

# Data Demand and Information Use in the Health Sector

## Conceptual Framework

MEASURE Evaluation

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## About MEASURE Evaluation

MEASURE Evaluation works to strengthen the capacity of host-country programs to collect and use population and health data.

As a key component of the Monitoring and Evaluation to Assess and Use Results (MEASURE) framework of the United States Agency for International Development (USAID), we work closely with USAID missions to promote a cycle of data demand, collection, analysis and use to measure progress toward addressing and confronting disease, population issues, and poverty.

We help health ministries, district caregivers, and local trainees successfully manage data for better informed program planning and policy-making. Our guidance and technical innovations empower our partners to improve family planning, maternal and child health, and nutrition programs and to confront HIV/AIDS, STDs and other infectious diseases worldwide.

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# A Conceptual Framework for Data Demand and Information Use in the Health Sector

**It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.**

*Sir Arthur Conan Doyle, British mystery author & physician (1859 – 1930)*

This publication provides a framework for improving the use of information to guide policymaking, program design, management, and service provision in the health sector in developing countries. It is intended for health and information professionals who collect data and generate information (or develop tools to facilitate such practices) to improve their understanding of the role information plays in health system decision making. The approach proposed here is also relevant to stakeholders at all levels of the health system—from program managers, practitioners and policymakers to members of civil society, community groups and patients—to encourage more strategic and effective use of health data and information in decisions, whether routine or one-time, simple or complex, minor or critical.

The premise of this paper is that health data and information lack value unless they are used to inform decisions. As such, interventions that increase local demand for information and promote/facilitate its use (Data Demand and Information Use or ‘DDIU’ interventions) are critical to improving the effectiveness and sustainability of the health system.

In order to fully develop both an approach to DDIU and interventions to support it, we have produced three related documents. This paper, which comprises Part 1, lays out a framework for DDIU; defines the terms “information use” and “data demand;” presents basic principles; discusses possible determinants of data demand and information use in the health sector; shows how information is used in the program cycle and introduces a matrix for understanding the link between the generation of data and its ultimate use. Part 2 provides guidance and tools for integrating DDIU principles into activity planning, implementation and, ultimately, into evaluation. Part 3 presents a series of case studies that illustrate, from a variety of settings, cases where data and information have been used successfully or not used, as well as examples of how interventions have successfully changed how information is used.

## Background

Much has been written about using information for program decision making (Lippeveld, Sauerborn et al. 2000);<sup>1</sup> assessing routine health information systems and using the information they generate (Health Metrics Network 2005); and using information to guide problem identification and policy formulation,

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<sup>1</sup> Also see <http://www.cdc.gov/descd/ddm/Default.htm>. Accessed 4/20/06. “Data for Decision Making.”

implementation, and evaluation (Hardee, Feranil et al. 2004).<sup>2</sup> While there remain important challenges regarding the quality, timeliness and level of detail of available information, it is generally recognized that much of the data needed for decision making are already being collected on an on-going basis by national health information systems. While national health information systems vary from country to country, in their broadest sense, they include all sources of health information, encompassing vital events monitoring; service statistics and surveillance (maintained by health and other ministries); population and housing censuses; periodic surveys; national health accounts; and resource tracking (often under the auspices of other local institutions). Often these systems exist in countries with highly decentralized planning and service delivery structures; this introduces the need to address DDIU at many levels.

The concepts presented in this paper are predicated on the assumption that fostering *evidence-based decision making*<sup>3</sup> is the primary function of national health information systems and is vital to the effectiveness of the health system as a whole. Indeed, the ultimate goal of a national health information system is to “collect, process, report *and use* health information and knowledge to influence policymaking, program action and research” (AbouZahr and Boerma 2005, emphasis added). As noted above, evidence-based decisions rely upon data and information from a variety of sources (Box 1). Each source aspires to produce data that are transparent, consistent, verifiable, and understandable. We posit that access to and capacity to use information more frequently and effectively will lead to decisions that improve health by improving the health system’s ability to respond to health needs at all levels.

### Box 1. Essential sources of health-related information

1. Decennial census.
2. Continuous monitoring of births and deaths, with certification of cause of death.
3. Surveillance and response system focused on epidemic and vaccine-preventable diseases as well as on emerging diseases.
4. Program of household surveys designed to measure use of health care services and important household or individual behaviors.
5. System of service-generated data derived from facilities and patient-provider interactions.
6. Mapping of public health facilities and services at national and district levels.
7. Behavioral surveillance, focusing especially on risk factors.
8. National health accounts.
9. Financial and management information.
10. Modeling, estimates and projections.
11. Health research, including clinical, health systems and operations research.

Source: adapted from AbouZahr and Boerma 2005

<sup>2</sup> Throughout this discussion, “data” and “information” are often used interchangeably. Strictly speaking, “data” should refer to raw observations (e.g. number of births, number of deaths from AIDS, etc.) and “information” to the results of analysis or synthesis of those observations (e.g. fertility rates, mortality rates, etc.). Information should be used to guide decision making, which requires that appropriate and high quality data be collected and analyzed.

