Improving Service Availability Mapping (SAM)

Data Use and Dissemination

World Health Organization

Executive Summary

The aim of Service Availability Mapping (SAM) is to collect key information on the availability of health resources and interventions and use the results for operations and strategic planning and management. With a focus on the district level, maps and summary measures generated through SAM provide national and district planners and decision-makers with information on the distribution of services within the country; they also provide baseline monitoring information for increasing the provision of key services such as antiretroviral therapy (ART), prevention of mother-to-child transmission (PMTCT) of HIV, and testing and counselling of HIV/AIDS.

Given the amount of effort that goes into SAM in a country and the wealth of information generated, clear strategies for the use and dissemination of these data are necessary to realize their full value. The WHO regional office technical support staff and other information specialists assembled at the SAM Training of Trainers (TOT) meeting in May 2005 identified data use and dissemination as an area requiring substantial planning and attention prior to large-scale implementation of the SAM procedure. Key concerns regarding feasibility of SAM data use at all levels primarily involve the varied technical and analytical skill levels of staff at different levels of the health sector, thus highlighting the need for appropriate and effective training. The primary objectives of the training workshops are to train decision makers and data users to interpret SAM results and to identify the types of decisions which they can use SAM to support. Learning and processing this information will occur most effectively through hands-on activities during which participants work as a team on problems relevant to their everyday work. Trainings should also facilitate participant understanding of the limitations of the SAM data. Detailed suggestions for structuring workshops and trainings at the national and district levels are provided.

Introduction

The WHO regional office technical support staff and other information specialists assembled at the Service Availability Mapping (SAM) Training of Trainers (TOT) meeting in May 2005 identified data use and dissemination as an area requiring substantial planning and attention prior to large-scale implementation of the SAM procedure. The principal concern was that tools such as SAM are only useful if both the demand for data among decision makers and the ability to use the data effectively are addressed concurrently. It was determined that SAM data should be disseminated at each level of decision making in a format appropriate to that level's specific needs, but SAM and other HIS tools will only be integrated into the decision making process if the information is easily understood and clearly targeted. This requires a detailed understanding of the unique challenges of receiving and using data at the facility, district, national and regional levels.

The Service Availability Mapping (SAM) project has developed robust strategies for data collection, but has less clear guidelines for data dissemination and use. Clear strategies for the use and dissemination of data are necessary to realize their full value, including the efforts that have gone into their collection. In order to better understand the challenges to effective data use and dissemination as well as potential techniques for addressing them, a series of surveys were conducted among SAM TOT participants, some querying the complete roster and others sub-groups of participants. This paper summarizes the results obtained from these surveys as well as a series of interviews with decision makers at the global, regional, national and district level conducted to identify the needs of potential data users. The annexes chronicle the survey process, which ultimately led to the decision to focus on data use at the district level as the most important priority for improving data use and dissemination.

SAM data use and dissemination

Effective use of SAM results requires not only that decision makers are informed and involved in the SAM process, but also that opportunities exist for policy makers and data producers/users to interact and discuss the most effective methods of disseminating results. The stakeholder workshop should include dissemination strategy planning that involves decision makers and data producers at the national and sub-national levels in an active process of analyzing, interpreting and using SAM results. Dissemination of results at each decision-making level should coincide with corresponding yearly planning cycles to ensure the incorporation of data into the process.

The national and regional dissemination workshops will largely determine the success of data dissemination and use in a country. These workshops are intended to foster discussion and planning regarding SAM results at all levels and should also serve as training modules to improve ability to critically analyze SAM data and to identify specific types of decisions that could be made using SAM results. All workshops should be held immediately following collection and cleaning of SAM data as their effective use and relevance to current policy depend on their timeliness. Workshops should be facilitated by both a data user and a policymaker in order to promote cross-communication between researchers and high-level data users and should be held immediately following data collection and cleaning.

National dissemination workshops

The objectives of the national dissemination workshop are the following:

- Allow stakeholders to view and discuss SAM results together
- Build country level capacity to use SAM data for decision making
- Facilitate planning of regional workshops for dissemination of SAM data to district and sub-district levels.

The capacity building aspect of the workshop should function as a training module to both assist with map interpretation and complement health management information system modules. Policy makers and data managers should discuss together the results of the SAM and establish corresponding action priorities based on them during the dissemination workshop.

