COMMUNITY-BASED HIS

ON THE DESIGN OF COMMUNITY-BASED HEALTH INFORMATION SYSTEMS

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On the Design of Community-Based Health Information Systems

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THE CHILD SURVIVAL TECHNICAL SUPPORT PROJECT

COMMUNITY-BASED HIS

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Acronyms

ANC	Antenatal Care
BCC	Behavior Change Communication
BHW	Baranguay Health Worker
CBCS	Community-based Child Survival
CB-HIS	Community-based Health Information System
CBO	Community-based Organization
CDC	Centers for Disease Control and Prevention
CG	Care Group
CGLP	Child Growth Learning Package
CHaMPS	Child Health and Maternal Protection for Sorsogon Project
CHC	Community Health Committee
CHP	Community Health Promoter
CHV	Community Health Volunteer
CHW	Community Health Worker
CICSS	Community Initiative for Child Survival
COMPROMA	*Comités de Promotores de Salud*/Health Promoter Committees
CORE Group	Child Survival Collaboration and Resources Group
CRS	Catholic Relief Services
CSTS	Child Survival Technical Support project
DHC	District Health Committee
DHMT	District Health Management Team
EPI	Expanded Program on Immunization
HCF	Health Care Facility
HDA	Health Development Agency
HIS	Health Information System
LGU	Local Government Unit
MCH	Maternal and Child Health
MEWG	CORE Monitoring and Evaluation Working Group
MOH	Ministry of Health

NGO	Nongovernmental Organization
PTF/ITF	Pregnancy Tracking Form/ Immunization Tracking Form
PVO	Private Voluntary Organization
RHM	Rural Health Midwives
SECI	*Sistema Epidemiologico Comunitario Integral*/Community Epidemiological Information System
SIVICS	*Sistema de Vigilancia Comunal de Salud*/Community-based Health Surveillance and Response System
TT	Tetanus Toxoid immunization
TBA	Traditional Birth Attendant
USAID	United States Agency for International Development
VHC	Village Health Committee
VHP	Volunteer Health Promoter
WRC	World Relief Corporation

Acknowledgments

I.   Introduction

As private voluntary organizations (PVOs) take on an increasing role in building the capacities of communities[1] to manage their health, the importance of strong community-based health information systems (CB-HIS) has become clear. These systems, when effectively designed and implemented, can empower communities by building their skills to make decisions regarding their health needs, increase the effectiveness of specific interventions, and provide strong links to district and national health information systems (HISs). Establishing such systems is not easy— PVOs must address challenges related to literacy and numeracy of the populations, competing stakeholder demands for information, and limited human and other resources.

In 1999, the CORE[2] Monitoring and Evaluation Working Group undertook a study of PVO experiences in developing HISs for Child Survival Programs. The study found little documentation of existing systems and little information that could be used to describe how "community information systems" are different from "health information systems." The result of the study was a set of guidelines (appendix A) for documenting community HISs that have been developed as part of Child Survival Programs. These guidelines were distributed to CORE Group members as a tool for creating consistent documentation around these issues.

This paper builds on this innovative work and expands the discussion to look at community information systems in a broader context. It is primarily targeted to health managers of Child Survival Projects in PVOs or other health development agencies[3] (HDAs) who want to enable communities to use locally specific and relevant data for making decisions about their own health. Its purpose is to (1) suggest a common language for talking about community HISs, (2) guide thinking about the role and objectives of an HIS in the context of the community decisionmaking process, and (3) suggest a framework for analysis of decisions to be made, related information needs, and methods and tools for a CB-HIS.

Examples from PVO experiences are summarized throughout this document and are illustrated in greater detail through six case studies in the appendices of this report. A summary comparison table of the case studies and suggestions for further reading are also included in the appendices.

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[1] In this paper, the term "community" refers to a defined group of individuals and families connected to one another in some way, typically through an area of residence but possibly through other types of social networks based on common interest, language, culture, occupation, etc. It usually implies a shared sense of interdependency and mutual trust among community members.

[2] The Child Survival Collaborations and Resources Group (the CORE Group) is a network of more than 35 nonprofit organizations working together to promote and improve primary health care programs for women and children and the communities in which they live. Collectively, its member organizations have a presence in more than 140 countries.

[3] In this paper, the term "health development agency" refers to any organization involved in the development of the health sector in a particular community. This can be the Ministry of Health, a local nongovernmental organization, an international PVO, or any combination of these organizations working in partnership.

This paper represents a step in advancing the thinking regarding the role and design of CB-HISs. It does not address or provide practical guidelines or tools for the actual implementation of an HIS at the community level.

Sections II and III seek to establish common language that might be used when thinking about CB-HISs. Section II distinguishes the main features of HISs according to the level of community participation. Section III examines a traditional decisionmaking process, information flow at the community level, and the role of that information in community-based decisionmaking structures.

Sections IV and V discuss the practical issues of identifying information needs for key decisionmakers and setting appropriate objectives for the HIS to be developed or redesigned. It includes a simple framework with an illustrative list of the decisions to be made, information needs, and methods and tools available at the community level.

Section VI suggests ways to facilitate the design of an HIS at the community level.

Section VII presents brief conclusions.

II. Community-based versus Community-focused Health Information Systems

The level of community participation in health planning, implementation, and evaluation is influenced by numerous factors, including local culture of community mobilization and self-determination, the type and strength of local governance structures, the degree of decentralization of formal health systems, the availability of resources for participation, and the presence of health development agencies (HDAs) promoting participation.

HDAs encourage community participation in health for a variety of reasons ranging from a purely utilitarian motivation to a broader goal of community empowerment.[4] The utilitarian perspective views participation as a means to an end, typically increasing effectiveness of health programs through better information or cost sharing. The empowerment model views participation as an end in itself, building community awareness and capacity to determine and act on health priorities, including generating and allocating resources.

Between these two models of community participation is a continuum of overlapping roles that a community can play in respect to health and development. Table 1 presents the typical activities a community involved in an HIS may conduct as determined by its main role along this participation continuum. In an advisory and consultative role, the community primarily provides information through community meetings, focus group discussions, key informant interviews, or household surveys. The HDA takes the lead in collecting and analyzing data and makes decisions and plans accordingly. When communities mobilize resources, they provide data on their human, material, and financial contributions and ability to pay. They often require and use data on the coverage, results, and costs of health services to determine these contributions. This cost-sharing role is often viewed as utilitarian, but it also enables communities to participate in decisionmaking and influence the quality and accountability of local health services.

Table 1. Role of the Community within Varying Models of Participation in an HIS

Participation Continuum		
Utilitarian Model ←――――――――――――――――――――――→ **Empowerment Model**		
Role of the Community		
Advisory and Consultative	*Resource Mobilization*	*Decisionmaking and Planning*
Provision of information on perceived health problems and priorities; socio-economic, cultural, and political context; and expectations from health services	Provision and use of information on human, material, and financial resources and on health services in the community	Design and implementation of HIS Participatory use of data for community decisionmaking

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[4] See Morgan, in appendix J, for a discussion of the utilitarian and empowerment models of community participation in health.

Finally, when communities assume a decisionmaking and planning role, they are at the forefront of the design and implementation of the HIS. The HDA can initiate and facilitate the process through participatory approaches, but the final decision and responsibility lay on the community. As a result of this process, the community benefits not only from better health services but also from the participation process itself, which leads to greater solidarity and social mobilization, increased awareness of their health and other needs, and better decisionmaking.