<sup>3</sup> MEASURE Evaluation (in addition to other MEASURE partners, such as DHS, CDC and the U.S. Bureau of the Census) is among many USAID-funded projects with the mandate to promote data use. For example, FRONTIERS for Reproductive Health provides assistance in using operations research findings to develop reproductive health policies and programs and collaborates with World Health Organization in an integrated strategy to strengthen capacity of local researchers and program managers in OR data use.

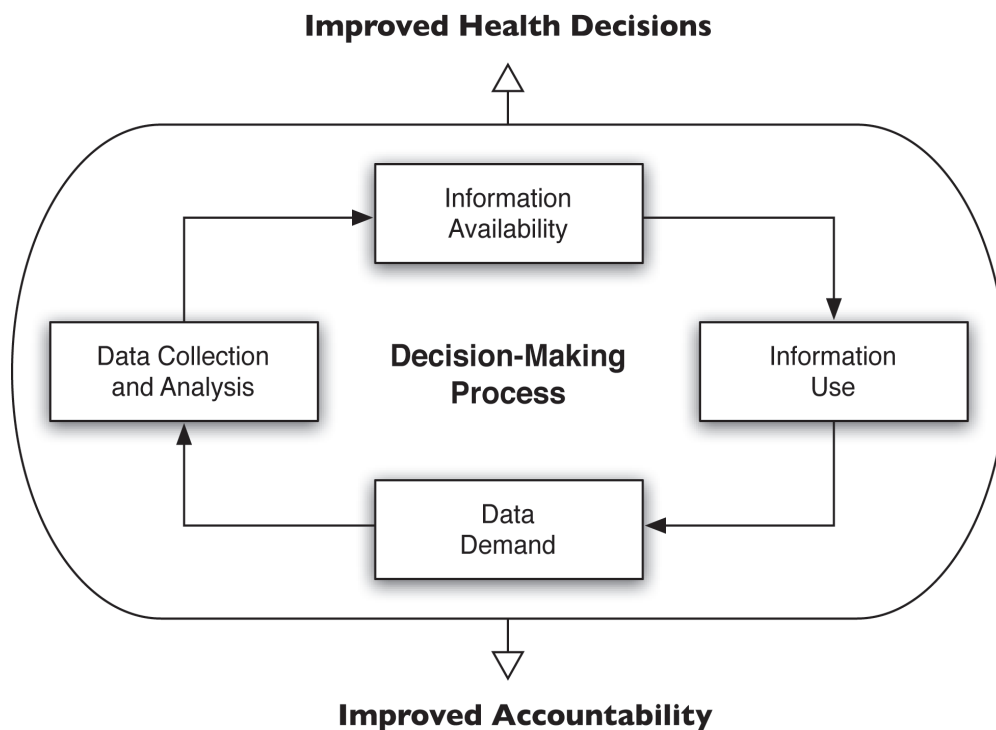
Another advantage of evidence-based decision making is that it promotes transparency in the decision-making process and allows for accountability of health decision makers (Scott 2005). When publicly available data and information are used for decisions, all stakeholders can (in theory) question the basis for such decisions and challenge public officials to defend their decisions. Better availability and use of information also permits improved accountability by allowing stakeholders and potential beneficiaries to monitor the outcomes of decisions. In this regard, the value of DDIU extends far beyond the health sector and, at its most fundamental level, is fully consistent with the aims and objectives of many public sector reform programs, and with the guiding principles of improved democratic governance.

### Conceptual framework for evidence-based decision making

Evidence-based decision making is enhanced by a sound demand for health information, the collection and analysis of health data, making information available to decision makers, and finally, from facilitating use of information to improve health system performance. (These elements of the continuum are supported through project efforts to build the capacity of counterparts and their institutions, and to build coordination and collaboration among data producers and consumers.)

Figure 1 presents a framework for DDIU as a cycle that connects demand to use through the intermediate steps of data collection and analysis and ensuring the availability of health information. In this framework a clear and consistent link exists between the use of health information and the commitment to improving the quality of data upon which it is based. The more positive experiences a decision maker has in using information to support a decision, the stronger will be the commitment to

**Figure 1.**



improving the quality and timeliness of data collection systems. This DDIU framework is presented as a cycle rather than a linear process, such that increased information use in turn stimulates greater demand for data.

Embedded within this cycle is the evidence-based decision-making process. The decision-making process involves *decision makers* and the *decisions* they make. To understand how information is used in this process, we present operational definitions of information use and data demand and consider the broader context of decision making in the health sector.

## Defining use and demand

### *Use*

We take ‘information use’ to mean that both positive *and* negative findings affect the decision-making process (Marin, Foreit et al. 2005).<sup>4</sup> A definition of use must, therefore, include the two key elements of this process: those who make decisions and the decisions they make.

