

DRAFT 2



Services Availability Mapping (SAM)

An application of WHO's HealthMapper information and mapping application for Public Health



World Health Organization
Public Health Mapping & GIS
Measurement and Health Information Systems

Trainer's Guide

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Abbreviated terms

DMO	District Medical Officer
GIS	Geographical Information System
GPS	Global Positioning System
HMIS	Health Management Information System
MoH	Ministry of Health
PDA	Personal Digital Assistants, sometimes called handheld computers or handhelds
SAM	Service Availability Mapping

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Preface

This guide has been developed as a training aid for focal points at regional and country level for training national teams in the implementation of Services Availability Mapping (SAM).

SAM is an application of WHO's public health mapping system and comprises a standard survey methodology for the rapid assessment of health services availability, remote field data collection devices, and WHO's HealthMapper application.

The guide aims specifically to provide an overall background and understanding of what SAM is, and provides guidelines and checklists for planning and conducting a SAM survey in a specific country. It also provides step by step guidance on using survey tools and instruments, including Personal Digital Assistants (PDAs) and forms, Global Positioning Systems (GPS) and the Healthmapper application. The guide comprises:

Introduction

That explains the rationale, objectives and components of SAM. It also give a brief overview of the 6 phases of SAM, including planning, the SAM questionnaires, raining, field survey, analysis and dissemination.

Chapter 1 – Planning SAM

Planning provides overall guidance and checklists for implementing Phase 1 of SAM - the planning stage. This includes guidance on liaising with in-country focal points, facilitating a stakeholder workshop as well as identifying in advance data and training requirements.

Chapter 2 – SAM questionnaires

Provides an in-depth overview of the 2 questionnaires that are used in the SAM at the district and health facility level. It explains the difference between the questionnaires and provides guidance and tips for trainers in training survey interviewers.

Chapter 3 – Preparing and training on survey tools

Chapter 3 explains the technology and tools required for implementing SAM, including the hardware and software requirements and step-by-step directions on using the tools that include GPS, PDAs and PDA form builders.

Chapter 4 – Field surveys

Chapter 4 provides checklists for preparing the field work in terms of teams, equipment and logistics. It also provides technical step-by-step directions on synchronizing and processing data collected during the surveys with the HealthMapper.

Chapter 5 – Analysis and report

Chapter 5 explains the standard template output reports that can be produced with the results of the survey and provides step-by-step guidance on using the HealthMapper and related software for the visualisation and analysis of the data.

Chapter 6 – Data dissemination and use

Chapter 6 provides information on how to disseminate the SAM data collected.

Introduction

What is it

SAM is an application of public health mapping that aims to rapidly assess and monitor the availability and coverage of health services availability at district and health facility level.

Purpose

To support decision making by providing national and district planners with the skills and tools required to assess, map and monitor service and resource availability on a regular basis.

Components

SAM is made up of a standard survey methodology used in conjunction with public health mapping tools and applications. The survey comprises a questionnaire comprising over 50 questions relating to the availability of specific health care resources and priority health care interventions. The questionnaire is administered at the district and or health facility levels.

The questionnaires are administered by health management teams during rapid field surveys of every district or health facility. Paper or electronic forms can be used to administer the questionnaire. Where possible, it is recommended to use electronic forms on Personal Digital Assistants (PDAs)

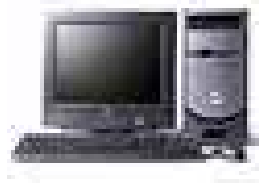
The results are uploaded into WHO's HealthMapper system for immediate feedback, analysis and decision-making.

Implementation

1. Data collected using questionnaires on PDAs by district health teams



2. PDA is synchronized with PC for data transfer



3. Data is analysed and maps and charts produced using WHO's HealthMapper



Rationale

A key goal of health programmes is to make essential health services equally accessible to all individuals and communities. Access has a range of dimensions, but the very first step is availability: only if services are available, issues related to access, coverage and utilization can be addressed. Monitoring the availability of services is of particular importance in the early stages of programme development or in the context of scaling up programmes. For the scaling up of interventions such as anti-retroviral treatment (ART) programmes) it is crucial to assess and monitor the "strength" of the health system as a whole.

Several health measurement tools provide information on access, coverage and quality of services. These include household surveys, clinic-based statistics and facility surveys. Each method has its own strengths and limitations, and can provide data on availability of services.

The value added of SAM is that it is rapid, cost effective and provides an easy and simple way of present data that is immediately relevant at national, district and sub-district levels.

Moreover, it provides the necessary link between the scale-up and strengthening of health systems. It provides information on the current coverage and lays a foundation for future evaluation of progress. It will also provide essential information on the scale-up potential.

Uses of SAM for public health decision-making

Baseline SAMs can be used to establish "what" and "where" at a given point in time. Alternatively, SAM can be used to follow-up on previous facility-based surveys. The outputs are visually friendly maps illustrating distribution. If known, this can be overlapped with prevalence of specific diseases, or simply population density. The power of these outputs is their ability to demonstrate quickly and easily the distribution of specific services within specific areas to a general audience. Because they are easily interpreted, decision-makers are empowered to make important decisions related to the distribution and strengthening of specific services relatively quickly. At a glance one may be able to see that prenatal services are disproportionately available given population density by sex and age, or, if HIV prevalence data is available by district, that counselling and testing services are not available in areas with higher-than-normal prevalence.

Customising SAM to country/local context

The SAM is intended to be a country owned and driven process. To this extent, SAM currently collects information on the presence of key health resources and interventions as determined by a country's health priorities; it also provides estimates of coverage for selected interventions. Information is collected on both the public and private sectors at two levels: the district and the facility level.

When undertaking the adaptation of SAM to local settings, consideration should be given to how this will affect data collection and should be certain that definitions are specific enough to assure comparability across the country and within districts. SAM training, data collection, and analysis is easily carried out even in larger countries within a month's time. Adding more to the tool will make it slower, and could create problems at the analysis stage if not carefully considered.

Timeline and budget

SAM is a tool that attempts to provide an overview of what is available, and where. It is fast and inexpensive compared to larger efforts such as population surveys. Experience has shown that data collection for all districts and a selected number of facilities takes 5 to 7 weeks, at a cost of approximately 300USD¹ per district on average. In many settings where data is not available on what exists, or in environments where rapid scale-up is occurring, a tool such as the SAM can become an important component of a national health information system essentially used to monitor how services grow and geographically expand over time. This requires the periodic application of the facility questionnaire, something that can be linked to district supervisory visits.

¹ This average estimation of cost does not include technical assistance, with such assistance, the average price per district is closer to 900USD. However, once SAM has been fully tested and validated, it is expected that the technical assistance costs will be significantly reduced.

Chapter 1

Planning SAM

Learning objectives

- ▶ Know and use the checklist for making preparatory arrangements for SAM implementation
 - liaising with in-country focal points
 - facilitating a stakeholder workshop

1 | Liaising with in-country focal points

All countries will have an in-country focal point responsible for facilitating the initial stakeholder workshop and serving as the main contact person on this project. The focal point is usually within the WHO office, but can sometimes be from partner organizations, including the MoH.

Prior to initiating any work in-country, it is important to liaise with the focal point in order to begin the process of organizing a stakeholder workshop (next section). WHO/HQ has a list of focal points and can communicate the name and contact information of these to you.

Liaising with the focal point includes the following:

- ▶ identifying relevant in-country partners;
- ▶ establishing a date for the stakeholder workshop;
- ▶ working with the focal point to collect any additional data (GIS and other health-related information).

Identifying relevant in-country partners

Generally speaking partners include those groups, individuals, and/or organizations that are carrying out or planning similar efforts as well as those for whom the outputs of SAM will be of interest. These often include:

- ▶ Ministry of Health (i.e., National Institutes of Statistics, GIS units, HMIS, Health Services, and other public research institutions);
- ▶ Universities and other academic institutions involved in research;
- ▶ NGOs and other organizations involved in data collection;
- ▶ UN health-related organizations present in the country (i.e., WHO, UNICEF, UNDP, UNAIDS); and
- ▶ International funders active in the country (i.e., the Global Fund, government agencies for international development).

Points to consider:

- ▶ To identify all partners, it may be necessary to carry out a rapid mapping of persons and groups interested in and involved in similar activities within the country. A lot of this information will be known to the Ministry of Health, although it should be complemented by contacts to larger, non-governmental, organizations working in a given country.
- ▶ In many countries, other mapping activities may be planned or on-going, and this will require those interested in SAM to make certain that activities will not overlap and will complement each other. There is no reason why SAM cannot be linked with other similar activities, and doing so may result in greater buy-in from other partners.

2 | Facilitating a stakeholder workshop

Bringing partners together and mobilizing them around SAM is a critical first step towards successful implementation.

In terms of time commitment, one can expect about 5 days; this includes the workshop itself (3 days), plus 2 days for last minute preparations. Because you will most likely not be in the country during the planning for this workshop, these 2 days serve as a period when you can finalize any outstanding issues with the country focal point. It is also a period during which you can collect and bring together any other data that is needed for implementation.

Several background materials will need to be used during the stakeholder meeting. These include:

- ▶ project planning document;
- ▶ SAM overview presentation;
- ▶ budget template;
- ▶ SAM district and facility questionnaires.

A project planning document, outlining specific roles and responsibilities, as well as the partners taking these on, is a key background document for the stakeholder meeting that should be discussed and agreed upon prior to implementation. A project planning document is provided in **Annex 1**.

A SAM overview presentation is provided in **Annex 2**. This presentation can be used during the stakeholder meeting to present SAM, its objectives, methods and outputs. The presentation is meant to be adapted as required.

A budget template is provided in **Annex 3**. One of the desired outcomes of the stakeholder meeting is a budget for the entire implementation process. The budget template found in the annex can be used as a basis for discussion. The template will need to be adapted for each country, but it outlines all of the major activities and items to consider.

The two final documents that are required for the stakeholder meeting are the district and facility questionnaires. The stakeholder meeting provides an opportunity to begin the adaptation process of these. By this we mean the process of assuring that the questionnaires are understood, and that they cover

key issues. One of the essential steps in the adaptation process is that of assuring that the terms used in the questionnaire are widely used and understood. This is important as it means that respondents are more likely to provide better quality answers that address the key issues of interest. The questionnaires that should be shared with stakeholders and adapted are found in **Annex 4**.

Meeting objectives

- ▶ To inform country partners about SAM, its objectives, implementation, outputs, and uses.
- ▶ To explore methods of linking SAM with on-going or planned efforts.
- ▶ To come to agree and develop an implementation plan including a timeline and budget.
- ▶ To finalize the adaptation of the district and facility questionnaires.

Meeting outcome

- ▶ Creation of a SAM working group (or steering committee).
- ▶ Agreement on states for implementation.
- ▶ Implementation plan with timeline and budget.
- ▶ Adapted district and facility questionnaires.

Meeting agenda

Day 1 – large group

Topic	Focus	Facilitator Notes
SAM overview	Presentation	
Q&A	Group discussion and clarification of SAM	
Partner sharing of experiences	Panel presentations of some select partners with large scale initiatives; more general group discussion exploring other initiatives they are aware of	Strong facilitator needed in order to guide discussion: focus on linkages to other efforts and identification of potential information sources (for validation purposes)
SAM implementation	Group discussion on the process of implementation and how it can be applied in Nigeria. This includes going over the project initiation document and discussing the creation of a SAM working group.	Facilitator needed to focus discussion on the identification of states (up to 3) and major urban centers to work in, agreement on a SAM working group (including participants), and going over the project initiation document.
Outcomes of day 1:	SAM working group and completed project initiation document	

Day 2 – smaller group

Topic	Focus	Facilitator Notes
Q&A	Address any remaining questions regarding SAM (broad)	
Partner sharing of experiences	Panel presentations of some select partners with large scale initiatives; more general group discussion exploring other initiatives they are aware of	Strong facilitator needed in order to guide discussion: focus on linkages to other efforts and identification of potential information sources (for validation purposes)
Overview of working group responsibilities	Outline of working group responsibilities as well as expected outcomes from the group (short and medium-term)	Facilitator needed to guide discussion on short term goals (adaptation of questionnaires, implementation plan) and medium term goals (oversight of implementation with emphasis on supervision during field work)
Working sessions	SAM implementation plan	Facilitator with field experience needed
Working sessions	Adaptation of questionnaires	
Outcomes of day 2:	Clear understanding within the working group about what is expected of them during the remainder of the stakeholder meeting as well as during the implementation phase.	

Day 3 – smaller group

Topic	Focus	Facilitator Notes
Working sessions	SAM implementation plan (timeline and budget)	
Working sessions	Adaptation of questionnaires	
Outcomes of day 3:	SAM implementation plan with geographical scope of work, timeline and budget. Process for next steps (submission of proposal to WHO/HQ for release of funds, recruitment of field staff, and date for training).	

3 | Data requirements

Prior to implementation, it is important to collect any GIS and health-related data that is available in the country. The need for these is two fold:

- ▶ GIS information will facilitate the mapping and analysis process;
- ▶ additional data, particularly on human resources and the availability of HIV interventions will help validate the information collected by SAM.