The appropriate level of participation for the design and implementation of an HIS depends on the objectives and context for involving the community. When the objective is merely to obtain the necessary information to better plan and achieve specific targets for an intervention that is otherwise simple and well accepted, an advisory and consultative role may be satisfactory. Even in this context, however, program managers may choose to encourage participation to address broader community health needs at the same time. For instance, when developing a surveillance system for acute flaccid paralysis and poliomyelitis as part of the Polio Eradication Initiative, strategies to involve the community and address a series of other infectious diseases and child health issues can be adopted.[5] A decisionmaking and planning role may also be adopted to improve the effectiveness of the intervention. In a WHO study that compared two approaches to community treatment of onchocerciasis with ivermectin, for instance, the villages in which community members themselves designed the distribution and followup of the treatment achieved significantly better reliability of reporting and higher coverage of the program than those that adopted the directives of the program.[6]

For the purpose of this paper, we consider c*ommunity-focused HISs*[7] to be ones in which community members supply the data in some way but have no significant role in managing the data or using them for decisionmaking. On the other hand, we consider CB-HISs to be those characterized by the empowerment model, in which the community is actively involved in decisionmaking and planning. In a CB-HIS, the collection, analysis, and dissemination of health data and information are designed to support the decisionmaking at the community level. This is the perspective of the following sections of this paper.

Finally, although this paper does not directly address the attitudes and values of the development agency staff working on community-based programs, it is essential that these be addressed on a project using participatory methods. To cultivate a strong and positive collaboration between an HDA and the community, HDA staff must be willing to respect opinions that diverge from their own and set aside any inclination to dominate the perspectives of others.

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[5] This is the approach of the *Community Surveillance Kit* developed by the CHANGE project in collaboration with CORE and the U.S. Peace Corps (see appendix J).

[6] See WHO/TDR (1996) in appendix J.

[7] The terms "community-focused" and "community-based" HISs are adopted and used by the CORE Monitoring and Evaluation Working Group. Alternative terms (such as "community-directed" in the WHO 1996 study) or alternative uses of the same terms ("community-based HIS" referring to any system using data from the community) can be found.

III. CB-HIS, Decisionmakers, and Information Flow

The purpose of a CB-HIS is to strengthen the decisionmaking process at the community level by providing the data needed by each decisionmaker and making the process explicit. This section presents the traditional steps in the decisionmaking process, examines the key actors involved in community decisionmaking for health, and discusses the implications of these factors for any HIS. Examination of these issues is important because (1) the role of health information in a given system is partly driven by the flow of that information among key decisionmakers, and (2) the decision to undertake a community-based or community-focused approach—as outlined in the previous section—can often be tied to the information flow between decisionmakers at the community level.

Steps in the Decisionmaking Process

The various steps can occur in almost any order or simultaneously, and the process is iterative. For example, a community may start with a perceived problem and then gather data to further define the problem, or may identify new health problems while reviewing existing data. The criteria for selecting the best alternative may change at some point, and this may affect the selection of the best alternative or call for new data. Finally, new solutions may appear when data from monitoring the implementation of a previously selected alternative become available.

The steps in the decisionmaking process are further described below.

- **Define the problem or the decision to be made.** A proper definition and understanding of a problem is crucial because it affects what alternative solutions are suggested. A decision is made to alleviate or resolve a problem.

- **Determine who will use the data/information gathered.** Although the data collected are intended to be used primarily by the community, it is important to anticipate early in the process that the data will also be used at the regional and national levels. If this is not planned for at the beginning, it will be difficult to incorporate this later in the project.

> ### *Steps in the Decisionmaking Process*
>
> - Define the problem or the decision to be made.
>
> - Determine who will use the data/information gathered.
>
> - Define the information needs and gather relevant data.
>
> - Establish criteria.
>
> - Generate alternative solutions.
>
> - Predict the consequences of alternative solutions.
>
> - Compare solutions and select the best alternative.
>
> - Implement and monitor the best alternative.

- **Define the information needed and gather the relevant data.** It is critical to use data to define a problem and put it in perspective. The need for additional data, or for an HIS to provide them, may become apparent while attempting to define a problem.

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- **Define the criteria to select the best solution.** The criteria for comparing alternative solutions and making decisions represent the values of the decisionmaker. It is important to define these criteria early in the decisionmaking process because they may determine the information needed.

- **Generate alternative solutions and predict their consequences.** This is the most creative step. Once a set of alternative solutions has been generated, the consequences of implementing each solution must be specified: effectiveness, cost, positive or negative side effects, feasibility, etc.

- **Compare solutions and select the best alternative.** The alternative solutions and their consequences can be compared in a variety of ways using explicit criteria. Once the decision is made, that is, once the best alternative is selected, everyone commits to its implementation. To make sure that everyone is truly committed to the selected alternative, it is imperative that the process leading up to selecting an alternative is highly participatory and respectful of all members involved in making the decision. A facilitator who has been trained in participatory methodology is essential to making this an effective process.

- **Implement and monitor the best alternative.** One of the best contributions of a CB-HIS may be to provide data to assess the implementation of the best alternative, identify new problems, and initiate other cycles of decisionmaking to further improve the solution to the problem.

Health Information Flow at the Community Level

Factors influencing the level of community participation in CB-HIS development are often integrally linked to the flow of information inherent in community decisionmaking processes. Relevant, accurate, and timely information is essential at all levels of a health system to make rational decisions, that is, to allocate resources to produce the most years of healthy life equitably and at the lowest cost. A CB-HIS consists of all the people, structures, and processes used to collect, analyze, and disseminate health data and information to serve that purpose.

The users of a CB-HIS are the people who make decisions based on the information it generates. To make decisions on priorities and the best course of action, CB-HIS users need data on the health status of individuals or the community; on the cultural, political, and socioeconomic context in which they live; and on available interventions and resources. They also need data to ensure the activities implemented with the available resources result in the expected change in health status at a minimum cost.

Four main types of decisionmakers in health can be distinguished in a community:

1) Household members and caretakers;

2) Health volunteers or other members of community-based organizations (CBOs) conducting health activities;

3) Health workers, including outreach workers from primary health care facilities (HCF), public or private, traditional health providers, and traditional birth attendants; and

4) Various elected or appointed members of a community health committee (CHC) or equivalent governance structure.

These four main types of decisionmakers are represented in figure 1. The oval shape in the figure represents the community level, the primary scope of this paper. Decisionmakers use health information for their own decisions and also transmit information to other decisionmakers. This information flow is typically bi-directional (reporting and feedback).

The diagram also shows the district health management team (DHMT) and district health committee (DHC) members who make decisions that affect the health of the community. HDAs, which are not represented in the diagram, may be directly involved in community decisionmaking through their association with one or several types of decisionmakers, but may also be only facilitators of the decisionmaking and information flow processes.

Clearly, all communities have traditional and informal decisionmakers and health providers that are not fully captured in the classification above. However, as such individuals begin to collaborate with other decisionmakers and health providers to improve health in the community, they typically can be associated with one of the other categories above.