A decision is a *choice* between two or more courses of action. In practice, not all choices are made consciously: the decision maker may not be aware that he/she is making a choice or even of what the alternative courses of action might be possible. The simplest choice is to do or continue with *X* versus not to continue with *X*; for example, to continue with a particular HIV prevention program or to suspend it.

For the purposes of DDIU, the definition of use includes awareness of decisions and choices. The decision maker must be explicitly aware of the decision he/she is about to make as well as at least two possible behaviors or courses of action to choose between. For example, if sales data from a program to provide insecticide-treated bed nets show that the program seems to be successfully increasing distribution of bed nets, the program manager may decide to maintain the program as it is rather than make any changes to it. Alternately, the manager may decide that based on information from similar programs elsewhere, the program could be even more successful if a new distribution mechanism were used. That would lead to a decision to try the new distribution strategy or to conduct operations research to test the new strategy compared to the existing strategy.

Two other aspects of use are also important:

1. Raw data are seldom useful for decision making and usually must be transformed into information that is usable and that relates to the issue being addressed. For example, it is not enough to know how many clients used services; comparison against a target or previous performance may be needed; and
2. Data collection/generation, its transformation into information, and its use in decision making may be done by the same person. However, they are more likely

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<sup>4</sup> As Marin et al. state “[T]he mark of a successful research program is one where both POSITIVE and NEGATIVE findings are used to make decisions.” A positive finding could be that a particular program works and is cost-effective (and hence may be a candidate for continued support or scale up); a negative finding could be that the program either does not work or is not-cost effective, and therefore might be terminated.

to be done by different people that have varying levels of understanding about each other's work (Yinger 2003).<sup>5</sup>

Information use is defined as:

Decision makers and stakeholders explicitly consider information in one or more steps in the process of policymaking, program planning and management, or service provision, even if the final decision or actions are not based on that information.

#### *Data Demand*

In order for stakeholders and decision makers to place value on information, they should have some incentive or motivation to use it. Demand is a concept distinct from use and it reflects, at least in part, a measure of the value that the stakeholders and decision makers place on the information, independent of their use of that information. For the purposes of defining demand, stakeholders actively and openly request information. They can also demonstrate that they are using information in one of the various stages as described above.

Data demand requires both of the following criteria:

1. The stakeholders and decision makers specify what kind of information they want to inform a decision; *and*
2. The stakeholders and decision makers proactively seek out that information.

In practice, it may be difficult to distinguish between *data demand* and *information use*, and one may choose to treat them as parts of a single process. Evidence of data demand could include managerial or policy directives to collect specific data, new or increased resource allocation for data collection and analysis (e.g., budget line items, establishing or strengthening statistical units inside ministries or programs, modifying job descriptions), and requests for special analyses.

## Underlying principles

Having defined data demand and data use, we list here seven additional principles or postulates that underlie our approach:

1. *Decisions are choices made in support of a goal.* We have defined a *decision* as a choice that is made between two or more courses of action. But choices must be seen in the context of the goals of those making or wishing to influence the decision. A *goal* is a desired outcome. For example, a goal can be to improve access to health services by an identified group or population. Or, it may be to reduce under-five mortality due to malaria.
2. *All decisions are made on the basis of some information.* While the emphasis of this paper is to increase the use of information for decision making, especially data emanating

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<sup>5</sup> For example, Yinger notes that analysts often consider that policymakers are too busy to read, reach hasty conclusions, initiate actions unsubstantiated by data, distrust survey and research findings, and have a limited perspective, and that the policymakers themselves should be responsible for drawing implications from the data.



from surveys and routine health statistics, we must recognize that *some* information is always used by decision makers in reaching their decisions. The actual information that is used may and will differ between decision makers. People daily make hundreds of decisions about things and in making these decisions they use information. The issue is whether they are aware of all the available information and are using it.

