
**THE JOHNS HOPKINS UNIVERSITY
SCHOOL OF HYGIENE AND PUBLIC HEALTH
INSTITUTE FOR INTERNATIONAL PROGRAMS**

Health Interview Surveys for

Child Survival Programs:

A Review of Methods, Instruments
and Proposals for Their Improvement

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HEALTH INTERVIEW SURVEYS FOR CHILD SURVIVAL PROGRAMS

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Preface

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"Health Interview Surveys for Child Survival Programs:
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Dale Huntington, DrSci.Candidate; Peter Berman, Ph.D.; and Carl Kendall, Ph.D.

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EXECUTIVE SUMMARY

The Health Interview Survey (HIS) is a widely used research method in child survival programs. However, there have not been adequate opportunities to date to compare experiences. Hence, the development of standardized approaches to conceptualization, measurement, sampling, and data analysis -- which build upon the results of previous HIS -- has not occurred in this area of health services research and evaluation. This review addresses this need by comparing eight child survival HIS selected for their research quality.

The uses and usefulness of the HIS research tool in child survival programs has been mixed; so much so that a comparison of experiences with the method risks grouping together studies of vastly different conceptions and applications. Three categories of the many uses of HIS have been established to guide the review.

The first category distinguishes between the content area of the HIS. This review focuses upon the Expanded Program of Immunization and the Control of Diarrheal Diseases; consideration is given to HIS that included other topics, such as malaria control, integrated maternal and child health (MCH) service delivery, and family planning. The second category of HIS types takes into account the different objectives of the studies: formative evaluation, program monitoring, and summative evaluation. The third category examines the design of the HIS, of which two broad types are delineated. Multi-purpose HIS are contrasted with multi-phase study designs, the latter type including a mix of qualitative and quantitative data gathering methods.

The starting point of the review is a synthesis of published literature on HIS in developing countries. Critical issues in the design and implementation of the HIS are drawn out, and are framed in the form of research questions that guided the review. Comprehensive background documents, including the survey questionnaires and internal reports are analyzed for each of the HIS included.

The intent of the review is to examine, in as much detail as possible, what each of these HIS have done and how they went about it. Within the broad categories of HIS uses, three distinct topic areas guide the review: Problem Formulation, Measurement of Variables, and Design Features. The final section of the review provides a summary listing of the major implications for future child survival HIS in developing countries.

The reader will find this review to contain a significant amount of descriptive information about specific methodological concerns that confront all HIS. Creative solutions and approaches taken for the resolution of unresolved areas are indicated.

INTRODUCTION

Health interview surveys (HIS) in developing countries are the most common form of gathering population based data for a variety of health care topics. The HIS generally involves the use of trained interviewers who administer a standardized questionnaire to a sample of a defined population, most commonly the mothers or principal caretakers of a young child. The uses and usefulness of the HIS research tool in child survival programs has been mixed, so much so that a comparison of experiences with the method risks grouping together studies of vastly different conceptions and applications. Certain parameters were established to facilitate our review in comparing examples of important child survival HIS.

The first parameter defines the content area of the HIS examined. In this review we were principally interested in the Expanded Program of Immunization (EPI) and the program for the Control of Diarrheal Diseases (CDD). However, we also include examples of HIS that looked into program issues of malaria, family planning and integrated MCH program delivery. Within these five child survival program content areas several applications of the HIS research tool become apparent.

The HIS has been commonly used in measuring program coverage, for example by the EPI. A second common application uses the HIS to measure self care practices. Health promotion programs to encourage salutary health care practices (e.g., ORT) have had extensive experience in developing HIS instruments. The knowledge, attitude and practice (KAP) survey, originally developed by family planning promotion programs, is a well known tool of child survival programs in developing countries today. A third application of the HIS involves the measurement of program outcomes: the impact of child survival programs on morbidity and mortality estimates has received significant attention in several major HIS.

Other child survival concerns have not been as fully developed as the above issues. The application of the HIS in exploring economic and distributive issues of child survival programs (e.g., family health spending or income - related biases in health care utilization) has lagged behind the development of measures for program coverage and impact. The current interest in cost recovery and financing of health care services has given an impetus to developing HIS that examine economic concerns; hence, the HIS method of data collection is being employed more often in this content area. Data on utilization of health care services in developing countries has not been explored as aggressively to date.

We have categorized a second cluster of HIS uses according to the study's objectives, of which three types are distinguished.

1. The HIS has been employed as a formative research tool: Baseline data and initial information needed for program development have often been gathered by a HIS.
2. Program monitoring needs are often addressed by a series of local level HIS. In this way operations and intermediate outcome data that are required to

keep the program running in appropriate manners are gathered as a regular program activity.

3. Impact evaluation of child survival programs employ HIS to assess the level of desired results.

Our review of child survival HIS has revealed another series of interesting distinctions in addition to the content and objectives of the HIS. The application of this particular research tool across disciplines has yielded a diverse collection of study designs and instruments. One commonly finds HIS that respond to multiple interests within the health care services. In these cases one instrument will consist of different components or modules, each responding to epidemiological, ethnographic, demographic, and economic issues. Generally these multi-purpose HIS (i.e., studies that probe multiple health care interests) reflect the approach to measurement of single discipline. For example, a multi-purpose HIS in support of a family planning program may measure the self-reported practices sufficiently and also provide a large enough sample size to detect prevalence rates, but the probing of related attitudinal measures in the standardized questionnaire can be too blunt a measure. This has given rise to the label of multi-purpose, but mono-method HIS.

The combination of qualitative and quantitative research methods is expanding our experience with HIS: recent studies are experimenting with techniques of data triangulation (see Fielding & Fielding, 1986) in an attempt to build upon the strengths of each data gathering method. Different child survival interests are being explored using different research methods, all within the context of a single study design. This is what we have defined as a multi-phase study. Some of the HIS reviewed are in the forefront of this methodological development and are forging new HIS tools for child survival programs worldwide. This development has, however, added another level of complexity to our efforts to compare and contrast HIS experiences.

Our interest has been primarily on the quantitative data gathering techniques of HIS (per our definition of an HIS). In the review of the multi-phase studies, acknowledgment is given to the qualitative phases and where appropriate, sampling issues, measurement methods, etc. from these other phases of the study are brought into the discussion of the HIS. In this way the quantitative phase of these more complex multi-phase study designs is examined in detail, thereby permitting a comparison of the resolution of key issues across a variety of study designs.

Five of the HIS selected for review are health care utilization studies of child survival programs, particularly CDD and EPI components. Two HIS that examine other child survival intervention areas are included in the review as well. The eighth HIS reviewed is primarily interested in determining contraceptive prevalence, and the correlates of its use, yet does include general health care practices information. Thus examples of both multi-phase, multi-purpose, and single content area child survival HIS are included in the review.

The studies that have been reviewed are:

1. Community Acceptance of Oral Rehydration Therapy in Haiti; (Pan American Health Organization).

2. Demographic and Health Surveys; Westinghouse (USAID).
3. Dietary Management of Diarrhea Study; Johns Hopkins University (USAID).
4. Health Communications for Child Survival Project Evaluation; Annenburg School of Communication (USAID).
5. Mass Media and Health Practices Project Evaluation; Applied Communication Technology (USAID).
6. Mortality and Use of Health Services; Combatting Childhood Communicable Diseases (CDC and USAID).
7. Child Survival Project Health Information System, Adventist Development and Relief Agency, Malawi; PRITECH (USAID).
8. Sine Saloum Family Health Survey; (CDC and USAID).

The starting point of the review will be a synthesis of published literature reviews on health care HIS in developing countries. Critical issues in the design and implementation of the HIS are drawn out of the literature review's synthesis. These areas of concern were framed in the form of research questions that guided our review of the child survival HIS we had collected.

Comprehensive background documents, in particular the survey instruments themselves and internal reports, are analyzed in this review. Unfortunately, the level of documentation available for review did vary across the different HIS. This has created a situation where (potentially) conclusions are drawn based upon incomplete evidence. We have tried to avoid this by highlighting the many positive aspects of these HIS, while acknowledging the gaps in our literature wherever it was evident to us. The reader is requested to keep this caveat in mind throughout the review.

The final section of the review will provide a summary listing of the major implications for future HIS in developing countries.

RESULTS OF RECENT LITERATURE REVIEWS OF HIS IN DEVELOPING COUNTRIES

Within the past few years there have been four comprehensive literature reviews published of surveys (HIS) in developing countries (Kroeger 1983a&b, 1985, and Ross and Vaughan 1986). The studies included by these authors reflect a wealth of knowledge. Two main types of HIS will be reviewed in this synthesis, and then basic methodological issues that cut across all HIS in developing countries will be addressed.

Illness Reporting in the Household Interview Survey

1. Validity Issues

The primary validation technique of self-reported morbidity in the industrialized world has been a medical examination subsequent to the interview (i.e., a criterion related validity test where a physician provides the 'actual status measure' of the respondent's self reported health). This validity test has been employed in the developing world, but with generally unsatisfactory results.

The 'objective' measure of the physician is generally recognized to be dependent upon the level of communication that has been achieved in the patient-physician encounter. Low back pain, angina pectoris, diarrhea or vaginal discharge represent some of the more simple examples of this fact. To enhance this communication, easily identifiable conditions that have a high degree of conceptual congruence between the patient and physician are best: this fact has limited the usefulness of this validity check in developing countries. The gap between patient and physician conceptions of disease symptoms is simply too vast. Two different types of data emerge from such an exercise (i.e., objective and subjective statements on an individual's health status), confounding efforts to provide a criterion against which the validity of the self-reported health status is measured. Recognition of this issue has reduced the value of medical examinations as a criterion related validity check on illness reporting in developing countries' HIS.

Another type of a criterion related validity check may be found by the use of established disease prevalence rates. Kroeger compared the self-reported prevalence rates for diseases with the likelihood of their occurrence in particular age and sex groups obtained from official statistics, and found good agreement. This obviously depends upon the use of validated official disease prevalence rates, which may or may not exist, and may suffer from the same biases of concern in HIS.

2. Reliability Issues

Reinterviewing of both the entire and a sub-sample of the HIS has been widely used as a check on the consistency of the responses. Several combinations of interviewer types have been used; most commonly, lay interviewers and health professional (either nurses or physicians) have been mixed, which has led to widely different responses. In general, conflicting experiences in the level of illness reporting has been shown in reinterviews: both increased and decreased levels of reporting have occurred, even when interviewers, or types of interviewers did not change.

In order to enhance the reliability of the reinterview test, several key elements should be addressed. Principal among these is the scheduling of the second interview. The period of time between the original and reinterview has varied from 24 hours to two weeks. There is a clear trade-off between avoiding a carry-over effect from the first interview to the second, and optimizing an overlap between the recall periods used to elicit the illness report.

In general, it was concluded that reinterviews have their specific fallacies, yet are useful for disclosing some kinds of response errors (i.e., those related to age and sex), and do provide a fair measure of the HIS reliability given comparable interviewers and an optimal time period between encounters.

3. Steps for Improving Illness Reporting in HIS

(a) Tracer Conditions

The discrepancies between lay and professional reporting of diseases has been shown to be reduced by the use of tracer conditions in developed countries, yet this technique has not been widely adopted by HIS in developing countries. A symptom checklist, or the use of specific conditions to trace an illness' history which has been developed using qualitative methods to assure conceptual and linguistic comprehension has greatly facilitated the collection of illness reports in the few studies which employed this method.

(b) Severity Measures

This is a gray area of measurement in industrialized countries, and all the more so in developing countries. None of the reviews proposed clear guidelines for the development of appropriate severity measures. The principal measures that have been employed relate to a self assessment of activity limitations, (e.g., functional impairment suffered due to the illness, such as unable to carry out normal activities, days of restricted activity, etc). Obviously this is highly dependent on the nature of the individual's normal activities, which is virtually impossible to standardize. Recognizing this limitation, other HIS have developed severity measures that are based on the number and duration of symptoms, and a self-assessment of the illness' severity by the respondents themselves (e.g., bothered them, hurt or pained them, concerned or worried about symptoms, etc.), and the kind of illness (e.g., tuberculosis being severer than bronchitis).