Figure 1. Main Types of Decisionmakers and Information Flow at the Community Level
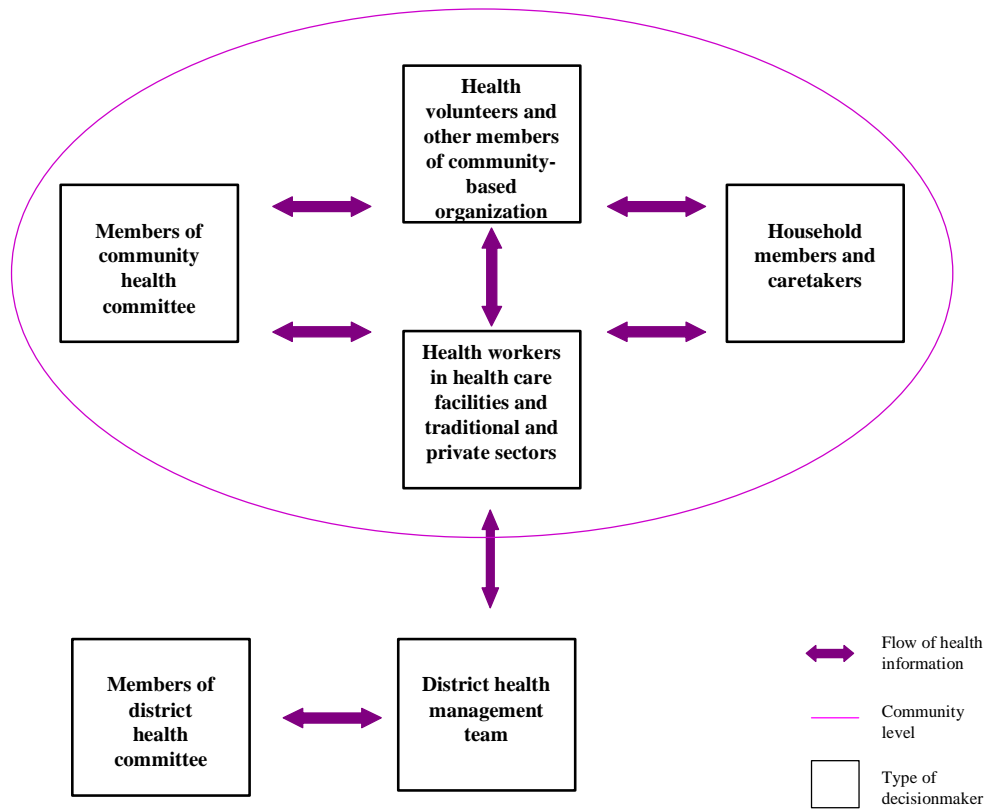
This structure of community decisionmaking for health is further discussed in the following section, where the information needs of the various types of decisionmakers at the community level are analyzed.

IV.   Information Needs for Community Decisionmaking

The challenge in designing a CB-HIS is to anticipate the type, timing, and format of the data needed by the different decisionmakers in the community and then to define the methods, tools, and resources to make them available.

For each decision to be made or problem to be solved at the community level, information needs must be first defined in general terms. Some problems require only single or occasional data collection efforts because they correspond to a new question or because they do not vary much with time. Other problems require continuous data collection and analysis because rapid changes may occur that require a prompt response or because progress expected from routine activities must be ascertained.

When the information needs are identified, the possible indicators can be defined along with the potential data sources and the methods and tools for data collection, transmission, analysis, and use. Once the best indicators for each problem or decision are selected, a review of the internal consistency and feasibility of the overall CB-HIS must be conducted.

Table 2 presents illustrative decisions to be made, the related information needs, and examples of methods and tools appropriate for each type of decisionmaker at the community level. It serves as a reference for the discussion that follows.

Defining the Information Needed for Making Decisions

In the Community-Based Child Survival Project in rural Intibuca, Honduras, a simple information system using traditional birth attendants supervised by community health educators was designed to improve maternal and neonatal care. The system quickly produced reliable data that mobilized communities to organize their own emergency transportation system, but very little data were used at the operational levels. The project staff then undertook an analysis of the decisions to be made at each level of the system to determine the information needed to support these decisions. (Case Study 4)

Table 2. Illustrative Decisions to be Made, Information Needs, and Tools by Type of Decisionmaker at the Community Level

Decisions Concerning the Following:	Information Needs	Methods and Tools
Household members and caretakers		
• Adopting key health behavior • Providing home-based care • Seeking outside care	• Key health behaviors • Individual risk status • Health status • Effective interventions • Availability and cost of health services, food, and commodities	• Health education materials, reminder cards • Home-based records • Constructive feedback from home visitors, health workers • Informal communication network and mass media
Health volunteers and other members of community-based organizations		
• Planning home visits • Targeting individuals, households with special needs • Selecting health education topics for home visits • Following up on defaulters • Reporting cases of notifiable diseases • Referring high-risk or severely sick individuals	• Composition and characteristics of all households • Individual cases of notifiable disease • Individual use of preventive services • Individual knowledge and practice of key behaviors • Availability and costs of health services, food, and commodities • Environmental factors: water, sanitation, food, vectors, climate	• Interview and observation during home visits • Census; demographic and epidemiological surveillance; household surveys • Community registers • Home-based records • Clinical guidelines, protocols • Constructive feedback from CHC, HCF
Health workers in health care facilities		
• Organizing health care services • Providing curative and preventive care for clients • Following up on defaulters • Detecting and responding to epidemics • Reporting cases of notifiable diseases	• Total population by age, sex, and key socioeconomic factors • Community health status, expectations, satisfaction • History, signs, symptoms of clients • Clinical standards • Incidence of notifiable diseases • Coverage of key interventions • Statistics of services provided • Cost of drugs, health worker compensation	• Interview and physical exams • Clinical guidelines, protocols • Home-based records • Clinical records, registers, and appointment rosters • Administrative, financial records • Census, demographic and epidemiological surveillance, household surveys • Reports from CBOs • Constructive feedback from CHC, DHMT
Community health committee members		
• Setting priorities for interventions, including allocation of resources • Selecting community health workers • Design and implementation of CB-HIS	• Community health status, expectations, satisfaction • Community and external resources	• Reports from CBOs and HCFs • Constructive feedback from DHMT

A.   Household members and caretakers

Community members and caretakers at the household level must decide which key health behaviors to adopt, when to provide what type of home care, and when and where to seek care outside the home. Specifying and organizing relevant information on health status and resources at the household level, along with providing the specific knowledge and skills related to key health behaviors, enable household members and caretakers to make better decisions to protect or improve their health.

Individuals usually assess their health needs or those of their dependents through the recognition of signs and symptoms of diseases or through the knowledge of specific individual risks (young age, pregnancy, etc.). Their decisions to change behavior, or provide or seek care, depend on their knowledge of the effective interventions and the resources available for health in terms of food, time, money, transportation, drugs, or health services, as well as a host of other factors.

Most of these decisions are based on knowledge gathered through informal communication networks or mass media. Among tools that can help individuals and caretakers make those decisions are home-based health education materials and reminder cards illustrating key health behaviors and interventions, as well as home-based records, such as growth charts, antenatal cards, cards for treatment follow up of tuberculosis or other chronic conditions, and so forth. Community members and caretakers also get health information from home visitors, health workers, and others.

B.   Health volunteers and other members of community-based organizations

CBOs can be established governmental or nongovernmental institutions, networks of community health volunteers (CHVs), women's groups, farmers' groups, vocational associations, school committees, and so forth.

CHVs and other members of CBOs must decide how to organize their work and, typically, plan home visits, during which they provide individual services, advice, and information. They need to target the households and individuals at higher risk, follow up on defaulters, decide the most relevant health education information or counseling to provide to which household or individuals, which case to refer, and so forth. They are often responsible for detecting, investigating and reporting cases of notifiable diseases and demographic events and for identifying and referring high-risk and severely sick individuals.

To make appropriate decisions at the individual or household level, CHVs and CBO members need to know the composition and characteristics of all the households they are in charge of and the health status, knowledge, and behavior of each individual. They collect most of this information on community members through regular home visits, informal or structured interviews, and examination of home-based records. This information is recorded in community registers, usually specific to particular programs (maternal and child health, tuberculosis, family planning, etc.). They also need a sound knowledge of the environment and availability of health services.

> **Mothers' Involvement in Community-based Growth Monitoring and Promotion**
>
> In Kenya, the International Community for the Relief of Starvation and Suffering engages mothers in weighing their children and plotting the growth curve themselves using innovative direct recording scales. The experience of Maasai communities, where 500 of these scales are kept in the communities rather than at the clinic, are described by Morley and Meegan.[8] Mothers using the direct recording scales put the child in the weighing trousers suspended beneath the scale and then enter the next point on the child's growth curve through a hole in the pointer using a thorn to prick the chart, thus creating a weight-for-age graph without having to read a number off a dial or identify the coordinates of the graph. The mother then holds the chart up to the light to see how her child is progressing. She discusses the direction of the growth line with other family members—grandmothers who are the decisionmakers as well as older girls who are future mothers. A study of the understanding of growth monitoring and frequency of growth faltering compared mothers who weighed their children and created the growth curve themselves with a group of mothers who had their infants weighed on a dial scale by community health workers who also created the growth curve. "Over the course of a year, about 90% of the mothers weighing their children on a direct weighing scale came to understand child growth as shown by a weight-for-age chart. Over a two- year period, a further study found that compared with those weighed on a dial scale by community health workers, only one-third as many children under two years of age weighted by their mothers with the direct recording scale showed faltering." When visits were made to homesteads where there was no weight gain in a month, mothers who directly weighed their children indicated that they had taken remedial actions, including giving the children extra milk or broth.