GIS information needs

The most essential part of the HealthMapper is the core geographic database. This represents the collection and standardization of all known existing data of individual countries relating to the following features:

- ▶ administrative boundaries (national, sub-national);
- ▶ location of villages (including village names and codes);
- ▶ location/type of health infrastructure;
- ▶ location/type of school infrastructure;
- ▶ location/type of safe water points;
- ▶ population by administrative level (and down to village where available);
- ▶ roads, rivers, forests, elevation.

The geographic database is developed in collaboration with various national ministries of each partner country. The database integrates several multisectoral

datasets which were retrieved from variety of sources in country. The completeness of these data varies from country to country.

Before undertaking a SAM survey for a particular country, it is first necessary to check what core geographic data is already available in the HealthMapper. You can do this by consulting the WHO GIS resource site (<http://www.who.int/gisresource/>).

It is highly recommended to identify and collect as much of the core geographic data, including locations of villages, health facilities, updated boundary files as possible prior to the first SAM workshop. This will make the data collection and mapping process much more effective.

As a basic minimum, you will need administrative boundaries down to admin level 2, major towns, population estimates down to admin level 2, and a complete list of health of facilities. If this list of health centers has no geographic coordinates, it is recommended to obtain the lowest administrative boundaries down to admin level 4 or level 5 or a list of villages with geographic coordinates.

Proposed steps for collecting geographical data

The proposed process for collecting geographic data is as follows:

- ▶ Contact the Public Health mapping team at WHO/HQ or the WHO regional focal point in advance of the survey to receive information on existing data or possible public domain data sources.
- ▶ If no or limited data are available, send the “Questionnaire for the assessment of national GIS/mapping resources” to the in-country focal point. In the questionnaire, the focal point is asked to conduct interviews with or contact the national ministries and UN agencies to obtain easily available information about the GIS resources and existing databases in each of the relevant sectors/ministries.
- ▶ If geographic boundary map data has been identified, send a request for a the digital copy of the map, requesting a copy preferably in ArcView Shapefile format.
- ▶ If data on the geo-location of villages or health facilities has been identified, send a request for an electronic copy of the database (in dbf compatible format).
- ▶ Send a copy of the newly acquired data to the WHO regional focal point and the Public Health Mapping team at WHO/HQ for updating and consolidation of the regional and global data repositories

Health information needs

Many countries carry out in-depth assessments on their human resources and well as on the availability of specific material resources and interventions. In order to validate SAM information, as well as add to the existing information base, it is important to try to collect any data available in these areas prior to

implementation. This data should be sent to WHO/HQ where it can be incorporated into a database, and eventually compared to SAM.

Points to consider

- ▶ Partners who believe in SAM and are interested in seeing it succeed will mobilize their colleagues at every level, greatly facilitating the work for field teams as well as potentially impacting the quality of data that is collected. NGOs or private, for-profit, partners that are active in the provision of health services at the district level may facilitate the collection of information on the private, for-profit and not-for profit sector if they are involved and informed about the SAM from the very beginning, for example.
- ▶ If partners buy into SAM they may also be more willing to make financial or in-kind contributions to the process which again facilitates the work in the field.
- ▶ In settings where there are no planned or on-going mapping activities, or where it has been determined that SAM cannot be linked, it is still critical to bring partners together in order to come to a common understanding of what SAM is, why it is important, how it is implemented, and how information can be used. In all cases, SAM should be implemented based on a perceived country need for the information it provides. SAM is not a donor-driven effort, it is country-driven, and country-owned.
- ▶ The benefits of investing in a partnership building and partner mobilization process are numerous. These potentially include increased support and buy-in, as well as increased resources and greater confidence in data quality.
- ▶ At the decision-making level, having multiple partners will increase the likelihood of data use.
- ▶ Documents required for the stakeholder workshop outputs are included as annexes in the SAM implementation guidelines.

4 | Training requirements

One aspect of the SAM project is capacity building with a training on field data collection tools and a training on the HealthMapper when results of the survey are available. A number of basic facilities and equipment must be organized before training can begin.

Teaching equipment

For teaching, the following items should ideally be available

- ▶ computer (video) projector (to project trainer's computer to screen);
- ▶ screen for projector;
- ▶ large blackboard or white board;
- ▶ chalks for blackboard or marker pens for white board.

Room facilities

For the training on field data collection tools, it is essential that you ensure that the following are available:

- ▶ 1 Personal Digital Assistant (PDA) per participant.

For the HealthMapper training, you will need:

- ▶ 1 computer per participant (a desktop or participant's own laptop). If not possible there should not be more than 2 participants per computer. See Computer Hardware and software specifications in next section;
- ▶ multiple power points (adequate number to support the number of computers and participants);
- ▶ extension cables to allow for each participants computer to be plugged in;
- ▶ 1 colour printer.

Learner's equipment

- ▶ Copy of the SAM questionnaires.
- ▶ Copy of the SAM Trainer's Guide.
- ▶ Copy of the HealthMapper Learner's Guide.
- ▶ Notepad.
- ▶ Pen.

Participant profile

Public health professionals from a wide range of educational backgrounds can be accepted for training in this subject (medical doctors, statisticians, epidemiologists, programme managers, data managers etc). However, all learners should have a good knowledge of Microsoft Windows applications and if possible a knowledge of data management systems or spreadsheets.

If computer knowledge is relatively low, the period of training may need to be extended. On average, it should be possible to teach the contents of the learner's module in 3-4 days.

Trainers should use the Rapid Assessment of Participant Needs and Computer Skills to assess the level of skill of the participants prior to the workshop.

Number of participants

Ideally a training session should have a maximum number of participants of 16.

Chapter 2

SAM questionnaires

Learning objectives

- ▶ Become familiar with the layout and contents of the SAM district and facility questionnaires.
- ▶ Become familiar with those parts of the questionnaires where adaptation may be required.
- ▶ Become familiar with those parts of the questionnaires where special attention is needed to assure that interviewers know what is being asked.

The layout of the questionnaire differs between the PDA and paper-based forms. Paper versions of the questionnaires are provided even if PDAs are used for data collection. Although content is the same, teams should be familiar with both types of formats in order to be comfortable with administering the questionnaire. This is especially important as the paper version of the questionnaire provides more detailed instructions and introductory text which can facilitate the application of the questionnaire, particularly at the beginning of application when field workers may be unfamiliar with the questionnaires.

1 | The district questionnaire

Overview

Part 1: Availability of services and service providers

Part 1, "Availability of services and service providers", focuses on enumerating the number of staff and hospital beds available in a district. It also looks at the availability of key health resources including blood transfusion and laboratories services, communication and technology resources, injection practices and sterilization equipment. Finally, this section asks about fees paid for services as well as external funding received by donor organizations.

This part of the SAM questionnaire contains many topic areas. Within each topic area, the respondent is asked to estimate *the number* of different resources available and *the existence* of specific resources at the district level. Part 1 therefore is for the district as a whole; it does not request information for specific facilities within that district.



Sample questionnaires
are available as
Annex 4.



It is important in this section to use probing in order to make certain that the estimates of coverage are based on the actual situation, not one that is mandated by existing policies and guidelines.

Part 2: Estimated coverage of specific resources

Estimated coverage of specific interventions is addressed in part 2. Here, respondents are asked to estimate the percent of facilities within the district that have specific resources. These include staff trained in the integrated management of childhood infections (IMCI), neonatal health, malaria among pregnant women, and TB prevention among people living with HIV. Additionally, respondents are asked to estimate the percentage of facilities that have access to TB drugs and piped water.

Part 2 of the SAM district questionnaire contains 8 questions. For each, key informants are asked to estimate the percentage of facilities offering these interventions within the district.

Four coverage options are provided: none (the service or resource is not available in any facility within the district), less than 50% (the resource is available in less than half of the facilities in the district), greater than 50% but less than 100% (the resource is available in over half, but not in all, health facilities in the district), and all (100%, the resource is available in all health facilities in the district).

The resources that are included in this section include:

- ▶ staff trained in IMCI;
- ▶ staff trained in safe motherhood/lifesaving skills;
- ▶ staff trained in HIV/AIDS care;
- ▶ staff trained in HIV counselling;
- ▶ TB drug stock outs;
- ▶ drugs for TB prevention among HIV-infected persons;
- ▶ presumptive intermittent preventive therapy for malaria during pregnancy;
- ▶ access to improved water supply.

Part 3: Checklist of health facilities

The third part, "Checklist of health facilities" looks at *every* existing facility within a district and determines the availability of seven key health interventions. This section is *facility specific* and aims to identify where specific interventions are provided. For this section it is necessary to have as complete a list of existing health facilities as possible. Such a list is often available within the GIS departments of the Ministries of Health (MoH), or can also be requested from WHO's Public Health Mapping and GIS team. In either case, field teams should initiate this section by reviewing the list with the key informant in order to assure that all facilities are listed. If they are not, space is provided both in the paper forms to list the additional facilities. Time permitting, the field teams should attempt to go to these facilities and obtain their geographical coordinates. It should be noted that this section of the questionnaire is completed on paper, and later keyed into a computer.

Once a complete list is obtained, the interviewer asks about *each* facility, inquiring about the existence of the selected interventions. Currently, the selected interventions are:

- ▶ prevention of Mother to Child transmission (PMTCT);
- ▶ HIV counselling and testing;
- ▶ ARV therapy;
- ▶ TB treatment;
- ▶ 5 b. TB diagnosis;
- ▶ 5 c. TB diagnostic laboratory facilities;
- ▶ caesarean section;
- ▶ emergency blood transfusions;
- ▶ outreach.

District questionnaire with notes for trainers

Please see **Annex 5**.

2 | The facility questionnaire

Overview

Part 1: General characteristics

Part 1, "General characteristics", focuses on enumerating and determining the availability of basic resources. These include beds (in-patient, maternity, and delivery) and number of in- and out-patients seen in the last month. This section also asks about the availability of specific infrastructure such as improved water supply, communication equipment (telephones and radios), and computers for staff. The section ends by asking about the availability of guidelines for specific health interventions.

Part 2: General purpose equipment

Part 2 of the SAM facility questionnaire asks about the availability of general purpose equipment in a facility. This section is divided into two parts: one part that should only be applied in hospitals, and a second that should only be applied in any other type of facilities (i.e., health center, dispensary, or health post). All the questions are "Yes" or "No". For each piece of equipment or resource, the interviewer should also ask if it is functional or currently available; only when the equipment or resource is present, and functional, should a "Yes" response be marked.

The section specific to hospitals contains 8 questions, each looking at the availability of the following:

- ▶ X-ray machine;
- ▶ oxygen system or cylinders;
- ▶ autoclave for sterilization;
- ▶ infusion kits for intravenous solutions;
- ▶ operating theatre;
- ▶ anaesthetic machine;
- ▶ haemocytometer;
- ▶ cytoflowmeter.

Once the hospital section has been completed, the interviewer should proceed to Part 3 of the questionnaire; they should not apply the section specific to other health facilities.

The section specific to all other health facilities also includes 8 questions. These ask about the availability of the following:

- ▶ blood pressure machine;
- ▶ stethoscopes;
- ▶ clinical thermometers;
- ▶ weighing equipment for children;
- ▶ weighing scale for adults;
- ▶ microscope;
- ▶ latex gloves;
- ▶ refrigerator.

Once the section has been completed, the interviewer should proceed to Part 3 of the questionnaire.

Part 3: Injection and sterilization equipment

This part of the questionnaires asks specifically about the general injection and sterilization practices of a facility. This section, like the rest that follow, is the same for all facilities. Three questions are asked in this section, one asking about the most common type of injection equipment used, one regarding most common method for sterilization, and a final question regarding the availability of environmental disinfectant.

Part 4: Human resources

The fourth part of the SAM facility questionnaire focuses on the human resources available in a facility. For each cadre of human resources, respondents are asked to quantify the number that work in the facility as well as the numbers present on the day of the interview.

The cadres that are currently included in this section are:

- ▶ medical doctors/physicians;
- ▶ clinical officers;
- ▶ certified/registered midwives (including nurse midwives);
- ▶ certified/registered nurses;
- ▶ nursing assistants/aides;
- ▶ laboratory technicians/technologists;
- ▶ pharmacists and dispensers;
- ▶ HMIS personnel/records assistants;
- ▶ health service managers.

Definitions for each of these cadres are provided in the implementation guidelines.

Part 5: Trained staff

Part 5 focuses on the availability of staff trained in a number of health interventions. These questions ask the respondent to quantify the number of staff that has received pre- or in-service training during the previous two years. Pre-service training is training that is carried out in university or similar institution prior to the person becoming part of the health system, which is before they begin to practice. In-service training tends to be shorter, and is often carried out while the person is already working in a profession.

There are 10 questions in this part of the questionnaire. These ask about the number of staff trained in the following:

- ▶ IMCI;
- ▶ safe motherhood/life-saving skills;
- ▶ HIV/AIDS treatment and care;
- ▶ HIV counselling;
- ▶ infection control/universal precautions;
- ▶ diagnosis and treatment of malaria;
- ▶ adolescent sexual and reproductive health;
- ▶ drug and supplies management;
- ▶ HMIS;
- ▶ health services management.