(c) Recall Period

Very little empirical evidence exists for the optimal recall period in developing countries. Currently a two week period is widely used in most HIS; however, past HIS in developing countries have employed recall periods of unlimited periods, 12 months, several months, and four weeks. Reviewers recognized the 'salient principle' effect on illness reporting (i.e., the more prominent the illness for the respondent, the longer the time period during which events surrounding the episode will be clearly remembered), and suggested a tailoring of the recall period to the nature of the illness being probed. Consequently some HIS will include a longer recall period for in-patient conditions, and a shorter recall period for more acute or self-limiting conditions. Linking the recall period to a local calendar event has been employed to firmly ground the time period in the respondent's frame of reference. Related to this point is a recognition of the seasonality of certain diseases which the recall period must take into account.

(d) Proxy Reporting

Very few studies in developing countries have provided empirical evidence of the differences obtained from proxy respondents rather than self-reporting. Evidence from industrialized countries indicate the potential effect of this issued on measurement:

"Studies in the United States have shown that the differences between proxy and self-reporting were small when specific disease conditions were referred to, and large (i.e., about 10%) with respect to chronic conditions" (Kroeger 1985)

Generally, it is acknowledged that proxy responding for adults will lead to an under-reporting of illness; mothers have been indicated as being valid proxy respondents for their child's health (probably because of the difficulties of obtaining self-reports). Less is known about the use of the child's principal caretaker as a proxy for the mother: more empirical research is needed on this choice to firmly validate a common practice.

The selection of the respondent must be guided by a knowledge of the decision making process for identifying an illness within the family context, or for seeking health care services in utilization studies as is discussed below. If this is a group decision, then family interviews are appropriate; if one key decision maker can be identified (such as the mother of the infant), then individual interviews are indicated.

(e) Lay versus Professional Interviewers

The discrepancy between the results of interviews conducted by lay and professional interviewers in a reinterview situation was indicated above. We will discuss this again for utilization information as well. Relative to illness reporting there is no clear preference for either category of enumerators, as each has its unique merits. Generally, lay interviewers are better at eliciting and recording the respondent's own expression of his health status, while interviewers with some training in a health profession are better at capturing professionally acceptable diagnoses: which of these response types is a better expression of the respondent's health status is not always immediately evident.

The difficulty in determining the optimal measure here is centered upon the distinction between clinical assessment and an individual's perception of his health status. It is interesting that different interviewer types have been suggested to be associated with this distinction in health status measurement. However, empirical evidence on this point is still lacking from HIS in developing countries.

The potential for bias in the reporting of health care practices has been indicated if the interviewer is known to the respondent as a health care worker.

Health Services Utilization Reporting

1. **Validity Issues**

The existence of a criterion related validity check for use of health services is extremely problematic in developing countries, where health facility attendance records are themselves poorly validated and unreliable. Some HIS have adapted this validity test, however. One use of this approach has been to obtain lists of patients from a clinic, or traditional healer, and then interview the patient (with both patient and interviewer blinded to the attendance information). The self-reported use is then easily validated.

A primary concern in utilization studies has been an overemphasis on reporting use for the Western sector's health care system. Several prominent HIS in the recent past have only measured use of this sector; other HIS have not adequately addressed the potentially sensitive nature of reporting traditional healer use. HIS that have captured self reported use of traditional healers have usually done so by the use of projective questions (e.g., questions about the practices of a third party, or hypothetical cases), or have interviewed respondents who were not hesitant to report the use because of societal approval of this health sector.

A complication in determining an appropriate recall period for a utilization HIS arises with the application of the 'salient principle' to the measurement of utilization correlates. Such variables as waiting time, travel costs, and patient satisfaction may have a shorter recall period than the actual consultation itself: consideration must be given to this issue in setting the recall period. Often two recall periods have been used in the same utilization study (e.g., one for morbidity and another for utilization), although this may pose additional problems by confusing the respondent. Empirical evidence is generally lacking on these issues.

A final issue surrounding the validity of utilization measures in developing countries' HIS has been the imprecision of the utilization measures. Numerous variables have been used in HIS to measure the level of use of different health care sources. Ross and Vaughan classify the range of variables as follows:

1. Questions on the source and type of care received during a specific, clearly identified episode of illness or disability.
2. Questions on the source(s) from which respondents would seek care if they became ill (i.e., hypothetical cases).
3. Reasons for choosing a particular source of care.
4. The degree of satisfaction with the care received.
5. The respondent's attitudes toward various sources or providers of health care.
6. The financial or other costs incurred by the respondent in using a particular source of care.

Questions of the first type will underestimate total use unless they are followed by a more general question about contacts for other reasons within the recall period, such as preventive care use. However, health care use must be clearly linked to a reported reason for and the site of health care contact (otherwise accompanying a sick friend may be referenced by the respondent). Particularly in primary care settings, the issue of separating preventive care use from curative care use has not been resolved empirically.

The use of hypothetical tracer conditions appear to promote the respondent saying what he believes the interview is looking for. Hypothetical conditions also provide responses that are impossible to validate.

2. Reliability in Utilization Studies

The reliability issues discussed under the section on Illness Reporting in HIS apply equally well to HIS that measure utilization. In general, the use of a test - retest reliability check on a sub-sample does provide an adequate measure of the HIS' reliability. Attention must be given to the timing of the second round of interviews in order to promote an overlap of recall period(s) while also decreasing the possibility of a carry-over effect from the first interview.

3. Steps for Improving Utilization Reporting in the HIS

(a) Recall Period

As noted above, adherence to the 'salient principle' in determining the recall period for health care use will require that variable lengths of time be employed, depending upon the nature of the illness for which health care was sought. Thus, recall periods of 2 weeks to 6 months for physician contact and 6 to 12 months for hospitalization have been used in the developed countries. In developing countries no empirical information on this subject is available. However, two or more different recall periods in the same interview may confuse the respondent. Careful consideration must be given to setting the recall period(s) for the correlates of use.

(b) Linking Utilization with Need

Medical anthropologists have shown that the type of illness and its etiological concept is one of the most powerful explanatory variables in the choice between different treatment alternatives. (Kroeger 1983a) Correctly referencing the medical need through acceptable concepts and linguistic terms necessitates the use of qualitative data. All of the reviews have stressed this point.

Utilization of health care services is only relevant when understood within the context of the need for such care. Over-, under-, and appropriate utilization are (theoretically) possible to measure when one has an estimate of the level of need for health care. Without a reference to the need for services a utilization measure exists in a vacuum. Thus the HIS must provide an explicit linkage between utilization of a health care service, and the level of need for said service.

The linking of use with need poses some particularly difficult issues for the HIS, in both industrialized and developing countries. It is frequently difficult to identify in the cluster of reported symptoms the leading sign that prompted the subsequent action; two or more illness episodes at any given time are common as well, each with different health care actions. Thus the definition of the illness episode becomes central to the linkage of use with need. Some of the solutions that HIS have employed are (Kroeger 1985):

- (a) A reported period of uninterrupted illness irrespective of the number of symptoms or conditions present (i.e., only one illness at a time is coded).
- (b) Code the different symptoms of one illness episode separately (i.e., illness label and symptoms are coded separately).

- (c) Code all different symptoms and illnesses reported, and then have the respondent identify the most important illness for which the health action was taken.

(c) Self Care

Generally, the measurement of self care must adhere to the same principles that guide the HIS in dealing with utilization of health care practitioners: relate the self care to specific diseases, to different levels of severity, and to different stages within the overall illness episode.

(d) Multiple Use of Practitioners.

The concurrent or serial use of several different types of health care sources is a well known phenomenon in most developing countries today. In order to adequately measure this multiple use, HIS must resolve several major problems, including the following (Kroeger 1985):

- (a) inhibitions of reporting traditional sector use;
- (b) limitations of retrospective cross sectional studies in identifying discrete steps in the health care seeking process;
- (c) use must be linked to a particular illness episode within a limited recall period.

Clearly a longitudinal study that embraces the entire illness episode is the optimal solution for this measure; small scale HIS studies have done this. Cross sectional studies have addressed this issue by probing different treatment decisions within a two week recall period for a targeted illness episode.

Methodological Issues of HIS in Developing Countries

1. Sampling

A general difficulty that all reviews of HIS have noted is the conception of the scope and size of the survey. The difficulties associated with the scope of HIS were suggested in the opening comments of the review: Multi-purpose HIS have too often resulted in large and unwieldy surveys that measure too many variables with too little precision. In addition to a grandiose conception, several multi-purpose HIS have included a large sample size when alternative designs might have been more reasonable.

Field conditions in developing countries are not generally conducive to large scale HIS. There are several features of developing countries in general that, when taken into consideration, indicate that national level, multi-purpose HIS are best avoided. Some of these features are: the diversity of ethnic groups in most developing countries that complicates the use of a standardized instrument and single sampling method across different cultural groups (each with different ethnomedical concepts, patterns of habitation, and often living in different climatic zones); the scarcity of trained interviewers; poor communication with remote rural areas; the need for relevant and timely data, etc. Certainly there have been large scale HIS that have successfully overcome these difficulties. However, unless substantial resources are devoted to the HIS, smaller studies are often a more rational use of resources.

A series of local level studies has been done in some circumstances, which all reviews found to be most sensible. In addition to responding to technical concerns about the reliability and validity of the HIS, local level studies fit within a policy framework of administrative decentralization (common to many developing countries). Small scale studies also enhance local health care personnel's understanding of their community.

The most common sampling method employed by HIS in developing countries is a multi-stage stratified cluster sample. This is largely due to the absence of comprehensive population lists. The selection of respondents on the final stage of the cluster design will often be a variation on the systematic selection process adopted by the EPI coverage survey, wherein the first seven respondents encountered in a randomly chosen sampling trajectory are enumerated. This method is not without its risks, however, as is suggested by Gray.

" A particular concern (with this method) is that geographically related households can lead to "pocketing", whereby contiguous units may be similar with respect to the variable of interest (e.g., immunization status or disease incidence), but unrepresentative of the cluster as a whole...the use of cluster surveys to measure community level variables such as access to health services, water or sanitation may be misleading, because these factors tend to be common to an aggregate of households in a locality. Thus, community level variables are more likely to differ between areas than between individual households within an area." Gray;17,18.

2. Interviewing Process

Too little attention has been paid to the selection and training of interviewers for HIS in developing countries. Their involvement in translating the survey instrument, the training of their supervisors, the actual supervisory activities in the field, their compensation and working conditions: each of these points will have direct effects on the HIS' overall reliability.

3. Questionnaire

The response effects associated with the ordering of questions has not been empirically tested in developing countries to date. In the United States, several studies have tested the ordering of need and utilization items, with different results. Research into this issue is called for. Basic issues such as placing sensitive items near the end of the interview have not been acknowledged in the literature.

Empirical evidence on the use several different question types, (i.e., broad versus tight ended) has not been provided by HIS in developing countries. More broad questions will promote a discussion format to the interview, which may relax the respondent, yet tighter questions will enhance the overall reliability. A common device used in industrialized countries' attitudinal measurement is the Likert Scale (e.g., 'On a range of 1 to 10, with 1 being strongly disagree and 10 being strongly agree, how do you feel about the following statements..'). The use of "Likert type" response patterns has not been explored adequately in developing countries' HIS to date.

