

# The Use of Structured Observations in the Study of Health Behaviour

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Occasional Paper 27

IRC International Water and Sanitation Centre  
The Hague, The Netherlands

1994

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# *Table of Contents*

<b>Glossary</b>		iv
<b>Preface</b>		v
<b>Introduction</b>		1
<b>Part One:</b>	<b>General Framework</b>	3
	1. Health intervention projects and the study of behaviour	3
	2. Methods to study health behaviour	4
	3. Participatory and rapid assessments	6
	4. The use of structured observations	7
<b>Part Two:</b>	<b>Research Design</b>	12
	1. Research team	12
	2. Preliminary qualitative research	12
	3. Sampling issues	13
	4. Observation issues	15
	5. Pretesting, training and supervision	17
<b>Part Three:</b>	<b>Steps in the Use of Structured Observations</b>	19
	1. Decide if structured observations are needed and can be done considering available resources	19
	2. Generate list of potential 'key' behaviours through literature review and interviews with informants	19
	3. Conduct qualitative research to identify which behaviours should be observed and how in a structured format	21
	4. Refine list of key behaviours and determine the heterogeneity of the population	22
	5. Identify who to observe, where, and when	22
	6. Choose type(s) of structured observations to conduct	23
	7. Estimate reactivity and variability of key behaviours	23
	8. Design instruments and data sheets	24
	9. Determine data collection schedule	25
	10. Train observers and pretest instruments	26
	11. Implement data collection and data management	27
	12. Clean data set(s)	27
	13. Process the data	27
	14. Conduct data analysis and use study results for project planning, implementation or evaluation	28
<b>Bibliography</b>		30

## Appendices:

1. Overview of main behaviours in five behavioural domains related to the prevention of water and sanitation-related diseases
2. Abstract of a health behaviour baseline study for the development of a health education programme
3. Abstract of an educational intervention for altering water-sanitation behaviours to reduce childhood diarrhoea
4. A. Example of a spot check observation form  
B. Example of a demonstration: asking and observing
5. Example of a field guide for preliminary qualitative research
6. Example of a 'script' of a mealtime observation (part only)
7. Flow chart to assist in selecting type of structured observation
8. Sample figure of estimating reactivity
9. General suggestions regarding the appropriate construction of data collection forms
10. Example of a precoded data sheet used for spot check observations
11. Example of an uncoded, but structured data sheet used for continuous monitoring observations
12. Example of a ratings checklist for household sanitation
13. Formula for calculating data collection parameters

## List of Tables

- Table 1: Overview of observation and interview methods  
Table 2: Features of a particular behaviour  
Table 3: Types of structured observations  
Table 4: Steps and goals in the use of structured observations

## Glossary

Health	The WHO defines health from the outsider perspective, as "a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity". From an insider point of view, what constitutes health can vary a great deal from culture to culture.
Health behaviour	What people do individually and collectively, in order to maintain and/or return to health. What specific steps are taken and why.
Physical clue	A sign of behaviour that may be used as an indicator for a particular behaviour that is not observed directly.
Reliability	The replicability or representativeness of collected data.
Validity	The extent to which one is measuring what one purports to measure.

## *Preface*

This publication was originally drafted by Margaret E. Bentley from the Johns Hopkins University Department of International Health for the Control of Diarrhoeal Diseases (CDD) Programme of the World Health Organization (WHO). The draft was one of WHO's contributions to the Oxford Workshop on the Measurement of Hygiene Behaviour, held in Oxford in April 1991. The ODA-funded Environmental Health Programme at the London School of Hygiene and Tropical Medicine (LSHTM), organizer of the Oxford Workshops, arranged for the draft to be reviewed and discussed by workshop participants and others. CDD subsequently handed over their responsibility to LSHTM to get this handbook revised and finalized through a consultative process with IRC and the School of Public Health, Johns Hopkins University.

The revised version of this publication was prepared by Marieke T. Boot in close collaboration with Margaret E. Bentley and with inputs from Joel Gittelsohn and Rebecca Y. Stallings. The final draft was reviewed by Astier Almedom, Robert Black, Ursula Blumenthal, Elena Hurtado, Ellen Piwoz, Anita Shankar, and Jan Teun Visscher.

As the third valuable product of the Oxford Workshop, this handbook provides detailed guidelines for the use of structured observations, a set of methods mentioned in the first two products: *Actions Speak: the study of hygiene behaviour in water supply and sanitation projects*, edited by Marieke Boot and Sandy Cairncross (IRC and LSHTM, 1993); and *Studying hygiene behaviour: methods, issues and experiences*, edited by Sandy Cairncross and Vijay Kochar (Sage, New Delhi, 1994). Practical examples in which structured observations have been used for assessing health/hygiene-related behaviours can be found in both of these volumes. This handbook is meant to provide a contribution to the methodology of health/hygiene behaviour assessments both for programme workers and academic researchers. We hope that you will find it useful for your work and encourage you to share your experience in due course.





## *Introduction*

This book provides guidelines for the use of structured observations. Structured observations are a method to measure behaviour. Measurement of behaviour is indicated in a number of situations for the planning, implementation and evaluation of health intervention projects.

As structured observations are like a cog in a machine it is necessary to first picture the general framework in which they are used. This is done in Part One of the book. Part Two covers general research design issues, and Part Three provides a step-by-step guide for the use of structured observations.

The audience for these guidelines comprises social scientists and others with a research background, who wish to consider structured observations as part of a health behaviour study, especially if the study is in support of a proposed or existing health intervention project. The terms 'programme' and 'project' are used interchangeably, as the difference between the two is irrelevant for the purposes of this book.



## *Part One: General Framework*

This part of the guidelines places the use of structured observations within the general framework of the study of behaviour for the development, implementation and evaluation of health intervention projects.

### **1. Health intervention projects and the study of behaviour**

Health intervention projects cover a wide array of activities, such as treatment of patients, immunization, water supply and sanitation, nutrition, family planning, health and hygiene education. A common feature of these projects is that they aim to achieve a positive impact on people's health. The focus of this book is limited to health intervention projects related to the control of diarrhoeal diseases (CDD programmes), feeding practices, and the improvement of water supply, sanitation and hygiene. However, the principles discussed will equally apply to other health projects.

Health intervention projects are always concerned to a greater or lesser extent with enhancing people's health behaviour. Health behaviour is what people do to maintain health and/or overcome illness (Scrimshaw and Hutardo, 1987). Health behaviour is, for example, drinking safe water, using a hygienic latrine, breastfeeding, eating sufficiently cooked food, washing hands after defecation and before touching food. An overview of the main health behaviours that help prevent water and sanitation related diseases is found in Appendix 1.

Influencing people to reduce risky behaviours and strengthen or develop health behaviours can only be effective when interventions are tailored to people's lives, and carefully planned, implemented and evaluated. This requires the study of people's behaviours.

Health education projects are most pointedly concerned with influencing health behaviour. These projects have also provided numerous examples of the importance of health behaviour studies for effective interventions. Health education projects that only stress simple messages which have no immediate relevance to the people concerned, have proved to be largely a waste of effort. For example, the simple message 'use a latrine' often does not influence people's behaviour because it does not take up people's concerns, aspirations and available resources.

The study of behaviour at the beginning of a project has as its purpose to assist *project planning and design*. First we have to learn about people's present behaviours and the factors that influence them. Also, we need to understand the perceptions and attitudes that motivate people to behave the way they do, and we should identify the problems that hamper health behaviours and the resources available to alleviate or solve these problems. This information helps us to plan and design a feasible and effective intervention. At the same time, this information may also be used as a baseline for monitoring and evaluation. An example is given in Appendix 2.

Health behaviour research is also useful for *project implementation*. Such research may have two purposes: 1) to provide ongoing monitoring of project activities; and 2) to solve specific project-related problems as they arise. An example of the latter is a sanitation project already under way that promotes the use of latrines, but that shows poor usage rates.

Finally, health behaviour studies are used for *project evaluation*. These studies are designed to assess whether the project was successful, and whether a health behaviour was enhanced

as result of the intervention. For example, when we want to evaluate a water supply project, we want to find out whether the new water supply facilities are used, by whom, how well, to what extent and why. And when we want to evaluate a handwashing promotion project we want to study whether more women, men and children wash their hands more frequently and thoroughly as a result of the project intervention.

In addition, but not covered by these guidelines, health behaviour studies sometimes have as a main purpose exploring or investigating the links between behaviour and health. An example, showing the complexity of such a study, is presented in Appendix 3.

## 2. Methods to study health behaviour

Several methods are available to study health behaviour. They can be broadly categorized into observation and interview methods, which can be applied both unstructured and structured. Table 1 presents an overview. The text of this section is summarized from Boot and Cairncross (1993).

**Table 1: Overview of observation and interview methods**

OBSERVATION	INTERVIEWS
Informal observation Participant observation Direct observation	Conversational interviews Key informant interviews Focus group discussions Topic-focused interviews
	Semi-structured interviews
Continuous monitoring Spot checks Rating checks	Structured interviews

Observation and interviewing methods allow us to collect qualitative and/or quantitative information. Qualitative information is primarily used to discover, explore and understand the behaviours and to gain insights into people’s motivation, attitudes and perceptions related to these behaviours. Quantitative information is primarily used to measure the extent to which particular behaviours occur, or when statistical inference is required. Together this information enables us to decide on feasible improvements and interventions.

### ***Observation methods***

Observation means watching or noticing by using all our five senses: seeing, touching, tasting, hearing and smelling. Observation as a data collection method for the study of behaviour is a skill that has to be learned. Observation is probably the most important source of information for understanding health behaviour. It has the advantage of providing firsthand data, and it allows us to find out what people actually do. Observation is not only used for directly observing people’s behaviours, but also for observing ‘signs’ of behaviours. Signs of behaviour, or so-called physical clues, such as soap and water present near the latrine, covered food, and scattered garbage, often provide us with a quick and easy indication of the presence or absence of health behaviour. These physical clues might also replace direct observations of behaviours that are too sensitive to observe or to do in the presence of an observer, or which are too difficult to catch as they happen infrequently or at irregular times.