Definitions for each of these areas are provided in the implementation guidelines.

Part 6: Drugs and commodities

This section of the questionnaire asks about the availability of specific drugs and commodities in the facility. Like Part 2, these are all "Yes" and "No" questions. Fourteen questions are asked, looking at the availability of the following basic drugs and commodities:

- ▶ injectable antibiotics;
- ▶ oral antibiotics;
- ▶ oral contraception pill;
- ▶ injectable contraceptives;
- ▶ condoms;
- ▶ iron;
- ▶ vitamin A;
- ▶ measles vaccines;
- ▶ first-line anti-malarial drugs;
- ▶ second-line anti-malarial drugs;
- ▶ antihypertensive drugs;
- ▶ magnesium sulphate;
- ▶ ergometrine;
- ▶ oral rehydration salts.

Part 7: Laboratory tests

This section of the questionnaire asks about the availability of specific laboratory tests in the facility. The interest here is in determining normal procedure for laboratory tests. For each laboratory test of interest, there are three options for respondents:

1. The test can be done-on site today (that is, specimens can be collected and a test carried out the same day).
2. The test can be done off site and results can be received within a few days time (that is, a sample is sent to a lab for analysis and results are returned to the facility).
3. The test cannot be carried out today (that is, a sample cannot be taken, nor can the patient be referred to another facility).

Part 8: Information on interventions available in the facility

The final part of this questionnaire asks more detailed information about the interventions available in a facility. For most interventions we are interested in knowing if they are provided by the facility and, if they are, how many people have benefited from them in the last completed month.

Currently, we are interested in knowing the following:

- ▶ HIV antibody testing- availability and number benefiting;
- ▶ ANC;
- ▶ HIV counselling to pregnant women;
- ▶ HIV antibody testing for pregnant women;
- ▶ PMTCT- availability and number benefiting;
- ▶ ARV therapy- availability and number benefiting;
- ▶ funding sources;
- ▶ smear microscopy for TB diagnosis;
- ▶ register of suspected TB cases;
- ▶ DOTS;
- ▶ HIV antibody testing for all TB patients;
- ▶ sexual and reproductive health services for adolescents.

Facility questionnaire with notes for trainers

Please see **Annex 6**.

Chapter 3

Preparing and training on the survey tools

Learning objectives

- ▶ Understanding how to prepare for SAM implementation in-country.
- ▶ Understanding how to build/customize data entry forms.
- ▶ Understanding how to use field data collection tools.
- ▶ Understanding how to use GPS

1 | Preparing for SAM implementation in-country

Several steps are required to prepare for country visits. Some of these are presented in Chapter 1: Planning SAM. Once you have already liaised with the in-country focal point, you can begin planning a visit to organize and carry out the stakeholder meeting and the training workshop. This is the first step in implementation and is discussed in "Facilitating a stakeholder workshop" in Chapter 1. This section therefore focuses on the next step, preparing for the training workshop.

The checklist below can help in guiding you through the process of preparing for the SAM training workshop:

- ▶ Liaise with country focal point to discuss objectives and desired outcomes of the workshop.
- ▶ Assure all preliminary information- GIS and other- are available and have been incorporated into the PDA
- ▶ Work with country focal point to assure all required logistics for the workshop are in place. This includes:
 - ➔ Venue for the training
 - ➔ Assuring all needed materials are available:
 - Participant notebooks including agenda and all training materials
 - Writing pads and pens
 - Computers
 - Multiple power point and extension cables
 - PDAs with Pendragon Forms already installed
 - PDA accessories: power cords, alternate power supply, memory cards, back up cards
 - GPS units with batteries
 - Pendragon software
 - HealthMapper software
 - Overhead projector

- Assuring all logistics are organized
 - Transport for participants to meeting venue
 - Per diem for participants
 - Hotel accommodations for all participants, if required
- Organize for field work during training
 - Organize car, petrol and drivers to take participants to sites
 - Obtain any required clearances to carry out the work
 - Charge PDAs and make sure the correct forms are installed
- Make time for feedback from field work
 - Address any issues participants may have
 - Make any changes to PDA forms as needed
 - Reinstall new form onto PDA, if changes/adaptations made
- Plan for logistics during field work (this is discussed in more depth in Chapter 4)
 - Get dates for field work
 - Establish who is going where, these are the routes field workers will take
 - Organize how supervisions will take place during the work
 - Assure all logistics are organized: drivers, per diems, any letters of introduction that are needed, and all materials (paper copies of questionnaires plus PDAs with correct forms and charging equipment)
- Agree on dates for next visit to bring all data together and plan the HealthMapper training

2 | Building/customizing data entry forms

Recent advances

Recent advances in Global Positioning System (GPS) and mobile technology facilitates rapid field data collection and transfer. With the introduction of Palm Pilots followed by pocket PC operating system, a new generation of handheld Personal Digital Assistants (PDA) have flooded the market. These handheld devices can be used with GPS receivers to collect information in the field. Once the location and attribute data have been collected, all the data can be imported in Geographical Information Systems (GIS) for mapping and analysis.

In addition, new mobile devices such as Tablet PC or smart phones can be GPS equipped and offer a larger choice of solutions for field data collection. New Tablet PC are now available in rugged versions and can be used for mapping applications in outdoor environment. Next generation mobile phones currently entering the market provide users with wireless Internet access and allow them to transmit real-time information on their precise location. With the availability of smart phones, new services are offered such as location-based services

(LBS). In these applications geographical data and processing are provided as a type of service over a wireless network connection.

Technological solutions

Considering the great number of GPS receiver models and manufacturers around the world and the recent development of new mobile devices such as Tablet PC, technological solutions for collecting data in the field are many and varied. All those solutions can be divided in four categories:



Solution 1: GPS receiver and paper.

This solution is the cheapest and is already used by different programmes to map and track infectious diseases at community level.



Solution 2: PocketPC and GPS.

This solution is based on Windows CE operating system and ArcPad as the data collection software.



Solution 3: PalmPilot and GPS.

This solution is based on PalmPilot operating system and Pendragon Forms as the data collection software.



Solution 4: Tablet PC and GPS

This solution is based on Windows XP operating system and HealthMapper as the data collection software.

Technology recommended for the SAM

To achieve the objectives of the SAM it is necessary to use advanced technologies. Some technological solutions have been tested before starting the project and these guidelines recommend a solution which comprises the integration of a number of technologies:

- ▶ GIS
- ▶ Handheld devices also called Personal Digital Assistants (PDA)
- ▶ GPS

The paper questionnaire is developed on handheld computers (Palm Pilots) using the Pendragon Forms software. Those mobile devices can be used together with a GPS (Global Positioning System) receiver to determine the latitude, longitude, and altitude of the health centres.



It is important that your palm device is configured with a full stop as decimal separator (in preferences/format/number - select 1'000.00)

Hardware and software requirements

The technical officer implementing the SAM should have access to a computer with the requirements below. In general, data managers will receive handheld computers to collect data during the survey. They are also required to bring their own laptop computers provided they comply with the specifications below.

Computer Hardware specifications

- ▶ Windows 98/ME/2000/XP/NT 4.0 with 32MB RAM (64MB for Windows NT 4.0/2000)
- ▶ 500 MB Hard disk space
- ▶ CD-ROM drive for installation

Software specifications

- ▶ HealthMapper 4.2
- ▶ Palm HotSync Manager software version 4.0 or higher
- ▶ Microsoft Access 97, Access 2000, or Access 2002/XP.
- ▶ Pendragon Forms 4.0

Handheld specifications

- ▶ Microsoft Access 97, Access 2000, or Access 2002/XP.
- ▶ Palm OS device running Palm OS 3.5, Palm OS 4.0 or higher recommended.
- ▶ Devices manufactured by Palm
- ▶ 16 or 32 MB memory. Palm OS form application size: approximately 350KB (0.35MB). Each record is typically 64 bytes per field. Size needed for 100 records will be approx. 2000 KB.

You will need the SAM installation CD to install some software listed above. This SAM installation CD should contain the following directories:

- ▶ Software : Pendragon and Palm HotSync
- ▶ Databases : Pendragon databases with forms for the SAM
- ▶ Documents : SAM trainer's Guide
- ▶ Presentations : PowerPoint presentations of the project

Pendragon forms overview

Pendragon Forms is a commercial software used to easily collect data with handheld computers running the Palm Operating System. Pendragon Forms

applications are used to design the SAM district and facility questionnaires on PDA.

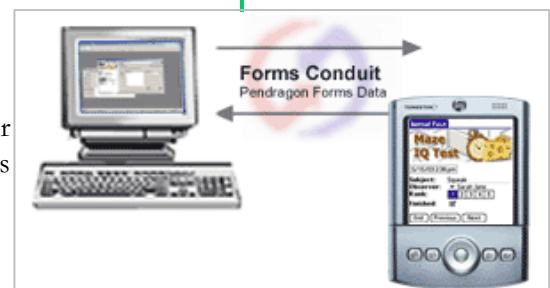
This software consists of a desktop form designer and database, a synchronization conduit and the handheld forms applications. For more information, you can visit the website <http://www.pendragonsoftware.com>

Desktop Designer & Database

The Desktop Forms Manager is an Access 97/Access 2000/2002 database application that includes a Form Designer and tools for viewing, managing and exporting data.

Synchronization Conduit

The Forms Conduit is a bridge between Forms on your desktop and Forms on your handheld device, and it runs during each HotSync data transfer.



Handheld Application

The Forms Runtime runs your Forms applications on the handheld enabling mobile workers to easily collect data and view existing database records.

The Pendragon Forms Manager database desktop enables you to create a form design that can be sent to a Palm OS handheld. The Form Designer window in the Forms Manager allows you to choose from 23 different field types as you design your form.

Before a form is sent to the handheld, the form design is “frozen”. This creates a database table within the Forms Manager for storing all the records associated with that form design. Once a form is “frozen”, it can be distributed to the handheld.

After the Forms Runtime application is installed on the handheld, you can synchronize the handheld. The Forms conduit runs during synchronization to send form designs and data from the PC to the handheld, and to send data from the handheld to the Forms Manager database.

Pendragon Forms Manager (Desktop)

- ▶ Microsoft Access 97, or Access 2000/Access 2002(XP) support.
- ▶ Automatically generate Microsoft Access tables and form designs for data entry.
- ▶ Automatically generate a Pendragon Form from an external table or query (including ODBC).
- ▶ Map a form to synchronize with external databases or queries (including ODBC).
- ▶ Manage the list of authorized users.
- ▶ Assign users and forms to groups for large scale distribution (and revocation) of forms designs.
- ▶ Form Categories on the Desktop - manage large numbers of forms.
- ▶ Export to ASCII and Microsoft Excel.

Installing Pendragon forms

Installing Pendragon Forms consists of four steps:


- ▶ Installing Palm Desktop on your PC
- ▶ Installing the Pendragon Forms Manager on your PC.
- ▶ Installing Pendragon Forms on the handheld.
- ▶ Installing the Pendragon Forms database for SAM

Step 1: Installing Palm Desktop on your PC


- ▶ Close any applications not in use
- ▶ Start the setup program PalmDesktop41SP03ENG.exe to install Palm Desktop on your PC from the SAM installation CD in the software directory.
- ▶ Follow the instructions to install the Palm Desktop software and HotSync manager to be able to synchronise your palm with your PC.

Step 2: Installing the Pendragon Forms Manager on your PC

- ▶ Close any applications not in use
- ▶ Start the setup program depending on your version of Access from the SAM installation CD in the software directory.
- ▶ Pf4xp.exe - Microsoft Access 2002/XP
- ▶ Pf42k.exe - Microsoft Access 2000
- ▶ Pf497.exe - Microsoft Access 97

- ▶ A Pendragon Forms Installation dialog box will prompt you to choose which version of Microsoft Access you have, if any. If you agree with the default option, click OK. Alternatively, click the correct option, then click OK. If you do not have any version of Microsoft Access, then when prompted, choose a Typical installation.
- ▶ You will be prompted to enter the product Unlock Code. This code can be found in the document "Unlock code for Pendragon Forms.doc" on the SAM installation CD (software/pendragon forms folder). You can select any of the 11 unlock codes available.
- ▶ After installing the software, please restart your system.
- ▶ Click Start > Programs > Pendragon Forms 4.0 > Pendragon Forms Manager 2002. (If you have Microsoft Access 97 the program is called Pendragon Forms Manager.) You will be prompted to enter your Palm device user name (if you do not know what your Palm device user name is, tap the HotSync icon  on the handheld and the user name should appear in the upper right corner of the screen - if no user name appears, please name the device as you did in step 1).

Step 3: Installing the Pendragon Forms Manager on the handheld

- ▶ On the PC, click on Start > Programs > Pendragon Forms 4.0 > Install Forms 4.0 on Handheld.
- ▶ 2. A Select Palm User(s) window will be displayed. Click on the name of a handheld user (usually shows the name entered in step 1 and 2, then click the Done button. If you have a Pendragon Forms license code for more than one user, you can select more than one handheld in the list.
- ▶ 3. Perform a HotSync data transfer by clicking on the hotsync  icon on your handheld device. This will install the Pendragon Forms program (FORMS4.PRC) on the handheld. Tap the Forms 4.0 icon on the handheld to enter the Pendragon Forms menu. You can now begin creating forms.