HIS reviewers have stressed the need for extensive pretests of the instrument, yet this is only a partial solution to the common problem of developing suitable items. Pretesting will not produce a sizeable lists of items from which a winnowing process of selection can occur: too often it has involved only a (rigid) set of items that are somehow 'fixed' before the fielding of the HIS. The use of an item pool, which has been generated out of exploratory studies featuring qualitative methods and broad open ended quantitative methods should be pursued more often in the development of questionnaires in developing countries HIS. Pretesting of the instrument can then proceed, focusing the researcher's attention upon such issues as the order of the items, interviewers use of the questionnaire (e.g., its layout) and the development of coding manuals.

4. Measuring Social Status and Income Levels

The extreme range and variation in income levels, wealth and assets (or lack thereof), and social standing in most developing countries is qualitatively different than what social scientists find in developed countries. Seasonal variations in labor/income further complicate the measurement issue. In general, calculations of family income are impossible to arrive at. Issues such as prestige and power are multi-dimensional, and an individual's social status in one sphere may be radically different in another: cultural bound notions pervade an understanding of this construct. No solutions to these issues have been found in the literature reviews.

The multi-dimensionality of the measurement issue surrounding socio-economic status (SES) leads the prudent researcher to narrow down the field of potential variables. One potential approach to this task begins with specifying a clear set of objectives in conceptualizing the study relative to the SES variables of interest. For example, if a child survival program is concerned with how much people spend to treat diarrhea, a wealth index may not be the best income measure; a measure of total cash expenditures might provide a more parsimonious indicator.

The use of qualitative exploratory studies for the identification of cultural bound status and wealth indicators has been effectively employed by recent HIS: this approach could be used to assist in clarifying the SES variables of interest for the main study design in other HIS.

5. Difficulties in Making Use of the Data

"An enormous amount of information never serves a useful purpose, because there is no system to make it available to the right people at the right time and in a form that is easy to understand" (White in Kroeger 1985).

This issue has been poorly resolved in both industrialized and developing countries. In part this stems from the social scientist's negligence of policy maker's timetables and schedules, as well as from ignorance of an acceptable form of data presentation so that it is 'digestible' to the policy maker. In addition, many HIS set out to address a multitude of problems and never provide conclusive information on any one particular issue. Policy decisions are made in the absence of perfect data; experimental hypotheses are never resolved

in a similar atmosphere. Measures to bridge this gap should be addressed during the preliminary stages of planning applied health care research in developing countries.

REVIEW OF EIGHT MAJOR HIS IN DEVELOPING COUNTRIES

This review examines current applications of the HIS research method in child survival programs. A cross section of studies was selected, but primarily we have focused upon CDD, EPI and malaria control programs. The intent of the review was to examine in detail what each of these HIS have done, and how they went about it in as much detail as possible (given the documentation made available for our review). Three topic areas were established to guide the review: Problem Formulation, Measurement of Variables, and Design Features. We open the review with a descriptive overview of each of the HIS.

I. DESCRIPTIVE OVERVIEW

1. Health Communications for Child Survival (HEALTHCOM)

The HEALTHCOM project is currently being implemented in 17 countries worldwide. Its mandate is to provide comprehensive communication support for child survival programs, most notably CDD programs. Because of the newness of the HEALTHCOM project, only a few of the sites actually have an evaluation component up and running. Of those which do, Guatemala, Swaziland, Malawi, and West Java, Indonesia are reviewed here.

In most of the HEALTHCOM evaluation sites the basic before and after HIS study design is employed, without the use of control groups (since most sites are a national program). This was the case in Swaziland, and Guatemala; it is projected to be the design in Malawi. In West Java, Indonesia, four separate HIS will be mounted in a longitudinal study using equivalent samples (but not a panel design due to effects of testing on the internal validity of the study). Each sample will contain approximately 750 persons.

In addition to the HIS summative evaluation on impact of the communications program, process evaluations will be conducted by interviewing project administrators, Ministry and USAID officials, etc. A cost analysis of the project for each site is planned as well.

2. Mortality and Utilization of Health Services (MUHS)

The MUHS was developed as a project evaluation tool for measuring mortality and morbidity impact, health care services' use and improved health practices in the home relative to diarrheal diseases, childhood immunizations and malaria. It was designed as part of the Combatting Childhood Communicable Diseases (CCCD) project of the Centers for Disease Control and USAID. Three sites were selected for the MUHS; Zaire, Togo and Liberia.

The MUHS was conceived as a before and after study design, with the possibility of an interim measure in the third year of the CCCD project for program management purposes. In Zaire two control areas were sampled in the before study. Up to three regions/counties where the CCCD project was operational were sampled in each site.

The draft questionnaire was developed by the International Health and Program Office (IHPO) in the CDC, Atlanta, as were generic sampling plans and data analysis procedures. Each of these points were adopted locally by country technical officers and national Ministry of Health officials. No exploratory studies were conducted in the development of the questionnaire; translation and pretesting of the questionnaire generally occurred as part of the training program for survey enumerators.

The original MUHS yielded mortality information that was under-reported in Togo and Zaire. A verification study, (retest) was conducted on a sub-sample in each of the three countries. Generally the mortality measures of the verification studies were deemed more valid and reliable than the main study, but several issues still remained regarding the replicability of the MUHS in a post test situation for program evaluation. To date, no follow up MUHS type studies have been done by the CCCD project; instead research efforts have concentrated on developing what is termed a 'P' survey (Practices), focusing on the measurement of service utilization and behavioral indicators of program impact.

3. Sine-Saloum Family Health Survey (SSFHS)

The SSFHS was a multi-purpose HIS implemented by the Ministry of Health and USAID in support of a rural primary health care project that was just completing its first phase of operation in this largely rural region of Senegal. The HIS covered the entire region of Sine - Saloum, except six urban areas and three towns in which health centers were located, thus involving a sampling universe of approximately 1 million persons. The survey design consisted of three components: a village dossier, a compound form, and the individual respondent questionnaire.

The one page village dossier was completed by the village chief in each of the sampled villages; it collected information on the proximity of various facilities (particularly health facilities) to the village.

The compound, or concession form was filled in by an interview with the chief of the concession. The data collected consisted of women's ages, marital status, and whether or not each woman had given birth. This information served two purposes for the SSFHS: it provided a sampling frame for the final stage of the sampling method for the HIS, and it provided total population estimates for analysis of fertility rates and sociodemographic variables, as well as age and marital status distributions.

The individual questionnaire of the HIS was the most important of the study's instruments. Each woman of childbearing age who had ever been in a consummated union or ever had a live birth was asked to respond to the 20 to 30 minute questionnaire.

The SSFHS was designed as an evaluation HIS. It was to provide a formative assessment of the rural primary health care (PHC) project at the close of its first phase, thereby assisting the project's second phase planners. It was also to provide a base line measure for the second phase's summative evaluation.

4. Community Acceptance of ORT in Haiti (HAITI)

This study was sponsored by the Pan American Health Organization in support of the Haitian Ministry of Health's MCH program. The study consisted of four discrete investigations of a single community with an on-going ORT health program in Haiti. Thus, the objective of the study is characterized as a program monitoring tool.

The design of the HAITI study is multi-phase. A household survey of ORT knowledge and use, a group of longitudinal case studies using ethnographic methods, a knowledge, attitudes and practice (KAP) survey of traditional healers, and an ethnographic description of the community were all developed as part of the overall study. A three month period of time (July - September, 1984) was given to all four studies, and an equal period of time for data analysis occurred immediately after the field work was completed.

There was no evident temporal progression of exploratory qualitative studies, quantitative HIS main study, and use of sub samples for the longitudinal case studies incorporated into the overall study design. Simultaneous use of qualitative and quantitative methods were employed.

5. The Dietary Management of Diarrhea Study (DMD)

The DMD study is a complex multi-phase study design featuring several components implemented over an extended period of time. The research is of a formative nature, (with both basic and applied research interests being addressed), with a health promotion / communications project activity built into the later phase of the program. The DMD project has been implemented in Peru and Nigeria using the same basic methodology in each country. This review will examine components of the DMD from each of its sites.

One of the features of the study design that sets it apart from other child survival HIS is the relatively long time period devoted to the data collection phase of the DMD project's activities: in addition to a large HIS and exploratory qualitative studies, the DMD also involves a 12 month longitudinal observation study that examines the effects of seasonal variation of foodstuffs on dietary intake.

The second phase of the DMD project undertakes clinical trials.

" These clinical trials will quantitate the severity of diarrhea and the nutritional outcomes of therapy among groups of children randomly assigned to treatment with one of the prototype study diets or with a formula diet previously shown to be well tolerated during diarrhea." (Brown, 1986)

The DMD project's third phase will field test the prototype diets which were developed during the clinical phase. An intensive health education intervention will accompany the field testing of the nutritional interventions of this phase.

6. PRITECH Malawi study (PRITECH)

The USAID-sponsored PRITECH project (Technologies for Primary Health Care) provides support services to USAID health care programs worldwide. One of the more recent HIS study designs (at the time of our data collection) done by PRITECH was chosen for

review as an example of the state of development which this type of child survival project currently implements. This survey was designed for summative evaluation purposes of a relatively small scale health care program in rural Malawi.

There are two separate surveys for this program, Phase I and Phase II. The Phase I HIS uses as a sampling universe the population within a radius of three miles of the Adventist Development and Relief Agency, ADRA, (the agency implementing the program); Phase II involves the population living between three and five miles as its universe.

The HIS of both phases are to serve as baseline project evaluation measures for the ADRA community health care program which was operating in two regions of Malawi. In addition to the HIS, clinic records, Community Health Worker (CHW) generated registers, and project records will all be employed for the program evaluation.

The Phase I HIS was initiated by the ADRA home office, using a generic questionnaire and implemented by the field staff. Data collection had begun prior to the arrival of the PRITECH team. Phase II HIS was designed and developed by two PRITECH consultants called in by USAID/Malawi to provide an improved evaluation component to the ADRA program.

7. The Mass Media and Health Practices Evaluation in Honduras (MMHP)

The MMHP project was one of the early public health communications projects sponsored by USAID in support of child survival programs; the HEALTHCOM project is in fact the second generation of the MMHP project. The content area of the original MMHP sites was the ORT component of the CDD programs, with information on dietary practices and environmental sanitation included. This review has selected the evaluation of the first MMHP site, Honduras, as an indication of a major multi-phase evaluation study that incorporated a longitudinal HIS component.

A listing of eight major categories of variables, operational measures, and procedures of measurement was developed by the MMHP evaluation group. Several of the variables needed to be measured only one time; others would require repeated measurement for a longitudinal assessment. Three types of study designs were employed for these purposes: a pre-test post-test, a panel study, and an ethnographic study. Variables were measured in a variety of ways, with overlap occurring intentionally between the study methods for convergence, or data triangulation assessment.

The panel study was the principal quantitative data gathering method. Four basic questionnaires were developed for use in the panel study: communication, morbidity, nutrition, and anthropometry. The first data collection consisted of a broad series of baseline items (the pre-test study), after which each questionnaire was administered separately in intervals corresponding to either the communication campaign's activities, or the seasons. A given questionnaire was usually administered at roughly four to six month intervals. This method prompted the label of Waves for each successive application of a questionnaire. The design incorporated the use of control groups and was in fact much more complex than this brief overview suggests.

In this review we have focused only on the results of the panel study, highlighting specific results of the mortality study, health worker knowledge study, and the ethnographic study.

8. The Demographic Health Survey (DHS)

The DHS is a worldwide study sponsored by USAID in support of population programs. It was initiated in 1984 as a five year follow-up to two USAID population surveys; the World Fertility Survey (1972-1984) and the Contraceptive Prevalence Survey (1970-1985). The DHS core component focuses on fertility and its proximate determinates.

Two variations of the same basic questionnaire have been developed for the DHS. Either a Model A or Model B questionnaire is employed depending upon the level of contraceptive prevalence of the country where the HIS is fielded. Both incorporate the service availability and health modules described in this review. Longer versions of the core questionnaire are being tested in four countries, and an in-depth study design of socio-cultural explanatory factors is planned. This review examines the Senegalese questionnaire, which is a longer version of core instrument. Significant differences between it and the core questionnaire will be highlighted where appropriate in the following discussion.