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[8] *Source:* Morley, D., and M. Elmore-Meegan. 2000. Growth monitoring a forgotten subject. *FAO: Food, Nutrition and Agriculture*, 2000. 27: 14–18.

CBOs can also derive information on the health needs of the community benefiting from their home-based services by summarizing individual-level information from the home visitors in the form of lists and total numbers of individuals or households with given characteristics (e.g., age- and sex-specific cases of certain diseases and conditions under surveillance, family planning acceptors by type of methods, pregnant women by risk status, growth-faltering children, immunization defaulters, and so forth). CBOs can also gather information on the resources available for community health, such as funds for emergency referral; individuals available to conduct specific health activities; and health education materials, equipment, bikes, and facilities (room, hut, or yard for depositories, meetings, and health services). With information on health needs and resources in the community, CBOs can determine priorities and develop action plans. This aggregate information on community health needs and resources is typically shared with the HCF and CHC.

C. Health workers in health care facilities

The HCF, public or private, is the first point of contact in communities with modern health services. It is typically staffed by at least one trained health worker (physician, nurse, or auxiliary) and often by community (outreach) workers, trained in health or not, working directly with the community.

HCF workers routinely record individual-level data from their clients to make health care decisions, such as treatment, immunization, antenatal care, long-term followup, etc. This is typically done according to standards from the Ministry of Health (MOH) or other sponsors, which also provide related tools, such as clinical guidelines and protocols, case-management records, registers, and reporting forms.

Care Groups of Volunteer Mothers Use and Report Data Effectively

In the Vurhonga Child Survival Project in the Chokwe District, Mozambique, volunteer mothers regularly visit all households to provide education and advice on key health behaviors and services. Each volunteer visits about 10 households on a monthly basis and meets every two weeks with 10 to 15 other volunteers to receive training and to discuss the health needs of the households they visited. The volunteers also report all births, deaths, and maternal and child health defaulters, and discuss the actions to take. The reports are made orally and one of the few literate volunteers transcribes the data in a form sent to the HCF. These data are also transmitted to the Village Health Committees and the District Health Office. Because all households receive regular visits from volunteer mothers and the volunteers meet regularly, this CB-HIS has excellent coverage and is used by the various community decisionmakers. (Case Study 1)

These data can be summarized into measures of the demand for modern health services in the community, but represent the levels of morbidity of only the fraction of the community that attends that facility. These aggregate data can possibly give estimates of the coverage of specific interventions if the target populations are well defined (age, sex, diagnosis, risk factors) and their size is known. HCFs usually manage funds from the MOH or another sponsor and from the collection of fees for services or the sale of drugs.

HCFs often collaborate with health volunteers or other members of CBOs or have their own outreach workers, who collect home-based information as described in the previous section. In these situations, the HCF may summarize the data from all home visitors, if this is not done by the CBO. All this information is needed to make decisions on priority activities and allocation of

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resources at the HCF level. At least part of this information is typically shared with the CBO and the CHC and transmitted to the DHMT. The HCF staff often provides technical advice to the CBOs and the CHC on health issues in general and on data needs, analysis, and interpretation, in particular.

D. Community health committee members

The CHC or equivalent governance structure typically comprises elected or appointed community members, local leaders, government officials, or persons involved in community health, such as the head of the HCF and sometimes CHVs. Women or members of under-represented groups may be encouraged to participate to represent all needs of the community and improve equity. With locally specific, relevant, and timely information, the CHC can address community health needs in an organized fashion, make appropriate decisions, and enforce them.

CHCs typically receive aggregate information on community health needs and resources from the CBO and HCF. They may also receive information or instructions from the DHC or the DHMT. The CHC then uses this information to make decisions that impact CBOs, HCFs, and the entire community. These decisions are, for instance, to build a well or a health post, to recruit health workers or volunteers, to improve water supply and sanitation, to set a fee structure for services at the health facility, to set specific immunization targets, to decide on priority health education themes during home visits, or to organize special events for specific interventions. The CHC also may play a critical role in the design and implementation of a CB-HIS involving various decisionmakers in the community.

E. Links with external health information systems

Although a CB-HIS focuses on problems and decisions to be made at the community level, it cannot operate in isolation. Figure 1 shows the links that a CB-HIS must establish with the DHMT and the DHC. Other HDAs promoting the development of a CB-HIS or merely involved in health activities in the community most likely need information that must be considered in the design or redesign of a CB-HIS.

Public health managers at the district or equivalent administrative level make decisions on strategies and allocate public resources for the entire district population. They typically use reports from the HCFs covering the district population that include aggregate data on the health services provided and the resources available in the communities they serve. These reports may also include aggregate data from home visitors. In the ideal situation where information is available for the entire population, the health district can calculate measures of the health status and coverage of interventions that are representative of the population.

The relationship between an external HDA or an MOH and a CB-HIS also depends on the scale of the overall system and the amount of aggregation of data the external HDA or MOH wants to carry out. When it is desired to aggregate data at the district, regional, or national level, greater amounts of standardization of indicators and their definitions, data collection tools, and aggregation methods are necessary, and it is most practical for this to be coordinated at the national level. Such a process of standardization, however, may mean that data are collected that do not correspond to that perceived as important by the community. It is important that HDAs

accept and support the data and indicators selected by the community to ensure ownership and sustainability of the CB-HIS. However, HDAs can also explain to community representatives that some data are needed for the management of programs that benefit the community and for the funding of programs that depend on documented results. The successful negotiation of the data to include in the CB-HIS typically involves the definition of a minimum set of indicators, along with their data collection and transmission procedures. Such negotiation relies on the positive and trusting relationship HDA staff have developed with the community.

V.   Objectives of Community-based Health Information Systems

An HDA engaged in the design or redesign of a CB-HIS must clarify its purpose early in the process because this determines the information needs, the strategies, and timeline for its development. In this section, the typical reasons for establishing a CB-HIS are presented, and specific objectives are proposed to help determine their relative importance.

A.   Effectiveness

Effectiveness is often the primary motivation behind establishing a CB-HIS. This is typically the case for programs with specific targets to achieve and demonstrate. For instance, in an immunization program with coverage targets to reduce the incidence of a specific disease, an effectiveness objective of a CB-HIS could be: "At a specified point in time, each home visitor will know the immunization status of all children under 12 months of age and use this information to followup on defaulters." If the CB-HIS helps achieve this objective, an increase in effectiveness of the immunization program is expected and can be demonstrated by a reduction in the drop-out rate, an increase in immunization coverage, or a reduction in the incidence of the target disease.

B.   Equity

If a concern for equity drives the development of a CB-HIS, the source and magnitude of the inequalities in health status and access to health services need to be documented to raise awareness of the issue in the community, develop appropriate remedial strategies, and assess their effectiveness. To ensure equity, it is essential that the CB-HIS coverage objectives include all segments of the population, particularly those that are traditionally underserved. A coverage objective could be: "At a specified point in time, at least 95 percent of the households

> **From Coverage to Equity**
>
> In the ENLACE project in the mountainous areas of Otuzco and Julcán, Peru, the community health promoters and health providers from MOH facilities implement an effective Community-based Health Surveillance and Response System to identify and track high-risk individuals and clinical cases. At the end of the project, 90% of the communities maintained updated data, 70% of the health promoters sent monthly reports and held monthly community meetings, 70% of the persons needing facility-based care were referred, and 50% of the referred cases were counter-referred to the health promoters. (Case Study 3)

in the population base of the CB-HIS will have had at least one visit from a home visitor in the last 3 months," or, "At a specified point in time, all deaths of children under age 5 will be recorded and a verbal autopsy conducted within a month." An equity objective could be: "After a specified period, the decisions and actions taken by the community will specifically address the needs of the high-risk and underserved population as documented by the CB-HIS."