3. *Stakeholders will want different types of information depending on the goal they are intending to achieve.* This postulate underlines the fact that as goals differ so will the information that will be required to reach the supporting decisions for the goals.
4. *There can be multiple (and possibly contradictory) goals.* We also recognize that decision makers can have multiple goals, and that a decision taken to achieve one goal may have implications for another. For example, a country may seek to increase financial sustainability of its health care system while at the same time increasing access for the poor. A decision in support of the first goal may be to introduce a cost recovery scheme for certain services. If applied to all clients, this decision could impede achievement of the second goal if higher prices for health care lower use by the poor.
5. *Decisions can be made by a single individual or by a group.* It is also important to recognize that sometimes a decision rests with a single individual, but also that many decisions involve a range of stakeholders. Even if a single individual makes a decision, he or she may take stock of the views of others. What this means for using information in decision making is discussed next.
6. *Individuals will have different goals or different interpretations of the same goal even if they are involved in the same decisions. Consequently they may use different information to achieve the goal.* The different stakeholders involved in a decision may not have the same goals or objectives. This is the case in many “political” decisions, including healthcare decisions. For example, officials in the national HIV/AIDS council may have as their overall goal a reduction in HIV incidence, while people living with HIV/AIDS may be more interested in access to affordable treatment. In making resource allocation decisions on the use of HIV/AIDS funds, these stakeholders will differ in terms of their goals and, therefore, in terms of the information they would use.
7. *Stakeholders often differ in their views about the importance of what information is needed to make the decision.* How and what information feeds into a decision depends on how the decision maker sees the decision linked to the goal. Two stakeholders who view the linkages differently will use different information or interpret the same information differently. For example, if one stakeholder believes that socio-economic factors such as education are important to increasing the use of health services, he or she would emphasize the use of education data; another stakeholder may see availability of services as the more important determinant of use of health services. A corollary to this is that even when individuals agree on the same causal model and on the relevant information to support that model, they may not agree on what the data say about the model’s validity.



A consequence of the above is that there is no right or wrong way to use information and no single specification of what information is appropriate. Therefore, the audience for DDIU is not just those in a position to make decisions but also the full range of all stakeholders who can influence decisions. Thus, within the health sector the domain for DDIU is not limited to public sector decision makers. The facilitation of DDIU should ideally include stakeholders at high levels in government, technical advisors from non-governmental organizations (NGOs), religious leaders, journalists, opinion leaders, private sector managers, clients and family members, and others affected by a health issue (Hardee, Feranil et al. 2004). Some examples of stakeholders are listed in Box 2.

Scott (2005) also points out that factors other than data can influence decisions, especially in the public domain. They include:

- ❑ power and influence of sectional interests,
- ❑ corruption,
- ❑ political ideology,
- ❑ arbitrariness, and
- ❑ anecdote.

These are some of the primary constraints or cross-cutting factors that can undermine evidence-based decision making of the sort that DDIU is intended to foster and support. These factors are echoed in recent research conducted by MEASURE Evaluation. A district statistical coordinator in East Africa reported that “[T]o a large extent...most decisions [are] not based on empirical data, but focused on the narrow social, political and economic interests (Ikamari 2005).” While these are certainly not factors that contribute to evidence-based decision making, they are nevertheless understandable when viewed through the lens of the larger decision-making process. Hence, power, corruption and political ideology have to do with politicians’ goals that may not correspond to the goals that people may assume are those of decision makers, or that even the decision makers may claim to have. A minister of health may declare that his goal is to better public health but he may also have a hidden goal of consolidating political power by allocating funds to his constituents. Making arbitrary decisions means making decisions that are seen to be inconsistent. But the seeming arbitrariness may be the result of a hidden or unrevealed goal. Lastly, while the use of anecdotal information upon which to base decisions may not be scientific and can also be arbitrary, it is another case of individuals deciding what they think is relevant.

### **Box 2. Examples of Kinds of Stakeholders**

- Government ministers
- Central ministry public health directors
- District level public health officials
- Program managers
- NGO technical advisors
- Religious leaders
- People living with HIV/AIDS, and their families
- Women of reproductive age
- Adolescents
- Journalists
- Parliamentarians
- Donors

## The determinants of DDIU

In addition to considering decision makers and how they make their decisions, it is important to understand the context in which decisions are made and how this influences not only the demand for data and the use of information but also the collection and availability of data.

The PRISM analytical framework of health information system performance identifies three main determinants of the use of health information: the **technical** aspects of data processes and tools, the **behavior of individuals** who produce and/or use data, and the **system/organizational context** that supports data collection, availability and use (LaFond, Fields et al. 2005). This DDIU framework proposes that sustained and effective availability and use of good-quality health information is more likely to result from a strategy that focuses on all three fronts—technical, individual, and organizational—than a strategy focusing on one front alone. These three components of the PRISM analytical framework can be used to identify opportunities for and constraints to effective (and strategic) data collection, analysis, availability, and particularly use. Strategies to improve performance in this area can then be built along the same three parameters. These strategies will be the subject of Part 2 of the DDIU series.

### Technical determinants

A system without a sound technical design, well-trained people, and clear norms and standards cannot produce the information needed for making decisions. Consequently, the path to improving the use of health information focuses mainly on introducing or upgrading technical skills, changing the design of the data system, or revamping the technology used to improve the availability and quality of data. One East African respondent stated:

*“[I]nformation on the cost of ARVs was hard to get as there were no standards on cost reporting, and data collection varied from organization to organization. Charges also depend on whether one is using generic drugs or not. The packages agencies and facilities adopt also vary from providing ARVs alone, treating infectious diseases, nutrition care, etcetera.” (Ikamari 2005)*

Interventions often focus on these technological ‘nuts and bolts’ of the system (data collection and standardization, transfer, analysis, and presentation), where most health and information professionals feel comfortable.