The DHS has made efforts to accommodate local government and other donor agency desires for more specific measures. An example is given: in Nigeria, over sampling in one state was done, and extra health items were added onto the core questionnaire to collect information relevant to a child survival health program being supported by UNICEF. The DHS is completely managed by local governments, with technical assistance and advice being provided by Westinghouse as terms of its project agreement with USAID.

II. PROBLEM FORMULATION

An explicit statement of the conceptualization of the study's approach to the content area -- be it utilization, morbidity assessment, or health knowledge and practices -- is not commonly expressed in the published literature. In the overall design of a study, however, the careful formulation of the problem to be examined is a critical step. The eight HIS were reviewed for their attention to this stage of development.

We next examined each study's use of research questions and/or hypotheses. Using the information gained from the review of the conceptual models and research questions/hypotheses, we constructed a list of the major variables examined by each of the HIS.

The completeness of these three steps in the preparation of the study varied tremendously between the HIS. In some instances it may have been a case of incomplete reports which were available for review. Yet in a few cases there wasn't an indication of the study having developed these preliminary steps. Rather it seemed as if the HIS relied upon the principal investigators implicit understanding of the problem and the research interests of the participating organizations.

A. Model Statement

As stated above, several of the HIS reviewed were intended as evaluation tools for the assessment of program impact. (HEALTHCOM, MMHP, MUHS, SSFHS, PR/TECH) Each

of these studies developed lists of program indicators. However only the HEALTHCOM and MMHP studies' background documents provided evidence of a conceptual model that linked together evaluation indicators into a theoretical statement about the program being evaluated. These two HIS studies are evaluating two different generations of the same public health communication program hence explaining (in part) their shared conceptual background.

"As developed over the last few years, the simplified model of what happens calls for a series of sequential steps of exposure, cognitive change, behavioral change, and health status change. Each step in the process depends on the degree of success at the previous step. (Briefing Paper pg.18)

The use of evaluation indicators that are of a more theoretical nature than empirical 'bench mark' statements can effectively guide the formulation of a study's implementation. Often this is the case in the absence of a model statement.

The MUHS evaluation provides such an example. Specific purposes of the survey are outlined as follows.

" 1.To evaluate CCCD program activities and impact:

Process Indicators: Levels and changes in utilization of specific CCCD services.

Health Indicators: Levels and changes in mortality (age-specific, and mortality due to neonatal tetanus and measles, and deaths associated with diarrhea and "malaria").

Behavior Indicators: Knowledge and practices related to CCCD interventions."

The remainder of the HIS were not strictly framed as evaluation studies, but rather were implemented as formative research activities. (DMD, DHS, HAITI) The DMD study was the only study of this class of HIS that included a conceptual statement in the documents which we reviewed.

The main objective of the DMD project is to develop a dietary intervention that will effectively block the nutritional insult to young children that occurs because of repeated, acute diarrheal episodes. The principal independent variable is increased specialized food intake (e.g., energy dense foods), which leads to a positive dependent variable outcome of unchanged nutritional status. Bentley's "Proposal for Anthropological Components" paper outlines a preliminary draft of a conceptual model for the DMD study, beginning from this starting point.

Added to this simple model are two intervening variables: food availability and acceptability. Each is broken down into sub-components. Availability of foods is influenced by several factors, including: household resources, seasonality, geographical location, etc. Acceptability can be influenced by cultural beliefs, age of the child, maternal work roles, taste of the foods, etc. Appetite loss during diarrhea may influence the acceptability of the specialized food.

B. Research Questions and/or Experimental Hypotheses

The HIS that were evaluation studies differed in their approaches to defining the research issues. The MUHS, SSFHS, and the PRITECH studies each relied upon an implicit research interest that would link the child survival intervention(s) to lowering morbidity and mortality. The two evaluations of the public health communication program (HEALTHCOM, MMHP) have gone one step further in presenting their research agenda in the studies's documents, and have set out a list of questions which probe into the 'How' and 'Why' of the program's impact.

Higher level evaluation / research questions pose a series of more complex questions regarding the program's operation, (Hornik and Foote, 1986)

1. "If knowledge is derived from multiple sources, both personal and mediated, does that make the transition to action more probable than when it is derived from a single source?"
2. "Once knowledge is gained do people adopt a new health practice regardless of whether only a few others or most others in the community have adopted the new practice?"

"For what types of people (in terms of education or social status in a community), and for what sorts of practices (e.g., contraception, bottle feeding), and in what sorts of communities (e.g., tightly knit vs loose organization) can community norms be ignored if the audience learns of and is persuaded of a new practice?"

A second level of research questions provide a comprehensive checklist of program operations. Some examples are:

1. What actually happened, and what was actually accomplished by the project implementors, and what the audience actually received.
2. Were the messages learned and accepted?
3. Were practices themselves altered?
4. Who is likely to be affected by a broadcast message?

Of the three formative evaluation HIS included in the review, two (DMD, DHS) provided succinct research statements and/or hypotheses. That of the DHS is presented as an example of this type of HIS's statement.

The central research question posed by the study is "to try to determine the extent to which variations in the unmet need for contraception (defined as the proportion of exposed women who want to avoid or delay childbearing but who are not using contraception) are related to variations in the availability of contraception." (Lapham & Westoff)

Hence the association between the measures of service availability and an unmet need is the central research question. In the health module of the core questionnaire (Section 4) this issue becomes one of the association between service availability and the level of a

women's knowledge of preventive practices, such as oral rehydration solution (ORS) or use of immunization services.

The final HIS reviewed in this section is the most complete in posing a series of research questions and hypotheses derived from the research interests. The HAITI study is presented in detail below. The orientation taken here is well conceived and could serve as a model for future HIS working in this area.

Several research questions surrounding the effective implementation of ORT programs were identified, (Coriel, 1985)

1. "The possible effects of alternative lay diagnosis for diarrhea-related illnesses.."
(e.g., use of enemas and purges)
2. "The need for a better understanding of the current and potential role of traditional healers in diarrhea management.."
3. How mothers are integrating oral rehydration into the total complex of the "maternal technology" surrounding diarrhea management.

There were three main study objectives stated in the study, around which a number of hypotheses were developed.

1. "To measure differential acceptance of ORT according to characteristics of the family, sources of information about ORT, and beliefs about the technique."

The major dependent variables investigated under this first objective were awareness of ORT, previous use, and recent use for treatment of diarrhea in preschool age children and infants (p.7). It was hypothesized that persons who have used ORT would differ from persons who are aware of but have not used ORT, according to the following characteristics (no direction of the relationship was indicated by any of the hypotheses):

- (a) sociodemographic factors : age, marital status, occupation, economic status, education, household composition, religion, community participation and use of medical services.
 - (b) source of information about ORT: medical personnel, mass media, community health workers, family members, friends, traditional healers.
 - (c) perceived mode of action of ORT: replaces lost fluids, prevents dehydration, stops diarrhea.
2. "To determine patterns of family care for children during episodes of diarrhea, including feeding practices and the use of ORT and other treatments."

The study sought to identify normative patterns of ORT use, including timing of the start of therapy, methods of preparation, schedule of administration, duration of use, and evaluation of effectiveness. It was hypothesized that the packaged mix would be used more often than SSS, and that its perceived efficacy would be better than the home recipe according to factors related to the diarrheal episode, including the following:

- (a) characteristics of the sick child: age, sex, breastfeeding status.
- (b) aspects of the illness: perceived etiology, folk diagnosis, related symptoms, severity, duration.

3. "To determine to what extent traditional healers have adopted ORT knowledge and practice in their healing practices."

Under the third objective it was hypothesized "that at least some traditional healers would have adopted ORT in their practices". Differential rates of adoption would be determined by the type of traditional healer: midwives, herbalists, magico-religious shamans, and injectionists.

C. List of Measured Variables

As stated in the opening remarks of this review, there was an intentional selection of the HIS upon certain child survival components, hence the overlap in the variables selected. None of the HIS examined general use of curative care services. This section of the review will present a brief listing of the major categories of variables across studies. We look at how these variables were framed into questionnaire items in the next section of the review.

HEALTH STATUS: DISEASE SPECIFIC

1) Diarrheal Disease:		
	Morbidity	All eight HIS reviewed
	Mortality	MUHS, DMD, PRITECH, MMHP
2) Malaria:		
	Morbidity	HEALTHCOM, MUHS, SSFHS, DHS
	Mortality	MUHS, SSFHS
3) Measles:		
	Morbidity	MUHS
	Mortality	MUHS, SSFHS
4) Tetanus Mortality		MUHS, SSFHS, DHS
5) ARI Mortality, Morbidity		SSFHS, DHS

MAJOR BEHAVIORAL VARIABLES

1) Source of Diarrhea Treatment		HEALTHCOM, MUHS, HAITI, DMD, PRITECH, MMHP, DHS
2) Source of ORS Packets		HEALTHCOM, MUHS, HAITI
3) ORS Packets; knowledge		All eight HIS reviewed
4) Sugar-Salt Solution, or another home based treatment		HEALTHCOM, PRITECH, DHS, MMHP HAITI, MUHS, DMD,
5) Feeding During Diarrhea		HEALTHCOM, MUHS, HAITI, DMD, MMHP
6) ORS Mixing Knowledge		HEALTHCOM, MUHS, HAITI, PRITECH, MMHP
7) Administration of ORS		HEALTHCOM, MUHS, HAITI, PRITECH, MMHP
8) Hydration Beliefs and Knowledge		HEALTHCOM, DMD, HAITI, MMHP
9) Breastfeeding		HEALTHCOM, MUHS, HAITI, DMD, PRITECH, DHS, MMHP
10) Malaria:		
	Dosage	HEALTHCOM, MUHS, SSFHS, DHS, MMHP
	Prenatal use	MUHS
11) EPI Coverage		HEALTHCOM, MUHS, SSFHS, PRITECH, DHS, MMHP
12) MCH Services:		
	Prenatal	SSFHS, DHS
	Postpartum	SSFHS
	Postnatal	SSFHS

SOCIO-DEMOGRAPHIC VARIABLES

13) Age	All eight HIS reviewed
14) Marital status	HEALTHCOM, DHS, MMHP,
15) Ethnic group	MUHS, SSFHS, DHS
16) Parity	HEALTHCOM, SSFHS, PRITECH, MMHP
17) Religion	SSFHS, DHS
18) Urban/Rural	HEALTHCOM, MMHP
19) Level of Education:	
Mother	HEALTHCOM, SSFHS, DHS, MMHP
Head of Household	HEALTHCOM, MMHP
20) Literacy	HEALTHCOM, MUHS, DMD, MMHP
21) Radio Listenership	HEALTHCOM, MMHP, MUHS, DMD
22) Housing Materials	HEALTHCOM, SSFHS, MMHP
23) Domestic Equipment	HEALTHCOM, MMHP
24) Occupational Status:	
Mother	HEALTHCOM, SSFHS, DMD, MMHP
Head of Household	HEALTHCOM, SSFHS, DMD, MMHP
25) Walking Distance (time) to the health center	MUHS
26) Distance to Health Center	DHS

III. MEASUREMENT OF VARIABLES

In this section we examine the questionnaires from each HIS to determine how questions were formulated for each of the variables listed above (i.e., the operationalization of the variables).

The different parameters of HIS content, objective, and study design, which were mentioned in the opening section of this review, come to the forefront in this section. Comparing how each study measured its variables without taking into account these distinctions could lead us into making unjust comparisons. This section of the review has therefore sought out specific areas of overlap in the measurement of a few variables.