Workshops should also include training in general data interpretation. SAM data should be used to establish priorities, plan investments, organize budgets and establish the national planning of resources. Skills that should be enhanced among decision makers and those who supply them with data include the ability to select data appropriate to the question being asked; define a geographic area for study; read and interpret maps, quintiles and various representations of the data; create and interpret various visual representations of the data (pie charts, bar graphs, etc.); and communicate and advocate for policies.

Building the capacity for more rapid dissemination of SAM results to sub-national levels should be a priority. Therefore, the national level data dissemination workshop should include opportunities for discussing the development of regional dissemination workshops for district and local-level decision makers. These workshops should pay close attention to how data may be packaged most effectively for users at each level, and, more importantly, focus on developing interactive training workshops intended to improve the data use and analysis capacities at the sub-national levels.

The national workshop is also the place to discuss additional national level information that may be needed to effectively interpret SAM results should also be discussed. Some examples include:

- Reference points for quantitative results such as target ratios or ranges for specific indicators (# of hospital beds per 100,000 population, etc.)
- Geographic, topographic, and infrastructure (i.e., road networks) barriers to access. Maps should address the influence of these factors on facility locations
- Distance between population centers
- Maps of income distribution or subsistence method where available
- Disease distribution surveillance data
- Caveats regarding the distribution of district level data. Individual indicators shown by district represent the average across the district as a whole, but there is likely to be great variation at the sub-district level
- Information on migratory patterns related to health seeking behaviour. Where are major health centres in the country and do they commonly receive patients from throughout the country as a referral facility?
- What additional context is there for the information in the map? Population prevalence of specific diseases? Financial accessibility and fee structures of facilities, etc.?

Regional and sub-national dissemination workshops

Regional dissemination workshops to distribute data to the district levels should be conducted in order to provide district managers with the same training and assistance that regional managers receive. Building the capacity for more rapid dissemination of SAM results to sub-national levels should be a priority. As much decision-making authority has been channeled to the districts through decentralization, districts should be able to process, analyze and interpret SAM results themselves. As such, these workshops should focus on illustrating the many health issues that SAM may be used to address at the sub-national levels as well as provide training in data analysis, epidemiological principals and evidence-based decision making. All levels would be better served if the central level moved into a supporting role and allowed districts to turn raw data into reports.

Survey results suggest that there is real interest and anticipation in receiving SAM results at sub-national levels. The timeliness of data dissemination from the national level down has been a problem, particularly as more districts implement SAM. It may also be difficult for national level staff to accurately interpret SAM results for each district. Until district level staff have the resources and technical capabilities to analyze, interpret and assimilate this type of information, it will not be translated into actions at the facility and sub-district levels. The quality and comprehensiveness of the information sent on to the facility levels therefore depends upon building district-level capacity to interpret and analyze data.

A key component of facility and local level data dissemination processes should include addressing ways in which SAM data can be passed along to the village, commune and facility levels. Districts and facilities may be in charge of facilitating the commune level process, and there are many models of community health development programs which may be adapted to the use of SAM and disease surveillance results. The community-managed health development programme is an approach in which communities gain ownership of their health and development so that villagers meet to identify and prioritize health problems, plan for selected priorities and request financial and technical assistance[1, 2]. Another approach, the Participatory Rapid Appraisal (PRA), also assists communities in identifying needs and assessing community satisfaction with services[3].

Making training more effective

One of the primary goals of the data dissemination workshop is training decision makers and data users to interpret SAM results and to identify the types of decisions which they can use SAM to support. Learning and processing this information will occur most effectively through hands-on activities during which participants brainstorm as a team and generate their own ideas about how SAM data can be used. Learning occurs best through the experience of doing the "work" of processing the data[4] . For this reason, training in the use of SAM results should be based on real world experiences and active learning projects that encourage participants' reliance on data. At the same time, such a workshop would also give data handlers the opportunity to brainstorm about the types of policy questions their data would be expected to answer. In this way, the workshop would give policy makers and data producers the opportunity to sample one another's thinking process and to experience the challenges faced by each in their daily interactions with data.

