neno district
- 2. Detailed mapping of water and sanitation infrastructure in Neno Boma (district administrative center) for planning and maintenance

Peru—Socios En Salud (SES)

- 1. Mapping of supported health centers providing treatment for multi-drug resistant tuberculosis (MDR-TB) in Lima city
- 2. Piloting of mobile data collection project to monitor activities of community health nurses, linked to geographic locations of patients in high-risk areas

by PIH country teams; data are aggregated at a high-enough level to ensure that sensitive data are de-identified before any presentations or mapping. Dissemination for external use must be approved by the country director and appropriate authorities and steps taken to ensure that health or other sensitive information remains confidential.

- ▶ For GIS use in healthcare M&E to be sustainable and effective, local capacity should be built to create, interpret, and react to the health data maps.
- ▶ Quality electronic health data are needed to sustain ongoing M&E activities using GIS. Once the geographic data are collected or obtained, basic health data analysis can be conducted relatively quickly if the health data are in a suitable format. Improvements in health data organization (including ensuring accurate address data) and quality enable GIS analysis.
- ▶ While many programmatic benefits can be obtained simply by mapping prevalence and distribution, additional benefit can be gained from more complex analyses, such as spatial analysis and modeling techniques, as well as using network analysis to understand the real patient experience of distance and geography.
- ▶ Key to an impactful M&E program—at both country and cross-site levels—is support to increase the use of the data for driving programmatic decision-making.

Lessons Learned

- ▶ PIH regards the health information of its patients as highly sensitive and confidential. Other healthcare organizations considering GIS use must address the ethical issues inherent. In PIH, patient addresses and related geographic data are only used internally