Step 4: Installing the Pendragon Forms database for SAM

All the forms designed with Pendragon are stored in an Access database. Once you installed the Pendragon Forms Manager on your PC, this database is empty i.e. it contains no form design. You can replace it by another Pendragon database containing all the questionnaires already designed for the SAM project. To do so:

- ▶ If your Access version is 2000 or XP:
 - ➔ Overwrite the file "Forms32k.mdb" in the C:\Program Files\FORMS3 folder with the file "Forms32k.mdb" in the database directory of the SAM installation CD.
- ▶ If your Access version is 97:



Before starting step 3, make sure your palm USB cable is connected to your computer.

- ➔ Overwrite the file "Forms3.mdb" in the C:\Program Files\Forms3 folder with the file "Forms3.mdb" in the database directory of the SAM installation CD.

Creating a new form

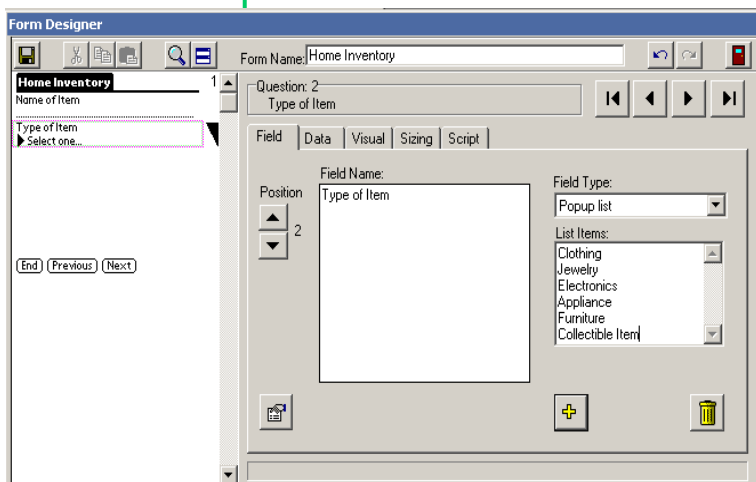
- ▶ On the PC, open the Forms Manager by clicking Start > Programs > Pendragon Forms 4.0 > Pendragon Forms Manager 2002. The Forms Manager window is now opened and can be used to design forms and view data.
 - ➔ To create a new form, click on the New button.
 - ➔ To edit an existing form, click on the name of the form listed in the Pendragon Forms Manager window to highlight it, and then click the Edit button.

Clicking on the New or Edit button in the Form Manager windows will display the Form Designer window.

The tabs in Field, Data, Visual, Sizing and Script, apply to the selected field in the Form Designer. By default, the field tab is selected. The most important tabs, that will be studied below, are the field tab and the visual tab.

The Field tab

- ▶ From the Form Designer window, you can design your form.
 - ➔ If you are creating a new form, fill-in **Form Name** field at the top of the window to name your form (*Home Inventory*) in the example below.
 - ➔ Click in the **Field Name** field and type the name of the first field of your form (*Type of Item* in the example below).
 - ➔ In the **Field Type** field, select the type of data that the handheld user can enter in this field (*Popup list* in the example below).



example below).



Click the button to add another field to the form.


Or, if you are on the last field of the form, click the button to create a field.



If you are creating a form with a lot of fields, click on the Save button in the Form Designer

window often, to save your work regularly.

There are 23 field types that you can use. Several field types require you to enter additional information. For example, a Popup List field, shown in the illustration, requires you to enter the options that you want the user to see in the Popup List.

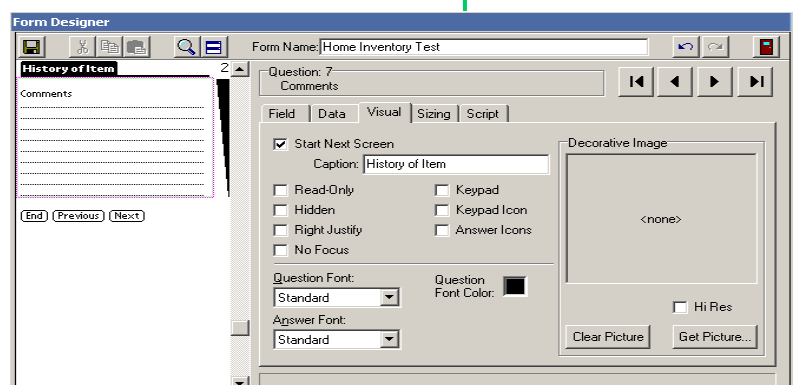
- ▶ As you add fields to your form design, the Preview Area on the left side of the Form Designer window shows you a preview of what your form will look like on the handheld.
- ▶ If your form design is several screens long, you can scroll up and down the Preview Area to find a particular screen.
- ▶ Click on a field in the Preview area to select that field to edit.
You can also use the  buttons to move from field to field.
- ▶ To re-position a field, click on the field in the Preview Area to select that field. Then click the Up or Down arrows to move the field to the previous or next position on the form.
- ▶ To insert a field in the middle of a form, click on a field in the Preview Area to select the field. Click the Plus button to add a new field after the selected field. Remember to type a field name and select a field type for the new field.
- ▶ To delete a field, click on the field in the Preview Area to select the field. Then click the Garbage Can button.

The visual tab

The Visual tab allows you to change the font for the question and answer components of the current field.

- ▶ If you want a field to start at the top of a screen, check the **Start Next Screen** checkbox on the Visual tab. In the **Caption** field, you can type an optional header for that screen. If you leave the Caption field blank, the default header is the form name.
- ▶ The colour and font of the question/answer can be personalised in this window

To save your form and exit the Form Designer, click the Exit button (at top right of the Form Designer screen) and choose Yes when prompted to save the form.



The data tab

The Data tab of the Form Designer window displays the Advanced Field Properties available for the selected field. If an Advanced Field Property does

not apply to a particular field type, it will be grayed out. Column Name, Primary Key and Max Length are Advanced Field Properties that must be set before a form is frozen, and cannot be changed after the form has been frozen. All other Advanced Field Properties can be set or changed whether or not the form is frozen.

The Column Name entered for the selected field should be exactly the same name as the column name used in the HealthMapper survey form.

The Primary Key can be a field or a combination of fields that uniquely identify a record.

A Required field is a field into which the handheld user must enter data and cannot leave the field blank.

The Display Key is used to display records on the handheld. When the handheld user chooses to review records on the handheld, a list of existing records is displayed on the handheld. The contents of the Display Key field of each record on the handheld is shown on the handheld. The Display Key is the district name for the SAM district questionnaire and the facility name for the SAM facility questionnaire.

The maximum length only applies to Text fields. If a form is going to be used as a Read-Only Reference form, the Max Length of all Text fields on the form should be set to the smallest value possible.

Designing the SAM forms

The SAM district questionnaire has to be adapted for each country. The full paper-based SAM questionnaire will need to be revised and approved before starting to design it with the Pendragon Forms Manager. Once the paper version is approved, you don't have to do it from scratch ; you can copy a form designed for a previous survey and adapt it as necessary.

1. Designing the SAM District form

- ▶ On the PC, open the Forms Manager by clicking **Start > Program Files > Pendragon Forms > Pendragon Forms Manager 2002**. The Pendragon Forms Manager window will open and can be used to design forms.



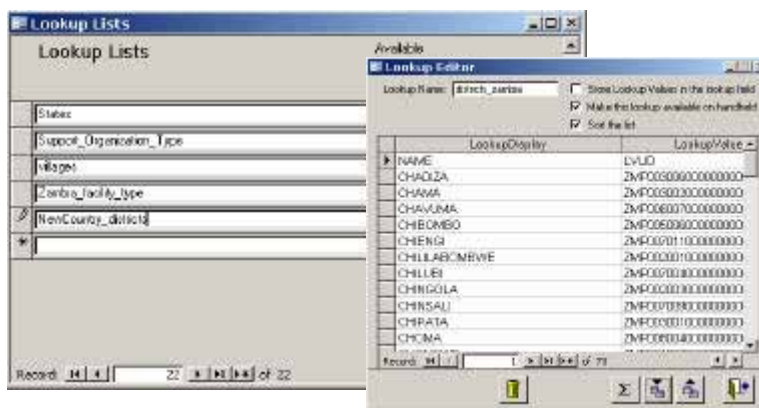
- ▶ Click on the form called "**SAM Zambia district**" to highlight it, and then click the **Copy** button. The system will create a new form with the same name followed by a *.
- ▶ Edit the copy of the form and change its

name to "SAM NewCountry district".

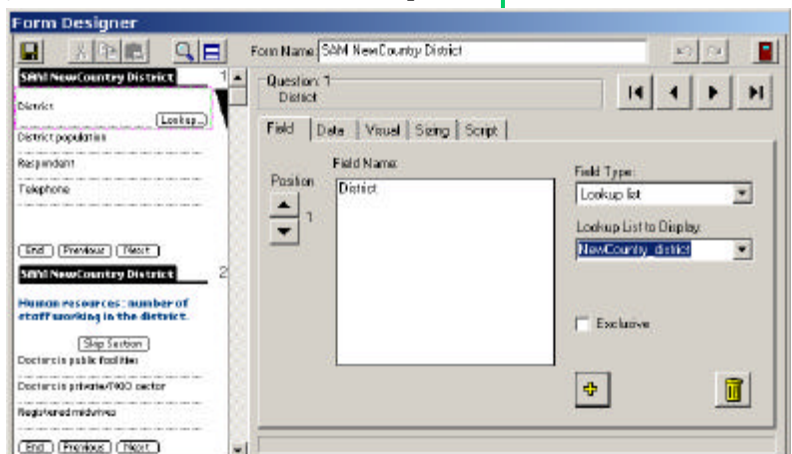
- ▶ Exit the Form Designer and save the modifications.
- ▶ The first thing to adapt in the form design is the list of districts. You can create a list of districts using Microsoft Excel. Open the file admin2.dbf from the HealthMapper country folder you are working on. Then, copy only the two columns Name and LvlID, paste them on a new Excel document and save the file as CSV.

NAME	LVLID
CHADIZA	ZMP003006000000000000
CHAMA	ZMP003002000000000000
CHAVUMA	ZMP006007000000000000
...	...

- ▶ Open the Pendragon Forms Manager by clicking **Start > Program Files > Pendragon Forms > Pendragon Forms Manager 2002**.
- ▶ Click on the **Lookups** button to view the list of districts available. You will now add the districts you have extracted from your healthMapper database.
- ▶ Put your cursor on the first empty field, name it and click on the **Edit** button to open the Lookup Editor window. From there, click on the **Import Lookup** and select the CSV file you have just created. Close the Lookup editor by clicking on the Close button.



- ▶ From the Pendragon Forms Manager window, click on the form called "SAM NewCountry district" to highlight it then click the Edit button.
- ▶ In the **Lookup List to Display** scroll-down list, select the lookup list you have just created.
- ▶ Click on **Save** to save your changes.



The next step will be to modify the form to be exactly the same as the paper version by adding or deleting fields.

- ▶ If a question is already in the form design you can change the field name but you must keep the column name.
- ▶ To add or remove a question, you can right click on the fields in the left side of the window.
- ▶ The most commonly used field types in the SAM District form are the Text, Numeric, Yes or No, Popup List or Lookup List. Use a lookup list when the display value will be different from the lookup value. For the estimated coverage for example the lookup list is defined as follows:

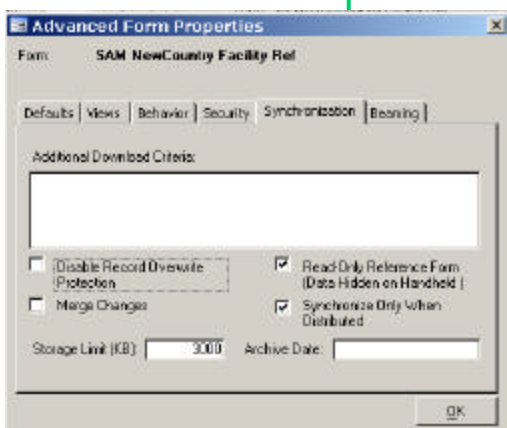
LookupDisplay	LookupValue
None	0
<50%	1
>50%	2
All	3

2. Designing the SAM Checklist of facilities form (Part 3 of the district questionnaire)

At the end of the SAM district questionnaire, there is a section with a checklist of health facilities in the district. The list has a number of columns corresponding to selected interventions. It can be entered in the Pendragon Form Manager as a new form with the complete list of health facilities. In order to display a list of health facilities or villages on the handheld, you need to create a special lookup to a read-only reference as it can display more than 1000 records.