### ***Unstructured observations***

Observations are unstructured when they are not organized in a complete or detailed way. Unstructured observations are particularly helpful to understand behaviours in their physical and socio-cultural context. *Informal observations* are spontaneous observations that take place while walking through the community, visiting houses, market places, water points,

schools, restaurants, and so on. *In participant observation*, the observer shares the life and activities of the people for a few days, weeks, several months, or even years. Through participation, the observer will experience the behaviours and combine this with observations and unstructured interviewing about what is happening. The purpose of such participation is to develop an insider's view on people's health behaviours. In *direct observation*, the observer remains an outsider, and is a spectator only. The purpose of such observation is to investigate and describe one or more behaviours fully.

### ***Structured observations***

Observations are structured when an observation list is used with a fixed number of points to notice, and when this list is applied in a pre-determined number of situations, or with a pre-determined number of people. Structured observations are particularly useful when we want to collect information about the extent to which particular health behaviours occur, including information about the frequency, intensity, and duration of the behaviours. *Continuous monitoring* involves observing and recording the behaviours that we are interested in for an extended period of time, for example several hours or a full day. It may focus on waste disposal patterns, handwashing behaviour, weaning food preparation, children's contact with soil, objects or animals, and so on. For example, if we want to study weaning food preparation behaviour, we may wish to know how the weaning foods are prepared and whether or not they are prepared fresh each time. If not prepared fresh each time, and if reheating of food occurs, we may wish to examine how and for how long weaning foods are stored. *Spot checks* are a particular type of structured observation, whereby the observer records the presence or absence of a behaviour or physical clue at the first moment of observation (Mulder and Caro, 1985). For example, children playing on the floor; the number of flies in a latrine; drinking water container covered; dirty diapers in the living area. *Rating checks* resemble spot checks but require the observer to make a judgement about what is observed. Examples are the cleanliness of woman's hands, the smell of a latrine or the freshness of food.

### ***Interview methods***

An interview is a meeting of two or more persons face to face. The purpose is to find out what is in the mind of the person(s) being interviewed. We interview people to learn about those things that we cannot directly observe, such as feelings, beliefs, perceptions, behaviours that took place in the past or that are too difficult or sensitive to observe. Interviewing as a data collection method for the study of behaviour is a skill that has to be learned.

### ***Unstructured interviews***

Interviews are unstructured when the persons being interviewed respond in their own words or when we allow the interview to occur spontaneously, more like a conversation. The purpose of unstructured interviews is to learn about people's views on health behaviours, to learn their terminology and judgements, and to capture their perceptions and experiences. *Conversational interviews* are spontaneous talks with individuals and groups on health behaviour. *Key informant interviews* are interviews with persons who are specially knowledgeable on issues related to health behaviour and with whom the interviewer develops an ongoing relationship of information exchange and discussion. *Focus group discussions* are open discussions among a small group of people on a specific subject with an emphasis on free exchange of views and experiences. Focus group discussions have the advantage of generating a large amount and more in-depth information in a relatively short time, because of the group interaction. *Topic-focused interviews* are guided by a

pre-prepared checklist with questions and topics to be covered during the interview. The checklist helps to ensure that all required information will be collected and the data will be more comparable, since all interviews will cover the same topics.

### ***Semi-structured and structured interviews***

As the name indicates, *semi-structured interviews* are something of a mix of both unstructured and structured interviews. They are guided by a list of questions that are asked in the exact wording and order as they have been written down. The answers, however, are still open-ended, and the respondent is free to give his or her own words, thoughts and insights in answering the questions. *Structured interviews* have closed instead of open-ended questions, but otherwise resemble semi-structured interviews. In closed questions, the answers are limited to a predetermined set of responses. The advantage is easy coding and analysis of the answers. Questionnaires usually contain a mix of open and closed questions.

## **3. Participatory and rapid assessments**

Rapid Assessment Procedures (RAP) are increasingly used in the study of health behaviour. The aim of RAP is to provide useful insights into the behaviour of the people in a quick and low cost way for the planning, design and evaluation of health related projects. RAP is specifically concerned with beliefs and perceptions regarding health, the prevention and treatment of illness, and the utilization of traditional and modern health services (Scrimshaw and Hurtado, 1987, Herman and Bentley, 1993). Most of the research methods discussed above are used (see Part 1.2), but with an emphasis on rapid (four to eight weeks data collection) and unstructured observation and interviewing. RAP is basically qualitative and in-depth, directed to exploration and understanding of behaviour rather than measurement (Griffiths, 1992).

Another response to the need for quick and cost-effective methods to provide projects with timely and relevant information is what is now known as Rapid Rural Appraisal (RRA). The RRA approach can be described as a semi-structured way of learning from local people, relatively quickly and in a multidisciplinary team, about the key problems and opportunities of an area and of deciding on an agreed set of possibilities for alleviating the problems and/or making good use of the opportunities (McCracken et al. 1988).

RRA has two basic characteristics. The first is the pursuit of 'optimal ignorance'. This implies that both the amount and the detail of information required to produce useful results in a limited period of time are regarded as expenses to be kept to a minimum. The aim of the multidisciplinary team is to arrive at an agreed sufficiency of knowledge necessary for a good project, and not to go beyond that. The second characteristic is the process of 'triangulation' - that is the use of several different sources and means of gathering information. The accuracy and completeness of an RRA study is maximized by investigating each aspect of the situation in a variety of ways. 'Truth' is approached through the rapid build up of diverse information rather than via statistical replication. Secondary data, direct observation in the field, semi-structured interviews, analytical games, and the preparation of diagrams all contribute to a progressively accurate analysis of the situation under investigation (McCracken et al., 1988).

Participatory Rural Appraisal (PRA) is a further development of RRA. It is based on the experience that an intervention is more likely to be successful when the people concerned are actively engaged as participants in the identification of problems, decision-making and implementation of the change process (Chambers, 1990).

Although rapid and participatory appraisals are more based on unstructured observation and interviewing, elements may be fruitfully applied to the use of structured observations, the main subject of this paper. In particular, spot checks can be used as a participatory rapid assessment tool.

#### **4. The use of structured observations**

Structured observations are a method to quantify or measure a behaviour or behaviours. First, it is important to decide which behaviour(s) we want to learn more about. (This issue is further discussed in Part 2.2.) The behaviours thus selected will be called 'behaviours of interest'. Then we must decide which features of these behaviours we want to measure. An overview of possible behaviours to study is presented in Table 2.

Consider the example of handwashing. We may wish to observe whose hands are being washed, where, when, with what, and for how long. Next, for each selected feature we have to determine what we want to record and how. To continue the example of handwashing, if we want to know when hands are washed we may record the time of the day, or the connected behaviours such as: 'before food preparation', 'after defecation'. What we record will determine what we learn from the study, and therefore we should give due consideration to this. Finally, we have to develop a data collection sheet. This also requires careful attention, to ensure that observations are recorded rightly, consistently and fully, and are easy to process. A sample sheet is found in Appendix 4. Only then we are ready to start the actual observations.

Each of the three main types of structured observations briefly described above (Part 1.2) can be sub-divided into two varieties, as shown in Table 3. Each type of structured observation and each variety can be used separately, but usually a mix will best suit the purpose of our study within the time and resources available.

**Table 2: Features of a particular behaviour**

<p><b>1. APPLICABILITY OF PARTICULAR BEHAVIOUR</b>          Is the behaviour applicable?          Is the behaviour performed?</p> <p><b>2. FEATURES OF PARTICULAR BEHAVIOUR</b>          What behaviour?          Who (age, sex, marital status, education, occupation religion, socio-economic aspects)?          In what sequence?          When (what occasion, time of day and year)?          How much (quantity)?          How well (quality or degree)?          How long (duration)?          How strongly (intensity)?          How often (frequency)?          Where (location)?          Combined with other behaviours (before and/or after)?</p> <p><b>3. DETERMINANTS OF PARTICULAR BEHAVIOUR</b>          Physical environment          Economic conditions          Cultural beliefs and practices          Household structure/organization          Community social structure/organization          Personal interest</p> <p><b>4. MOTIVATION FOR PARTICULAR BEHAVIOUR</b>          Why (purpose/reasons)?          Perceived costs and benefits          Antecedents and consequences of behaviour</p>
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Source: Boot and Cairncross, 1993

**Table 3: Types of structured observations**

<p><b>1. CONTINUOUS MONITORING</b>          - extended observation          - time-point monitoring</p>	<i>Observation of behaviour</i>
<p><b>2. SPOT CHECKS</b>          - observation of events/activities</p> <hr style="border-top: 1px dashed black;"/> <p>- observation of physical clues</p>	
<p><b>3. RATING CHECKS</b>          - environmental ratings          - individual ratings</p>	<i>Observation of signs of behaviour</i>

Source: Boot and Cairncross, 1993.



### ***Continuous monitoring***

The first type of continuous monitoring is *extended observation*. Extended observation is continuous observation over an extended period of time (usually a number of hours) at a household or any other place such as a school or water collection point. It is the most common form of structured observation, and most suitable when a series of behaviours or infrequent behaviours have to be observed. In extended observations, the behaviours of interest are noted down in a structured format as and when they occur. Extended observations require a high level of commitment and concentration of the observer to avoid missing any important behaviours of interest over the entire observation period.

The second type of continuous monitoring is *time-point observation*. This differs from extended observation only in that the observations are carried out at fixed points in time. Examples are spotting all behaviours during the first five seconds of every minute, or spotting the behaviours of interest every 30 minutes throughout the day. Time-point observation reduces the risk of lapses in concentration that are common in continuous monitoring. This type is only useful for observing behaviours that occur frequently.

Continuous monitoring requires the observer to be in close contact with the person or persons to be observed. Therefore, the observer must be trained to relate positively with the observed persons and the observed persons need to have a positive attitude to the study and to the observer. Continuous monitoring is more time consuming and complicated than the other types of structured observations with respect to data collection, data analysis and statistical interpretation.

One form of continuous monitoring involves the use of video equipment. The use of videotape has the advantage of recording actual behaviours and events, but it needs a good system of coding and analysis. High-quality computer tools for video recording, for coding observations and for exploratory video analysis are increasingly available. The use of computer-based video systems is comparatively expensive and requires the assistance of a senior professional. Usually there is not much reason to use video equipment in the study of health behaviour for project purposes. Rather it is a valuable tool for more scientifically-oriented research.

### ***Spot Checks***

Spot checks involve recording of people's *behaviour* or *physical clues* at the first moment of observation (Mulder and Caro, 1985). Spot checks are usually carried out immediately upon arrival of the observer at the place where the observations will take place. This may have the advantage that the 'real situation' can be observed, undisturbed by the reactions of the people to the presence of the observer. However, a problem could be that, on the arrival of the observer, all normal activity ceases immediately. Spot checks of physical clues may often be easier and more reliable than spot checks of behaviour. The influence of the observer on the behaviour we want to study is further discussed in Part 2.4.