Technical rigor is clearly needed in information systems; these essential elements and skills are at the core of an effective and efficient health information system. Nevertheless, technical interventions alone cannot translate into use of data on the ground. There are many examples of information systems where the indicators are sound, data collection forms are well designed, and people are well trained, but where neither data tools nor information itself are used routinely to manage health services, design programs or make policy. Too often, data collectors and users are not motivated to use the information system, or the organizational context undermines evidence-based health action. For example, in health systems that use normative rather than strategic planning, decision makers follow traditional patterns of resource allocation based on set formulas. Even the availability of accurate and timely health data cannot guarantee that evidence becomes the basis of decision making. For data to be used consistently, the entire health system must place a high value on health information and be structured in a way that allows evidence-based decision making.

Ensuring that information based on technically sound data is understood by potential users is another aspect of the technical determinants of information use. This requires the adaptation of data and information products to the organizational contexts in which they are intended to be used. Lay people, especially those not working in public health, are often unfamiliar with statistical concepts or demographic indicators. As one journalist reported recently, “We don’t trust the government’s [HIV/AIDS] data because we don’t understand it.”<sup>6</sup>

### Determinants at the system and individual levels

The wider environment in which health system decisions are made includes the institutions and stakeholders that influence data users, as well as the data collectors and users. Structural constraints, such as poor roads, lack of telecommunications capacity, and insufficient quantities of appropriate human resources, present very real obstacles to timely and complete reporting of information. The internal organization and culture of the health system also matters. A health system structured around vertical disease control programs, for instance, is often at odds with an integrated district-level health information system. Organizational factors, such as lack of clarity about roles and responsibilities for information use; failure to actively promote the value of evidence-based decision making, lack of norms or standards with respect to data quality; and ambiguity surrounding the flow of information throughout the system, have a direct influence on the use of data. Many of these organizational factors are not addressed by interventions that have been designed to strengthen data and information systems. However, without an organizational context that supports and values data collection and use, it is nearly impossible to make the links among health data, health information, and health action.

For example, one frequently expressed issue is the lack of clear expectations related to data production and information use and a failure to reinforce expectations through supervision of staff at all levels. A public health official in West Africa, when asked if there had been occasions when data quality or local technical capacity made it difficult to use information in making a decision, responded:

*“Yes, we have such cases. There was an occasion when a report was sent from a Local Government Authority and I saw an incidence of smallpox. A serious matter like that requires urgent attention because the disease was thought to have been eradicated. I summoned the officer in charge of health ... to go and confirm the reported case. ... He found that the doctor actually diagnosed chickenpox, but the local officer responsible for sending data to the state headquarters recorded smallpox. Such a case can make you think twice in using data collected by certain categories of staff and on the quality of staff collecting/recording various statistics in the health facilities. ... The staff must be told that every piece of information they forward is being scrutinized and not just dumped on the shelf. We asked them to do the job for specific reasons, but they seem not to understand the importance of the job they are doing” (Adewuyi and Akinlo 2005).*

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<sup>6</sup> Interview with the Director of Journalists Against AIDS, Nigeria, February 2006. <http://www.nigeria-aids.org> Accessed 4/20/2006.

## Behavioral determinants

Health data are collected and used by people who play professional and personal roles in the health system. Although building the capacity of these people is at the center of data and information use strengthening, behavioral aspects of capacity are often the most difficult to identify and confront in a meaningful way. Behavioral influences on data demand and use often involve intangible concepts such as motivation, attitudes, and the values that people hold related to health information, job performance, responsibilities, and hierarchy. Influencing many of these behavioral factors will require interventions that go beyond simple training that improves knowledge and skills in understanding data and using information.

Behavioral factors give crucial insight into the way in which health workers, managers and policymakers use information (or fail to do so). For example, the primary role of health service providers revolves around their roles and responsibilities as health workers or managers of health services. They see their other duties, such as disease surveillance, stockkeeping, and evidence-based planning and budgeting, as secondary to providing health care. As reported by an East African district medical officer, “Staff refuse to use data; they do not appreciate the importance of data, hence never refer to it in making decisions.” If expectations with respect to data use are unclear to health professionals at all levels of the system, their motivation and commitment to making informed decisions can suffer.

Technical, system, or individual behavioral determinants of the use of data and information in evidence-based public health policy and program design rarely act alone. They are interconnected. For example, on the technical-behavioral continuum, if policymakers feel that they have not effectively mastered the necessary skills to understand and use information effectively, then they are less likely to demand appropriate data and use information strategically. On the environmental/behavioral continuum, competency in collecting and using health information requires not just knowledge and skills but a supportive environment as well. In Tanzania, for example, the routine analysis of disease surveillance data by health workers has been improved by clarifying organizational roles and responsibilities. Job descriptions, responsibilities, and accountability mechanisms should be clear to data collectors, and they must have the tools necessary to complete their work. Many health systems are not designed to offer such guidance and support to health workers; this leads, in turn, to little appreciation of the value of health data and information.