A. Health Status

1. Mortality

Most of the HIS reviewed used a truncated birth history, within six years most commonly, for the estimation of mortality rates (MUHS first round, SSFHS, DMD, MMHP, and the DHS). The DHS provides an opportunity to employ a full birth history in some of its sites. The MUHS employed a pregnancy history in Liberia during the first round, and in all three sites during the its retest study. The MMHP initially began collecting childhood mortality information using the truncated birth history, but due to coding and collecting difficulties the study switched over to relying upon official government statistics that were collected at the county seat. The PRITECH study collected mortality information based upon a one year recall period for all children/births under five years of age.

The MUHS, SSFHS, DMD, and PRITECH studies collected cause of death information through the use of tracer conditions (up to 16 specific symptoms were proposed

in the SSFHS, although the other studies probed only a few symptoms, e.g., diarrhea). The SSFHS provides the most well developed example of this technique.

" An infectious disease specialist from the University of Dakar and a medical epidemiologist from the Centers for Disease Control examined all questionnaires which listed any dead children. By synthesizing the data on symptoms, the cause of death given by the mother and any other relevant information on the questionnaire, a determination was made (where possible) as to the most likely cause of death. Not only did this procedure allow the assignment of causes of death with much greater reliability than otherwise, it also considerably reduced the proportion of deaths of indeterminate cause from 42% to 20% of all deaths". (SSFHS report pg.79)

2. Morbidity

(a) Recall Periods

The following tables presents the different recall periods employed by the HIS for probing self-reported morbidity. The MMHP evaluation employed the 6 month recall period only for those respondents who did not have a case of diarrhea within the 2 week recall period. The SSFHS study referenced the previous rainy season in probing into malaria morbidity.

	Hours 24	1	Weeks 2	4	Months 6	12
Diarrhea	HCOM MUHS DMD DHS	HAITI MMHP	HCOM MUHS DMD MMHP DHS	HCOM		
Malaria	HCOM MUHS	HCOM	MUHS	DHS	SSFHS	
Measles						MUHS
ARI				DHS		

The MMHP study used the two week recall period for diarrheal morbidity in a slightly different fashion than did the other studies. If the response was positive for the two week recall item, mothers were asked whether the child was sick on the day of the interview and two weeks before the interview (the beginning of the recall period). The MMHP evaluation was able to determine "whether the duration of an episode is contained during the two week recall period or whether it is truncated at either end." (pg.100)

(b) Severity

The HEALTHCOM, MMHP and DMD studies all employed a fairly complete severity probe into the reported diarrheal episode. The DMD study requested information of all children (most recent case of diarrhea), and then specifically for the children who had a case within the two week recall period, as follows (Nigeria questionnaire):

51. On the worst day of (index child's) diarrhea, how many stools did she/he have during the day and night?
52. What was the consistency of the stools on the worst day?
53. What color were those stools?
54. At any time during the illness, was there any blood or mucus in his/her stool?
55. Did he/she vomit or have a fever at any time during the episode?
56. Do you think the diarrhea was severe, moderate, or mild?
57. What type of diarrhea did (index child) have?"

The MMHP questionnaire was basically the same, yet it included the additional information:

"Information about specific signs of dehydration (mouth, eyes, urine, fontanel) was recorded by the interviewer by direct observation only for children who were ill with diarrhea on the day of the interview." (pg.11)

Only the HAITI study attempted to apply the WHO definition of severity. Cases were broken down by severity of the diarrheal episode: Acute episodes (3 or more stools per day for less than 21 days), chronic diarrhea (3 or more stools per day for 21 days or longer), and mild diarrhea (1 or 2 stools per day, no time period). In order to distinguish acute from chronic cases, respondents were asked about the number of watery stools passed per day and the number of days duration of the episode. Although this prolonged the recall period to three weeks, it did permit the calculation of prevalence rates for each severity category.

B. Health Practices Data

Prenatal care service, childhood immunizations, and family planning service utilization are not reviewed in this section. There was very little variation of interest in the measurement of immunization status and use of prenatal care services. The later was collected through a self-report on ever use (no probing into the frequency or the timing was found in any of the HIS' documents reviewed).

Immunization status was universally collected through evidence from the child's health card. The validity of this widely accepted method has not been questioned by these HIS. Issues such as the interpretation given of the absence of the child's card and alternative measures (e.g., use of BCG scar), and the reliability and validity of the card for reporting immunization status were not followed up in any of the HIS reviewed.

Family planning service utilization is qualitatively different than the other child survival program components, and hence is not examined in detail in this section.

1. Diarrheal Disease Treatments

(a) Feeding

Most of the HIS reviewed probed extensively into feeding practices during and after diarrhea (HEALTHCOM, DMD, HAITI, PRITECH, MMHP). The DMD study examined the feeding behaviors of a normal child as well in a series of probes. The MMHP instrument offered comparisons for the mother to make, such as: 'Would you feed a child with diarrhea foods that are: spicy, greasy, hot, soupy?';

The quantity of the extra liquids was probed in this manner in the MUHS and the HEALTHCOM evaluations: 'Should the child with diarrhea drink more liquids, the same amount, or less liquids than the child without diarrhea?'. Breastfeeding during episodes of diarrhea was examined most commonly with a single dichotomous item about breastfeeding during diarrhea.

(b) Self Care

The HEALTHCOM instruments provide an example of a thorough probe into self care practices of diarrhea. Most of the points it touches upon were employed in the other HIS, yet none of them responded to all of the variables included in this evaluation. Appendix A presents an excerpt from the HEALTHCOM Guatemala questionnaire for more detailed reference.

(c) Oral Rehydration Solution: Packets

The HAITI report provides a succinct listing of an approach to the measurement of ORS use. Six dependent variables were studied as potential outcome variables in the construct of ORT knowledge and use:

1. Knowledge: "Correctly defined ORT, gave home recipe, or recognized the packet". A dichotomous variable.
2. Previous Use: "Previous use of either packet or home ORS". A dichotomous variable.
3. Method Used: "Used the packet versus home ORS in the past". A dichotomous variable.
4. Delay: "Number of days before began ORT in past". An interval level variable, 1 through four days.
5. Recent Use: "Packet or home ORS used". A dichotomous variable.
6. Type Used: "Used a packet versus home ORS recently". A dichotomous variable.

Although the level of measurement is not as fully developed in this HIS as in others studies, it does provide a fine example of a brief series of probes into the ORT use.

A more thorough probing into knowledge of diarrhea, treatment options and ORS packet use is provided by the HEALTHCOM questionnaire employed in the West Java evaluation. The series of questions opens with a recall item on 24 hour point prevalence, and a brief severity probe eliciting the mother's own term for the diarrhea which her child had. The sources for care are requested for the case, and the types of treatments received from each source are recorded. The questionnaire then returns to the severity measures again,

probing it fully. Feeding practices during the diarrhea are collected. An excerpt of this questionnaire is included in Appendix B for a more detailed reference.

2. Malaria Treatments

Two of the HIS reviewed probed into malaria treatment practices: MUHS and HEALTHCOM. The MUHS employed a single nominal item requesting a self report about where the child received treatment for a reported malarial episode within a two week recall period. Contrasted with this single item measure is the series of questions posed by the HEALTHCOM evaluation in Malawi: Appendix C presents excerpts of this study's questionnaire.

A deficiency of each of these studies was noted in their use of the term 'fever' as a proxy for malaria; the use of this term presupposes that the respondent either considers all fevers to be malarial or that she possesses an implicit understanding of the interviewer's reference. The limitations of a single phase study design that did not include any qualitative research into specific concepts and labels for malaria is evident.

3. Correlates of Use: Social and Economic Factors

(a) Costs to Patients

Very little information relative to the costs of obtaining health care, or of adopting salutary health practices in the household was collected in the eight HIS reviewed. The HEALTHCOM, MMHP, and HAITI HIS requested the respondent to report the amount spent on curing the child's diarrhea, either using the ORS packet or in combination with other treatments. The DMD study collected information on the expenditures on food per person per week, but not on health care expenditures. The DHS study does include probes into cost information on family planning services in the Service Availability questionnaire.

Cost issues were clearly not the primary nor secondary concern of these studies. However, the complete absence of any items probing the costs of obtaining a child survival intervention was a noticeable deficiency. Several of the HIS aimed at collecting information relating to service availability. Other barriers to obtaining care, in this instance financial barriers, were often ignored.

(b) Socio-Economic Status

Unfortunately, we did not find evidence of any creative solutions to the problems in measuring SES that were indicated in the literature review section. The multi-dimensionality of this construct has produced an assortment of measures, most of which include some sort of empirical assessment of housing construction materials and material possessions, self reported education level (and/or literacy), and statements on occupational status.

Since many of the HIS reviewed were applied research activities, they should have been interested in collecting detailed explanatory data on their respective projects. Hence, one would assume that the measurement of SES was important to the studies reviewed. As suggested in the literature review section (pg.15-16), the failure to adequately tap this dimension may relate in part to an incomplete understanding of how an individual's socio-economic status affects his or her participation in the child survival program. Various

questions should be posed early in the conceptualization of the HIS relative to the SES dimension. For example: Are financial barriers paramount to use of the clinic services? If so, then an income index is called for, and not a wealth measure; Is an individual's social standing important for adopting a new behavior which was open to public view? If so, then a measure of prestige should be included in the HIS instrument.

A technical point is made regarding the data analysis of the SES measures: only the HAITI study gave evidence of analyzing the inter-item correlations amongst the SES measures and building a reliable scale score for use in regression analysis. This level of data analysis would seem to be a prerequisite for employing a measure of SES in the HIS findings.

The following is a review of the principal variables which were employed in the HIS we reviewed, noting the manner in which the various studies conceptualized their measurement.

1. Education: The DHS study's measurement of this variable collected information on the respondent's attendance, highest level achieved (primary, secondary or higher), and the highest grade achieved.
2. Literacy: This variable was probed more often than education level. The MUHS studies gave a good criterion related validity test of this variable. A respondent was given a card (in the MMHP it was handed to her upside down and the interviewer noted if she turned it right side up first) with a single word in her language on the first line, a group of words on the second line, and a complete sentence on the third line. She was then asked to read each line as a criteria for establishing her literacy level.
3. Wealth: The MMHP evaluation collected information on land ownership, types of crops, ownership of livestock, ownership of home, versus renting it or other circumstances.
4. Income: The HEALTHCOM evaluation elicited a self report on employment status for wage income.
5. Occupational Status: The SSFHS coded two sectors, either agriculture or non-agriculture; the MMHP examined the level of commercialization of the agricultural occupation. The DHS coded two sectors of work, and then made a distinction between working mainly on family land or someone else's land, and whether the labor is for salary or share cropping. None of the HIS attempted to include a measure of the occupation's prestige or power (e.g., blue or white collar).
6. Material Possessions: The HAITI study provided an excellent example of a short scale for use in measuring this variable. Different scales for urban and rural subsamples were developed.

<u>Item</u>	<u>Urban</u> (%)	<u>Rural</u> (%)
Radio	43	22
Food Cabinet	12	21
Sewing Machine	4	3
Metal Roof	39	43
Cement Floor	43	24
Latrine	35	31
Wardrobe	11	NA
Cornmill	NA	4
Kitchen	NA	80
Reliability (alpha coefficient)	.70	.70

The total number of material items were summed for arriving at a scale score. The scale scores for each population group (urban and rural) were then correlated with specific demographic variables to measure their convergent validity.

Scale Score Correlations with Demographic Variables:

	<u>Urban</u> r (p)	<u>Rural</u> r (p)
School Attendance	.38 (.001)	.18 (.011)
Years of School	.35 (.006)	.23 (.071)
Literacy	.27 (.001)	.17 (.019)
Household Size	.19 (.008)	.27 (.001)
Total Children	.03 (.374)	.26 (.001)
Wage Earning Employment	.21 (.004)	.16 (.019)
Recent Use of Medical Services	.19 (.008)	.07 (.181)
Father of Children in Household	.05 (.268)	.14 (.038)

7. Walking Distance: Only a few of the HIS measured variables related to access, most commonly by assessing the physical proximity of the health care source. The MUHS requested a self-report on walking distance (in time) to the nearest water source and the nearest health center. The DHS service availability questionnaire requested a report on the distance to the nearest health center from the village chief.