Spot checks are a much quicker and easier method than continuous monitoring. Spot checks are very suitable for time allocation studies, in which case the spot observations note the exact activity of all persons in a household at a given (usually random) time. Spot checks are also very useful to observe routine behaviours, such as whether drinking water is covered, how food is stored, whether children's faeces are left in the living environment, whether animals are tied or penned, and so on. Spot checks are not useful for direct observation of behaviours of limited frequency and duration, such as tooth brushing, since it

is unlikely that a person will be brushing his or her teeth at the precise moment a spot observation is carried out.

An alternative use of spot checks is to ask people to demonstrate the behaviour of interest, and then to observe and record whether it is done correctly. For example, people can be asked to demonstrate the use of a protected well or how to prepare oral rehydration solution, or invited to show how they usually wash their hands (Boot and Cairncross, 1993).

### ***Rating checks***

Rating checks involve the observation of physical clues of health behaviour to which the observer adds a value judgement. For example, 'Woman washes her hands' is a pure observation of a behaviour of a person, while 'woman's hands are clean' requires a judgement by the observer. Rating checks can be used both for *individual ratings*, such as clean or dirty face, good or bad teeth, short or long nails, and for environmental *ratings*, such as good or poor waste water disposal, clean or dirty latrine, big or small garbage pile.

Rating checks provide a quick method for a quantitative indication of health behaviour, as the observer does not have to wait for the behaviour to occur. The problem with this method is that it is very difficult to make consistent judgements about clean or dirty, good or bad, thorough or superficial, more or less. It is even difficult for one observer to make consistent judgements for similar observations, more difficult to maintain consistency among several different observers. It is therefore recommended to use ratings only if unavoidable, and when ratings are used, to take ample time for training the observers to ensure that everybody is making similar judgements all the time. It will help when the ratings are specifically defined (see Part 3, step 8c).

### ***Advantages of structured observations***

There are several important advantages in using structured observations for health behaviour studies. First and foremost, structured observations provide information on what people actually do, rather than on what they say they do or did. There are many reasons why there might be a difference between what people actually do and what they say they do. For example, people may prefer to answer what is locally considered appropriate ('what everyone should do'), or what they would like to do if they were able to, or what they think the interviewer would like to hear.

Thus, when we are interested in knowing whether a mother washes her hands before handling food for the family, there are several ways in which this question might be investigated:

- a. The mother could be asked, through the use of a structured or unstructured interview, whether she washes her hands before food preparation. Data obtained this way provides information on *reported behaviour*. Reported behaviour is what people say they do, but it provides no way of knowing what people actually do.
- b. The mother could be observed, through continuous monitoring in the home, for handwashing before preparing food. Data obtained this way provides information about *actual behaviour*.
- c. The mother's handwashing behaviour could be inferred through the use of spot checks and/or rating checks. By trying to see whether water and soap are readily available in the

kitchen environment, or whether mother's hands are clean, we get an indication of handwashing behaviour. Thus, these data provide information on *inferred behaviour*.

A second advantage of structured observations for health behaviour studies lies in the depth and breadth of these methods. Not only can we observe the frequency and duration of the behaviours of interest, but also we can observe associated activities and behaviours. For example, we can observe the interaction between mother and child during food preparation, and the behaviours that precede and follow food preparation. Thus, structured observations may help us to understand at what moments and why a mother washes her hands.

#### ***Disadvantages of structured observations***

There are disadvantages to the use of structured observations, and these should be considered before deciding on the suitability of this research method in a health behaviour study. The disadvantages are especially related to continuous monitoring.

First, higher qualified field staff are needed and they will need more training than is required for the use of unstructured and semi-structured interviews. Structured observations also take more time. As a result, the costs involved will usually be higher. In addition, data analysis of structural observations is usually complex and requires the assistance of a statistician (see also Kanki et al., 1993 and Curtis et al., 1993).

## *Part Two: Research Design*

This part of the guidelines relates to issues on the use and design of structured observations for the study of behaviour in health intervention projects.

### **1. Research team**

A typical research team for the study of health behaviour includes a social scientist and/or health educator as principal investigator(s) and a number of field staff for the field observations. In addition, the assistance of a statistician should be secured for advice on sampling issues, observation schemes, data processing and analysis. For the preliminary qualitative research (see Part 2.2 and Part 3 step 3), more trained investigators and focus group facilitators may be required. If the health behaviour study also focuses on the relationships between behaviour and health, an epidemiologist should be part of the team as well.

It is important to consider whether the field staff should be men or women or both, and what are the implications of each. Observation of women and children can often only be done by female staff for obvious reasons. There are usually less restrictions on female staff observing the behaviour of men than for male staff observing women, but this should be checked. As field work often implies travelling and staying away from home, appropriate arrangements should be made to enable female staff to do so.

Ideally, all members of the research team should participate in all aspects of the study, including development and testing of the structured observations, training, observation, analysis and report writing. The principal investigator maintains overall responsibility and supervises field staff and data collection, unless this task is delegated to area supervisors.

How the research team is selected depends on local resources and the level of participation desired. As a rule of thumb, the active participation of people who are expected to work with the results makes it more likely that the results will be effectively used. This may concern specific population groups, project implementation staff, project development and coordination staff and related government and non-government organizations' staff. However, this is not to say that representatives of all these groups should be part of the research team itself; rather, a small active team should be selected and the others should participate in decision-making processes where their involvement matters.

### **2. Preliminary qualitative research**

Structured observations should always be preceded by preliminary qualitative research. If we proceed immediately to structured observations of health-related behaviour, we run the risk of collecting information that is not useful for the planning, implementation and evaluation of our project intervention. The first step is to properly identify key questions and problems and then we can determine what and how to observe in a structured way. This requires preliminary investigations through the use of unstructured observations (see Part 1, and Part 3, step 3).

For example, if we want to learn more about weaning food practices, what information might be required? Probably we already have some idea of how the food is prepared, served, and stored within the households in our project area. But unless the behaviours of interest are understood in detail, it is not possible to formulate good structured observations.

In this example, the kind of qualitative information that may be required includes the frequency and times of the day when food is prepared for an infant, who the usual child caretaker or feeder is, where and how the food is prepared, the types and recipes of weaning foods prepared, the technology that is used, the types of utensils used for food preparation and within which food is stored, whether it is common to leave food uncovered or not, and if so, where the food is stored, whether animals run free, and so on.

In addition, before starting with structured observations we should know something about the variability of the behaviours of interest, that is whether or not these behaviours differ considerably between individual households or various socio-economic and cultural population groups. If a risky behaviour appears to be very rare amongst the group of study - for example if weaning food is seldom stored - it would not be an interesting behaviour to study as it is not an important factor for the group. If a risky behaviour appears to be very common a smaller sample size may be chosen. A risky behaviour that is very common should not be selected for structured observations if we are interested in showing the relation between behaviour and health. If almost everyone has the same risky behaviour than this will not come out as a risk factor in the study. Preliminary qualitative research will also help to determine the most simple types of structured observations that will still produce useful results.

### **3. Sampling issues**

Sampling issues arise when we decide from whom and from where to collect observation data for our study. It is important to carry out sufficient observations on the right individuals, in the right locations, to get a representative picture. It is equally important not to do more observations than necessary, in order to reduce the cost in time, energy and money involved in data collection and analysis. Sampling helps to get useful results from structured observations at minimal cost.

Three main sampling issues need to be resolved for the use of structured observations: (1) selecting an appropriate sampling method, (2) determining a suitable level of selection, and (3) deciding on the sample size. Usually this requires the advice of a statistician; a brief overview is given below.

#### ***Sampling procedures***

There are four basic sampling procedures: simple random sampling, systematic sampling, stratified random sampling, and cluster sampling.

#### **Simple random sampling**

In a simple random sample every member of the population has an equal chance of being selected. (A member or unit of the population can be a household, a mother, a school-age child, but also a water collection point, a market place, and so on.) A common method to obtain a simple random sample is by means of a table of random numbers, which can be found in most statistics books.

#### ***Systematic sampling***

A systematic sample is often easier to draw and therefore more frequently used than a simple random sample. In a systematic sample we just divide the number of members in the total population by the number of members we want to include in our sample, and the interval found is used as a measure for selection. For example, if our total population is 250

and we want to have 25 members in our sample, then the interval is 10 ( $250:25=10$ ), and thus we select every tenth member of the population in the sample.

### *Stratified random sampling*

In a stratified sample the total population is first divided into groups, based on one or more criteria. For example, the population may first be divided into income groups or groups with and without piped water supply. Then within each group a number of households are sampled. The advantage of this sampling procedure is that the sampling size can usually be smaller than for the two other sampling procedures described above. Therefore, a stratified sample is often the best choice for structured observations of health behaviour, because it provides, at lowest cost, precise and useful information about the various groups of people that are relevant for a health intervention project.

### *Cluster sampling*

In cluster sampling, clusters - for example neighbourhoods, villages or schools - instead of members of the population, are sampled by using simple random, systematic or stratified sampling procedures. Cluster sampling has two advantages. Clusters are more easily sampled because it takes less effort to make a listing of all clusters than of all members of the population. Travel time and expenses are reduced as observations are limited to members of the selected clusters. Disadvantages of cluster sampling are that the results are less representative of the total population and that analysis of cluster data is more complex, if the clusters, rather than their members, are taken as the units of analysis (which is more correct).

### *Levels of sampling*

Sampling procedures can be carried out at various levels. The most common levels are: country, city/village, household/site within the city or village, and individual. For structured observations of health behaviour, the lowest levels are the most important ones.

#### *a. Choosing countries*

Usually this option does not come into focus, as most health intervention projects are not above country level. If countries have to be selected, this is seldom done randomly for practical or political reasons.

#### *b. Choosing cities or villages*

If a project area covers more than one city or village a sample may need to be taken. This sample is often not random as it may be too complicated to obtain a total listing. Instead, often a number of selection criteria are formulated in relation to the purpose of the study, and based on these criteria, the required number of towns/villages with the right characteristics is chosen.

#### *c. Choosing households or sites within cities/villages*

At this level, the sampling methods discussed previously are those that are most commonly used. As an alternative, all households or sites that have a certain characteristic may be selected. For example, all households with a child under three years of age, or all male and female representatives who will play an active role in the project intervention, or all communal water collection points, and so on.