## Evidence-based decision making and policy and program decision stages

*“The primary stakeholders are policymakers like us because without information, things are done arbitrarily and one becomes unsure of whether a policy or program will fail or succeed. If we allow our policies to be guided by empirical facts and data, there will be a noticeable change in the impact of what we do.”*

Director of Policy, National Action Committee on AIDS, Nigeria

In this section, we place DDIU in the context of the development and implementation of a health intervention in which evidence-based decisions are made. We will define evidence-based decision making as a process by which public health decisions are informed by using data transparently, and that includes stakeholder consultation whenever possible.

Table 1 outlines the general steps in evidence-based decision making. Each stage involves a set of discrete decisions that require data and information (third column.) In developing a DDIU strategy for any particular national or sub-national setting, it will be important to recognize these stages and the role of information in each.

**1. Problem identification and recognition.** The first stage in evidence-based decision making (and, hence, in DDIU) is identifying what the issue or problem is. This may occur when data reveal some health issue that had previously not been apparent. How these issues and the information that is used to identify them come to light will differ from setting to setting and issue to issue. In some cases, a stakeholder or researcher may formulate a hypothesis about the situation, and then conduct research to prove or disprove the hypothesis. In other cases, an issue may be discovered simply by happenstance. Or, anecdotal evidence may mount to the point that research is conducted to confirm if the issue is widespread.

Identification of an issue is not, however, sufficient for it to be addressed by a policy or program response. Once this information is revealed, a variety of stakeholder groups, such as civil servants, NGOs, development agencies or the media, may advocate for the new policy issue to be recognized and

**Table 1. DDIU in the context of evidence-based decisions and program stages**

Stage	Decisions	Type of Data Needed	Stakeholders
<b>1. Problem identification and recognition</b>	<ul style="list-style-type: none"> <li>• Priority-setting</li> <li>• Advocacy</li> <li>• Target-setting</li> </ul>	Situation analysis, routine/surveillance data, population-based survey	Public health officials, civil society, opinion leaders
<b>2. Selection of the response</b>	<ul style="list-style-type: none"> <li>• Selection of intervention</li> <li>• Operational plan</li> <li>• Program budgets</li> </ul>	Literature review, secondary analysis of existing data, (including on cost-effectiveness), special studies, operations and formative research, and research synthesis (if new data are needed)	Public health policy officials, service providers, beneficiaries
<b>3. Implementation and program monitoring</b>	<ul style="list-style-type: none"> <li>• Maintain operational plan and continue funding budget</li> <li>• Mid-course adjustments</li> </ul>	Process monitoring and evaluation, quality assessments, outputs monitoring	Service providers and program managers, civil society
<b>4. Evaluation</b>	<ul style="list-style-type: none"> <li>• Scale up program</li> <li>• Discontinue pilot and test alternative intervention</li> </ul>	Outcome evaluation studies, surveys, routine sources and surveillance	Public health officials, civil society, opinion leaders

addressed. Similarly, stakeholders who may be negatively affected by the resolution of an issue may lobby against any remedial action. For example, tobacco companies may oppose regulatory efforts aimed at reducing cigarette smoking.

At this stage, objectives or a target may also be set. For example, if the issue is that not enough people have access to a particular service, then the objective may be for a specified percentage of the population (say, 50%) to have access by a target date.

The data and information needed to carry out these steps in an evidence-based manner will come from a variety of sources. A situation analysis may uncover a problem, or the scale of a problem, that had not previously been highlighted. Similarly, detailed sero-prevalence data may reveal a rise in prevalence among a subpopulation that had not previously been noticed.

The stakeholder/users of data at this stage will range from public health policy decision makers to members of civil society and opinion leaders. The latter two groups will use information to push for decisions that resolve identified issues that are of interest to them. For example, groups representing persons living with HIV and AIDS (PLWHA groups) may push for legislation that protects the rights of PLWHAs in the face of evidence that PLWHAs are being discriminated against. Policymakers will use the information to decide if action is needed and, if so, what.

**2. Selection of the response.** Once an issue has been identified, the next step is to undertake analysis of the extent and nature of the problem and to lay out alternate courses of action. This may involve looking at best practices or other sources of information on how issues have been resolved in other contexts. It may also involve identifying key target groups that may benefit from the decision. Selecting the response will also involve developing a detailed plan as to what the operational response will be, including a budget.

Data and information that will inform the response strategy can also come from a wide variety of sources but will be data that focus on program strategies. Operations research studies, cost effectiveness analyses, cost parameters, service statistics, and demographic data are some examples of data that will be used at this stage.