C.   Accountability

If a reason for establishing a CB-HIS is to increase accountability of local health services to the community, the system could include information to evaluate progress toward this objective. An accountability objective could be: "After a specified period, the CHC makes recommendations regarding the HCF services based on information from the CB-HIS, and these recommendations are regularly implemented and documented by the HCF."

D.   Community mobilization

A primary motivation of an HDA in involving community members in data collection may be to raise their awareness of their health needs and to increase their participation in selecting and implementing solutions. Such motivation determines the design of the CB-HIS. A community mobilization objective might be: "At a specified time, the CHC will have adopted health action plans supported by sound data and an explicit decisionmaking process and take significant action toward its implementation."

E.   Empowerment

An HDA may choose to invest resources in the development of a CB-HIS to enable a community to make the best decisions and effectively plan interventions to improve its own health. An empowerment objective for a CB-HIS could be: "After a specified period, specified community decisionmakers will be competent in making specific decisions." Competence could be defined, in this context, as the ability to conduct the step-by-step decisionmaking process described in section IV.

Strengthening Partnerships with Community Health Information

In the SECI Project in Oruro, Bolivia, volunteer health promoters were trained to gather simple Maternal and Child Health data during home visits. Each month, the promoters and associated health workers consoli-dated the community-based and the facility-based data and presented the findings in community meetings. This gave community members the opportunity to prioritize their health needs and develop action plans. One year later, children in SECI communities were more likely to be immediately breastfed, have a health card, and receive vitamin A supplementation than children in control communities. There was also evidence that the local health services were more accountable to the community. Finally, the communities and the local health services were able to generate more financial support from the local government for services to pregnant women and children under 5. (Case Study 2)

F.   Sustainability

Early in the of design or redesign of a CB-HIS, it is important to specify the timeframe within which the HDA initiating the CB-HIS is operating and the aspects of the HIS to sustain once the leadership and funding of the HDA decrease or end. A sustainability objective could be: "After a specified period of time, the community decisionmakers will continue to have access to the information they need."

Typically, the costs of a CB-HIS cannot be estimated in monetary terms alone because the most important resources are the time of community members and volunteers or other in-kind contributions. Nevertheless, defining the resources needed and ensuring that they are available are critical for the sustainability of a CB-HIS. A resource objective could be: "During a specified period after the end of the project, at least x CHVs will conduct at least y home visits per month, and the CHC will meet at least once a month to review the data."

VI. Facilitating the Design of a Community-based Health Information System

Facilitating the design or redesign of a CB-HIS by involving the community members and decisionmakers is a powerful way to ensure that its objectives and the information it includes correspond to problems important to the community. It also provides the opportunity to build the capacity of the community to make better decisions.

Before leading a community through the design or redesign of a CB-HIS, it is important to identify the existing decisionmaking structures and processes. Every community has indigenous decisionmaking structures, whether a chief, a council, the heads of families, or individuals themselves. Typically, there are also specialized structures, such as those introduced in Section II: a CHC, CBO involved in health, and one or several HCFs. If the existing decisionmaking structures and processes omit certain groups, such as women, youth, or minorities, then it is important to recognize these potential biases and try to incorporate representatives of those traditionally marginalized community members.

Community participation in the design or redesign of a CB-HIS may vary during the facilitation exercise. For instance, when deciding on the main objectives of a CB-HIS, as discussed in section IV, a fairly representative group should be selected because this concerns the whole community. However, when specifying the information needed (as discussed in section V), those directly affected by the decisions should be involved.

Letting Communities Decide

In the Community Initiatives for Child Survival in Siaya (CICSS) project, the village health committees (VHCs) and community health workers (CHWs) were trained in the collection, analysis, and use of data specifically designed to support the strategies and objectives of the project. At the end of the project, the VHCs and CHWs found the CB-HIS cumbersome and were not using the data as much as expected. The CICSS project staff redesigned the system using participatory approaches to let the VHCs and CHWs define their information needs and the data to be collected. (Case Study 5)

VII. Conclusions

In this paper, we distinguish community-based from community–focused HIS and provide a general framework to design or redesign a CB-HIS. First, define the problem and the decisions to be made. Second, determine who will use the data collected. Third, identify the health information needs and the related methods and tools for each decisionmaker at the community level. We also provide guidance on how to facilitate the design or redesign of a CB-HIS by involving community members and decisionmakers. Throughout the paper, we place the emphasis on the users of the information and on the decisions that they have to make.

The proposed framework is suitable for a more extensive review and documentation of the multitude of projects implementing HIS at the community level. Such systematic review will provide the information necessary to develop easily accessible step-by-step guidelines and tools to design CB-HISs in the variety of conditions in which PVOs operate.

Appendices

A. CORE Monitoring and Evaluation Group Community-based Health Information System Guide for Case Studies

This guide was developed to document CB-HISs that have been developed as part of the Child Survival Programs. This information can be shared with other organizations developing CB-HISs to help with the process. In addition, this guide focuses on what sets these systems apart as CB-HISs instead of simply health information systems.

The following questions are guides to help describe a CB-HIS.

Purpose of the Health Information System

1. **What is the purpose of a CB-HIS?** A CB-HIS has a variety of uses, including

   - being a disease surveillance system;

   - collecting information on routine service activities;

   - collecting administrative information on revolving community health funds;

   - tracking children who do not receive services; and

   - registering vital events.

2. Why does your organization call this a **community-based health information system**?

Development of the System

1. Who designed the system?

   - What role did the community play in the design of the system?

   - What role did the MOH play in the design of the system?

   - What role did local NGO partners play in the design of the system?

2. Was the development process participatory? Explain.

3. How were people trained to use the system?

How the System Works

1. What intervention areas are included in the information system?

2. What management areas are included in the information system?

3. What capacity-building areas are included in the information system?

4. Who is the target population?

5. Is the information collected quantitative, qualitative, or both?

6. Who collects the data for the system? How are data collected? What training on collecting data is provided? How much time is spent on data collection? Who monitors data quality? Who performs data audits? What is the data flow? How, when, and where are data aggregated? How and to whom are reports generated?

7. Who analyzes the data? How are the data analyzed? Do they require processing outside the community before they can be used in the community? Do community members analyze the data? (Give examples) How much time is spent on data analysis?

8. Who makes programmatic decisions based on the information from the system? How are these decisions made? For example, where are findings from the information system discussed? Are monthly meetings held? Are written reports sent to the different groups responsible for making programmatic decisions?

   Give examples of programmatic decisions made by the following groups, as appropriate to the system:
   - Community Health Committee
   - MOH Health Center staff
   - District-level MOH health staff
   - National-level MOH
   - NGO partner staff
   - Project staff
   - Home office staff
   - Other relevant groups

   Describe actions taken because of decisions made using the information system.

9. Is the information relevant to priority community problems? (Give examples)

10. How does the community find out about the information? For example, does the CHC hold community meetings? Is there a community information board at a key location or do community health workers spread the word from house to house during home visits?

11. Is the CB-HIS connected to a planning process? Please describe this connection.

12. Is the CB-HIS connected to a supervision system? Please describe this connection.

13. What are literacy levels in the community? How is the health information system appropriate for these levels?

14. What tools are used in the information system? Include, in an annex, copies of any forms used.

Strengths and Weaknesses

1. What is the most important accomplishment of this system?

2. What are other major strengths of this system?

3. What areas still need work?

4. Would you call this system a community-owned system? Explain.

Source: Community-Based Health Information System, Technical Assistance Group (TAG) meeting, April 18, 2001, Calverton, MD.