*d. Choosing persons within the households or at the sites*

This point comes up when it is not immediately clear who to observe, or when there are various choices for observation. For example, when we want to study faeces disposal practices of children under five years of age, who do we select for intensive observation? We may go wrong if we decide to observe the mothers as they may not always be child caretakers. So we must identify the actual caretakers, perhaps an older sibling or other family member, or as an alternative, we could focus on the child itself. But when there are various children under the age of five, again we have to make a choice, whether to include them all or not.

Choices of sampling methods and levels of selection always depend on the purpose of the health behaviour study in relation to the intervention project, and on available resources. Especially at the households/sites and individual levels, these choices can only be made after a preliminary qualitative investigation.

***Sample size***

When a sampling procedure and levels of selection have been identified, a decision can be made about the sample size. How large our sample should be is not an easy decision. If we wish to come close to a 'truly' representative sample size, we have to apply statistical calculations and for this the help of a statistician will be indispensable. A basic rule about sample size states that about thirty units are required as a minimum in order to provide a pool large enough for even the simplest analyses (Dixon, B.R. et al., 1987). In general, if the total population size is known it is reasonable to draw a 10-20 percent sample, taking into account the purpose of the study, the total population size, the variation in population groups, and the sampling procedure applied.

**4. Observation issues**

***Basic decisions***

When we want to conduct structured observations, there are a number of decisions to be made. The main decisions are summarized below. Usually the decisions are interrelated, and one decision will influence the others. Again, useful decisions can be made only after preliminary qualitative investigations.

*a. Should observations be location- or person-based?*

Observations are person-based when the observer follows the person whose behaviour is under study, wherever this person goes. On the other hand, observations are location-based when the observer settles down at a location, for example at a public bathing place or in a kitchen, and observes the behaviour of the people who move into the place. Observations are also location-based when the observer does spot checks of physical clues of related behaviour, such as whether water pots are covered or not.

*b. How long should the observations take, and what is the best time of the day?*

A decision about the duration of the observations only applies for continuous monitoring. For example, if we want to study food preparation and storage behaviours, the observer might need to arrive before breakfast and leave only after the last meal in the evening. This is because food preparation and storage behaviours may vary with the type of meal and the time of the day. Since observations are costly and of long duration this may fatigue the observer. It is therefore important to minimize observation time without sacrificing the collection of relevant information. Thus, based on information learned during the

preliminary investigation, we may cut down the observation time. For example, only the preparation of the main meal may be observed over a period of time. This can be supplemented by time-point observations or spot checks on the preparation of other meals. The best time of day to do structured observations is primarily dependent on when the behaviours of interest are most likely to take place. However, the preferences of the people being observed and the availability of the observers should also be taken into account.

*c. How often should the observations be repeated?*

Continuous monitoring is often limited to a one-time observation period. The advantages are clear, as it will limit time and costs, and data analysis will be less complicated. The disadvantage is that this one time observation may not give us a reliable picture of everyday behaviours. How do we know that what we observe on one day is the same as what we might observe a next day, or that what we observe in the rainy season is the same as what we would observe in the dry season? If the decision is for a one-time observation period only, we should take care that when we want to do an evaluation on the basis of a baseline, data collection during the evaluation should resemble data collection during the baseline. Unfortunately, there is no rule of thumb for deciding whether one observation period will be enough and if not, how many observations should be done. People may react or behave differently when they know that they are being observed, which may also influence the number of observations required. This problem of 'reactivity' is discussed below.

***Reactivity***

It is quite normal for people to react to the presence of an observer or to behave differently than usual. When we know somebody is observing us, we tend to show our best side, or behave as we expect the observer would like it. Also, we may consider some behaviours too sensitive to show and therefore wait until the observer has left. This phenomenon is called 'reactivity', and since it influences obtaining a reliable picture of actual behaviour, we should deal with this as best as we can.

One way to deal with reactivity is to select locally accepted observers and to pay due attention to gender aspects (see Part 2.1). Another suggestion is to start with systematic observations only when the community has become accustomed to the observer's presence. People may still act differently under observation, but this appears to be reduced through use of repeated observations, as the observed grow accustomed to the presence of the observer. Through pre-testing it may be possible to identify a point in time where reactivity decreases significantly. For example, if two visits are needed before people feel at ease and start acting as if the observer is not present, these two visits should be added to the total number of observations required.

***'Marker' behaviours***

Direct observations are inappropriate when a behaviour is considered to be too private. For example, there are few cultures where it would be appropriate to actively observe adults' defecation. Sensitivity towards the use of structured observations within a specific culture or for specific behaviours is an issue that should be addressed in qualitative investigations. When a behaviour itself cannot be observed, for sensitivity or for other reasons, often another 'marker' behaviour can be noted. For example, in Nepal, adults pour a small pot of water to take with them when they go to defecate. This behaviour could be used as a 'marker' for adult defecation.

***Openness on the purpose and type of the observations***

It is good practice to be open on what the study is about. Not only do people have the right



to know in what they are involved and why, but also their involvement as partners has distinct advantages for the depth and usefulness of the study (see also Part 2.1). However, if we are interested in how successful the project intervention was, or in the relationships between certain behaviours and the risk of getting ill, it may be necessary to withhold some information from both the people under observation and the observers in order to prevent reactivity and biases. For example, if observers know we are interested in the relationship between weaning food hygiene and diarrhoea morbidity, it may influence what they think they see. And if we want to know whether more people cover water pots after the project intervention, people may quickly cover their pots just for the observation, rather than as a hygiene practice.

## **5. Pretesting, training and supervision**

Once we have decided on the observation data-sheets and implementation scheme, they should be carefully pretested. Pretesting is often neglected due to time constraints, but taking a little time for it may save a lot of time later on during observation and data processing. Pretesting enables us to make necessary improvements in the observation scheme, the recording formats and the data processing and analysis procedures before it is too late. Field testing of the observation scheme may or may not be done as part of the training of the observers or field workers. It is important to actively involve the field workers in the development of the observation scheme. It is also important to involve the people that will be subjected to observations by seeking their advice as to how and when to observe best (see also Part 2.1).

Training of the observers is always necessary. Training may require from several days to one or more weeks, depending on the experience of the observers and the complexity of the observations to be made. For example, observing the presence of a latrine is fairly simple, although in practice one may find it difficult enough to decide whether to classify a particular structure as a latrine or not. It is more difficult to observe defecation practices of children under five, and the observers may need a number of practice rounds before they can do a good and consistent job. More difficult also are rating checks, which therefore require ample training to ensure that consistent choices are made, not only by the individual observers, but also between the various observers (see Part 1.4).

A training usually includes at least the following:

- a. Welcome and introduction of participants.
- b. Overview of the health intervention project, its objectives, organization and implementation.
- c. Introduction on the purpose and set-up of the health behaviour study, and the roles of the various people involved.
- d. Detailed discussion on the role and tasks of the observers. Stress that the success of the study will depend largely on how well they do their job of collecting precise data.
- e. Step-by-step discussion of, and detailed instructions, on the use of structured observations. Explain the why, what and how of each observation item and how to record the observation data.
- f. Role play the observation scheme. Discussion the experiences with the role play, and role play again.
- g. Detailed discussion on how the observers should introduce themselves and establish rapport in the community and the households. Role play the introduction several times,

- because this is often a difficult part of the job.
- h. Discussion of the list of persons or locations the observers have to visit and what to do when this is not possible.
  - i. Practice runs of the introduction and observations in the field. Discussion of the field experiences.
  - j. Discussion of the arrangements made for guidance and support for the observers while they are in the field.

In Metro Manila, for example, two research assistants were given intensive training in participant observation and interviewing. After a didactic part they had to observe selected behaviours for several days in two households. Findings were discussed and only then did they start a three-month observation study (Baltazar, 1991).

Training and preparation can very well be concluded with establishing a test to prove the reliability of the person in observing behaviour. Also it is important to schedule the field work in such a way that close supervision is possible. Time for discussion and reflection on the information collected, as well as for checking and organizing the completed observation forms, must also be built in. The supervisor should be present, especially at the beginning of the study, to provide support and clarification, assist in solving problems and review the completed forms. In addition, if the team is working together in one locale, it is advantageous to discuss the progress each night, as it will help to maintain motivation, and additional relevant information not captured by the observation forms may emerge in these discussions.

## *Part Three: Steps in the Use of Structured Observations*

This part provides step-by-step information on the process of developing, pretesting, implementing and analysing structured observations in a behaviour study for a health intervention project. There are fourteen steps and each step is broken down into key goals (see Table 4). The steps described are one possible scheme for incorporating structured observations into health behaviour studies, and should be adapted to actual needs. The steps resemble ordinary steps in any behavioural study, but with a purposeful bias towards structured observations.

STEP 1. Decide if structured observations are needed and can be done considering available resources

### ***1a. Determine the research needs***

First, determine whether the study is needed for assisting project planning and design, project implementation, and/or project evaluation (see Part 1.1). The question to be answered is: 'What should be the objectives of the study and what are our key-questions and problems we need more information about?'

### ***1b. Determine if structured observations are necessary***

Is knowledge of actual human behaviour necessary to meet the defined research needs?

Structured observations make a study more costly in terms of time, qualified field staff and complexity of data analysis (see Part 1.4). Continuous monitoring, in particular is a time and labour intensive research method. Therefore, it should be decided if quantitative measurement of human behaviour is really indicated.

### ***1c. Decide on available resources***

Can sufficient money, time and personnel be made available to do structured observations?

The question on available resources is closely related to the previous question on whether or not structured observations are needed. If we conclude that structured observations are needed but sufficient resources are lacking, we may wish to reconsider or scale down our research needs and choose simpler research methods instead. This will have implications for the research results and their use in the intervention project, but these can be taken into account.

STEP 2. Generate list of potential 'key' behaviours through literature review and interviews with informants

### ***2a. Review the literature and 'brainstorm'***

Which behaviours might be important to consider for structured observations?

Depending on the objectives of the study and the key questions and problems determined in step 1, we should decide which behaviours need further investigation. To this end it is helpful to first screen available literature and brainstorm with informants about possible 'candidate' behaviours for further study.

**Table 4: Steps and goals in the use of structured observations**

**Decide if structured observations are needed and can be done considering available resources**

- a. Determine the research needs of the health intervention project.
- b. Determine if structured observations are necessary to meet these research needs.
- c. Decide if available resources are sufficient to do structured observations.