Stakeholders at the response design stage will involve public health policy officials, service providers, and beneficiaries. Public health policy officials will be interested in overall strategy and long term goals as well as budgetary requirements. Service providers will be stakeholders since they can be the main agents for the interventions. Potential clients or beneficiaries of the intervention will be interested in the response design.

**3. Implementation and program monitoring.** Once the response has been decided upon and implemented, policymakers and program implementers require information to monitor progress. This is normally done by measuring inputs, outputs and outcomes associated with the response. Some information may be available at frequent intervals, such as service delivery data, which are often collected monthly or even weekly. Other information appears only every 3-5 years in the case of surveys, or every 10 years for population censuses. Increasingly, projects and programs have well-designed performance monitoring plans (PMP) or 'logical frameworks' that contain performance indicators for monitoring progress towards meeting program goals.



Monitoring can reveal when key indicators are going off-track, which may lead to further investigation and a change of policy or adjustment of the strategy. For example, Scott (2005) cites the case of Uganda, where a Demographic and Health Survey (DHS) revealed that the infant mortality rate had not changed between 1995 and 2000, despite the country's experience of rapid economic growth and declining poverty. Further analysis disclosed a variety of explanatory factors, including a decline in vaccination coverage. Following discussions among policymakers, the immunization program was revitalized.

In addition to policymakers and program implementers, civil society and the potential beneficiaries of the programs will also want to know if the response is being well-executed and is making a difference. Their access to the monitoring information should be facilitated.

**4. Evaluation.** The fourth category of decision making concerns evaluating whether the original decision was the “correct” decision, whether the chosen intervention was appropriate, whether it was implemented as intended, and if the issue to be resolved has in fact been resolved. Measuring the impact of an intervention is methodologically complex and requires more information than monitoring program or policy implementation. Impact evaluation can involve a variety of study designs and so can involve different data requirements. Progressively more stringent data and resource requirements are needed as the demand for explanatory power of the evaluation increases (Habicht, Victora et al. 1999). The major decisions that would be affected by an evaluation might be whether to scale up a program from a pilot stage or whether to continue a full-fledged program as it is currently designed.

The kinds of data that will be used in an evaluation will be typically more research oriented (e.g., a population-based survey) than would be the case for program monitoring. Even when some of the outcome indicators may be part of the project's PMP (for example, the contraceptive prevalence rate) and are used both for monitoring and evaluation, if the evaluation element requires evidence of causality the demands may be for more rigorous data.

Stakeholders who would be interested in the results of an evaluation exercise would be largely the same as those who were involved in the initial program identification – public health officials, civil society and opinion leaders. Program implementers would also be interested in the results of the evaluation since funding for the programs will be affected.

It is important also that the evaluation design and data requirements are specified up front as the program or policy is implemented. This allows for the establishment of a baseline as well as anticipation of what data will be needed for the evaluation. This also means that the evaluation is seen as an integral part of the whole activity or policy and not just as an add-on after a period of time or, worse, after the program has ended.

### **Identifying opportunities to promote DDIU: The interconnections among supply, demand, and capacity**

In this section we present an approach to diagnose a given situation in order to identify some strategic entry points for promoting DDIU. Specifically, these entry points depend upon understanding how data supply, information demand, and capacities for use all interrelate in a given context.



The conceptual framework presented in Figure 1 (page 3) posits that improvements in health result from strengthened data and information systems and strengthened local capacity to collect and use data and information. Thus, DDIU is not a stand-alone activity, but should be integrated into all data collection and analysis activities. As we have discussed, sustainable demand for and use of health information are most likely to result when integrated with activities to improve technical quality of data and data tools, build individual capacity for understanding and using data, and strengthen the organizational context in support of data collection and use (LaFond, Fields et al. 2005).

The conceptual framework also posits a direct link from use to demand (whereas the impact of demand on use is mediated by the intervening stages of data collection and dissemination). In other words, effective interventions to improve use of existing information should directly influence program managers and policymakers to demand more information. Interventions to improve demand by showing the value of information will indirectly influence use, as increased demand must first lead to better data collection and more widespread availability of information that is ultimately used to guide decisions.

Obviously, information use cannot be achieved if data are not readily available. Data collection and analysis are not sustainable if decision makers who control or influence resource allocation do not demand them. The interconnections between availability of information and DDIU are illustrated in Table 2.

**Table 2. Joint classification of data supply and data demand/information use**

		Data supply	
		Weak ←	→ Improving
Data demand/Information use	Weak ↑	1. Statistics are weak, and policymakers and program managers make little use of them. In addition, policymakers and program managers are unaware of the need for, or lack of, evidence-based program and policymaking.	2. The quantity and quality of statistics are improving, but they are not used for decision making because policymakers and program managers lack the incentives and/or the capacity to utilize them. This may result in policy and program design and implementation that are not evidence-based. This situation may also apply in cases where international and/or donor reporting requirements lead to increased resources for data collection without national use of the information that is produced.
	Improving ↓	3. Statistics are weak but are increasingly used by policymakers and program managers for a variety of purposes. Data deficiencies reduce the quality of decision making.	4. Statistics are improving and are being increasingly used for decision making. This results in better policy and program design and implementation.