B. Six Case Studies of Community-based Health Information Systems

The following six case studies illustrate specific aspects of CB-HIS discussed in this paper. Because they are based on information from various secondary sources (see references at the end of each case study), and not from a systematic purposeful data collection effort, the various descriptions do not necessarily describe the same aspects of each CB-HIS. A summary table follows the six case studies, in which the highlight of each CB-HIS is presented (these highlights are featured in boxes in the body of the report). Other features of each case study are listed according to the community decisionmaker.

C. Case Study 1: Vurhonga, Chokwe, Mozambique

The Vurhonga Child Survival Project (1999–2003) covers a total population of 130,000 inhabitants in the rural area of Chokwe District in southern Mozambique and is implemented by World Relief Corporation (WRC) and the Ministry of Health (MOH) of the Chokwe District. The main strategy of the project is (1) to help 48 communities to create 220 care groups of 10-15 volunteer mothers working as behavior change agents through regular home visits of about 10 households each; and (2) to help the District Health Office expand its network of health posts so that 95 percent of the population lives within 5 km of a trained health care provider (nurse or first-aid worker—*socorrista*).

The Vurhonga project has designed an elaborate health information system that comprises quarterly household surveys, monthly reports from the WRC animators who help to create the care groups, and a CB-HIS. The MOH also collects data from its health posts. At the end of the Vurhonga project in 2003, only the CB-HIS will continue and will be incorporated in the MOH system.

The CB-HIS relies on the care groups of volunteer mothers. These volunteers consist of both illiterate and literate women elected by their communities. Using nontraditional techniques, such as songs and skits, the WRC staff train the care group volunteers in health education and advise on key health behaviors and services. They also provide the volunteers with education materials, such as pamphlets and flip charts.

The CB-HIS is designed to register births and deaths and to track children and women of reproductive age who do not receive specific health services, such as immunization, antenatal and delivery care, and nutritional counseling. The data are primarily collected and used by the volunteer mothers. During biweekly meetings of the care groups, the volunteer mothers report these data orally on the basis of their knowledge of the families they are in charge of; the care group leader transcribes this information. This systematic group reporting is an opportunity to double-check the information provided by each volunteer and to discuss appropriate actions. It takes about 20 minutes per care group meeting to let all the volunteers report their information.

Every month, the care group leader sends a written report of the data collected from the volunteer mothers to the local health post. The nurse or *socorrista* of the health post can review this report and take appropriate actions. He or she then compiles the reports from the different care groups in the catchment area of the health post. This report is presented and discussed at the

monthly Village Health Committee meeting. The nurse or *socorrista* also sends this summary report to the district officer who can detect discrepancies among the health posts. The Vurhonga CB-HIS is not connected to a planning and supervision system at the MOH district level yet, but this could be done as soon as the completeness of the reporting makes it possible.

Given that female literacy is only 25 percent in Chokwe District, the Vurhonga CB-HIS is very appropriate to the population in Chokwe because it does not rely on literacy skills of the volunteer mothers, who can report their data orally. The system has excellent coverage because volunteer mothers visit all households in the project area and meet biweekly.

Sources: Welch, Rikki. 2001. The use of care groups in community monitoring and health information systems. *Child Survival Connections* (www.childsurvival.com); Midterm evaluation report of the Vurhonga II Project. World Relief Corporation, Baltimore.

D. Case Study 2: SECI, Oruro, Bolivia

The SECI (*Sistema Epidemiologico Comunitario Integral*/Community Epidemiology Information System) project (2000–2004) is implemented in the rural department of Oruro, Bolivia, with support from Save the Children. It was designed to improve the health status of women and children in rural areas of Bolivia by increasing use of health services and changing household behaviors. Specifically, the project planned to achieve these goals by increasing communication between communities and health service providers through the use of a community- and facility-based health information system.

During the design phase of the project, Save the Children staff worked with indigenous communities and local health personnel to develop a CB-HIS. They used participatory methods to understand the local health problems, beliefs, terminology, local literacy, numeracy, analysis skills, and the traditional planning and decisionmaking processes.

Save the Children then trained volunteer health promoters (VHPs) to use simple forms and community maps to collect health data during household visits and other interactions with the community. At the end of each month, the VHPs, the health personnel, and Save the Children staff consolidated the community-based data with that collected in the health posts and hospitals. This information was then presented to the community by a team consisting of a VHP and a doctor or nurse from the nearest health facility. Information on the health status of women and children was presented using culturally appropriate materials accessible to individuals without literacy or numeracy skills. Indicators for maternal health include number of pregnant women, prenatal checks, pregnant women with anemia, births attended by trained and untrained individuals, and maternal deaths during pregnancy or delivery. Indicators for child health include number of cases of diarrheal disease, respiratory illness, malnutrition, complete immunization, and child death. Data regarding these indicators was presented using cloth banners and charts with drawings and colors (red, yellow, and green) representing different levels of health status. The promoters and health personnel helped communities analyze and understand the information and use it to prioritize their health needs, develop plans, take action, and monitor progress. Women were especially encouraged to attend and participate in these regular meetings to enhance their decisionmaking roles and status in the community.

After one year of implementation, Save the Children conducted an evaluation of the project using seven communities participating in the project and seven control communities in which the same health activities were implemented except for the information system. Household surveys showed that children in SECI communities were more than three times more likely than children in control communities to be completely immunized by age 5. SECI children were also more likely to be immediately breastfed, to possess a health card, and to receive vitamin A supplementation. There was also evidence of increased mobilization of SECI communities that led to local health services being more responsive and accountable. Communities involved in the SECI project were able to mobilize and apply pressure on the local government to increase financial support to the hospital for services it provided to pregnant women and children under 5 years of age. According to the new national health insurance, these services were supposed to be free. However, the government had not reimbursed the hospital for the last 8 years, thus preventing the hospital from honoring the new benefits.

Part of the success of the SECI project was attributed to a supportive policy environment at the national level that promoted community participation, local health planning and decentralization, and access to health services. However, the evaluators concluded that respectful dialogue and use of locally specific data improved communication between the communities and the health services personnel and that this greatly contributed to the strength and sustainability of the SECI project in promoting positive health behaviors and improving the health status of women and children.

Source: Willis, C., L. Howard-Grabman, D. Marsh, and D. Shroeder. 2001. Mobilizing joint planning, action and monitoring in Orru, Bolivia. Save the Children. Presentation papers from Reaching Communities for Child Health: Advancing PVO/NGO Technical Capacity and Leadership for Household/Community IMCI Conference. Baltimore, Maryland, January 17–19.

E. Case Study 3: ENLACE, Otuzco, and Julcán, Peru

The ENLACE project was implemented by CARE from 1996 to 2000 in the provinces of Otuzco and Julcán in northern Peru. The project aimed at improving maternal and child health through prevention and control of diarrheal diseases; control of acute respiratory infections and pneumonia; and better care-seeking behavior during pregnancy, birth, and postpartum. In addition to strengthening health services in the peripheral MOH facilities, the ENLACE project developed a network of health promoters to conduct monthly visits to all high-risk households.

During these visits, the health promoters provided health education, made referrals, and monitored health status.

An innovative strategy of the ENLACE project was the development and operation of a community-based health surveillance and response system (*Sistema de Vigilancia Comunal de Salud*—SIVICS) to help health promoters identify and monitor community members at higher risk. The project area was divided into sectors based on the jurisdiction of health facilities, within which health promoters were responsible for approximately 30 families each. The health providers in charge of the health facilities were responsible for all health promoters working in their sector. A house-to-house community census and survey was conducted by promoters and updated on a continual basis using family cards.

Each promoter created a communal map of his or her sector, labeling households that are considered high risk (households with children under 1 year of age, pregnant women, or women of reproductive age). Data collection focused on the information needs for each of the three project intervention areas: for diarrheal diseases and acute respiratory infections control, the focus was on households with children under 5, with emphasis on those under age 1; for maternal health interventions, the focus was on households with pregnant women or women of reproductive age.