**Generate list of potential 'key' behaviours through literature review and interviews with informants**

- a. Review the literature and 'brainstorm'.
- b. Develop preliminary list of key behaviours.

**Conduct qualitative research to identify which and how behaviours should be observed**

- a. Develop a field guide.
- b. Conduct the qualitative investigation.

**Refine list of key behaviours and determine the heterogeneity of the population**

- a. Refine the list of behaviours to be observed in a structured format.
- b. Determine behavioural markers, if needed.
- c. Ascertain cultural, economic and religious heterogeneity of the study population.
- d. Check the work so far with the decisions in step 1.

**Identify who to observe, where and when**

- a. Identify who (and what) to observe.
- b. Identify locations where key behaviours occur.
- c. Identify times that key behaviours occur.

**Choose type(s) of structured observations to conduct**

- a. Do the minimal options exercise.
- b. Use flow chart to select type(s) of structured observations.

**Estimate reactivity and variability of key behaviours**

- a. Select test sites.
- b. Estimate variation in key behaviours.

**Design instruments and data sheets**

- a. Operationalize and define key behaviours.
- b. Design continuous monitoring/spot check instruments.
- c. Develop ratings checklist, if required.
- d. Prepare observation summary.

**Determine data collection schedule**

- a. Determine the number of days for data collection.
- b. Determine the mean number of observational episodes that can be conducted by one observer.
- c. Determine the number of observers required to conduct structured observations.

**Train observers and pretest instruments**

- a. Involve observers in development of structured observations.
- b. Develop field manual and code books and carry out the training.
- c. Pretest instruments.
- d. Conduct reliability tests to reduce inter- and intra-observer variability.

**Implement data collection and data management**

- a. Conduct the structured observations.
- b. Review data sheets and store properly.

**Clean data set(s)**

- a. Conduct range checks.
- b. Conduct consistency checks.

**Process the data**

- a. Determine frequencies of key behaviours.
- b. Determine amount of time spent on key behaviours.
- c. Create behavioural scales or scores.

**Conduct data analysis and use study results for project planning, implementation or evaluation**

- a. Do descriptive analysis.
- b. If necessary or desirable, do further statistical analysis.
- c. Maximize the use of the results of the study.

The literature review may include hygiene literature about links between behaviour and health, social science literature about local socio-economic and cultural settings, beliefs and practices, and books on the study of behaviour, with checklists such as the one presented in Appendix 1.

Brainstorming should be with people who can provide relevant information about the subject of our study, the project or study area and local patterns of behaviour from various perspectives. These people may include fellow researchers, project staff, community groups and other knowledgeable people, such as local health workers, religious leaders, school teachers, representatives of local organizations. Unstructured interviews with individuals and groups are the best tools for these brainstorming sessions.

**2b. *Develop preliminary list of key behaviours***

After the tasks in 2a have been completed, a preliminary list of key behaviours for further study can be finalized. It is best to organize the list in such a way that specific behaviours can be grouped together under more general headings such as 'food handling' and 'personal hygiene'. Perhaps weight can be given to behaviours that appear to be particularly important, for example behaviours that were frequently cited. The list will form the basis for the qualitative data collection in the next step.

STEP 3. Conduct qualitative research to identify which behaviours should be observed and how in a structured format

**3a. *Develop a field guide***

The field guide contains instructions for the field workers on the types of questions that should be investigated and observed, the types of households, respondents and key informants to locate for unstructured interviews, how to record the collected data, and so on. A sample field guide for the collection of information on feeding practices during diarrhoea is shown in Appendix 5.

**3b. *Conduct the qualitative investigation***

Field workers for this qualitative part of the research require to be trained investigators and focus group facilitators. The principal investigators should actively participate in the field work, and if time allows may wish to do all this work themselves.

The most common research methods at this stage will be unstructured interviews, including focus group discussions, and unstructured observations. An effective strategy for the unstructured observations is for an observer to remain in a household or location for several hours, taking notes about what he or she sees in the form of a 'script'. It may not be feasible or necessary to write down each and every behaviour, but detailed descriptions of relevant events and their sequence can provide a rich data source. An example of a 'script' of a meal time observation is given in Appendix 6.

The data collected may be entered and organized for analysis on a microcomputer. A number of software packages are available for this, including ZyINDEX and NOTEBOOK (Pfaffenberger, 1988). However, for many studies it will not be necessary to depend on specialist software packages. Instead, the written text can be grouped under key-points or codes representing key-points, and then the information under each key-point can be analyzed and interpreted. A report of the qualitative data should be prepared by the principal investigator for review by the entire team.

## **STEP 4 Refine list of key behaviours and determine the heterogeneity of the population**

### ***4a. Refine the list of behaviours to be observed in a structured format***

The results of the qualitative research should allow us to make a more definitive list of behaviours that should be observed for our research needs, as identified in step 1.

### ***4b. Determine behavioural markers, if needed***

Once the list of behaviours has been created, it is necessary to ascertain which may be observed directly. As stated earlier, it may be culturally inappropriate or insensitive to observe some behaviours. Through the qualitative research we should know which behaviours cannot be observed directly and which could be good 'marker' behaviours instead. A good 'marker' behaviour is representative of the real behaviour. In other words, the 'marker' behaviour should consistently occur when the actual behaviour occurs and it should not occur when the actual behaviour does not.

### ***4c. Ascertain cultural, economic and religious heterogeneity of the study population***

The information collected during steps 2 and 3 should allow for an assessment of the heterogeneity of the population under study. This is important to know as it may influence the sample methods and sample size and the type of structured observations to conduct within the various groups.

### ***4d. Check the work so far with the decisions in step 1***

At this point we should check if the selected behaviours for structured observation will really meet our objectives and give answers to our key questions as formulated in step 1. If not, we have to go through the steps again and see where we went wrong. It may be that we either have to adapt our objectives or revise our set of selected behaviours.

## **STEP 5. Identify who, where and when to observe**

Whereas the previous step was concerned mainly with utilizing the data from the qualitative investigation to decide on key behaviours for the structured observations, this step uses the same data to describe the context in which these behaviours occur.

### ***5a. Identify who (and what) to observe***

Just as it is important to reduce the number of key behaviours to observe, so it is important to focus on those people responsible for the behaviours of interest. Thus, if we are interested in child defecation practices we should focus on the child and its caretaker. Defining who is the caretaker may not always be as simple as it seems, because it is not necessarily always the mother, nor is it necessarily always the same person throughout the day.

### ***5b. Identify locations where key behaviours occur***

It is extremely important to determine where to observe. Behaviours that are person-linked require the observer to follow the person, while location-linked behaviours necessitate the observer remaining in one or two key spots for the duration of the observation. For example, if we are interested in interactions between children and animals, we may wish to follow the children, whereas if we are interested in food preparation practices we will likely locate our observations in kitchens.

### ***5c. Identify times that key behaviours occur***

Insight into the duration, frequency and seasonality of the behaviours of interest is equally important for deciding how to organize the structured observations. If the preliminary data suggest that a behaviour occurs infrequently or at odd times, this will influence the observation period required, or may require us to look for alternatives, such as spot checks of physical clues or demonstrations. If key behaviours only occur during certain times of the day, the structured observations should focus on those time periods. If seasonality of behaviours appears to be an issue, this should also be addressed.

#### **STEP 6. Choose type(s) of structured observations to conduct**

Again, this step can only begin on the basis of the data available from the preliminary qualitative investigation.

##### **6a. Do the minimal options exercise**

Spot checks of physical clues are the quickest, easiest, least intrusive and cheapest type of structured observations, whereas continuous monitoring is the most complicated, time consuming, intrusive, and expensive. Therefore, it is needed to take the objectives of the study (including the identified key problems and questions) and reflect which types of structured observations would be best suited for each key behaviour, taking into account available resources and constraints.

##### **6b. Use flow chart to select type(s) of structured observations**

A more scientific way of deciding on the type(s) of structured observations that will best 'capture' the behaviours of interest is by using the flow chart in Appendix 7. Six yes-no questions must be answered. A positive response to any of the questions results in 1-2 points being added in favour of spot check observations, while a negative response results in 1-2 points added in favour of continuous monitoring.

#### **STEP 7. Estimate reactivity and variability of key behaviours**

The extent of reactivity and the variability of the behaviours of interest will determine the number of times the observations should be repeated (see Part 2.4). Therefore it is necessary to conduct test introductions and test observations in sites similar to those being included in the sample. It is best to first draft the data collection forms (see next step) and to use this test round also for a first try out of the forms.

##### **7a. Select test sites**

A reasonable number of sites should be chosen and repeated visits made to each site. An observer should not go to the same site on the same day of the week or time of the day.

##### **7b. Estimate variation in key behaviours**

The use of a line graph may be a handy tool to get an indication of the variation in key behaviours, as shown in the sample figure in Appendix 8. Based on the estimated variation, a decision must be taken about if and how often observations should be repeated. If reactivity would require a large number of repeated observations, the introduction and/or the observation form may need to be adapted to reduce the problem of reactivity.

#### **STEP 8. Design instruments and data sheets**

##### **8a. Operationalize and define key behaviours**

When a set of key behaviours has been established, it is necessary to clearly define and operationalize under what circumstances the behaviour will be considered to be present or absent, and the different forms of the behaviour that will be recognized.

For example, it is necessary to clearly define what constitutes handwashing: a mere rinsing with water, actual rubbing of the hands together while rinsing, the use of soap? Other aspects of the handwashing may also be important to record: Did the person wash his own hands or were they washed by someone else? Where did the handwashing take place? What source of water was used for washing hands? What was done with the waste water? In addition, the preliminary qualitative research may have indicated that mothers consider washing of clothes and bathing of children as a type of handwashing at the same time, and if so, we should also consider this in our definition.

**8b. *Design continuous monitoring/spot check instruments***

Once key behaviours have been operationalized and defined, the design of the structured observation instruments may begin. General suggestions regarding the proper construction of data collection forms are found in Appendix 9. There are two main types of instruments for coding structured observations: (1) pre-coded data sheets and (2) uncoded, but structured data sheets. Both methods make use of a codebook that lists, defines and operationalizes all key behaviours together with codes for recording.