Training workshops should use proven adult education methods rather than traditional lectures to help participants learn by doing. They could be built around a case study that runs through several sessions intended to illustrate step-by-step the process of identifying program management questions, analyzing data for answers to those questions, displaying the data and planning how to act on the findings. Afterward, participants put all of these steps together for a final project in which they analyze data from their own districts. Ideally, participants work in teams to identify information needs for a concrete activity such as preparation of a health plan of the district, a project plan for an identified program/service (e.g., HIV/AIDS) or a hospital plan. This session may be used to introduce concepts related to information quality as well as to provide skills to assess the relevance, accuracy, completeness, timeliness and feasibility for data collection. The session should also facilitate participant understanding of the limitations of the SAM data.

The following are suggestions to target training modules at all levels:

- Survey district level records managers and data producers to assess their specific knowledge base and the information most useful to them in interpreting SAM results.
- Identify the specific problems caused by a system in which decentralization has placed the decision making process at the district level, but which has left the task of processing and interpreting data at the central level.
- How can references and global standards be used to improve interpretation of SAM measures? For example, what is considered a "good" doctor-patient ratio? What ratio do other countries or districts have?
- Develop examples of different ways of displaying the SAM data in maps and charts and resources for using and interpreting these presentations. As data dissemination workshops occur, gather examples from those working in the field who use and prepare maps and graphs.
- Develop examples of questions and decisions that are supported by the maps. These examples may be used in data dissemination training modules.
- Develop examples of map misinterpretation. How may the maps be misleading if other relevant information is not taken into account?

    - Example 1: a SAM survey in Uganda showed one district with an unusually high density of doctors relative to the rest of the country; further investigation revealed that respondents included student doctors in their estimation of physician number, thus inflating the number.
    - Example 2: a district with a large private hospital could potentially draw visitors from outside of the district, thus skewing the number of hospital beds actually available for the population the hospital is intended to serve.
- Pay special attention to methods of distributing SAM data to the private sector. Incorporate clear guidelines into the SAM strategy for involving the private sector in SAM dissemination procedures.
- Identify and collect examples of training workshops that are being developed for decision makers and data users in the use and interpretation of SAM results.

Practical challenges at all levels of dissemination

Dissemination workshops at the national and district levels will inevitably have to address practical challenges in dissemination. Although email capabilities generally exist at the national and central levels, country reports often must be broken into multiple sections for transmittal. A central website where SAM results can be displayed, manipulated and accessed by all relevant stakeholders would be useful, but not necessarily feasible at the district level where computer access is minimal or sporadic. Files could be sent via CD-ROM, but maps received in any electronic format remain problematic for districts as color printers are rarely available and black and white maps limit the amount of information that can be displayed.

Currently, hard copies of maps are being emailed or sent by courier to the district level offices. The disadvantages of paper include its propensity to be lost or isolated in a single person's office. Also, data transfer in paper form often compromises its quality each time it passes from one level to the next. And of course, paper distribution prevents recipients being able to manipulate the maps themselves.

Ideally, the SAM results for a given country would be available on a central website and district management offices would be equipped with both a functioning computer and a color printer to facilitate distribution of these results to the sub-district levels. In cases where color printing is prohibitively expensive, paper copies would be disseminated.

Conclusions

Clear strategies for the use and dissemination of data are necessary to realize their full value, including the efforts that have gone into their collection. A key aspect of effective data use is appropriate, targeted training in critical analysis of SAM data and the identification of decisions which SAM data could help inform. Building the capacity for more rapid dissemination of SAM results to sub-national levels should be a priority, thus addressing issues of both technical skills and resources at these levels will continue to be vital to the success of SAM.

References

1. P. Wright. *EBPM using evidence course: missing evidence exercises.*
2. P. Wright. and P. Mason. *Implementation of EBPM (Evidence Based Policy Making)* Presented at Evidence-Based Policy Making workshop in Vietnam.
3. L. Kapiriri, et al. *Public participation in health planning and priority setting at the district level in Uganda.* Health Policy and Planning. 2003;18(2): 205-213.
4. S. Orzeszyna. *Assignment report on service availability mapping (SAM) in Nigeria.* World Health Organization, 2005.