Each promoter shared monthly reports with the other health promoters and health care providers in his or her sector, who were organized in committees (*Comités de Promotores de Salud*— COPROMSAs). These reports included information such as the number of home visits, population size, births, deaths, high-risk persons, cases of illnesses, cases referred, and number of educational activities conducted. The COPROMSAs met monthly to solve problems and plan activities based on this community surveillance data. Based on the promoters' monthly reports, sector health providers and staff made monitoring and follow-up visits to high-risk individuals with the local health promoter.

At the end of the projects, the SIVICS had achieved the following coverage: (1) More than 90 percent of the 390 project communities updated their communal maps monthly, (2) approximately 70 percent of the 590 health promoters were able to send monthly reports and held monthly meetings with their MOH facilities for the planning of community-based health activities, and (3) more than 70 percent of people needing facility-based care were referred using referral slips; approximately 50 percent of the referred cases were returned to the CHV (counter-referral) for followup.

One of the strengths of the SIVICS was its association with the MOH facilities. This helped the health promoters to offer effective referral mechanisms to persons needing care or to initiate effective responses to problems encountered during their home visits through the COPROMSA meetings. Given the impressive increase in the use of maternal and child services during the project period, results largely attributable to the health promoters network and the SIVICS, the MOH has expanded this program to other areas of the country using its own resources and has provided a grant to CARE to develop instruction materials for the development and operation of this system.

Source: Kukreja, Namita, 2000. Final evaluation report of the ENLACE project. CARE, Atlanta.

F.   Case Study 4: CBCS, Intibuca, Honduras

The Community-based Child Survival (CBCS) project (1999–2003) is implemented in Intibuca, Honduras, by Catholic Relief Services (CRS) and a local NGO, COCEPRADII. It provides services to a population of approximately 30,000 people. One of the main objectives of the project is to improve the ability of women, families, and traditional birth attendants (TBAs) to prevent, recognize, and respond to obstetric complications and to access first-level referral facilities in the event of obstetric complications.

The CBCS project designed a CB-HIS as a first step toward achieving these objectives. The CRS Honduras team reviewed all the existing data collection tools, including that of the MOH, and made revisions to best meet the needs of the project, the local NGO, CRS, and larger bilateral donors. The emphasis was placed on adopting a simple and sustainable tool that supports the involvement of individuals with limited literacy. Current indicators include age of pregnant women, stage of pregnancy, antenatal care, presence of pregnancy complications, presence of or previous delivery complications, postpartum care and complications, referrals, location of delivery, delivery attendants, and status of mother and child post-delivery (alive or dead).

CRS and their local NGO counterparts then trained all the community health educators and field supervisors on the new CB-HIS (5-day workshop) and then all the TBAs on the collection of data (3-day workshop). In Intibuca, the TBAs are all members of the CHCs and have already received training on midwifery and management of hemorrhage.

A supervision system was established in which the health educators supervised the TBAs' data collection monthly. These monthly visits had three objectives: (1) to identify necessary revisions to the CB-HIS; (2) to analyze the current reproductive health status of the community; and (3) to provide continuing support and training to the TBAs. The health educators compiled the information gathered by the TBAs and submitted reports to the CRS field supervisor. The supervisors then revised these reports and submitted them to the CRS manager. The field supervisors conducted monthly meetings with the health educators and other NGO staff to ensure project objectives were being effectively pursued and met.

Every 6 months during community meetings, the field supervisors and health educators reported back the data they collected and analyzed. The information was communicated verbally to encourage participation from illiterate community members. As a result of this process of information sharing and mobilization, the community designed its own emergency transport system to respond to the high number of obstetric emergencies. This system was managed through the bank and other community resources.

A review of the Intibuca CB-HIS highlighted the fact that the system was operational and producing the expected information. The next stage in the development of this CB-HIS is to identify the criteria for decisionmaking at each operational level: the TBAs, followed by the health educators, the project supervisors, and, finally, the CRS managers. Community members and the MOH staff will be involved in this process of setting criteria for decisionmaking, as well as in the regular assessment and decisionmaking that will follow.

Source: Rosales, Alfonso, Marylena Arita, and Mirna Nunez. 2001. A community-based health information system in Rural Honduras: The CRS/COCEPRADII experience. Catholic Relief Services, Baltimore.

G.   Case Study 5: CICSS, Siaya, Kenya

The Community Initiatives for Child Survival in Siaya (CICSS) project in the Siaya District, Western Kenya, was initiated in 1995 by CARE and the Centers for Disease Control and Prevention (CDC) to expand existing efforts to reduce maternal and child mortality. It was designed to empower communities to operate a system of curative health workers and a health committee overseeing a community pharmacy. The main strategies of the project were to

- train, equip, and supervise locally elected community health workers (CHWs) to provide promotive, preventive, and curative health services to mothers and children, and

- support the formation of village health committees (VHCs) to manage and support CHW activities.

The project emphasized community-based mechanisms to build ownership of activities among beneficiaries. VHC members were expected to collect, analyze, and interpret information to promptly identify health problems, implement disease prevention activities, and promote appropriate health behaviors. Two registers served as primary sources of data: the *maternal and child register*, in which was recorded information on pregnant women and on immunization and mortality of children less than 2 years of age; and the *clinical register*, which provides information on children and pregnant women seen by a CHW. The CHWs entered and summarized the data in both registers. On a monthly basis, VHC members were responsible for reviewing the data from the CHW's registers, interpreting changes and patterns, and developing action plans to address problems. With technical assistance from project staff, VHC members worked with the CHWs to translate these plans into specific activities to conduct in the community. Also, data on the major health events over 1 year were recorded on a *community chalkboard* available for public viewing at the pharmacy.

Although the community was expected to use the data, it was the project staff that had determined the data sources, data collection tools, and indicators based on the needs of the project. In fact, despite the emphasis of the project on developing community management capacity and using participatory methods, the final evaluation revealed that the CHWs viewed data collection as burdensome and did not understand much of the data they collected. Further, the VHCs lacked support from the community for their activities, and the use of data on the chalkboards remained very low.

In 2000, the project was redesigned before its expansion into new districts. A new training process was developed that focused on community-generated ideas and shared knowledge. This new training had two primary objectives: (1) to encourage participants to identify problems and find solutions together, and with the assistance from the district health information officer and CARE staff, and (2) to facilitate the community's process of defining how to use data generated by the system. The community became primary decisionmakers, building ownership and understanding of data relevant to their own needs. This promising experience still has to be evaluated to assess the expected increase in motivation and retention of the CHWs and VHCs and their increased use of the information generated by the system.

Source: Oyloe, Peter. 2001. Letting communities decide: A proposed methodology to expand the role of community members in community-based health information systems. Rollins School of Public Health, Emory University, Atlanta.

H. Case Study 6: Child Health and Maternal Protection for Sorsogon Project, Sorsogon Province, the Philippines

From October 1997 to March 30, 2002, the Child Health and Maternal Protection for Sorsogon (CHaMPS) Project was carried out by World Vision in Sorsogon Province (Southern Luzon, Philippines) covering a population of 622,000. The project aimed to improve immunization coverage, vitamin A intake, exclusive breastfeeding, diarrhea case management, pneumonia case management, maternal care, and family planning use. The major project strategies for achieving these objectives included (1) improving leadership, planning, and management capacities of local government units (LGUs) (municipality and barangay levels), (2) improving municipal and rural health officers' system management and health care delivery skills, (3) expanding grassroots empowerment through educating and training caregivers, families, and village health workers, (4) applying quality assurance principles to improve quality of care and raise productivity and client satisfaction, and (5) strengthening linkages among partners, communities, and health officials to create a team to work together to achieve health goals.