To create a read-only reference form:

- ▶ create a form called "**SAM NewCountry facility ref**" with the following text and numeric fields:
 - ➔ Name: freeform text, display key, Max Length 50
 - ➔ District: freeform text Max Length 50
 - ➔ Type: freeform text Max Length 10
 - ➔ HMIScode: numeric integer
- ▶ Exit the Form Designer and save the modifications.



- ▶ In the Pendragon Forms Manager window, click on the form called "SAM NewCountry facility ref." to highlight it then click the Properties button. Make sure the checkbox "Keep a Copy of Records on Handheld" is checked.
- ▶ Then click the Advanced Form Properties button and click the Tab Synchronisation. Check the "Read-Only Reference Form" checkbox and "Synchronize only when distributed". Increase the storage limit depending on the

number of records in your list, for example to 3000KB. Delete the default Additional Download Criteria of Username = ##USERNAME## so that the Additional Download Criteria field is blank.

- ▶ Click on OK to go back to the **Form Properties** window.
- ▶ From there, click on the **Freeze Form design for distribution to handheld and create database** button.
- ▶ Freeze the reference form and click on OK to go back to the Pendragon Forms Manager window.
- ▶ From there, click on on the button **From ASCII** to import a list of health facilities from a CSV file (Excel file saved as .csv file - note that the Excel file needs to have columns identical to the fields created in the "SAM NewCountry facility ref." ; e.g. to follow the example above,

ProjectID	HerID	Username	TimeStamp	Name	District	Type	HMISCode
		No one	06-18 22:44:58	Bwamba	Chadcs	HC	300113
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300111
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300112
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300113
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300114
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300115
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300116
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300117
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300118
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300119
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300120
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300121
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300122
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300123
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300124
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300125
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300126
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300127
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300128
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300129
		No one	06-18 22:44:58	Chadcs	Chadcs	HC	300130

the Excel file will need the following columns: Name, District, Type, HMIScode.

- ▶ The system will ask you which username you want to use for the data you are importing, with "No one" by default. You can leave the default option and

click on **OK** to proceed.

- ▶ Select the .csv file you wish to import and click on **Open** to continue. The system will import the data and go back to the Pendragon Form Manager window.
- ▶ From there, you can view the data imported by clicking on the **Edit/View** button, which will open the form Viewer.
- ▶ The next step is to create a form called "**SAM NewCountry services**" with the following text and numeric fields:
 - ➔ Subform list with reference to "**SAM NewCountry facility ref**" (select field type "Subform list" from the drop-down list and type **SAM NewCountry facility ref** in the Subform list field box.
 - ➔ Name: freeform text display key
 - ➔ District: freeform text
 - ➔ Type: freeform text
 - ➔ HMIScode: numeric
 - ➔ PMTCT: yes/no
 - ➔ HIV counselling and testing: freeform text
 - ➔ ARV therapy: freeform text
 - ➔ TB diagnosis laboratory facilities: freeform text
 - ➔ TB diagnosis: freeform text
 - ➔ TN treatment: freeform text
 - ➔ Caesarian section: freeform text
 - ➔ Emergency blood transfusion: freeform text
 - ➔ Outreach: freeform text
- ▶ Make sure that the "column names" in the Data tab are identical to those created in the **SAM NewCountry facility ref**.

- ▶ Save your changes and close the **Form Designer** window to go back to the **Pendragon Form Manager** window.
- ▶ Click on **Properties**, and on the **Freeze Form design for distribution to handheld and create database** button to freeze the reference form. Click on **OK** to go back to the **Form Manager** window.
- ▶ To distribute the forms "**SAM NewCountry services**" and "**SAM NewCountry facility ref**", click on the form names to select them and then click on the **Distribute** button. Note this will have to be done one by one.

3. Designing the SAM facility form

- ▶ Click on the form called "**SAM Uganda facility**" to highlight it, and then click the **Copy** button.
- ▶ Edit the form and change its name to "**SAM NewCountry facility**".

Exit the Form Designer and save the modifications.

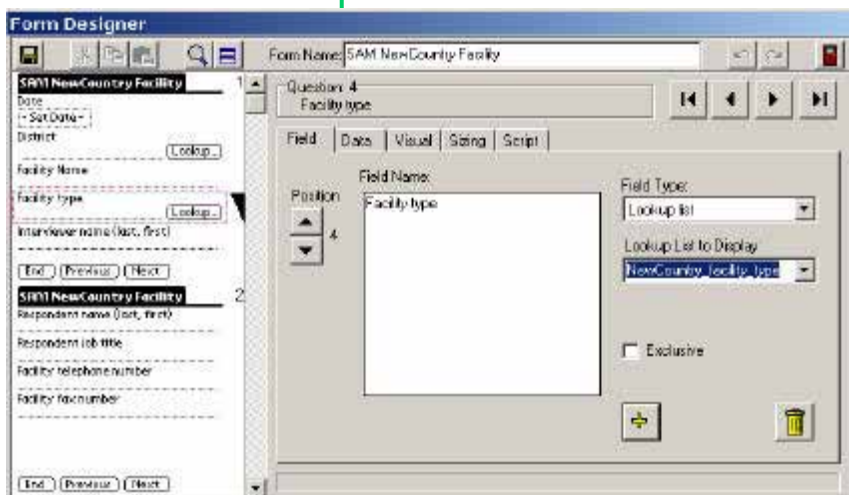
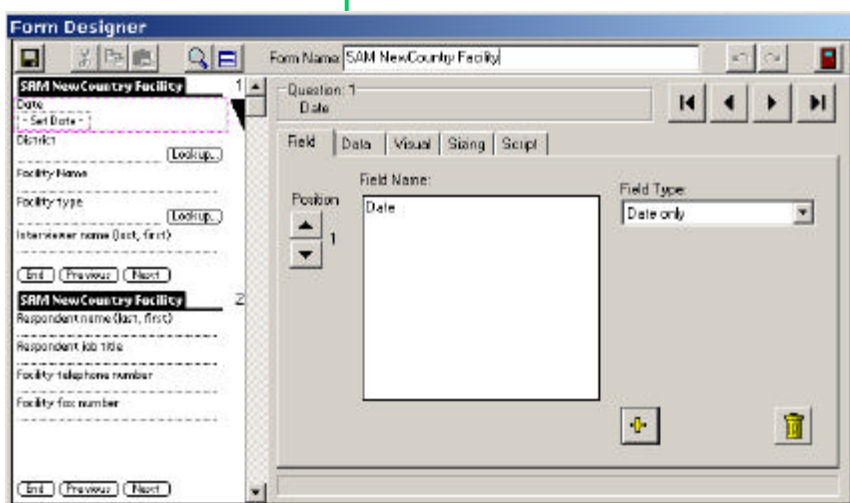
- ▶ In this form you will need to adapt the list of districts and the type of facility. You can create a list of districts and a list of facility type using Microsoft Excel and save the file as CSV.

- ▶ To make a new lookup, click on the **Lookups** button. Then, enter the name of the new lookup list and click on the **Edit** button. In the lookup editor window, click on the **Import lookup** button to import a list of districts and select a text file (CSV, TXT) containing the list.

- ▶ In the Pendragon Forms Manager window, click on the form called "**SAM NewCountry facility**" to highlight it then click the **Edit** button. Select the

field **District** and select the name of the new lookup list you just created in the **Lookup list to display**. Repeat this operation for the type of facility.

- ▶ Then, you will need to modify the form to be exactly the same as the paper version by adding or deleting fields. To add or remove a question, you can right click on one field.



- ▶ If a question is already in the form design you can change the field name but you must keep the column name.
- ▶ To add or remove a question, you can right click on the fields in the left side of the window.

Important rules in designing the SAM forms

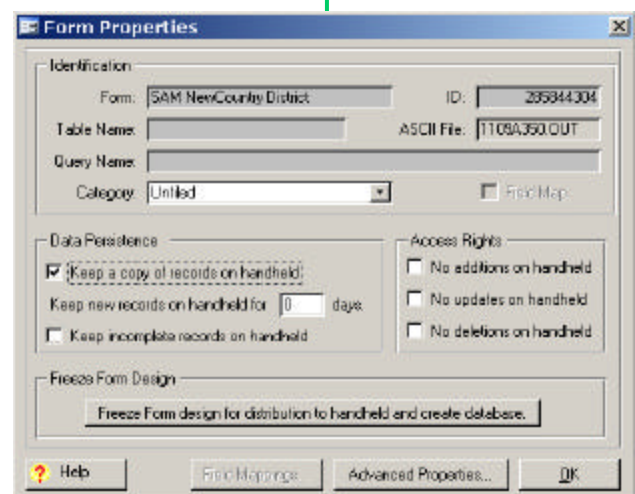
- ▶ Minimize the use of Text fields. If there is a question on your form for which there are several known responses, use a Popup List or a Lookup List field to let the handheld user select a response.
- ▶ For the **yes or no** question, always display the field as two individual boxes labelled Yes and No. It is recommended to put the No (N) as the default value.
- ▶ One field should be selected as a key and one as a display field. It can be the same such as the name of district for the SAM district questionnaire. This way users will not be able to enter duplicate records on the handheld.
- ▶ Before freezing the form, make sure it is identical to the paper version.
- ▶ Make the majority of the form questions mandatory to answer
- ▶ Use the list of districts from the HealthMapper database
- ▶ For a question previously defined in the form, you may change the field name but do not change the column name

Freezing the form design

The next step in the form design process is to select form properties and freeze the form design. Freezing a form design creates a database table within the Forms Manager database for storing all the records associated with a form. You cannot add, delete or move fields once the form is frozen.

To freeze a form:

- ▶ Click on the name of the form to highlight it, and then click the Properties button.
- ▶ In the Data Persistence section of the Form Properties window, choose how long you want to keep records on the handheld after synchronization.
- ▶ Check the Keep a Copy of Records on Handheld checkbox if you want the handheld to have a copy of the records after synchronization.
- ▶ Click the Advanced properties button and click on the Security tab. In the VFS Backup options (under the Security tab), you should choose **Use Backup if Available** if you want to back up data to



external storage media. It is highly recommended to use this option because when it is selected, then if the external media card is plugged into the handheld, every new record and every modified record for this form design will be written to the external media card in addition to being written to the Forms application in RAM on the handheld.

- ▶ To freeze the form design, click the **Freeze Form Design for distribution to handheld and create database** button.
- ▶ Once the form is frozen, the Table Name field in the Form Properties window displays the name of the database table that was created for storing records for this form. The ID field is a unique Form ID number. A form on the handheld has to match the Form ID on the PC for the form to be able to synchronize. It is therefore very important not to delete a form design from the PC if you are still using the form on the handheld. Click the OK button to close the Form Properties window.

Managing the list of handheld users

To distribute the form, the handheld device must be part of the users authorized by Pendragon Forms. To activate a multi-user code, click the Options button in Pendragon Forms Manager. An Environment Options window will be displayed. Click the Add button and enter the new multi-user code in the Add Multi-User Code window. This code can be found in the document "Unlock code for Pendragon Forms.doc" on the SAM installation CD.

In the Pendragon Forms Manager, click the Users button to add each additional handheld user to the list of active users. Enter the handheld user names and check the Active box. You will also need to add the users to a Default User Group by clicking the Groups button.

Distributing the form to the handheld device

Once you have frozen a form, the next step is to distribute the form to the



handheld device. Click on the name of the form in the Forms Manager window, then click the Distribute button. The form will be added to the Default User Group, and members of that user group will receive the form design on their next synchronization.

If this is the first form that you are sending to the handheld, make sure that the Forms application is installed on the handheld. To check that Forms is installed on the handheld, tap the Applications button on the handheld (the House

icon). You should see an icon for Forms 4.0 on your handheld screen. Once the Forms 4.0 icon is present on your handheld device, synchronize the handheld to receive your form designs.

IMPORTANT things to check before starting data collection

- ▶ If you don't see the form on the handheld, check the users list and the default user group in Pendragon Forms Manager. You should see the name of the handheld in the user list and the name of this handheld as well in the default user group.
- ▶ Enter a few records in the handheld and test the synchronization with your PC.
- ▶ Someone should be responsible for synchronizing handhelds with a PC and for making backups of the Pendragon Forms Manager regularly (Forms3.mdb or Forms32.mdb)

3 | Using field data collection tools (PDAs/ handheld devices)

This section shows how to use the field data collection tools. This section can be distributed separately to the staff collecting data in the field. During data collection process, it is recommended to fill in the paper-based forms as a safety measure. It can help to review and compare data collected from each medium.

Using forms on the handheld device

Starting the handheld

- ▶ To switch on your handheld press the on/off button.
- ▶ Tap the Forms 4.0 icon on the handheld or press the default button (cf. note on margin on default button) on your handheld to see the form designs that have been sent from the PC.



You can define a default button (microphone button, ...) to directly access the SAM forms. On your PDA click on "Preferences", then "Buttons". Select Form 4.0 for one of the button.

This is the pendragon Forms

Tap the Applications button to view the applications on the handheld.

Make sure that you are viewing all applications.