8. Housing types: The SSFHS created a typology of housing types out of exploratory studies, which was used to code an objective item by the interviewer. Types were categorized according to the material of which the walls and roof of each respondent's house was made:

- traditional: walls and roof made of local materials.
- improved traditional: only the roof is made of modern materials (e.g., toll).
- semi-modern: only the walls are made of modern materials.
- modern building: both the walls and roof are made of modern materials.

The DMD, MMHP, DHS studies added to this range of construction materials the following: sources of drinking water, type of toilet facilities, type of household waste disposal, kitchen inside or out, proximity to other households.

IV. DESIGN FEATURES

A. Recall Periods

The relation between the recall periods for establishing various aspects of diarrheal disease severity and treatment behaviors is presented in this section. Generally the manner in which the recall issues were resolved here were applied to other diseases as well.

Two different recall periods were referenced for probing diarrheal severity, ORT use, and knowledge of the ORS mixing formula, etc.: either (a) the recall period for the morbidity probe (which was generally two weeks), or (b) the most recent case was referenced. Sometimes an HIS would reference both recall periods in an either/or situation (e.g., if the mother did not recall an episode within the two week morbidity recall period then she was asked to think about the most recent case).

It is important to note that the same recall period was referenced for establishing ORT use and the various correlates of that use (e.g., source of packets, etc) in all of the HIS reviewed. The consistency with which the same recall period was referenced across these various aspects of diarrheal disease treatments is a strength of the HIS reviewed.

CHOICE OF RECALL PERIODS IN MEASURING:

<u>Morbidity Recall</u>	<u>Most Recent Case</u>
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ORT Use, and Knowledge of the Correlates
of Use (ORS Mixing Formula, Quantity
Feeding Practices, Source of Care)

MUHS	MUHS
SSFHS	HAITI
PRITECH	DMD
DHS	HLTHCOM
MMHP	MMHP
<u>Severity Measure</u>	
HLTHCOM	HLTHCOM
MUHS	DMD
MMHP	

The MMHP evaluation in Honduras was a complex study design, with different questionnaires measuring different aspects of the communications program. Diarrheal disease morbidity (and its severity) was measured in one questionnaire, and ORT knowledge and mixing behaviors were measured in another; use of ORS was measured in both. Thus in one questionnaire ORS use is clearly linked to the morbidity recall period, and in another it is linked to the most recent case in the household's children under five years of age. This permitted the MMHP study to compare the resulting information from different recall periods. Unfortunately, no analytical information on this point was available for review.

It is noted that the DHS study measures ORT use by referencing the case established in the morbidity recall period; no other correlates of use nor severity measure are probed.

B. Response Error

Response error indicates a set of conditions that lead to respondent confusion and hence error in their responses. Thus one could think of response error as a sub-category of both reliability and internal validity. In developing countries, HIS response error is a major problem, as its sources are numerous and require that the researcher exercise meticulous control over all aspects of the survey. Three broad categories of response error sources are generally acknowledged in the literature: effects due to the interviewers, the questionnaire, and the respondents themselves.

1. Interviewer

(a) Interviewer training and supervision

All of the HIS reviewed gave their interviewers a one to two week training program, employing didactic sessions on theory and practice interviewing. The DHS made this training program competitive, with several of the trainees not being offered positions upon completion of the program.

Supervision of the interviewing process differed between the HIS as well. The DHS was the most rigorous of the HIS, (although the MUHS in Zaire provided nearly the same level of supervision). In the Senegal DHS two groups of interviewers in the north and 3 groups in the south were fielded, directed by two supervisors. Each team of interviewers consisted of a male and female controller, five interviewers, one agent for anthropometric measures, and a driver. Frequent contact between the supervisors and the interview teams occurred during the course of the survey in order to draw the interviewers' attention to the types of errors the central office was finding in the completed questionnaires. Each completed questionnaire was reviewed by the team controller and supervisors, and by the survey supervisors before being sent to the central office. In the central office a team of four agents reviewed the questionnaires for sampling, face validity of results, use of filter questions (e.g., transition questions), and the strict application of interviewing instructions.

2. Questionnaire

(a) Questionnaire design

The layout of the questionnaire itself, that is to say the presentation and ordering of the questions, varied tremendously between HIS. The DMD Nigeria questionnaire was found to be an example of a clearly designed questionnaire in terms of its graphic layout and presentation of coding categories (both of which will reduce interviewer error). The flow of questions was indicated by text (e.g., 'skip next question', or 'go to question #49') instead of using graphics, e.g., arrows or path indicators. This system may be more comprehensible to the interviewers in developing countries, but empirical evidence on this is lacking.

The use of transition questions was employed between the modules (e.g., feeding during diarrhea and treatments for the illness), and several of the complex items were laid out very clearly through the use of matrices for their coding.

The HEALTHCOM questionnaires excelled in this area and are perhaps a state of the art in the extensive use of transition questions and interviewer patter to provide a bridge between the various components of the questionnaire. The repeated probing of variables, rather than the blanket treatment of a cluster of items one at a time, provides opportunities to examine the stability of responses, the convergence of slightly different constructs, and enhances the overall dialogue atmosphere of the interview.

(b) Questionnaire Translation

In the SSFHS the survey instrument was not translated, rather interviewers were left to their own devices to translate it either spontaneously or on their own. On the other extreme, the DHS instrument was translated, and back translated into the four major languages of Senegal prior to the interviewer training program. The other HIS generally performed somewhere between these two examples, usually developing translated questionnaires during the interviewers training programs.

3. Respondents

(a) Proxy Respondents

The reporting on the use of proxy respondents was incomplete in the documents available for review, although all HIS reviewed indicated that the principal caretaker of the child or its mother were the respondents. Only the HAITI report included a reference to the fact that 22% of its respondents were proxy for the mother of the child.

As was indicated in the literature review section, we currently do not have any empirical data on the use of proxy respondents for the mother of the child, or its principal caretaker. The designation of principal caretaker may be misleading, particularly when one is probing into health care behaviors (i.e., the 'nanny' may not be the individual who makes self care treatment decisions).

(b) Acquiescent Response Set

The extent to which the tendency to reply affirmatively occurred in the HIS reviewed was not measured. Issues surrounding the concept of respondent confidentiality were not addressed either. The lack of qualitative research to develop culturally specific terms for such key labels as malarial fever and diarrhea in most of the HIS is an indication that response error due to respondent confusion was probable.

C. Exploratory Studies

Several of the HIS employed concurrent qualitative studies, but only the DMD study incorporated exploratory data collection prior to the main study.

" ..the two objectives of the preliminary ethnography are to use the data to design the sample survey instrument and to finalize the protocol for the intensive following of diarrhea episodes." (Bentley, 1986)

The following is a listing of the general categories of information collected during the DMD exploratory study.

1. Household Food Availability/Utilization/Consumption
2. Child Feeding Patterns
3. Food Preparation Methods/Patterns
4. Emic (Subjective) Classification System for Diarrhea
5. Belief System for Diarrhea and Other Childhood Illness
6. Child Care Patterns
7. Maternal Work Roles and Household Labor/Economic Activities
8. Household Sanitation/Hygiene Patterns
9. ORS/ORT Use Patterns
10. Media Source/Use Patterns

The results of the exploratory study were composed into the following matrix:

Name of Diarrhea	Characteristics (Description)	Cause	Preferred Treatment	Feeding Practices
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D. Reliability

The MMHP panel study provided an opportunity to examine the stability of responses over time for the each respondent. The HAITI instrument's 'Material Life Style Scale' was examined for its reliability using Cronbach's alpha coefficient. None of the other HIS reviewed -- except the MUHS -- examined the reliability of their instruments. The retest reliability study of CDC's MUHS was carefully reviewed in order that lessons learned by this study could be drawn out for future child survival researchers.

The validity of the mortality estimates became a major issue in the MUHS studies. A retest verification study was done to confirm the stability of the observed mortality estimates over time. Reinterview questionnaires were prepared with the necessary identification information from the main study (ID number, name of household head, name of the respondent, etc.). A second form was prepared to facilitate comparison of the data in the field between the original and reinterview questionnaires. All interviews were tape recorded.

As soon as possible after the interview, the team leader reviewed the questionnaire and compared it to the original MUHS questionnaire: if any discrepancies between the two forms existed, the team leader assigned a reconciliation interview. This was a third interview conducted by an interviewer who was fully cognizant of the discrepancies. Approximately 70% of the respondents had a third such reinterview in the Liberia reliability study.

The comparison of the reporting between the two surveys is briefly presented as follows.

(1) Togo: The estimates from the MUHS using indirect estimation techniques are more similar to the retest survey than the direct estimates: children ever born and children surviving gave under 5 mortality of about 130, as opposed to a value of 80 from the maternity history. The reliability study gave a maternity history value of 166. If the maternity history did record all of the births and deaths in response to the questions about children ever born and deceased, then the direct and indirect estimation techniques should have been quite similar. The observed difference indicated that a response error existed either on the part of the interviewers or the respondents. A likely source of this response error would be that the interviews focused on children living, rather than children ever born to the respondent.

(2) Liberia: 29.5% of women reported more surviving children at the time of the verification survey than they did in the MUHS, although 54% of these women reported exactly the same increase in the number of children surviving. (Ewbank) Hence a substantial proportion of the omitted children were surviving children: this addresses the concern that pregnancy histories will misclassify stillbirths as live births.

(3) Zaire: Under reporting in the MUHS was concentrated in two of the six clusters and was more significant among older women. (Ewbank) This large variation in completeness of reporting among clusters reflected the interviewer variation which was experienced in all three countries during the main MUHS study.

E. Validity

Several different tests of the measurement validity were developed by the HIS reviewed. Basically these fall into three classes: criterion related validity (linking the reported behavior to an empirically verifiable fact), convergent validity (linking the measurement to a similar yet slightly different variable), and multi-trait, multi-method validity tests (giving evidence that the same variable was measured using different research methods -- e.g., qualitative and quantitative--and measuring different traits of the same phenomenon)

(a) Criterion related validity

This was most commonly done in the literacy testing wherein the respondents were given a card to read. In other instances a self reported working radio was requested to be turned on for the interviewer, or the ORS solution reportedly being used to treat the child with diarrhea on the day of the interview was requested to be shown to the interviewer. Some of the survey instruments seemingly never missed an opportunity to probe this dimension of validity (HEALTHCOM, MMHP, MUHS).

(b) Convergent validity

This was accomplished in two manners. The HEALTHCOM instruments provide the best example of convergence across similar items: the repeated probing of various aspects of the same dimension of ORS use in several places of the survey instruments provide ample opportunity to analyze the self reported behaviors for convergent validity. The MMHP evaluation measured the same variables across waves of interviews, employing different survey

instruments. The convergence of self reported behaviors indicated by this study is strong evidence of the validity of the responses.

The second type of convergent validity relates to an observed correlation between items of similar, yet different conceptual constructs. The SSFHS study provided some analysis of this type by comparing occupational type and housing category: higher level occupations were found to live in more expensive houses -- not exactly a startling finding, yet one that is evidence of convergence.

(c) Multi-Trait, Multi-Method validity

A multi-phase study design provides the opportunity to analyze specific constructs from the perspective of research methods, and from within different constellations of variables (e.g., traits). Several of the HIS reviewed did this (MMHP, DMD, HAITI, HEALTHCOM). This was most commonly done by using an ethnographic methods either on a sub sample of the quantitative study, or in a concurrent study using an independent sample.