Midway through its implementation, CHaMPS facilitated the development of the CB-HIS system known as pregnancy and immunization tracking forms (PTF/ITF). These registers are designed and implemented primarily to empower communities to track health service coverage and practices of pregnant women and children 0–12 months old through a cohort system. It also acts as a surveillance tool for maternal and neonatal deaths through inquiry on the outcomes of pregnancies and childbirths. Today, it continues to engage the communities and health workers in simple and participatory analysis, problem-solving, and action-oriented processes on maternal and child health.

The development of PTF/ITF as a system was done in progression. Various health stakeholders from the provincial, municipal, and village levels conducted a series of consultations and workshops to collectively develop a set of essential data needed as well as tools and processes by which these data can be generated and managed by people in the community. These data requirements are also consistent with the health action messages that the project and local partnership use in all of their behaviour change communication campaigns and activities.

World Vision, in tandem with the staff from the municipal health office, facilitated the training of rural health midwives (RHMs) and *baranguay* (village) health workers (BHWs) on PTF/ITF. Orientation and dissemination activities were subsequently conducted with other key community players, such as TBAs and village officials in every catchment area (a group of 2–3 villages).

How It Works

An informal reporting network at the village level consisting of members of caregivers' classes, day care teachers, village leaders, TBAs, and other key community players report pregnant women and infants 0–12 months old to trained BHWs. The BHWs register these clients in the columnar notebook or PTF/ITF. For easy tracking, the BHWs use the cohort system where pregnant women with the same month of last menstruation and newborns/infants with the same birth month are grouped together. This system of recording enables the health workers to visually scan each cohort's page and anticipate health services and careseeking practices needed

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in a particular month or to follow up on defaulters. It also guides them to provide necessary and timely counseling and referral.

In tracking the pregnancy, the BHWs gather essential information on prenatal visits, such as tetanus toxoid immunization, plan for delivery, person who attended the delivery, health condition of the mother and child after delivery, birthweight, health condition of the mother and child after 27 days, follow-up visit, postpartum vitamin A use, family planning, and exclusive breastfeeding practices. These data are collected through continuous reporting, feedback, interaction, and action with the health client.

As soon as a pregnant woman delivers, the name of the newborn is written in the pregnancy register and the child's name is entered into the immunization-tracking register. This child will be monitored until full immunization is achieved. This register is also useful in tracking target participants for caregivers' classes initiated by the *barangay*.

If the outcome of the pregnancy is death of the mother or child, this information is automatically captured and prompts BHWs and the rural health midwives to conduct an investigation using verbal and social autopsies. A surprising number of deaths not registered in the local registry surfaced using this system (more than 20%). The Municipal Health Offices (MHO) used this information for advocacy with local government officials (e.g., hiring additional midwives increasing training funds, allocating of funds for medicines, simplifying death registration, etc.).

The data in the PTF/ITF are periodically reviewed, aggregated, and analyzed during cluster meetings in every catchment area. BHWs, *barangay* officials, TBAs, RHMs, and representatives from the main health office (usually the public health nurse or the municipal health officer) attend these meetings, which usually are held in the village health center or posts. Using highly participatory and creative approaches (such as pictographs and pyramids), these meetings enable participants to understand the health data and identify issues and concerns affecting service delivery or health practices. Actions that need to be taken at the community level are addressed; some of the other concerns are elevated to the MHO, LGU, and provincial health office levels.

This project has many promising practices:

1. Linking the child growth learning package (classes that focus on key family practices) with data to be collected at the community level to monitor compliance with these key practices.

2. Developing a cascading level of training with orientation for various stakeholders and using group-specific training methods, such as role-play about "Tracking Mary" in the case of data collection.

3. Organizing cluster meetings of 2–3 villages to share and discuss the progress, challenges, and steps to address problems generated from the information collected.

4. Linking the PTF register with community-based disease and death surveillance (CDBBS).

5. "Offloading" some work to the BHWs, which has enhanced the HFA staff's appreciation of BHWs' work as well as improved the collection and reporting of vital statistics at the village level and its subsequent use for advocacy.

Strengths and Weaknesses

The system has accomplished the following:

- Enabled the BHWs to appreciate data-based decisionmaking and action planning; shifted the role of BHWs from passive spectators to active participants and owners of health data management; and created competition to achieve better coverage among BHWs.

- Provided a means for the BHWs and RHMs to gauge the effectiveness of village-organized behavior change communication activities, such as caregivers' classes and counseling activities.

- Developed a pool of trainers through which the system can be disseminated and replicated.

- Strengthened the relationship and interaction among CHVs (BHWs and TBAs) and between CHVs and facility-based health staff (RHMs, PHNs, MHO).

- As an advocacy tool, generated the awareness, support, and participation of local elected officials on maternal and child health issues (e.g., funding caregivers' classes, providing financial incentives to members of caregivers' classes, etc.).

- Complemented the facility-based HIS and improved coverage of vitamin A supplementation and tetanus toxoid immunization.

- Sensitized the communities to the relevance of maternal and neonatal death surveillance.

The following remains to be done:

- Further document the gains achieved through PTF/ITF.

- Fine-tune and develop simplified prototypes of participatory approaches and methodologies for data review and analysis during cluster meetings.

- Train younger volunteers and intensify involvement of members of caregivers' classes.

- Simplify the disease and death surveillance system.

I. Comparative Table of Community-based Health Information Systems in Case Studies

Project Name	Vurhonga	SECI	ENLACE	CBCS	CICSS	CHaMPS
PVO (project period)	WRC (1999–2003)	SCF (2000–2004)	CARE (1996–2000)	CRS (1999–2003)	CARE (1995–1999)	WV (1997–2002)
Locality, Country	Chokwe, Mozambique	Oruro, Bolivia	Otuzco and Julcán, Peru	Intibuca, Honduras	Siaya, Kenya	Sorsogon, Philippines
Highlight	Oral report by volunteer mothers during Care Groups (CG) meetings	Use of CB-HIS to improve interaction between communities and HCF	Development of population-based HIS centered around HCF and well supported by the MOH	Design of CB-HIS as first step in process of improving emergency obstetrical care	Redesign of CB-HIS by community members in 2000	• Community-based pregnancy and immunization cohort tracking system • Death and VPD disease surveillance with verbal and social autopsies
Main CB-HIS Features by Community Decisionmakers						
Household	Growth charts	Individual health cards				Child and maternal health cards
Community-based organization	• Volunteer mothers • Community census and bimonthly home visits • Oral reporting and discussion by CG • Transcription and transmission of CG reports to HCF	• Volunteer health promoters • Use of cloth banners with color coding • Transmission of data, results, and plans to the district for advocacy	• Community health promoters • Community census and monthly visits • Family cards • Community maps • Monthly reports to other CHPs and HCF providers in the area • Referral slips	• Traditional birth attendants are primary data collectors at the household level • Health educators supervise TBAs • Community meetings for feedback on data collection results	• Community health workers • Maternal and child registers • Clinical registers • Algorithm for treatment of common diseases	• Barangay health workers maintain pregnancy and immunization tracking forms • BHWs and rural health midwife analyze and feed back results to community

Project Name	Vurhonga	SECI	ENLACE	CBCS	CICSS	CHaMPS
Health care facility	• Analysis and use of CG reports • Aggregation and transmission of CG reports to CHC and DHMT	•Support to VHPs for analysis presentation to the community •Community meetings where VHP and health workers present data	• Counter-referral slips • Monthly meetings with CHPs • Visits to high-risk households identified by the CHP		• Community pharmacies	• Analysis and aggregation of BHW reports • Followup of some ANC and EPI defaulters and any reported VPD and maternal child deaths
Community health committee	• Village health committee • Use of HCF reports		• COPROMSA groups elected board of directors, HCF workers, and CHPs • Monthly meetings to discuss reports and make decisions			• Village health committees • Monthly meetings for data analysis and plans • Community "chalk boards" to display major health events

J. Suggestions for Further Reading

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