Make sure the battery is fully charged before you go to the field

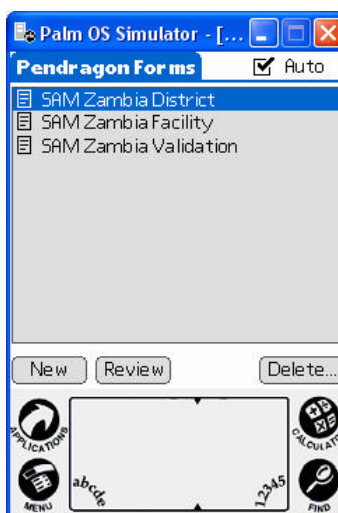
There are usually three types of forms available:

- ▶ Sam district: it corresponds to the district questionnaire
- ▶ Sam services: it corresponds to the last part of the district questionnaire (Part 3)
- ▶ Sam facility: it corresponds to the health facility questionnaire

Note that a Sam facility ref. form can be founded among the form: this is a none editable form use as a reference for the lookups in the other forms.

Entering new records

- ▶ To fill in a form, tap the name of the form then tap the New button. This creates a new record, that is, a new instance of filling in the form.



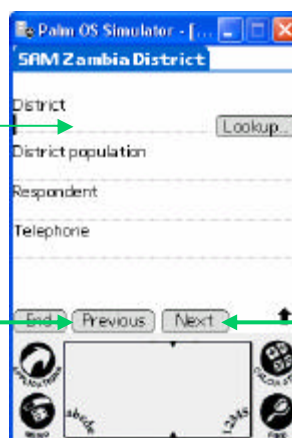
To fill in a form, tap the name of the form and then tap the New button



To display the keyboard on not expendable palm, click on the corner of the pad "abcd" to display the letters andd "1234" for numbers.

To fill in a field, tap in the answer part of the field, and then select or write your answer.

The Previous button takes you back to the previous screen. If you are on the last field of the form, tapping the Next button will exit the record and return you to the main Forms screen. You can also tap the End button to end the record and return to the Forms main menu. Note that if the key fields (district, health facility name,...) aren't filled a message will remind the user to do so.



If a form has more than one screen, tap the Next button when you are ready to move to the next screen.

Entering data for districts

SAM Zambia is used here as example.

- ▶ Tap the Forms 4.0 icon on the handheld or press the default button on your handheld to see the form designs that have been downloaded from the PC.
- ▶ To fill in a form for a new district, tap **SAM Zambia District** then tap the New button.
- ▶ Enter the name of the district by using the Lookup table then enter all information corresponding to the SAM questionnaire.
- ▶ To review the information for one district, tap **SAM Zambia District** then tap the Review button.

Entering data for facilities

- ▶ Tap the Forms 4.0 icon on the handheld or press the default button on your handheld to see the form designs that have been downloaded from the PC.
- ▶ To fill in a form for a new facility, tap **SAM Zambia Facility** then tap the New button.
- ▶ Enter the name of the facility by tapping on **SAM Zambia Facility Reference**. Entering the first letter/character in the lookup field displays a number of records that match the character. To refine the search enter the next letter/character of the record you are searching. Selecting a record in the list copies all the fields from the reference form to the new record (e.g. district, type, latitude, longitude,...). If the health facility is not found in the lookup table, you can type in the name and the district in the form as well as all the information related to the facility.
- ▶ To review the information for one facility, tap **SAM Zambia Facility** then tap the Review button.

Reviewing records

To modify an existing record, you need to review the records on the handheld by selecting the record that you want to modify. Records created on the PC and downloaded to the handheld for completion are considered existing records.

- ▶ To review records collected, tap the name of a form and then tap the Review button. A list of existing records for that form will be displayed.

- ▶ To determine which record to select, you can display up to two additional fields by tapping in the second and third column heading positions and selecting a field name.
- ▶ To search for a particular record, you can tap the Search button (zoom) and enter the first letters of the name or tap the Sort button and sort the records from A to Z.
- ▶ Tap on a record to select the record and make changes.

Important things to know when using the handheld

- ▶ Tap the Applications button (the House icon) to come back to the starting point with the handheld
- ▶ Review the records entered and make sure there is no record without name or records entered twice
- ▶ Check battery level before you go to the field
- ▶ Charge the handheld frequently (15 to 30 minutes by day) Don't leave the PDA with flat battery more than five days
- ▶ Never remove the memory card from the handheld

4 | Using GPS (handheld devices)



One the aspect of the SAM relates to the services offered in health facilities. If health centers are visited during the survey, it is necessary to collect the geographical co-ordinates of these centers with a GPS receiver in order to be able to represent them on a map.

In order to standardized data collection for health facilities the following protocol should be respected as much as the context allows it. It is important to remember that GPS devices should be used outside, in a large, open area that has a clear view of the sky.

For the selected districts of the SAM survey, each health facility of a village, town or city should be visited. By convention only health facilities which are "hard" build should be reported to ensure reliability of data over time.



When using the GPS device for the first time, it will take up to five minutes to find your location. After the first use, only 15 to 45 seconds will be needed to find your location, depending on the strength of the signals received.

Configuration of the GPS device

- ▶ Before starting data collection the GPS devices setting should be configured properly.
- ▶ Make sure that if the device had been previously used to collect data, the data collected be on a PC, the device empty and ready to be use.
- ▶ To ensure optimal compatibility with other layers of geographical information within a GIS, it is advisable to take the coordinates of a point in **decimal degrees**. The GPS device should be set-up as follows:

Position FRMT	Hddd.ddddd
Map datum	WGS 84
Units	Metric
North reference	Magnetic
Angle	Degrees

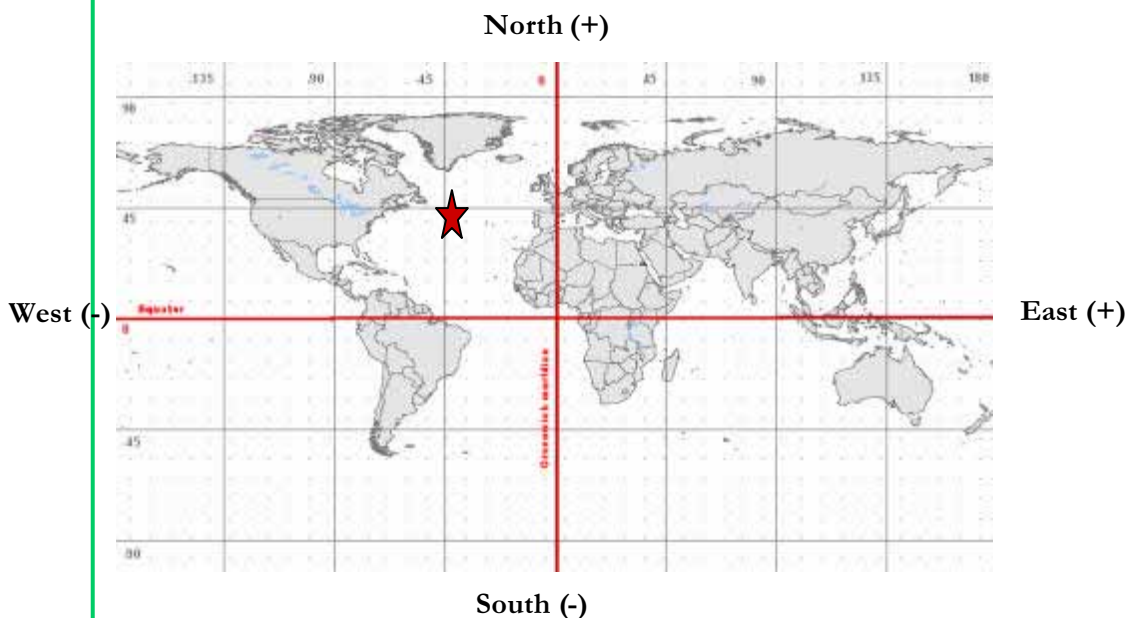
Collecting geographic coordinates

Once you have set-up the units on the GPS device you can use it to record the geographic co-ordinates of a point. GPS receiver can record in memory a certain number of points but it is recommended to report important information like the latitude and longitude or the name of the point on paper and/or on the PDA. To record the geographical co-ordinates of a point:

- ▶ It is necessary to be placed at the **health facility entrance** in a open area that has a clear view of the sky and hold the GPS receiver parallel to the ground.
- ▶ Make sure you get the message "Ready to navigate" on the GPS and the accuracy is lower than **20 meters**. In case you do not get the message "Ready to navigate", wait at the same place during 5 minutes.
- ▶ When the signal is sufficient (it is recommended to establish connection with four satellites) and the accuracy is good enough, you can record the point. You can report the co-ordinates latitude and longitude on the paper form and/or in the PDA.
- ▶ Switch off the GPS receiver once the point is recorded.

Latitude and longitude

Latitude is measured from the equator, with positive values going north and negative values going south. Longitude is measured from the Greenwich Meridian, with positive values going east and negative values going west.



So, for example, 45 degrees north latitude, 45 degrees west longitude, is +45 degrees latitude, -45 degrees longitude.

Note that the GPS device will display the letters N (north) or S (south) in front of the latitude, and W (west) or E (east) in front of the longitude indicate the position in relation to the Equator and to the Greenwich Meridian. Thus, based on location of the health facility positive (+) or negative (-) co-ordinates should be properly reported. On the example below, the coordinates will be displayed as follow on your device:

N 45.00000

W 45.00000

Note that the elevation will be displayed on the same screen and might be a useful information to note down as well

Check-list

- ▶ Check battery level and verify that devices are properly working.
- ▶ Check the setting of your GPS receiver (Hddd.dddd, WGS 84, ...).
- ▶ Have questionnaire for data collection ready to be used (paper form, PDA form, Excel from).
- ▶ Make sure to be properly placed for reliability of data collection

Report coordinates taking into account location to the Equator and Greenwich meridian.

- ▶ Make sure that all information relative to the collected point has been reported (names, coordinates, etc...)

Chapter 4

Field surveys

1 | Preparing field work

A good field work preparation is essential for a successful data collection. Several domains have to be considered:

Gathering and preparing the teams

Depending on the number of districts and/or health facilities to be surveyed, as well as the resources allocated, the total number of data collectors will vary from one country to another. Nevertheless, a team should be composed of two persons, having -if possible- some type of data collection experience and preferably working for the HMIS in the Ministry of health.

Prior to going to the field the teams will review the questionnaire and be trained on using the PDAs. During the training, a visit to the field should be organized. This will help the teams practice and getting use to the SAM questionnaire. It will also give them an opportunity to address any question and difficulties encountered prior to starting field work.

A clear list of daily tasks for each team should be established, including the districts or health facilities to visit.

To follow-up on data collection as well as for the record a list of the teams should be set-up with detailed contact of the data collectors.

In case of emergency, a focal point contact should be given to the teams

Equipment:

Each team will receive the following equipment to conduct the survey. Note that if PDAs are used, it is highly recommended that a paper version of the questionnaire be filled as a backup.

- ▶ Paper version of the questionnaire
- ▶ Pen and paper
- ▶ Hard support to write on
- ▶ Cover/information letter for the health officer to be interviewed and a legal authorization
- ▶ Calling card (for mobile phone)

If PDA is used:

- ▶ PDA uploaded with SAM questionnaire
- ▶ Memory card in palm
- ▶ Charger for PDA

Logistics

- ▶ A budget/or access to a copy machine should be planned to reproduce paper version of the questionnaire based on the number of units to be surveyed.
- ▶ Transportation, including availability of a driver as well as petrol for the vehicles should be organized before starting the data collection.
- ▶ Food and accommodation, in case of overnight stay in the field, should be provided to the data collectors.
- ▶ A briefing on safety issues in the field should be addressed if applicable

Conducting the survey

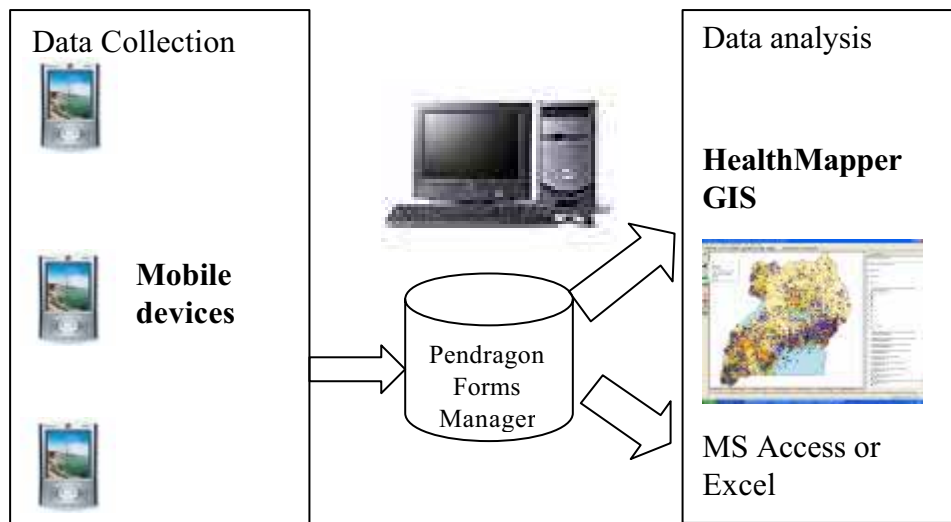
Prior to the survey health officers should be contacted and informed of the data collection. An appointment should be set up to ensure time efficiency for both the interviewers and interviewee.