An example of a pre-coded data sheet for structured observations is presented in Appendix 10. Key behaviours are printed on the data collection sheet, so that indicating whether a behaviour has occurred involves little more than checking a box. Precoded data sheets are a simple and rapid method of data collection that are well-suited to spot check structured observations. As the number of different behaviours to be recorded must fit on to one or two sheets of paper, this method is especially appropriate when a short, well-defined list of key behaviours has been developed. However, if observers are not well trained and motivated, the use of precoded data sheets may lead to categorization of ambiguous behaviours into inappropriate categories, even if blank spaces are left on the data sheet for 'other' behaviours.

Appendix 11 presents an example of an uncoded structured data sheet. Blank spaces are left to be filled in by the observer with the appropriate behavioural codes as they occur. The observer will need quite some training to get familiar with the code-book to quickly find the right code for each behaviour. Encoded data sheets are suited for structured observations of complex events where numerous behaviours occur in a rapid sequence.

Data should be coded at two levels: the observational episode (the visit) and the key behaviour. At the level of the observational episode, items that may require coding are the date and time of the beginning of the observation period, the identification of the observer, the identification of the household and person(s) observed, and the time of each observation or the sequence of observations. Minimally, at the level of the individual behaviour, both types of structured observation require the following data: the time the behaviour is observed, the persons involved, and the behaviour observed. Additionally, other kinds of data can be recorded at the behavioural level if needed. For example, a study of infant feeding behaviour might record the type and quantity of food given to a child during food serving.

**8c. *Develop ratings checklist, if required***

A decision should be made about the inclusion of a supplementary ratings checklist. If ratings are used, the behavioural indicator should be defined in terms that are 'observable by the senses' (Fisher et al., 1983), and be coded in such a way that an observer can discriminate among all choices.



For example, in case we want to know about hand cleanliness, we must decide whether it will be sufficient to distinguish between (1) clean and (2) dirty (which is easier), or that we need more alternatives to choose from, such as (1) very clean, (2) relatively clean, and (3) dirty. We need good definitions of the various alternatives to make sure that consistent choices can be made by and between the observers. An example is given in Appendix 12.

As discussed before (Part 1.4), judgements for ratings are more liable to inconsistencies and mistakes and therefore should only be used if the alternatives have even more disadvantages.

**8d. *Prepare observation summary***

The data sheet for structured observations may also include some questions to be asked after the observation has been completed. Sometimes it is important to clarify information related to the behaviours of interest, which will help to analyse and interpret the collected data.

**STEP 9. *Determine data collection schedule***

This step concerns a series of logistic decisions about how to collect structured observation data. Rough estimates of the number of days and number of observers required can be calculated by using the formula in Appendix 13.

**9a. *Determine the number of days for data collection***

The number of days available for data collection will depend largely on when the study should be completed and on project resources. Research that is meant to assist in project planning and implementation is likely to be needed quickly, whereas resources are usually limited and competing with other needs.

**9b. *Determine the mean number of observational episodes that can be conducted by one observer***

Continuous monitoring usually requires a minimum of several hours per observational episode, and therefore it is unlikely that more than two to three such observations can be conducted in a single day. If the observations are carried out at a fixed time during the day, for example in the early morning to catch defecation behaviours, or before lunch time to catch food preparation behaviours, then only one observational episode per day may be possible. Spot checks may be done quickly, and even 10 to 30 spot checks are possible in one day if the behaviours of interest (or physical clues) can be observed the whole day. These estimates will vary depending on the distance between the households or locations, the means of transport available, weather conditions, and so on.

**9c. Determine the number of observers required to conduct structured observations**

When we know the number of days available for observation, and how many observations can be done per day, we can calculate the number of observers required based on the selected sample size. Generally, fewer (two to five), more highly trained observers should be used for continuous monitoring observations. More (four to ten), less highly trained observers can be used for spot check observations. If our calculations show a time or manpower constraint, previous steps and available resources should be reviewed again to make ends meet.

**STEP 10. Train observers and pretest instruments**

**10a. Involve observers in development of structured observations**

Observers' involvement in the study may well start in the early steps of the research, but should be ensured from step 7 onwards, as their contributions will be crucial to the success of the data collection.

**10b. Develop field manual and code-books and carry out the training**

Once the data collection sheets have been developed, the observers should be trained to use them as intended. A manual should be prepared that outlines the entire protocol, including the timing and frequency of observation periods, rules for how the observer should present him or herself and interact with the persons, and details for filling in each data sheet, with operational definitions for each behaviour.

**10c. Pretest instruments**

Once the training exercises have been completed, the data sheets can be pretested among households or at locations that are similar to, but not included in, the study. Use the opportunity to also identify any other possible problems with the observations, including time and timing, reactions of the persons under observations, transport etc. Any problem that comes out of the pretest should be looked into seriously, and changes made accordingly.

As part of the pretest, enter the collected data into a computer and carry out a test data processing and analysis to identify any problems. Check whether it will result in the information required as defined in step 1.

**10d. Conduct reliability tests to reduce inter- and intra-observer variability**

Structured observation data should be reliable between observers, so that, irrespective of the observer, the same coding is being obtained. The best method for testing is to pair observers for observations of the same episode, and then compare their codings (Mulder and Caro, 1985). Each observer should be paired with each of the other observers (presuming there are no more than four or five in total). Until there is 80 or 90 percent agreement in all recordings, the data collection should not begin. If there are some repeated problems, operational definitions or data sheet structure may need to be revised. If a particular observer is having difficulty, this person will need more training or may have to be replaced.

A second reliability test is whether the observer is consistent in his or her observations over time (Mulder and Caro, 1985). A consistency check should be done at regular intervals as part of the supervision task, but may require more attention at the beginning of the data collection, and when the risks of routine slip in after some time. When a check shows that the observer is including many new codes or omitting old codes, something might be wrong.

## **STEP 11. Implement data collection and data management**

### ***11a. Conduct the structured observations***

When the data sheets are finalized and reliability tests have been completed, data collection can be implemented. It is recommended to remain alert to the reactivity and reliability problems and devise strategies to reduce them.

### ***11b. Review data sheets and store properly***

During the first weeks of data collection, data sheets should be reviewed nightly by the supervisor, and consistency checks done on a weekly basis. In addition, observers should be queried about any difficulties they may be experiencing in making observations or recording data.

Data sheets should be stored in an area safe from rain, insects and other forms of damage, and should be entered directly to the computer or copied as numeric codes on columned coding paper if direct data entry is not possible. However, data entry to a computer should always be done as soon as possible. Check for possible transcription errors.

## **STEP 12. Clean data set(s)**

Once the data has been entered, the data should be read using a statistical software package. There are two basic steps in data cleaning: range checks and consistency checks.

### ***12a. Conduct range checks***

Obtain simple frequency distributions for every item on the data file, and check for any irregularities. For example, if an item was supposed to be coded "1=no, 2=yes, 8=not applicable, 9=unknown", the investigator should circle any occurrences of values other than 1, 2, 8 or 9 on the printout and check with the observation sheets to see what caused the error. If it is simply a data entry error, it should be converted. Otherwise, the 'context' (such as related items), should be examined to determine what the correct code would be. As a last resort, errors may be recoded as 'unknown'.

### ***12b. Conduct consistency checks***

Some items in the data collection form can be cross-checked against each other as a consistency check. For example if one of the recorded answers was that the mother was 'away', then the answers related to the way in which the mother responded to the child when he defecated should be coded 'not applicable'. If another code is found, check for the reason. If it is not possible to trace the correct answer, use the code 'unknown'.

## **STEP 13. Process the data**

### ***13a. Determine frequencies of key behaviours***

As a first step, determine the frequencies of the key behaviours defined in step 4. If the data are recorded in a continuous observation, it is assumed that each person is observed for approximately the same amount of time. (If not, it is necessary to make an adjustment to reflect the length of time by using the following formula: # times behaviour X was observed/ # hours observed for each person.

When a series of spot checks are used it is assumed that each person is 'spotted' the same number of times. If this is not true, proportions should be used instead of simple counts, using the following formula: # times behaviour X was observed / n, where n is the # of spot checks for person i.

Counts of behaviour can form the basis for the estimation of time allocation of household members to different tasks, for example what proportion of a woman's time is spent on washing clothes, child care, food preparation, and so on. Counts can also have a more specific focus, such as how often a child's fingers touches soil and his or her mouth, or what different types of foods are given to children aged between 6 and 12 months.

**13b. Determine amount of time spent on key behaviours**

For continuous observations, it is a simple matter to calculate time spent in a particular activity if the starting and stopping times are recorded each time the activity is observed. Such recordings allow the investigator to calculate the duration of each observation of the activity, which can then be summed together over the observation period to yield *total time spent* in activity X. The *mean duration* of activity may also be computed by dividing the total time spent by the number of times the activity is observed. In both cases, it is assumed that observation periods are of approximately equal length for all people. Otherwise a proportion should be substituted for simple time spent (by using the following formula: total minutes in activity X / total minutes observed) and the mean duration should be analyzed separately for subsets of people with similar observation periods. For example, if people were observed for periods between 5 and 16 hours, they could be divided into subsets of people with 5-8, 9-12, and 13-16 hours of observations.

**13c. Create behavioural scales or scores**

At times, information may be collected on a *set* of related behaviours which the investigator intends to combine into a scale that is a proxy for a characteristic that cannot be measured directly. For example, Bentley et al. (1989) collected information on specific observable behaviours of young children and their mothers during feeding episodes. The various particular behaviours were combined into scales measuring 'child's acceptance of food' and 'mother's encouragement to eat'. Common types of scaling include: additive scales, Guttman scale and factor analysis. The use of scales require the services of an experienced statistician.

**STEP 14. Conduct data analysis and use study results for project planning, implementation or evaluation**

**14a. Do descriptive analysis**

In a descriptive analysis we consider the frequencies and mean figures of the key behaviours and determine what these figures tell us of our project planning, implementation, and/or evaluation. It is important to specify the figures for gender, age and socio-economic or cultural groups as this will help us to gain a deeper understanding. The analysis will also be more fruitful when we combine the quantified data with the qualitative data from the preliminary investigation and the additional qualitative data gathered as part of the structured observations.

One way to make the analysis an educational and productive experience is to call one or more workshop type of meetings and discuss the figures with the people who are expected to work with the results of the study. For example: 'We found that around 90 percent of the women and 62 percent of the men wash hands after defecation. Some 70 percent do so with mud, 10 percent with soap, and the rest with water only. Of the 47 percent of the women who wash hands before food preparation, 90 percent do so with water only, and 10 percent with soap and water. What do these figures tell us? How do these figures relate/compare to other findings? What can we learn from these figures and what are the implications for our project?' Project staff and population groups (the target groups of our project) are the key

people to be involved in the analysis process, as they will have important things to say about the figures and are the main actors in the transition from study to action.