Annexes

Annex One

Survey One
Administered to: All SAM TOT participants

Purpose: The SAM TOT group determined broadly that there were definite challenges in data use and dissemination. A survey was sent via email to all workshop attendees in order to ask participants to identify in more specific detail some of the challenges that had prompted their observations during the workshop. Participants were asked to post their responses to a Sharepoint site developed during the SAM TOT for information sharing during SAM implementation processes. The goal of the survey was to gather introductory information about the data flow process in specific detail, to identify specific ways in which data handlers and policymakers could work together more closely, to identify training needs among policymakers and to identify ways in which policymakers might be induced to become more involved in the data collection process.

Survey One questions:

1. What do you feel are some of the most important challenges with respect to data dissemination at the facility, district and national levels?
2. What do you feel are some of the most important challenges with respect to data use at the facility, district and national levels?
3. What ideas do you have about how may SAM results be distributed to policymakers and other data users most efficiently? What kinds of questions should we ask policymakers and data users in order to find out what methods of data distribution and packaging would best encourage their use of the data?
4. Who in your regional office and bilateral affiliations do you feel will be using the SAM results and who do you hope will use SAM results in the future? (Example: Names, jobs and reasons for needing data)
5. What suggestions do you have regarding when and how to involve policymakers at the facility, district or national level in the SAM planning process? What would be the advantages and/or disadvantages of making policymakers more involved in planning for SAM?
6. What ideas do you have for enhancing the skill levels of policy makers and data users? What skills would you target? Who would you target (position title, etc.) with each intervention? Do you have examples of skills enhancement materials that you would be willing to email to me?
7. Please also suggest names of people in the data-use or policymaking process who would be willing to share their opinions regarding how data is used at different levels
8. If there is anything else that you think we should be asking in our effort to better understand how data is used by a country's different constituencies, please let us know

Results: No participants responded. It is thought that the questions may have been too general leaving participants uncertain how to answer Also, the survey was sent to all TOT participants via a single mass email rather than by individual emails, making it seem less personal or directed, and there was no incentive for response. Finally, the Sharepoint site was not well-used by TOT participants. Periodic visits to the site between mid-May and late-July showed little activity in any area, including the discussion site established for the survey.

Annex Two

Survey Two
Administered to: National-level data users

Purpose: The lack of success with the first survey suggested that questions should be made more specific and be targeted toward those directly involved with data use. Rather than ask regional level participants to answer broad questions about general data dissemination, it was decided to focus on the SAM as a case study and to target a first line of questions at national level recipients who are heavily involved in data use and dissemination, These individuals were sent a brief letter of introduction and the survey questions by email.

Survey Two questions:
(Questions were adjusted slightly depending upon the expertise of the recipient to whom it was sent.)

1. How does your country plan to use SAM data at the facility, district and national levels?
2. How will the data be distributed and packaged at each of these levels? Who will decide how the data will be distributed and in what form?
3. What do you feel are some of the most important challenges with respect to data dissemination at the facility, district and national levels? In other words, what are some things that make it difficult to distribute the data to the appropriate policymakers? What kinds of questions should we ask policymakers and data users in order to find out what methods of data distribution and packaging would best encourage their use of the data?
4. What do you feel are some of the most important challenges with respect to data use at the facility, district and national levels? What are some ways in which data could be used more efficiently? Are there particular skills that you feel would be helpful in the interpretation of SAM data?
5. How does your country plan to use the SAM data? In what format will you present SAM data and how will this vary with the facility, district and national levels?
6. Who among your regional office and bilateral affiliations do you feel will be using the SAM results and who do you hope will use SAM results in the future? (Example: Names, jobs and reasons for needing data)
7. What suggestions do you have regarding when and how to involve policymakers at the facility, district or national level in the SAM planning process? What would be the advantages and/or disadvantages of making policymakers more involved in planning for SAM?
8. What ideas do you have for enhancing the skill levels of policy makers and others in their use of SAM data and other kinds of data? What skills would you target?
9. Please also suggest names of people in the data-use or policymaking process who would be willing to share their opinions regarding how data is used at different levels.
10. If there is anything else that you think we should be asking in our effort to better understand how data is used by a country's different constituencies, please let us know.