F. Non-Response

Non-responder rates were not a significant issue in any of the HIS reviewed. Each of the studies devoted substantial effort to following-up incomplete contacts with respondents in order to minimize the opportunities for non-responses. In the studies that did report non-response rates, they were low: the Togo MUHS reported a 4.2% non-response rate; the Senegalese DHS reported a 3.2% non-responder rate.

Only the SSFHS study provided an opportunity to compare non-responders with responders through the use of its 'Concession Dossier Form' (which also served the purpose of establishing the sampling frame for the last stage of its multi-stage cluster design). This form, which was completed by the head of the concession, gave socio-demographic data on all adult women residing in the household. The non-responder rate for the study was low, and the non-responders were found to be very similar on the observed characteristics to the responders; their absence was explained by the beginning of the harvest season.

G. Sampling Methods

(1) Sample Size and Sample Frame Construction

Reporting on sample size determination was incomplete in most of the HIS documents we reviewed. Both the MUHS and the SSFHS presented their calculations for arriving at the sample size required in order to obtain acceptable sampling errors for the mortality estimates; the DHS reports made reference to the statistical power requirement, but the documents available for review did not provide evidence of the sample size's derivation. The PRITECH study acknowledged that the sample size was determined strictly by budgetary concerns (e.g., there was a budget for one month wages for X number of interviewers); the MMHP's panel study design incorporated budgetary/logistical concerns into its sample size calculations, but it also gave evidence of addressing statistical power issues as well (e.g., the percentage change in the least common practice was predicted and used in the size calculations).

The construction of sampling frames generally relied upon census data, either from the most recent census, the World Fertility Survey (WFS), or a special census which was recently undertaken. The SSFHS developed its own sampling frame on its final stage of selection by the innovative use of a special data collection form called the 'Concession Dossier Form' (discussed above under Non-Response, and General Study Design).

2. Multi-Stage Cluster Design Features

Variations upon this type of sampling design were employed in all of the HIS reviewed. The Senegalese DHS used four stages in the design, with stratification occurring on one stage. The first stage of the sample incorporated all of the census districts: 50% of these districts were randomly selected. In the second stage, one sub-district per census district was randomly selected (if only one sub-district existed, it was kept -- 5% of the cases). In the third stage strata five categories of the concessions in the sub-districts were developed, based upon the number of inhabitants in the concession. A weighted random sample of one concession was drawn from the five categories for each sub-district. On the fourth stage the number of women selected in each concession was drawn. 5,000 women were sampled using this procedure.

The PRITECH report clearly addressed the issue of sampling methods in its report, (which was written in the format of a guideline for the HIS supervisors). The first stage of the design are the villages, with approximately 10 - 26 villages randomly selected within each clinic catchment area. A census would be done of each selected village (the second stage), and 10 - 26 interviews would be randomly selected. The actual number of clusters to be chosen at each clinic area depends upon the proportion of persons who are expected to have a particular characteristic (e.g., 20% of the children are estimated to have had a case of diarrhea within the past week). If 50 village clusters have been formed (i.e., identified by geographic mapping), then 15 village clusters should be surveyed (given an estimated proportion of 20%). These 15 village clusters can be selected randomly, using lists drawn up from the cluster mapping.

The MUHS employed sampling procedure known as probability proportionate to size (it was the only HIS reviewed to follow this sampling method).

" This involves listing all villages (districts, etc.) within the total Universe to be samples; their population; and cumulative population. If 30 clusters are desired, the total population is divided by 30 to yield the "sample interval". A random number between 1 and the sampling interval is selected, to yield the "starting number". Starting with this number and serially adding the "sampling interval" will yield 30 different "target numbers". These numbers locate where (in which villages or districts) the 30 clusters will be selected, using the "cumulative population" column. Larger villages (districts, etc.) have a greater chance of being selected, as their population stands a greater chance of containing one of the 30 "target numbers". (Proposal for an Integrated Community Based CCCD Mortality Survey)

This method obviously relies upon existing, and presumably accurate census information for its sampling frame, which may or may not be available. However, in circumstances where the researcher has access to current census data or another form of reliable population estimates, this procedure is excellent method of selecting clusters for the first stage of the sample. Of interest is the method of respondent selection on the final stage.

On the second, or final stage of the sample the MUHS, DMD and the SSFHS followed the EPI evaluation strategy of selecting a starting point at random and interviewing all women in each household until the quota of 30 interviews per cluster was attained. The application of this well known method for respondent selection across different HIS types is not without its problems, however.

Ewbank states that while this strategy makes sense when only 7 households per cluster are desired, the selection procedure of the World Fertility Survey and the DHS is more appropriate when larger numbers are involved. This procedure of complete lists on the second stage of the sample would avoid the tendency that was noted in the MUHS of selecting the households in the center over the periphery. The other HIS reviewed employed either a systematic or simple random sample on the final stage.

3. Design Effect

" The sample sizes required for cluster surveys are larger than those needed for simple random surveys because of the design effect, which is the ratio of the variance obtained by cluster sampling to the variance obtained by simple random sampling. The sample size required for a cluster survey depends on the estimated size for a simple random sample at a given level of precision, multiplied by the design effect. Thus, the magnitude of the design effect has important implications for logistics, costs and feasibility, and can vary greatly depending on the intracluster distribution of the factor of interest (i.e., pocketing), and its frequency in the population." Gray;18

The HEALTHCOM Guatemala evaluation and the MUHS sites employed a design effect of 2 in the determination of the sample size. None of the other HIS made reference to the effect of using a cluster based sampling strategy on the precision of the sample.

IMPLICATIONS FOR FUTURE HEALTH CARE HOUSEHOLD INTERVIEW SURVEYS

We began this review by noting that there had been a wide variety of uses for the HIS in support of child survival programs, and that the track record of this research tool's usefulness had been mixed. The selection of eight related, yet qualitatively different HIS was intended to highlight this point.

Most of the HIS reviewed had the objective of providing a summative evaluation measure for their programs. The exception to this were the more complex studies that addressed several program objectives. These studies (DMD, MMHP, HAITI) used a multi-

phase design that lent itself to providing formative and program monitoring evaluation data as well as the summative measures. It was interesting to note that the formative evaluation objective was most fully addressed by the use of qualitative research methods in these multi-phase HIS. The program monitoring objective was fulfilled by the longitudinal design of some of the study phases in the DMD and MMHP.

The content of the HIS varied a great deal more than their objectives: a wide variety of child survival program components were addressed in the HIS reviewed. We classified the HIS in the opening section as either multi-purpose (e.g., probing a series of self care practices and clinic service utilization) or mono-purpose (loosely defined as probing into one set of child survival practices, such as self-care). This distinction provided interesting results in the analysis.

The multi-purpose HIS (DHS, PRITECH, and SSFHS) provided less detail in their measurement of child survival behaviors than did the mono-purpose HIS: this was predicted in the opening section. HIS that attempted to measure levels of program participation across a diverse range of child survival interventions were found to provide (at best) only modest indications of program results: No clear evidence of the determinants of the observed behavior were provided. The later category of information is what is most needed by managers and planners for the effective development of the child survival program. The information collected must take account of this programmatic need. By designing the HIS to be narrowly focused in their measurements, this requirement was found to be more effectively addressed.

We made one other distinction in the opening section that provided the review with an interesting perspective. We indicated that the use of different data gathering methods within an overall study design (such as ethnographic and quantitative methods) would be termed a multi-phase study design. Creative use of the multi-phase design concept has led to the targeting of specific child survival interests being measured by different research tools. The DMD, HAITI, and MMHP HIS employed a multi-phase design with quite positive results, as was indicated in the review.

However, the ways and means of combining these different research methods within a single study are still in a state of development. These three child survival HIS left several areas of methodological development for future HIS to address, for example the linkage between the qualitative and quantitative components of the study is not entirely evident. Implicitly the knowledge gained from the exploratory study was fed into the quantitative HIS, yet explicit linkages could not be traced in the study design. A creative jump was made between the phases without the use of methodological tools.

The movement from exploratory studies that feature open ended questions to tighter items in structured interviews is well recognized, yet the HIS reviewed did not give sufficient evidence of the quantitative measures building upon the qualitative. Examples of this type of linkage could be in the use of cultural specific glossaries for key terms (such as malarial fever, or diarrhea), or in the use of focus groups to confirm structured questions and response categories.

The following comments highlight a few of the specific experiences of the HIS for a few prominent methodological concerns that future child survival HIS will face.

1. Health Status

The measurement of health status in child survival programs has not been clearly resolved in any of the HIS reviewed, although each of the studies made strong contributions towards the measurement of mortality and morbidity.

(a) **Mortality**

The mortality assessment experience of the MUHS is evidence of the difficulties in using cross sectional study designs. Two of the three study sites gave much lower mortality estimates than the third. A retest on the sub-sample of the original MUHS sample in each site gave mortality estimates that were validated by showing convergence with another survey done in the region -- the SSFHS. The SSFHS mortality measures were validated by showing convergence with a small scale longitudinal study on childhood mortality that the French organization ORSTOM was conducting in Dakar.

Although the retest study of the MUHS suggests that a carefully designed and controlled cross sectional study will provide reliable mortality estimates, alternative study designs may be less resource intensive. A longitudinal study of population groups served by regular child survival services (such as ORSTOM study) may be a less intensive design, but the total costs of a long term study will climb beyond the financial capabilities of many programs. Hence other solutions to this problem are required. The under-reporting of neonatal mortality does not seem to affect the reporting of post-neonatal and child mortality; one possible use of these mortality rates in which we have more confidence may be in estimating the error in neonatal mortality reports. (Reinke)

(b) **Morbidity**

Twenty four hours and two week recall periods for diarrheal disease were most commonly used; malaria morbidity was probed using a four week recall period. Consideration of the seasonality of diarrhea and the timing of the HIS was generally ignored in the documents available for review; it is difficult to gauge whether this was brought into consideration during each of the studies.

In any case, this should always figure prominently in the reporting of results.

There was evidence of an untested scale for diarrhea severity in the LMD, HEALTHCOM, MMHP, and MUHS studies. In addition to the self reported data, the MMHP study requested an assessment of the child's hydration status by the interviewer for all current cases. Future HIS should work on validating these scales and developing a standardized approach to their construction across cultures.

There are two options for consideration in the cross cultural adaptation of morbidity assessment in child survival HIS. The first involves developing a list of key terms for diarrhea

and malaria in each of the local languages the HIS will encounter. The intent is to avoid the use of a generic proxy term (such as fever for malaria). This list can be placed within the questionnaire as a glossary, to which the interviewer can refer for finding the correct standardized term for referencing in the questions about morbidity and treatments. None of the HIS reviewed experimented with this approach.

The second option requires much less exploratory work and is given an excellent presentation in the HEALTHCOM West Java questionnaire. The respondent is probed regarding the symptoms of the referenced diarrhea case in detail, after which she is requested to give her own term for the diarrhea she just described. This term is then used by the interviewer for the remainder of the interview.

2. Health Practices

(a) Hypothetical Conditions and Recall Periods

The literature review of published HIS studies was not positive about the use of hypothetical conditions to elicit self-reported practices and knowledge about health care treatments, yet several of the HIS reviewed employed this technique. For example, the HEALTHCOM in particular made extensive use of the hypothetical neighbor with a sick child probe. The possibility of respondent confusion due to an array of different recall periods is the concern behind this issue, as is the difficulty in validating the self-report of a hypothetical condition.

There are several recall period concerns that need to be more fully addressed by future child survival HIS: What is the optimal recall period for health care practices?; Does response error increase because of multiple recall periods?; Is it necessary to reduce inhibitions by unlinking the behavior from the respondent in child survival self-care practices (e.g., the hypothetical case)?