If we want to compare the figures from the baseline study with those of the evaluation study, we should ask the statistician to calculate whether the differences found are within the boundaries of mere coincidence, or indicate that these differences may be due to the impact of the intervention.

***14b. If necessary or desirable, do further statistical analysis***

Additional statistical analyses are often not necessary, but may sometimes be indicated to increase the wealth of the results of the study. The statistician can advise on this, and her or his assistance will be required.

***14c. Maximize the use of the results of the study***

The study is only useful when the results are applied in the project. If we start to think about this only at this stage, we are already too late. Rather, the use of the results should be at the fore front of our minds and actions from the very first step in the research (see Part 2.1 and the first steps above).

At this stage, we take the actual step from results to action. One way to facilitate this is to formulate the recommended actions in the research report, together with an indication of who should take prime responsibility. Workshop-type meetings should be held about the results of the study and the planning of actions. Repeated meetings should be organized, for example after three and six months, to check and further reinforce the use of the study results.

In case the study results are used for project planning and the development of a hygiene education programme, a test phase may be indicated to ensure a good intervention.

Wider dissemination of the study results may be very useful for colleagues in similar projects or with similar interests.

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## Environment and Development

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*Appendix 1. Overview of main behaviours in five behavioural domains related to the prevention of water and sanitation-related diseases*

<p><b>A. Disposal of human faeces</b></p> <ul style="list-style-type: none"> <li>- choice of place for defecation</li> <li>- disposal of faeces</li> <li>- anal cleansing</li> <li>- disposal of cleansing material</li> <li>- handwashing</li> <li>- cleaning of the toilet/latrine</li> </ul>		<ul style="list-style-type: none"> <li>- maintenance of the toilet/latrine</li> <li>- other activities related to faecal matter               <ul style="list-style-type: none"> <li>. use of faeces as fertilizer</li> <li>. use of faeces for fish production</li> <li>. animals eating faeces</li> </ul> </li> </ul>
<p><b>B. Use and protection of water resources</b></p> <ul style="list-style-type: none"> <li>- choice of water source</li> <li>- water collection</li> <li>- water transport</li> <li>- water use at the source</li> <li>- waste water disposal and drainage</li> <li>- water treatment</li> </ul>		<ul style="list-style-type: none"> <li>- water source protection and maintenance</li> <li>- other activities related to water source               <ul style="list-style-type: none"> <li>. water conservation by prevention of water pollution</li> <li>. water conservation by prevention of ecological degradation</li> </ul> </li> </ul>
<p><b>C. Water and personal hygiene</b></p> <ul style="list-style-type: none"> <li>- water hygiene in the home               <ul style="list-style-type: none"> <li>. water handling</li> <li>. water storage</li> <li>. water treatment</li> <li>. water re-use</li> <li>. waste water disposal</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- personal hygiene               <ul style="list-style-type: none"> <li>. washing of hands/cleaning of nails</li> <li>. washing of face</li> <li>. body wash/bathing</li> <li>. hygiene after defecation</li> <li>. washing and use clothes, towels and bedding</li> </ul> </li> <li>- personal hygiene during natural events, such as menstruation, birth, death, illness</li> </ul>
<p><b>D. Food hygiene</b></p> <ul style="list-style-type: none"> <li>- handling practices               <ul style="list-style-type: none"> <li>. cleaning of kitchen/food preparation area</li> <li>. handwashing/use of clean hands</li> <li>. use of clean work-top and kitchen utensils</li> <li>. use of clean dish cloths/kitchen towels</li> <li>. use of safe water</li> <li>. disposal of waste water and garbage</li> </ul> </li> <li>- preparation practices               <ul style="list-style-type: none"> <li>. washing of raw food and fruits</li> <li>. temperature/length of cooking</li> <li>. temperature/length of re-heating</li> <li>. speed of cooling</li> <li>. time of preparation</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- storage practices               <ul style="list-style-type: none"> <li>. temperature/length of storage</li> <li>. location and coverage of stored food</li> <li>. storage of left-overs</li> <li>. storage of eating/kitchen utensils</li> </ul> </li> <li>- eating and feeding practices               <ul style="list-style-type: none"> <li>. handwashing/use of clean hands</li> <li>. use of clean eating utensils</li> <li>. feeding of babies and small children</li> <li>. times of eating and feeding</li> <li>. washing of eating/kitchen utensils</li> </ul> </li> </ul>
<p><b>E. Domestic and environmental hygiene</b></p> <ul style="list-style-type: none"> <li>- household hygiene               <ul style="list-style-type: none"> <li>. wiping of surfaces</li> <li>. sweeping and cleaning of floors/compounds</li> <li>. removal of shoes before entering the house</li> <li>. cleaning of children's play objects</li> <li>. insect control</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>- environmental hygiene               <ul style="list-style-type: none"> <li>. street cleanliness</li> <li>. waste water disposal and drainage</li> <li>. solid waste disposal</li> <li>. hygiene of public places</li> </ul> </li> <li>- animal management               <ul style="list-style-type: none"> <li>. control/corralling of animals</li> <li>. safe disposal of animal faeces</li> </ul> </li> </ul>

Source: Boot and Cairncross, 1993.

*Appendix 2: Abstract of a health behaviour baseline study for the development of a health education programme*

In the Quabane Valley, Lesotho, a health behaviour baseline study was carried out at the beginning of a health education project. The major objective of the study was to gather indepth information on water, sanitation and hygiene practices which will enable the development of an appropriate health education project. A related objective was to gather area-specific baseline information which will be of use for the evaluation after project implementation.

Research began with a review of relevant literature. In the field, two basic methodologies were used. The first was participant-observation and consisted of informal observations and conversational interviews to gather information on the more sensitive issues pertaining to water, sanitation and hygiene practices. In addition, a questionnaire and structured observations were used to gather socio-economic data and information on less sensitive practices.

Based on the study, risky health behaviours were identified and health education actions proposed. One of the clear risks was the disposal of children's faeces. The faeces are usually collected on a piece of flat iron and cast onto the ash heap within a few metres of the home. Sometimes they are scattered over a wide area. The faeces of sick and invalid people present very similar risks, as they are disposed in the same way. The proposed health action therefore would be to encourage mothers to cover children's faeces rather than leaving it on top of the ash heap or cast it over a wide area. Also, the burial of the faeces of the sick and invalid would receive special attention.

Source: Hall et al. (1991).

### *Appendix 3: Abstract of an educational intervention for altering water-sanitation behaviours to reduce childhood diarrhoea*

A case-control baseline study was carried out in 25 slum communities in Bangladesh in order to detect behaviour on which to base interventions for improving water and sanitation practices and reducing rates of childhood diarrhoea. At two-week intervals for a period of three months the history of diarrhoea was recorded in all children under six years of age in 1350 families. A total of 247 randomly sampled families were visited once unannounced during the study for extended observation of hygiene practices. The order of such visits was arranged at random, and the duration of the visits ranged from three to five hours. Each visit began in the early morning. During the visit, the field officer recorded observations about specific water and sanitation practices that were potentially related to childhood diarrhoea. To ensure that the observations were collected in a systematic fashion, the observers were asked to note observations for all entries on a highly structured data form. The form also contained open entries for qualifying comments and additional observations. To maximize objectivity of the observations, the observers were not informed about the purpose of the observations and were also kept 'blinded' as to histories of diarrhoea of the families under observation.

After data collection was completed, behaviour potentially affecting the incidence of diarrhoea was compared in the case group with the highest ratio of diarrhoea and the control group with a zero ratio of diarrhoea. Three water-sanitation behaviours were shown to be associated with high rates of childhood diarrhoea: mothers not washing their hands before preparing food; young children defecating in the family living area; and inattention to proper disposal of garbage and faeces, thus increasing the opportunity for young children to place waste products in their mouths.

From these observations three educational messages were developed. The educational intervention included small group discussions with women or children only, larger demonstrations to mixed audiences, and community-wide planning and action meetings which also included husbands. After eight weeks of intensive educational efforts, the messages were reinforced with new stories, games, and community organization for a further four months. After the educational intervention, the results were evaluated, using the same interview and observation methods as for the baseline. Improvement in hand washing practices before food preparation was noted, although no improvement was observed in defecation and waste disposal practices. The rate of diarrhoea in children under six years of age was 26 percent lower in the educational intervention areas than in the non-intervention areas. The authors conclude that these results suggest that a simple educational message designed to alter behaviour associated with childhood diarrhoea can modify practices and reduce rates of diarrhoeal disease.

Sources: Clemens and Stanton (1987); Stanton and Clemens (1987); Stanton et al. (1987).

*Appendix 4: A. Example of a spot check observation form*

<b>FAMILY CODE:</b> .....
<b>OBSERVATION CODE</b>
0. NO
1. YES
2. WAS NOT OBSERVED
9. DOES NOT APPLY
<b>HOUSE:</b>
1. Is food covered? _____
2. Is water which is stored inside the house covered? _____
3. Is the ground in the house and yard clean and free of human and animal faeces? _____
4. Is the ground in the house and yard clean and free of garbage? _____
5. Are the animals inside the house? _____
6. Are the animals tied or penned up? _____
7. Are the mothers's hands visibly clean? _____
8. Are there children's (age under 5) hands and faces visibly clean? _____
<b>LATRINE:</b>
9. Does the house have a latrine? _____
10. Is the latrine enclosed in an outhouse (walls)? _____
11. Is the latrine (bowl covered?) _____
12. Is the latrine clean (free of cleaning material and faeces)? _____
13. Does the latrine show signs of use? _____
- discoloured bowl
- worn bowl
some odour
- floorboards soiled with dirt
- cleaning materials
14. Is water for handwashing available? _____
15. Is soap or ash for handwashing available _____

Source: Brown et al, 1992.