Results: 61% of recipients responded either by email or telephone. The increased success of this survey is thought to be due to the personal email invitation and the follow-up phone calls, as well as the more focused nature of the questions. Nevertheless, responses to this survey discussed problems with data interpretation and distribution in general terms. Responses may have been broad because most countries had not yet disseminated SAM results, making speculation on the process difficult.

This survey round did generate strong support for development of an interactive stakeholder and data dissemination workshop to be integrated into the SAM implementation process. In particular, it was hoped that the dissemination procedure would combine active participant involvement in decision-making training, incluging review and interpretation of SAM results. Examples of training workshops designed to achieve these objectives were collected and are included in Annex XX.

Annex Three

Survey Three
Administered to: All SAM TOT participants (second attempt at follow-up)

Purpose:
The purpose of this survey was to obtain from the complete pool of SAM TOT participants additional information on challenges in data use and dissemination identified in the sub-group's survey responses.

Survey Three questions:

1. What will your role be in implementing the SAM?
2. What kind of data is needed, and how will the SAM help to fill that need at the central, district and facility level?
3. Have you had any discussions with policymakers regarding the SAM thus far? If so, what has been your interaction with policymakers with respect to SAM?
4. Do you normally have direct contact with the users of the other kinds of data you produce? If so, could you describe when and how you normally work with them? What are some of the challenges you face during this interaction?
5. In general, who uses the information that you provide? How do they use this information? (please answer with respect to national, district and facility level)
6. How does the SAM fit into the existing HIS of the countries where you hope to implement it?
7. What challenges do you expect to face in ensuring that the data from the SAM will be used (please respond with respect to the central, district and facility levels--but especially at the district level)?
8. What challenges do you expect to face in distributing the data from the SAM (please respond with respect to the central, district and facility levels--especially the district level)?
9. Who will COLLECT the SAM data in your region? (job titles and names if you have them) What is their education and experience? What other data do these people usually work with?
10. Who will PROCESS and ANALYZE the SAM data in your region? (job titles and names if you have them) Are they the same people who collected the data? What is their education and experience? What other data do these people usually work with?
11. Who will USE the SAM data in your region (please answer with respect to the central, district and facility levels--give job titles and names if you have them) Are they the same people who collected or analyzed the data? How will they use the data?
12. What types of data do decisionmakers use and in what format (please answer with respect to the central, district and facility levels)? What are some of your main considerations when you provide data to decisionmakers at different levels? (please be as specific as you can)
13. What kind of training will you have to provide to people at the central level and the district level in order to facilitate decisionmaking using the SAM data? What kind of support team is required in order to allow the decisionmakers to use the SAM data?
14. What suggestions do you have regarding when and how to involve policymakers at the facility, district or national level in the SAM planning process? What challenges do you face in making policymakers more involved in planning for SAM.
15. Please suggest names of people at the district level who are involved with data-use, analysis or decisionmaking.
16. What other questions should I be asking in order to find out about problems in data use or distribution at the district level?

Results:
This survey achieved a 50% response rate. Questions were more focused than in the first survey and were sent individually. Further, an initial introductory email was sent asking each recipient whether he or she would be

willing to complete the survey. The survey itself was emailed only after recipients had expressed willingness to complete it and included a deadline for its return.

Annex Four

Survey Four
Administered to: SAM TOT participants in direct contact with in-country data handlers at academic, national and provincial institutions

Purpose: The goal of this survey was to determine what specific training would be required to improve data producer and policymakers' abilities to interpret data. It was also intended as a basic troubleshooting tool for SAM to determine whether there were any obvious difficulties in interpreting the maps and charts. As the least was known about data use at the district level, this round of surveys was intended to potential problems that might arise in district-level interpretation of the surveys.
Survey Four questions:

Dear Respondent,

Thank you for agreeing to answer these questions! We really appreciate your feedback and would be very grateful to have your responses by **Monday, July 19th if possible**. Our purpose with this exercise is to learn the following:

How is data used at the district (and national) level?
What are some challenges in using and disseminating the data at the district level?

The following two maps and graph have been created using Service Availability Mapping (SAM), a rapid assessment tool for monitoring and evaluation of basic services availability at the district and facility level. The aim of SAM is to collect information on the availability of health resources and interventions, as well as to present that information in a manner that is convenient for use in strategic planning and management.