(b) Alternative Sources of Care

The use of alternative sources of care was routinely collected in the HIS reviewed - a major improvement over the published studies reviewed in the literature reviews of Ross and Vaughan, Kroeger. However, much more needs to be done to fully understand the relation between traditional treatments and child survival interventions.

For example, traditional forms of rehydration are known to exist (e.g., guava leaf tea in West and Central Africa, fermented porridges in Central and East Africa). What is not known about these treatments is their relation to the ORS solution. Child survival HIS should go beyond merely referencing these treatments and should begin to probe more fully into their role within the total range of treatment options available to the individual.

The perceived efficacy of the various treatment options open for a mother with a sick child, only one of which is the child survival treatment, should be understood by program planners. From this starting point can the program begin to effectively address the child survival intervention's position in the 'marketplace' of health care behaviors. Only the HAITI study gave attention to this issue by directly addressing the range of behaviors that make up the "maternal technologies" for treating an ill child.

(c) EPI Participation

The use of child survival health services centered almost exclusively on diarrheal disease and malaria treatments and prevention. Childhood immunization status was recorded almost exclusively from the child's health card. No other probes were made regarding immunization status. There currently exists a growing body of literature on the social determinants of childhood immunization status. (Heggenhougen & Clements) Future child survival HIS should take these studies into account and address the Expanded Program of Immunizations from a much broader conceptual framework than has been the case in all of the HIS reviewed.

(d) Correlates of Use: Social and Economic Factors.

The generally underdeveloped problem statements and conceptual design of the HIS reviewed manifested itself most clearly in the treatment of the social and economic factors related to their programs. As we suggested above, program managers and planners do indeed need to know about the determinants of child survival participation and impact: clearly SES figures into this need. Future child survival HIS should develop their conceptual approaches to this dimension by relying upon existing literature in this area to guide their selection of indicators (see the World Bank's "Living Standards Measurement Study")

What we found in these child survival HIS was a smattering of various measures pertaining to socio-economic status (housing type, literacy, material possessions). There was no evidence of developing a scale score for this dimension in any of the reports available for review, except in the HAITI HIS. This study did in fact provide good evidence of analyzing the inter-item correlation between these measures to see if they actually tapped the same dimension, and used the results to build a scale score for SES.

3. Sampling

The innovative use of a concession dossier form of the SSFHS study in Senegal is something that future HIS should consider. It has several advantages:

- (1) It involves local socio-political leaders in the survey, who would otherwise not be consulted;
- (2) It provides baseline information on the women of childbearing age in the concession for use in both the construction of a sampling frame for the final stage of a multi-stage cluster design, and for comparing non-responders with responders on important socio-demographic characteristics;
- (3) It is an inexpensive addition to the survey, as preliminary contacts are usually mandatory prior to the arrival of the survey enumerators in most rural areas of developing countries.

Evidence was given in the MUHS study that by employing the EPI method of sampling on the final stage of a multi-stage cluster design (i.e., collecting data from the first seven respondents encountered in a randomly assigned direction), preference was given to selection in the middle of the cluster to the periphery. The indiscriminate use of this method of respondent selection in the face of pocketing (e.g., concentrations of certain attributes within the cluster) has been suggested as being inappropriate in other types of HIS.

More creative use of stratification methods needs to be developed in HIS studies; only the MMHP study reviewed here employed a purposive selection process for its panel study's location, selecting strata of Honduras in a representative fashion of several socio-environmental concerns. Particularly HIS which focus upon health care practices and beliefs should consider stratifying on social variables (e.g., language, religion, occupation, etc).

4. Design Features

1. Validity

The multi-phase studies (MMHP, DMD and HAITI) explored the use of data triangulation methods for convergent validity. The development of convergent validity as part of the single phase HIS depends upon the possibility of repeated probes into the same dimension of behaviors during the course of the interview. This is what the HEALTHCOM and MMHP evaluations did. This resulted in longer interviews, which apparently did not effect the data quality (e.g., no observed increase in response error due to interviewer or respondent fatigue).

There is currently very little evidence on the optimal interview time in developing countries; in the United States the rule of thumb is generally 30 to 45 minutes. In developing countries the primary constraint to longer interviews appears to be the quality of the interviewer, not respondent fatigue. As the HEALTHCOM and MMHP HIS have shown, the benefits of providing opportunities for the convergence of responses in a longer interview outweigh the difficulties of recruiting, training and paying for more experienced interviewers.

2. Item Design

There was heavy reliance upon the use structured questions with precoded response categories in all of the instruments reviewed (What, Where, Who and How questions). There should be a greater variety of item types incorporated into the HIS instruments, particularly in those which probe into attitudes and beliefs about disease and their treatments.

As an example, the use of response categories that request the respondent to either agree or disagree with a statement (i.e., on a scale of 1 to 10) was not fully explored in the HIS questionnaires. There were a few examples of movements in this direction, such as in the measure which requested a self-report on the quantity of food or liquids given to the child during diarrhea: normal amount, less than normal, or more than normal.

CONCLUSIONS

This review has taken a descriptive overview of the uses and usefulness of the health interview survey in support of child survival programs. Our data sources for the review of the data collection instruments and methods were primarily unpublished background documents, reports and notes from the field. Every effort was made to couch our analysis in terms of the literature available for review.

Two broad areas of critique have emerged from the review. HIS with narrowly defined content area, labeled mono-purpose HIS, were found to provide program planners with

more information on the determinates of health care behaviors than multi-purpose HIS, apparently fielded to respond to multiple programs. Multi-purpose HIS seemed to be most effective when designed as multi-method studies, combining qualitative and quantitative data collection methods in a single study design.

The second area of critique concerns the size of the HIS. Large scale surveys are resource intensive undertakings; the volume of data generated often precludes the timely presentation of results for program planners. In many cases a large sample is a prerequisite for measuring the phenomenon of interest. In other cases a centralized program management style preclude consideration of alternative study designs. A series of local level HIS, implemented and analyzed on a regional or district level is a viable alternative to a national HIS.

Each of the HIS reviewed gave evidence of addressing the shortcomings of previous studies and of adapting health services research methods developed in the industrialized countries to the field conditions in the developing world. It is hoped that this review has indicated developments in creating new methods for future social science research.

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APPENDIX A: DIARRHEA TREATMENT PRACTICES

HEALTHCOM Guatemala Questionnaire

(Reference pg. 34)

(a) Use of: Pharmacists:

47. Have you ever asked a pharmacist for help in the treatment of diarrhea in a child?
48. What treatment does the pharmacist give for diarrhea?

(b) Use of: Community Health Worker:

49. Have you ever asked a community health worker for help in the treatment of diarrhea in a child?
50. What treatment does the community health worker give for diarrhea?

(c) Use of: Health Facility:

51. Have you ever gone to a health facility (clinic, health post) for help in treating diarrhea in a child?
52. What do the personnel at the health post or center always give for diarrhea in young children?

(d) Cause of Diarrhea:

53. 1. What do you think causes diarrhea in children?

(e) Signs of Dehydration:

53. 2. How do you know when a child is seriously ill with diarrhea? (Ask for 3 responses)

(f) Knowledge:

54. Have you ever heard of using a home-made sureo to give a child when she/he has diarrhea?

(g) Use:

55. Have you ever given home-made suero to a child who has diarrhea?

(h) Mixing formula:

56. Do you know how to prepare the mixture (solution)?

57. What do you use and how much do you use to prepare it?

- If liquid is mentioned, ask: How much do you use?
measured in cc: _____
- If sugar is mentioned, ask: How much do you use and in
what do you measure it?
number of cubes, or measure taken by interviewer
- If bicarbonate is mentioned ... (same as liquid and sugar)
- If juice is mentioned.. (same as other ingredients)
- If another ingredient is mentioned ..

(i) Source of knowledge:

58. From whom or where did you learn to make the mixture?

(j) Administration:

59. How much of this mixture should a child with diarrhea be given per day?

(k) Efficacy:

60. What is the home - made solution that is given to children with diarrhea for?"

APPENDIX B: ORS PACKETS

HEALTHCOM West Java Questionnaire

(Reference pg. 35)

"Now I would like to hear your opinion on what is the best way to treat diarrhea. In the following questions we will discuss how you usually treat diarrhea. These questions have no relation with the last time your child experienced diarrhea. We will start with asking you questions on how you usually treat children with beginning diarrhea.

(a) Timing of treatment:

28. If a child under five starts to have loose stools some people say that you take care of it right away - other people say that you can leave it alone, for the moment. What do you say, for starting to have loose stools - should you do something right away, or leave it alone?

(b) Belief on treatment:

- 29a. What is the best way to take care of beginning diarrhea?
29b. If your neighbor's child who is one year old has diarrhea with weakness, and does not want to eat and play as usual, what advice would you give to your neighbor?
29c. If your neighbor's child who is one year old has diarrhea and vomits continuously, what advice would you give?

ASK Q. 30 AND 31 FOR ALL WHO MENTIONED "EXTRA FLUIDS IN Q.29a"

(c) Rehydration practices:

30. What extra fluids would you give?

(d) Quantity:

31. How much extra fluids would you give in a day?...

(e) ORT Packet: knowledge

ALL RESPONDENTS:

- 35a. Have you ever seen a packet like this? (SHOW ORS PACKET)
35b. Have you ever heard of a medicine called Oralit?
35c. What is it for?

(f) ORT practice:

- 35d. Have you, yourself, ever prepared Oralit?

(g) ORT mixing:

35e. Do you know how to mix an Oralit packet?...
(h) ORT source of knowledge:

35i. Where did you learn how to prepare it?

(i) ORT mixing formula:

35j. How do you prepare an Oralit packet like this one? (Quantities recorded)
- MENTIONS BOILING THE WATER: Should the water be hot or cool when you add it to the Oralit?

(j) ORT attitude:

36. Now I'd like to ask your opinion. Will a child under five who is sick with diarrhea normally take Oralit or won't he take it?

(k) ORT quantity/administration:

37. How much Oralit should you give a child who is sick with diarrhea in one day?

38. How often should you give Oralit to a child who is sick with diarrhea?

(l) ORT use:

39. Have you ever given Oralit to a child under five years of age?

40. Have you ever given Oralit to anyone in your household?

(m) Source of care, ORT:

41. Where did you get the packet of Oralit the last time you used it?...

(n) Possession of ORT packet:

45c. Do you have an Oralit packet in your house right now?

46. Can I see it?

(o) ORT attitude:

47. What do you think - is Oralit a good treatment for diarrhea or not such a good treatment?"

APPENDIX C: MALARIA TREATMENT PRACTICES

HEALTHCOM Malawi Questionnaire

(Reference pg.35 in text)

(a) 7 day prevalence:

83. Did any of your children have a fever in the past week?

84. Which child is it?

(b) Self care:

88. What did you do at home for the fever?

(c) Source of care:

89. Where did you get the medicine(s)?..

(d) Timing:

90. When the child had a fever, did he/she start taking the medicine the same day of the fever, or some days after the fever began?

(e) Dosage:

91. How many pills did the child take the first day?

(f) Duration:

92. For how many days did the you give the medicine?

(g) Efficacy:

93. Did the fever go away?

(h) Source of care:

94. Did you take the child to anyone for treatment?

95. To whom did you take the child?

(i) Timing of care seeking behavior:

96. Did you go with the child the day he/she got sick, or after on day, or after several days?

(j) Type of treatment:

97. What medicine was the child given?

(k) Dosage:

98. When the child was sick, how many pills was the child given to take at that moment?

(l) Duration of treatment:

99. How many pills were you given to take home?

100. For how many days did you give this medicine to the child at home?

101. From the medicine you were given, how many pills do you have left now?

(m) Knowledge of treatment:

102. Have you ever heard of a medicine called Chloroquine?

103. What is it a medicine for?

(n) Use:

104. Have you ever taken this medicine?

(o) Belief:

105. Why did you take the medicine?"

(Malawi questionnaire, not fielded as of 8/87)