Mapping for Improved Health
Geographic Information Systems (GIS) and the Demographic and Health Surveys

The Added Value of GIS
Where people live affects their health, nutrition, and access to health care services. To promote a better understanding of these issues, MEASURE DHS has routinely collected geographic information in nearly all surveyed countries since 1996. Using GIS, researchers can link DHS data with routine health data, health facility locations, land use, local infrastructure, and environmental conditions.

Linked DHS and geographic data are now being used to meet a large variety of public health needs, including planning for HIV/AIDS and family planning programs and analysis of the effects of environment on early childhood mortality. Researchers are also linking GIS with anemia prevalence data to model estimates of malaria endemic/epidemic areas and the seasonality and intensity of transmission.

MEASURE DHS is also looking at new technologies such as personal digital assistants (PDAs) and GPS technology to improve data collection for all DHS surveys.

GIS services at MEASURE DHS include:
- Collection of geographic information (latitude and longitude) with GPS units for most surveys;
- Linking DHS geographic data with other geographic data for analysis;
- Training in GIS, including analysis, map making, and integration of GIS data;
- Publication of further analysis reports and atlases;
- Online GIS mapping tools for technical and non-technical users.
Online GIS tools for non-GIS users

**STATmapper** ([www.statmapper.com](http://www.statmapper.com)) allows users to create interactive maps from 54 surveys in 46 countries. Topics include housing characteristics, early childhood mortality, fertility and family planning, maternal and child health, and nutrition.

**HIVmapper** ([www.hivmapper.com](http://www.hivmapper.com)) is an interactive GIS mapping tool that allows users to quickly create maps using standard HIV indicators from surveys in over 20 countries.

In both cases, users can select the country(s) and the health indicators of interest. The maps produced can be exported and integrated into presentations and reports. They can also be used for further analysis. Future growth is planned for STATmapper and HIVmapper, including the addition of new indicators and mapping features.

Online GIS tools for GIS users

**HIV Spatial Data Repository** ([www.hivspatialdata.net](http://www.hivspatialdata.net)) provides geographically-linked, HIV-related data for mapping in a GIS for 49 countries. Data are provided in shape files that allow GIS users to integrate their own GIS data with the DHS HIV/AIDS indicators data. The HIV Spatial Data Repository is part of PEPFAR’s effort to provide data for decisionmaking and improve knowledge and understanding of the impact of HIV worldwide.
**Geographic data** from 67 DHS surveys in 36 countries are available online for download or upon request. The data include latitude and longitude coordinates of the surveyed communities and can be linked to the DHS dataset. Users need GIS software to display the geographic data on a map. Download data at www.measuredhs.com.

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**In-Country Training and Technical Assistance**

MEASURE DHS has provided training in geographic data collection and analysis and in mapping in North Africa, the Middle East, Asia, and sub-Saharan Africa. The trainings are customized by country and can include building in-country capacity in the following areas:

- Using local data and DHS data and linking them with GIS for mapping
- Mapping DHS data with other GIS datasets
- Using DHS data to produce atlases and other reports

In one week of hands-on training, the participants, including staff from Ministries of Health, Ministries of Planning, National AIDS Commissions, and National Statistics offices, acquire the skills to integrate multiple datasets and carry out their own exploratory geographic analysis of selected populations and health indicators. Participants learn how to prepare maps to use in reports and presentations.

As a result of training in Tanzania and Kenya, participants are creating maps which overlay HIV prevalence rates with the location of various HIV-related service sites (i.e. VCT, PMTCT, ART) to assist planning, management, and evaluation of activities funded through PEPFAR and other development partners.

In addition, MEASURE DHS provides in-country technical assistance to set up GIS databases to support management, decisionmaking process, and M&E of health programs.
Macro has published numerous geographic studies in recognized international journals, as well as its Geographic Studies series. Some examples include:

- **Comparison of HIV prevalence estimates from antenatal care surveillance and population-based surveys in sub-Saharan Africa** (Montana, L.S., V Mishra and R. Hong, 2008, Sex. Transm. Inf., 2008; 84:i78-84.). This study found that ANC surveillance surveys tend to overestimate HIV prevalence compared to prevalence among women in the general population in DHS/AIS surveys. However, the ANC and DHS/AIS estimates are similar when restricted to women and men, or to women only, residing in catchment areas of ANC sites. Patterns by age and urban/rural residence suggest possible bias in the ANC estimates.

- **Spatial Analysis of Childhood Mortality in West Africa.** Using geographic data from 10 DHS surveys from West Africa, this study assessed the impact of environment and spatial factors on child mortality. The study found that child mortality rates are higher where populations are either dense or extremely dispersed.

### Atlases
- Central African Republic
- Democratic Republic of Congo
- Ethiopia
- Tanzania
- Uganda

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**About MEASURE DHS:** Since 1984, the MEASURE DHS (Demographic and Health Surveys) project, implemented by Macro International Inc. and funded by USAID, has collected and disseminated nationally representative demographic, health, and nutrition data from over 80 developing countries. Through data collection, analysis and dissemination, the project has contributed greatly to advancing global understanding of population and health trends worldwide.

All DHS research and data are accessible for free at: [www.measuredhs.com](http://www.measuredhs.com)