Many countries lack knowledge about the availability of basic services within their borders. This is a problem because donors who offer performance-based funding require countries to be able to report service availability as well as to monitor changes in services over time. Service Availability Mapping (SAM) is a tool used to collect information on the existence of specific health services within districts and facilities. The major advantages of SAM as an assessment tool are that it is inexpensive, quick, and results are immediately available so that SAM can also be useful for long-term monitoring of services distribution and scale-up.

Information for SAM is collected, processed and used at the country-level. This information is displayed visually in the form of user-friendly, color-coded maps. The maps are intended to provide a complete picture of the distribution of key health services and to highlight gaps between population density and the spatial distribution of health services within and between districts in a country.

We would like to find out how the method of distributing, displaying and using the results of SAM can be improved for use by data analyzers and decisionmakers at the district level.

The SAM procedure involves several steps. First, the questions from two standard questionnaires are modified according to country needs and entered into handheld PDAs (Palm Pilots). The first questionnaire is a district survey administered to all districts within a country, and the second questionnaire is a facility survey that is administered to all facilities within a chosen district. The district survey includes questions about human resources and the presence or absence of specific services and infrastructural components in the district. Meanwhile, the facility survey determines whether 9 specific services are offered within each health facility in chosen districts. Field workers administer the surveys to key informants at the district and facility level, and they enter the results into the handheld Palm Pilot.

After the responses to the district and facility questionnaires are collected and stored in the Palm Pilot, they are taken back to the country office and uploaded into a computer program called Health Mapper. Health Mapper is a software package developed by WHO, and it is linked to the Global Positioning Satellite (GPS). It contains a database which has all the geographic coordinates of each health facility. Health Mapper is used to produce the maps that show the distribution of key health services by district, as well as the distribution of services in facilities within the selected districts.

Directions:
The following two maps and one graph have been produced using SAM data. Please examine them and answer the following questions for **each one**. Please be as detailed as possible. We are especially interested in any information about how these materials would be used or distributed at the **district level,** but information about national or regional level use would also be of interest to us if that is more relevant to your own experiences.

A. Personal information:

1. *Please describe your role and experiences in data use and/or analysis.* (Example: what kinds of information do you work with, how do you use it; do you have experiences at the facility, academic, district, regional or national level; who are the people you receive information from and to whom do you give information (positions, names); what do you feel is your strongest area of expertise?)

B. Data Use--Please answer the following questions for each of the 3 figures that follow:

2. *Who would use this map (or graph) at the district level and how would each of these people use it? (Please give position titles and names if you have them.)*

3. *What are the challenges of using a map (or graph) like this for data analysis and for decisionmaking?*

4. *How could this map (or graph) be improved for use at the district level by decisionmakers and data users?*

   For example:

   i. What information is lacking in this map (or graph) that a district-level decisionmaker who is examining it might want to know and how could this information be included?
   ii. Is this map (or graph) easily understood by everyone who would use it? Why or why not?
   iii. Are there problems with use of this map (or graph) for presentation of data? If so, what are they?
   iv. Are there data displays (other maps, graphs, bar charts and so forth) that might complement this map (or graph) or be a good alternative to this map (or graph)? If so, what are they?]

5. *What additional training requirements be necessary helpful in allowing people at the district level to* ***analyze*** *or* ***summarize*** *this data? If so, what types of skills and capacity building would you suggest? Are there any specific training modules that we could examine?*

C. Data Dissemination--Please answer these questions for each of the 3 figures that follow:

6. What would be the challenges in distributing this map (or graph) to the district level data user or decisionmaker?

7. What method and format would be best for distributing this map (or graph) at the district level?

D. Implementation

8. Is the presentation of health services availability data through these kinds of maps something that your district or institution would find useful? Why or why not?

9. If you are working at the country or district levels, would you have the human resource and computer capacity to undertake health services availability mapping (SAM) if you were given other necessary resources? (The World Health Organization Headquarters would provide resources such as Personal Digital Assistants (PDAs), Global Positioning Satellite (GPS) units, Pendragon software, training and other necessary assistance.)

Results:
Eight of 26 recipients (31%) responded with completed questionnaires. The major observation from this survey was that much work is being done at the district level to increase capacity building, and there are many examples of district level evidence-based decision-making workshops available.