Adapted from Scott (2005).

This matrix will be situation-specific; even within a country or organization, different programs will have different technical quality of data and tools and different patterns of decision making. By completing the matrix for a given situation in a given country, those who are working to strengthen DDIU can gain insight into where early interventions might have the greatest likelihood of success.

For example, a well-established family planning program may have reliable service statistics collection and experience in interpreting unmet need from the DHS, while a newly-emerging infectious disease area may have well-trained epidemiologists but weak notification systems. With substantial resources being devoted to HIV/AIDS programs, it is possible the data systems related to other health issues, such as routine childhood immunization, may deteriorate. On the other hand, systems strengthening related to HIV/AIDS could help improve data availability and use in other health areas as well.

Examples of the four categories are shown from recent program experiences in Table 3. In Part 2 of the DDIU series, we will examine these and other examples in more detail in an effort to understand what conditions lead to being in each of the quadrants and what approaches could be taken to move to quadrant 4, where data supply and data demand/information use are both improving.

**Table 3. Examples of data supply and data demand/information use**

		Data supply	
		Weak ←	→ Improving
Data Demand/Information Use	Weak ↑	<p>1. Nigeria, education sector: Data on schools and students are poor or non-existent and no use is made by the federal Ministry of Education of the little information that does exist.</p> <p>St. Lucia, HIV/AIDS: The HIV/AIDS Program plans to design Behavior Change Communication campaigns, but there are no data on most-at-risk populations.</p>	<p>2. Nigeria, reproductive health: statistics are improving, due largely to donor-driven efforts such as the DHS, but these data are not regularly used by Ministry of Health to guide programs.</p> <p>Mozambique, HIV/AIDS: HIV prevalence estimates and impact projections are regularly collected and widely disseminated, but not used to guide resource allocation.</p>
	Improving ↓	<p>3. Nigeria, HIV/AIDS: sentinel surveillance data exist but routine health information and patient data are lacking. Demand for information is high and the National Action Committee on HIV/AIDS uses whatever data it has for advocacy and program monitoring.</p> <p>Dominica HIV/AIDS: National Surveillance Team regularly discusses trend data from VCT sites, but NAP/C lacks complementary data to understand the epidemic more comprehensively.</p>	<p>4. Egypt, reproductive health: abundant data are collected regularly through surveys and routine health information systems and are used by the Ministry of Health and Population.</p> <p>South Africa: Standard District Health Information System implemented in all districts and adapted to respond to different local information needs.</p>

## Changing the paradigm: From ‘data dissemination’ to DDIU

The DDIU framework presented here can be seen as not just a set of guidelines and principles for fostering evidence-based decision making; it can also be seen as a paradigm shift away from an approach where data are collected or research is carried out and then “disseminated” as a final activity. Such “dissemination” rarely leads consistently to the use of the findings. Indeed, there is often no reason to expect that stakeholders are going to use the data in the first place if they have not been involved in defining what information they want. What we are calling a DDIU approach is one in which data and information are collected in response to an identified need, a need that is justified in terms of the decision-oriented use to which information will be put. In this way data and health information – whether program monitoring data that are part of an M&E system, routine health information, survey data or operations research findings – can address demand from the beginning, increasing the likelihood that when information is available, it will be fully used. One could call this a shift in a paradigm to a data and information culture or, as we have called it here, a shift to evidence-based decision making. While such a shift does not ensure that decision makers will always use the data in ways that researchers or data collectors and analysts may think they should, we maintain that when information is more freely available to all stakeholders, the opportunity for open debate and dialogue among stakeholders is created. This opportunity can open the door to decisions that will ultimately improve the health outcomes of programs or policies.

## Making DDIU work: A preview of Part 2

As indicated in the introduction, this paper provides a general framework for DDIU and presents some basic principles and concepts. In the second part of the DDIU series, *Strategies and Tools for Data Demand and Information Use in the Health Sector*, we provide more detail as to how one goes about implementing DDIU activities.

Part 2 examines the constraints to evidence-based decision making, and how to identify and address some of the main constraints. In addition, Part 2 examines strategies to encourage DDIU and guidelines for implementing DDIU activities and interventions, and presents a set of tools for DDIU including:

- ❑ The Decision Calendar
- ❑ Assessment of Data Use Constraints
- ❑ Information Use Mapping
- ❑ Stakeholder Engagement
- ❑ Performance of Routine Information System Management (PRISM)

Part 2, *Strategies and Tools for Data Demand and Information Use in the Health Sector*, is a separate publication. It is available for free download or order from the MEASURE Evaluation Web site, <http://www.cpc.unc.edu/measure>.

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