The survey should take about an hour. Depending on access to information of the health officer and his/her availability it might take a little longer. However it is important to keep track of time in order not to effect the all timeline of the survey. If using the paper version of the questionnaire as well as a PDA, it is recommended that the person in charge of the paper form reads the question aloud. The question should be addressed in a clear manner.

2 | Synchronizing and processing data

Data processing overview

After data collection and analysis, results are displayed in the HealthMapper GIS. This mapping surveillance system is used to map selected key indicators that will allow planners at district or national level to plan and monitor service availability through mapping of facilities and services on a regular basis related to regular supervision and drug supplies.



Synchronizing data

To send your data from the handheld to the PC, you will need to synchronize the handheld. During this process, records which are created on the handheld will be sent to the PC, and records which are on the PC will be sent to the handheld. It means that the data transfer process is bidirectional.

Before starting the process, you must make sure that the handheld you want to synchronise is an active user for Pendragon Forms.

To synchronize the handheld, you need to do the following

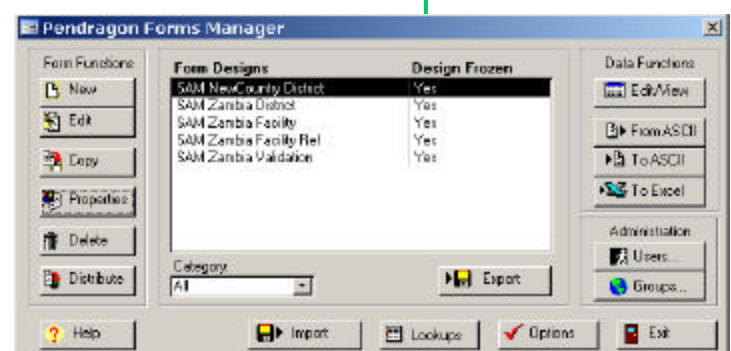
1. Connect your handheld to the cradle/cable.
2. Start HotSync Manager if it is not already running.
3. From the HotSync Manager menu, choose Local USB and/or Local Serial.
4. Press the HotSync button on the cradle/cable.

Note: The first time you synchronize a handheld, you must enter a user name in the New User dialog box. Every handheld should have a unique name. To prevent loss of a user's records, never try to synchronize more than one handheld to the same user name.

5. A progress dialog box should be displayed on your computer and handheld. You should wait for a message on your handheld indicating that the process is complete.

Viewing and Editing Data in the Database

During the synchronisation process, new records or changed records are uploaded to the Pendragon Forms database.



To view the results on the PC, open the Pendragon Forms Manager..

Click the **Edit/View** button to display the data associated with that form. An Access form is displayed to allow you to view and modify your data. Pendragon Forms adds four fields to the front of the database table for the program internal use: RecordID, UnitID, UserName and TimeStamp. With this additional information, you can check which user has entered a record and when it was entered.

LvlId	DistrictPopulati	Respondent	Telephone	HumanResourc	Docspublics
NYIMBA	80627	NICHOLAS MU	06 370088 / 063		1
MAMBWE	53902	CHARLES BAN	06 245078		2
CHONGWE	174126	Mr. Chongwe	01620023		2
KAFUE	242166	Mr. Mwila/Mrs.	01312031		5
LUANGWA	24369	Mr. Zimba	01415086		2
LUSAKA	1558616	Dr. Makasa	235554		22
MUFULIRA	140507	Dr. G. Mukupa	411202		22
NDOLA	391521	G. Phiri	681928		95
CHILILABOMBW	68620	Michael Zulu	383380		2
KITWE	410448	Dr. Kakungu Si	222682		65
MPONGWE	78841	Dr. T. Tembo	01 482039		1
MASAITI	100252	Mr. B. Maswan	760042		0
CHINGOLA	173406	Dr. W. Kanwek	311331		10
LUFWANYAMA	71359	Mrs. G. Phiri	731869		0
LUANSHYA	149090	Dr. P. Mulenga	512779		2
KALULUSHI	86190	Mrs. F. Sowi	732818		1
MUMBWA	163357	Dr Dube,DDH M	260 01 800197		4
SERENJE	144351	Mr Chilufya , DI	382097		2
KAPIRI MPOSH	244020	Dr Mwimuna	271192		1
MK1 ISHI	122812	Mr V. Silawwe	05 362017		2

The fields in the form appear as columns, and each record is a separate row. To edit a record, click in a cell and type your corrections. To save changes in a row, position the cursor outside of that row. To add a record, click in the blank row (the last row in the list of records.)

If you enter a new record it will be sent to the specified handheld during the next HotSync data transfer.

IMPORTANT: precautions to take during data collection process

- ▶ It is recommended that one user synchronize at least once a week if they are creating or modifying records on the handheld.
- ▶ You need to backup the Pendragon Forms Manager database regularly on your computer. It is stored in the C:\Program Files\Forms3 folder
- ▶ Never delete or change columns in the database table, or the form will not be able to synchronize to the database table.

Exporting Data for analysis

When all the data collected in the field is available on a PC, the next step is to do some analysis in a data management system. Data processing and analysis can be done in Microsoft Excel or in Microsoft Access. The database table can also be imported in the HeathMapper database.

Exporting Data in Microsoft Excel

To create a report, you can export the data to Microsoft Excel.

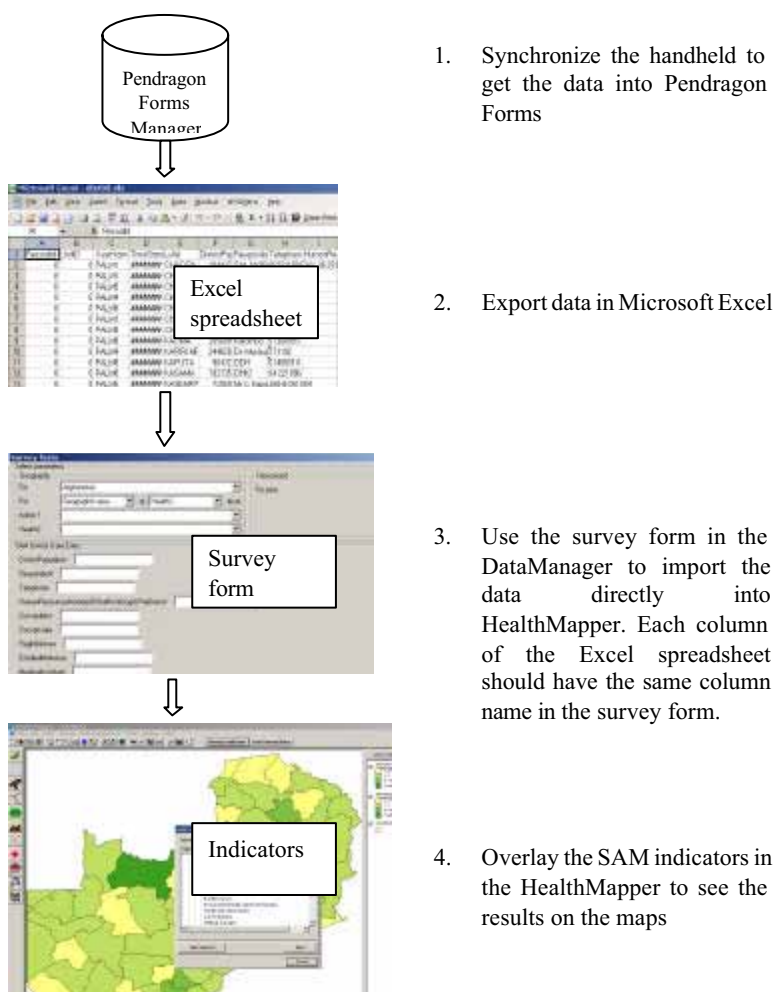
- ▶ In the Pendragon Forms Manager, click on a form to select that form.
- ▶ Click on the **To Excel** button to export the data to an Excel spreadsheet file. You will be prompted for a file name for the Excel Spreadsheet.
- ▶ After exporting the data to Excel, close the Pendragon Forms Manager. You can then open the Excel file and use Excel to create your report.

Importing data into HealthMapper

This section shows how to import data from Pendragon Forms into the HealthMapper database. You may use the DataManager version 4.2 to import the SAM survey data directly. A new function is now available to integrate more easily the data from a questionnaire into the HealthMapper Access database.

With this new function, you don't need to select each column from the external file and to make it correspond to a given indicator. You can import automatically a large number of indicators from the survey form. You can use Excel as the data file formats that can be imported into the HealthMapper.

Illustration of data flow



Importing survey data

The form designed for the SAM survey is available in the new version of the DataManager and you may use it to import your survey data.

To import SAM data in the HealthMapper, you can use the DataManager version 4.2.

- ▶ Click File/Import data/Import survey data
- ▶ Select the form you want to import data for and the geographic level (admin2 or health2)
- ▶ Select the country that you wish to import data for.
- ▶ In the Select file to import dialog box, navigate to the directory in which the file to import is stored, select the file type (e.g. database IV, Excel, Access) depending on the format of the file that you wish to import. Select your file and click on Open.
- ▶ The Import data dialog box will open. On the left of this window, you will see the Geographic attributes table which contains the attributes of Admin as they exist in the HealthMapper database. On the right, you

will see the attributes of the external table that is to be imported into the HealthMapper.

- ▶ In order to import the data, it is necessary to join the features from the External table to corresponding columns in the Geographic attributes table. The External data must match with the HealthMapper database either on name or external code. For the SAM survey and particularly for the health centers, it is recommended to use a code instead of a name.
- ▶ The results of the automatic join process will appear in the column Status for each admin name. Where the geographic names did not match (during the geocoding process), it is possible to edit the names in the external file on which the join is based. **You will now need to specify a year for your data.** The process will import each column that match the form definition.

At the end of the import process you can easily display the SAM indicators in the HealthMapper if you click on Overlay indicator button.

Customising the survey form and adding new question

If the SAM questionnaire has been adapted for a new survey with new questions, you will need to adapt the HealthMapper database using the DataManager. For each new question you will need to create a new indicator in the HealthMapper database and you will have to adapt the survey form as well.

Add a new indicator

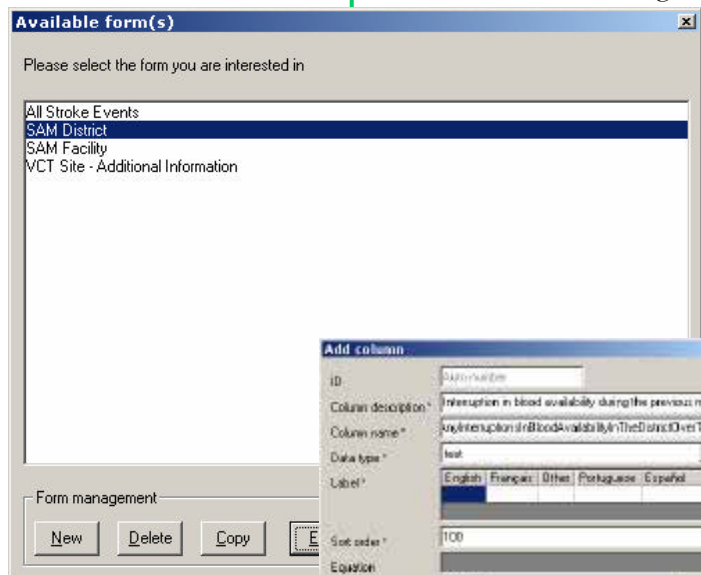
To add your indicators in the HealthMapper, you can use the DataManager.

- ▶ Click Start > Programs > HealthMapper > DataManager.
- ▶ From the Menu Bar, choose Define Indicators > categories > Indicator category manager.
- ▶ Navigate to the SAM category and ensure the indicator does not already exist.
- ▶ Move the cursor to the right side of the window and right click. From the pop up menu, choose **Create new indicator**.
- ▶ From the **Indicators** dialog box, click on the **New** button.
- ▶ For periodicity of the new indicator, select Yearly. For the type of value, you need to always select numeric. For the type of map display rendered, select Graduated color. Click on the Create Indicator button.
- ▶ When prompted "Assign this new indicator to the selected (sub) category?" click on Yes.
- ▶ Type in the new indicator name and definition if available. For example, you can add a new indicator concerning the interruption in blood availability during the previous month.

Add a new column in the survey form

Once all the new indicators are created, you can start to modify the SAM survey form with the DataManager.

- ▶ Click Start > Programs > HealthMapper > DataManager.



- ▶ From the Menu Bar, choose Update program data > Use survey forms.
- ▶ Select the form you want to edit
- ▶ Click the Edit button. A new dialog box is showing the list of fields for the selected form. To modify the form definition, you can delete, edit and add a column.
- ▶ Click the Add column button to add a new question to the form.
- ▶ Enter the column description and the column name. Note: the column name entered must be exactly the same as the column name used in your external file. The function will import each column from the external file that match the column name entered in this form definition.
- ▶ Select the data type either text or numeric. For a Yes/No question, the data type should be defined as text.
- ▶ Enter the label in one language or

more. It is the text of the question as it is displayed in the form design. Click on the text box and press F2 to edit the label.

- ▶ Enter the sort order. It must be a number corresponding to the position of the question in the form.
- ▶ Select a display set. Some answers in the questionnaire can have a defined set of values. For instance, the question on the interruption in blood availability during the previous month will have the values yes or no as possible answer and the values stored in the database will be 1 and 0. In this case, it will be necessary to select the Yes/No as the display value set.
- ▶ Select the indicator to feed
- ▶ Select the population subgroup
- ▶ Select the indicator display set which should be the same as the display set.
- ▶ Optionally you can also set the position of the question, the field size and the word wrap.
- ▶ Click on the save button

IMPORTANT things to know when importing SAM survey data into HealthMapper

- ▶ You can modify or copy the existing survey form for the SAM district or for the SAM facility questionnaire.
- ▶ Each column of the Excel spreadsheet you want to import should be the same as the column name in the survey form of the DataManager.
- ▶ It is recommended to use a unique code to join the tables from Pendragon Forms Manager and from HealthMapper.
- ▶ If the SAM questionnaire has a new question, you will need to add a new indicator and a new column in the form with the DataManager.

Chapter 5

Analysis and report

1 | The HealthMapper

The HealthMapper is an interactive information and mapping system designed for public health managers and decision-makers who need easy access to a database, reports, graphs, tables, spreadsheets, and maps. It was developed to simplify the use of GIS and mapping for public health and to help organize the collection, storage, retrieval, management, and analysis of public health data, at national and global levels. The mapping and information “package” consists of:

- ▶ a database of core baseline geographic, demographic and health information;
- ▶ a data management facility;
- ▶ a mapping interface.


It can support a range of roles in public health decision-making including:

- ▶ assessing resource allocation (health services, water supply, schools);
- ▶ determining geographic distributions of disease;
- ▶ identifying relationships and correlations;
- ▶ supporting planning and targeting of interventions;
- ▶ strengthening data collection, analysis and management;
- monitoring diseases and interventions over time.

The system is currently in operation to support a range of public health programmes in over 60 countries in all regions of WHO. It is increasingly being implemented at district levels to support multi-disease surveillance activities.

The full HealthMapper Learner's guide (parts 1-4) together with the HealthMapper quick installation guide are available as **Annex 7**.


2 | Using the HealthMapper to quickly display SAM data

The HealthMapper application offers My favorites  tool, which is a time-saving function that allows you to save and rapidly access commonly/frequently used indicators. It allows to display standardized maps for SAM indicators.



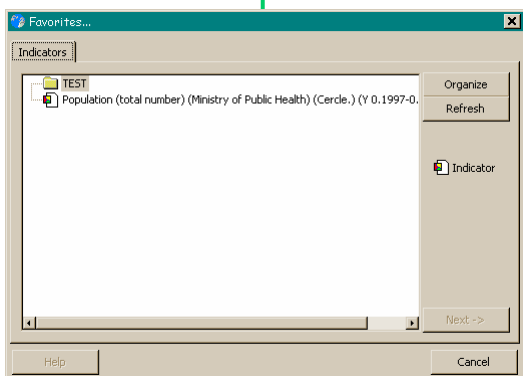
when using “My favorites” to display a map the only parameter that needs to be re-selected is the period

Creating a map using "My favourites" for SAM database

- ▶ Open the HealthMapper, start a new project and select the country of your choice.
- ▶ To display a map with an indicator saved in the favorites folder, click on the **My favorites** tool 
- ▶ View the **Favorites** folders, and double click on the SAM folder and sub-folders to display the list of favorite maps.
- ▶ Choose the map of interest by clicking on it to highlight it.
- ▶ Then click on **Next**.
- ▶ In the **Select time period** dialog box, choose the period for which you want the favorite map and click on **OK**.
- ▶ The favorite map will appear.

Create a new "My Favorites" folder

- ▶ If the SAM folder doesn't exist in My favourites or if you want to add a new folder it can be created as described below.
- ▶ Click on the **My favorites** tool. The HealthMapper favorites dialog box will appear.




- ▶ Click on **Organize**.
- ▶ You will be browsed to the **Favorites** folder path (default d: or c:\hmap\favorites).
- ▶ If this is the first time using the **Favorites** folder, it may be empty. Otherwise you will see a list of already created favorites folders.
- ▶ You can change the view of these folders by going to the menu bar, and clicking on **View/List** or **Details**.


- ▶ To create a new folder, from the menu bar, choose **File/New/Folder**. A New Folder icon will appear.
- ▶ Click on the New Folder icon/name to highlight it. Then from the menu bar, choose **File/Rename**. You will now be able to edit the name of the folder.
- ▶ Type in the new name of the folder. Click outside the box or press on **Enter** to finish.
- ▶ You can continue to create as many favourite folders in this way.
- ▶ Close the **Favorites** folder window and you will return to the HealthMapper **My favorites** dialog box.
- ▶ Click on **Refresh**. Your newly created folders will now appear.

- ▶ Click on **Cancel** to return to the maps. You will need to create and save maps to each folder.

Create a thematic map and save to “My Favorites”

- ▶ Click on the **Overlay indicator** button.
- ▶ From the **Indicators** tab, choose an indicator (e.g. SAM/Availability of services and service providers/Human resources/Doctors per 100,000) and click on **Next**.
- ▶ In the **Levels** tab, choose the **Admin.1** level and click on **Next**.
- ▶ In the **Time** tab, select **One time period**, choose the last year available, and click on **Next**.
- ▶ In the **Sources** tab, choose a source and click on **Next**.
- ▶ Click on **Finish**.
- ▶ If you want to change default settings (colour, symbology, etc.), first create the map, click on the **Layer properties** button, select **Edit legend** and change the colour scheme and class intervals as desired. Click **Ok** to exit.
- ▶ Activate the layer you want to save to **My Favorites** (e.g. Doctors per 100,000), right click on the **Legend area**, and choose **Save as favorite**.
- ▶ In the **Save as favorite** dialog box, browse to the directory where you want to save the data (c: hmap/Favorites).
- ▶ If you have not already created a new favorites folder as previously described, click on the **Create new folder**  icon.
- ▶ A new folder icon will appear. Type in a name for the new folder e.g. **SAM_Human resources**.
- ▶ Once the New Folder has been renamed, double click on it to open.
- ▶ In the **File name** box, the selection that you have just made will appear as default.
- ▶ If you want to change this, type in a new name of the saved favourite map e.g. **Doctors per 100,000**.
- ▶ Click on **Save**.
- ▶ The newly created map will now be saved to the Favorites folders according to the parameters selected (indicator, level and source) and you will be taken back to the map.

Retrieving a map from “My favorites”

- ▶ To retrieve a map saved in the favorites folder, click on the **My favorites** tool .
- ▶ View the **Favorites** folders, and double click on the folder of interest to view the list of favorite maps.



Avoid using any punctuation marks, commas, colons in the favorites file names. Do not change the file type name (.hfi)



when retrieving a “My favorites”, the only parameter that needs to be re-selected is time

- ▶ Choose the map of interest by clicking on it to highlight it.
- ▶ Then click on **Next**.
- ▶ In the **Select time period** dialog box, choose the period for which you want the favorite map and click on **OK**.
- ▶ The favorite map will appear for the newly selected time period.

3 | Producing the SAM output report

A standard format for the SAM report has been developed and is presented below. This format is intended to be a framework for the report, providing you with a brief description of what could be included (text and tables of other illustrations). This template is intended to guide the process of developing a final report, but it can and should be adapted based on country interest.

Report template draft outline

1 Executive Summary

2 Introduction

- ▶ Brief standard write up on the need for service availability data,
- ▶ Background SAM and Health Mapper

3 Method

- ▶ Brief description of SAM methodology in general; Health Mapper;
- ▶ Specific implementation in country: who did it, how, what districts were not visited, approach cities
- ▶ Integrating SAM with on-going and planned efforts
- ▶ Validation component: facilities in districts, external comparison with admin records etc.

4 National level

- ▶ This section lists the level and distribution of leading summary indicators of the SAM, and compares the results with other countries and international standards if available

4.1 Health infrastructure

- ▶ Table 4.1.1 - Number of hospitals per 100,000 population, distribution city - non city and by district quintiles
- ▶ Table 4.1.2 - Summary distribution of districts by level of water supply in any health facility; electricity; computer for the district director of health services; internet connection; cell phone; short wave radio
- ▶ Table 4.1.3 - Summary distribution of districts with key equipment: X-ray machine, oxygen, type of needles and syringes
- ▶ Table 4.1.4 - Blood transfusion practices

- ▶ Table 4.1.5 - Laboratory capacity: proportion of districts that have a lab with a lab technician, can do Hb, can do blood count, can do liver functions, can do glucose test, CD4 cell count
- ▶ Table 4.1.6 - Proportion of districts receiving donor support; proportion charging for a list of services

4.2 Human resources

- ▶ Table 4.2.1 - Number of health workers per 100,000 population (by type, also separate doctors and assistant doctors) and distribution city-non-city and by district quintiles, also all medical workers combined (doctor, ass.doctor, nurse, midwife); nurse doctor ratio
- ▶ Table 4.2.2 - Public private sector split if available.

4.3 HIV/AIDS

- ▶ Table 4.3.1: Number of facilities that provide ART, PMTCT and testing & counselling, and per 100,000 population; ART per 1,000 people in need of treatment; PMTCT per 1,000 HIV infected women; T&C per 1,000 HIV infected persons
- ▶ Table 4.3.2: Proportion of districts with 1, 2, 3 or more ART facilities (also for PMTCT, T&C)
- ▶ Table 4.3.3: Proportion of districts covered by social marketing of condoms; INH prophylaxis;
- ▶ Table 4.3.4: Percent of districts by level of coverage of HIV/AIDS treatment and care trained staff and counselling trained staff

4.4 Maternal and child health

- ▶ Table 4.4.1: EOC: Percent of districts with at least 10 midwives per 100,000 population; ability to do Caesarean section; emergency blood transfusion; proportion facilities with EOC trained health worker
- ▶ Table 4.4.2: Child health: Percent of districts by level of coverage of the IMCI training

4.5 Malaria

- ▶ Table 4.5.1: Malaria: coverage of districts by IPT social marketing, practices of intermittent preventive therapy (IPT) during pregnancy

4.6 Tuberculosis

- ▶ Table 4.6.1 (needs to come from facility specific listing): Number of facilities with TB diagnostic and treatment services per 100,000 population (to be developed)

5 District and regional levels

In this section all districts are grouped by region or province and data are presented by district and by province. For many variables it will be sufficient to show the maps. But in addition, a few tables:

5.1 Health facilities by district, including type

5.2 Human resources by district (attached separately)

6 Facility SAM: results from X districts

6.1 Method and issues in implementation

6.2 Comparison with district level information - summary of main findings

6.3 Results from the facility SAM - for each district there should be a standard summary that captures facility specific HR, absenteeism, training activity, health infrastructure status, equipment and commodities, drug supply, service availability and a few other things.

7 Data use: SAM results for decision making

7.1 Dissemination of results

7.2 How SAM results have been used.

Chapter 6

Data dissemination and use

Learning objectives

- ▶ Know and use the checklist for making preparatory arrangements for SAM dissemination workshop
- ▶ Know how to plan for SAM district roll out
- ▶ Become familiar with techniques for involving stakeholders and decision makers on using SAM results

1 | Preparing for SAM dissemination workshop

Information must be disseminated in order to be used, and a dissemination plan should be developed during the SAM planning stages in order to assure that adequate resources are allocated to this activity. It is important to make certain the right people receive SAM results, and it is important to note that these people may very well differ from those individuals involved in data collection. Essentially, SAM is a tool that facilitates decision-making, therefore those individuals at the national, district, and facility level that are responsible for making decisions around the service delivery package should be targeted. Additionally, in-country partners that are not necessarily directly involved in decision-making, but who may provide technical or financial support may also be included. A dissemination workshop bringing all of these stakeholders together is essential.

Such a workshop would focus on presenting the results, and discussing their public health implications. It should also be an opportunity for discussing roll out of SAM at the district level, as well as discussions about how the results will be used for program planning.

Checklist for preparing for the SAM dissemination workshop:

- ▶ Make sure all results are available
- ▶ Prepare presentation of results
- ▶ Work with in-country focal point on agenda and objectives
- ▶ Work with in-country focal point to assure all logistics are organized
- ▶ Prepare copies of preliminary or final report, either in paper or on CD

2 | Planning for SAM district roll out

Once results have been presented, there may be interest in pursuing SAM further. This process should begin by planning the stages for implementation. You should work with interested parties to identify a few districts where there is interest in implementing SAM as a monitoring tool. The next step will be budgeting for this, and facilitating the process of obtaining the required financial and material resources.

3 | Techniques for involving stakeholders and decision makers in the use of SAM results

This section of the trainer's guide requires further development and will be completed shortly. We anticipate that your feedback in this area will help us further develop this important part of SAM work.