Appendix 4: B. Example of a demonstration: asking and observing

- FAMILY CODE:** ..... \_\_\_\_\_
37. *Se ora*, could you please show me how you usually wash your hands? \_\_\_\_\_  
0. NO  
1. YES
38. **CODES** 0. NO 1. YES
- (YES) a) USES RUNNING WATER ..... a) \_\_\_\_\_  
b) USES SOAP OR ASHES ..... b) \_\_\_\_\_  
c) USES A CLEAN RAG OR AIR DRIES HER HANDS ..... c) \_\_\_\_\_
- 

**Instructions from the codebook:**

37. *Señora*, could you please show me how you usually wash your hands.
- This question requires the mother to perform a concrete action: wash her hands. The mother's response is recorded as follows:
0. NO For some reason, the mother does not wish to wash her hands (for example, because she is ill). To the extent possible, the extensionist should insist that the mother demonstrate her hand washing technique.
1. YES The mother agrees to wash her hands.
38. **CODES** 0. NO 1. YES
- These are the codes which the extensionist will use to record her observation. For each item, there must be a code, as follows:
- a) Uses running water
0. NO Does not use running water (perhaps she places her hands in a container)
1. YES Does use running water, whether from the tap or some container
- b) Uses soap or ashes
0. NO Does not use soap or ashes
1. YES Does use soap or ashes to wash her hands
- c) Uses a clean rag or air dries her hands
0. NO Does not use a clean rag to dry her hands nor does she air dry them (perhaps she dries them on a dirty apron)
1. YES Does use a clean rag to dry her hands or she air dries them.

Source: Brown et al, 1992.

## *Appendix 5: Example of a field guide for preliminary qualitative research*

### **ETHNOGRAPHIC FIELD GUIDE COLLECTION OF INFORMATION ON FEEDING PRACTICES DURING DIARRHOEA**

#### **INFORMATION TO BE COLLECTED**

This guide covers the breadth of information that should result from interviews with key informants. Interviews with others, which must necessarily be of shorter duration and of a non-repeated nature, should not go into great depth on general issues. The key issues of diarrhoea management should be the emphasis for non-key informant interviews.

The guide should be read through carefully several times before conducting the first interview and may be helpful for the first several interviews. The goal should be to 'know' the material well, so that interviews will be complete in content, but spontaneous in form. The sequence that is presented here need not be strictly followed. However, all the key elements should be covered in each topical area.

#### **EXPLANATION OF STUDY**

Introduce yourself. Explain your programme association and that you are interested in learning about child feeding, health, and illness. Stress that you are not an expert in any of these areas, but that your work is to understand what people do.

#### **GENERAL ILLNESS TAXONOMIES**

Begin by asking, 'Can you give me the names of all the kinds of illness people have around here?' First, simply acquire a list of all the names. Try prompting the respondent by suggesting seasonal illnesses: 'What kinds of illnesses occur here in winter?' After compiling the list of illnesses, go back to the beginning of the list and ask, 'What is the symptom of this illness?' Probe for detail here. For example, the respondent may give the name *gripe*, with the following associated symptoms: fever, sore throat, and runny nose. Ask, 'if there is only fever and sore throat, but not a runny nose, is it still called *gripe*, or would that illness have another name?' For this primarily taxonomic exercise, there is no need to ask about causes or treatments.

#### **CHILD ILLNESS**

Refer to the list of general illnesses. Ask, 'Which of these illnesses do children experience?' Make a new list of child illnesses. With this list, repeat the exercise used for general illnesses. Find out what the symptoms for each illness are. Once this has been accomplished, ask whether any of these illnesses are serious, and under what circumstances. For example, if the respondent answers, 'Measles is very serious,' you should ask, 'What can happen to a child with measles? Are there any circumstances when measles is not so serious?' For some of the childhood illnesses, ask about causes and treatments. Don't do this for all illnesses, as it would require too much time. The objective is to be able to make some distinctions between diarrhoea and other illnesses. For example, ask, 'When the child has *gripe*, what do you do? If he or she doesn't get better, then what do you do?'

#### **CHILD DIARRHOEA - GENERAL**



If diarrhoea has been mentioned as a childhood illness, return to it by saying, 'You mentioned that diarrhoea is a childhood illness, what is diarrhoea? How do you know the child is having diarrhoea?' How diarrhoea is perceived by the respondent is one of the key questions. Ask if there are any special names that are given for diarrhoea. Are there different 'types?' What are the names and physical characteristics (descriptions) of each type? What is the cause of each type? What is the best treatment for each type?

Ask if the respondent considers diarrhoea to be a serious thing? If not, probe for why not. If yes, find out the reason. Ask if any one type of diarrhoea is more serious than another. Determine why. Ask what can happen to a child with diarrhoea. Here probe for cognitive beliefs about a developmental sequence for a diarrhoea episode. Get good descriptions of the symptoms and physical characteristics of each stage. Probe for distinctions between the different types of diarrhoea and possible alternative outcomes.

Refer to the causes that have been given for each diarrhoea type. Ask if the respondent thinks diarrhoea can be prevented. If yes, how? If no, why not? Refer to the treatments that have been mentioned for each type. Probe for more detail on treatment. Find out when during an episode a particular treatment should be done, and why. Do people use both home and health/medical treatments at the same time? What kind of advice do their doctors and health practitioners give them about what to do during diarrhoea? (Ascertain what kinds of health care is available, what people prefer, etc.).

#### **CHILD FEEDING - NORMAL, DURING DIARRHOEA, AND AFTER DIARRHOEA**

Determine what people normally feed their infants and children. Ask about breastfeeding and weaning practices: When is the best time to wean, and why? What are the best foods to offer, and why, when should other foods (list them) be offered, and why? When should breastfeeding be stopped completely, and why?

Ask about how food availability and food production influences what a child eats, and determine the amounts available. Find out if there are any times of the year when there is not enough food if so, do people have enough money to buy from the market? Do they ever experience hunger? Are there times of the year when mothers think their children don't get enough to eat?

For some interviews with mothers who have small children, get a 24-hour recall of all foods that were consumed. Begin by asking, 'Yesterday when the baby or child woke up, what was the first thing that he or she ate?' Find out what the mother gave the child throughout the day until the child went to bed. Don't worry about recording *amounts* of food, just find out which types of foods the child consumed. Be sure to get these lists for a wide range of ages of children.

Ask about feeding during diarrhoea. Start with a general question: 'When a child has diarrhoea, should he or she be fed differently?' Let the respondent answer spontaneously, then probe for details about changes in the amounts and kinds of foods that should be given during diarrhoea. Find out the reasons for these changes. If the respondent believes that some foods are useful or harmful during diarrhoea, get a list of these along with the reasons. After discussing feeding during diarrhoea, go back to the matrix of the different 'types' of

diarrhoea. For each type, ask whether there should be changes in the amounts or kinds of foods that should be given. Find out when changes in feeding during a diarrhoea episode should occur: At the onset? After a few days? Probe, but don't lead. For those foods that have been listed as useful, get precise recipes (if such preparation is required). Ask about child feeding right after the diarrhoea has stopped. Are there any changes in the amounts or kinds of foods given? Does a child appear more or less hungry?

### **THE LAST DIARRHOEA EPISODE**

Ask about the last diarrhoea episode that occurred in the household. Find out the age and sex of the child. Ask the respondent to describe everything that happened, beginning with the physical description and symptoms (e.g. number, color of stools, vomiting, etc.). What do they think caused the diarrhoea? Ask about treatments that were given. When during the episode, and why, was each treatment done? Who and how was the decision made for each treatment? Were they happy with the outcome of the treatment/s?

Ask about feeding during diarrhoea. Find out amounts and kinds of foods given. Was more or less food given? Did the child seem more or less hungry? When during the episode, and why, did changes in feeding occur? What were the reasons for these changes? Were the changes perceived as beneficial?

### **WOMEN'S WORK/CHILD CARE**

Find out what kind of work women do during the day, and how this changes throughout the year. Begin by talking about the current season. Ask what women do when they first wake up: Then what? Next, ask how this changes during the next season. Probe to see if women perceive conflicts between their non-domestic work and their domestic work - including child care. If women do work substantially outside of the home, who takes care of their children'?

### **FOOD PRODUCTION/AVAILABILITY/CONSUMPTION**

Ask what foods are currently being grown. Find out who does the agricultural work. What happens to the food when it is harvested? Is the food processed in the home? By whom? Is the food grown for local/household consumption, or for the market? What foods are grown during different seasons? Within a household, do all family members eat these foods - how is the food that is grown distributed? Which foods that the family consumes must be bought in the market place? Which foods are obtained not from food production or the market, but from alternative sources (e.g. food aid, exchange/barter). Make lists. In the homes of your key informants, do a food inventory (list all the foods, and amounts, that are currently in stock).

### **COMMENTARY ON INTERVIEW GUIDE**

In the everyday activities and experiences of people, childhood diarrhoea - its perceived causes and consequences, and what to do about it - is but one small footnote. Understanding how people 'get their groceries', or provide resources for their families, is of key importance. For women who have multiple work roles but finite time, a description of their usual activities (and how these vary seasonally) is a necessary prerequisite to understanding how they manage

an illness like childhood diarrhoea. Therefore, one important goal of the preliminary ethnography is to 'paint a picture' of women's work and how this changes throughout the day and year.

Although the focus is on feeding during and after diarrhoea, these behaviours cannot be separated from the larger cultural context of childhood diarrhoea. Similarly, it is necessary to understand how diarrhoea as a child illness is perceived in relationship to other child illnesses, such as measles, chickenpox, upper respiratory infections, etc. It is possible that some respondents will perceive that diarrhoea episodes follow a somewhat predictable sequence of developmental stages, and that specific symptoms will trigger a change in behaviour - an action. For example, an increase in the number of stools may result in the mother (or other caretaker) making a change in feeding patterns, or the child may be taken to the doctor. Similarly, the combination of fever and vomiting may precipitate specific action. In the interviews, first probe to see if diarrhoea can be described developmentally and if so, link these description or 'stages' to beliefs about what the appropriate response (or action) should be.

Probing for cultural definitions and subcategorizations of diarrhoea, beliefs about cause and treatment for each 'type' of diarrhoea, and differences in feeding for each diarrhoea 'type' is of key importance.

The names for the different 'types' of diarrhoea may or may not reflect its characteristics. Probe in detail for the descriptions. There may be more than one characteristic for each diarrhoea type. The perceived cause for each diarrhoea type should be described in detail. Often, the perceived cause may lead to clues about intervention barriers. For example, in some cultures, teething diarrhoea (which is perceived to be caused by teething and related to a developmental stage in a child's life) is considered a 'rite of passage' and to some mothers may not be seen as requiring or responding to an intervention. It may not be seen as serious, but rather a positive benchmark of growth. This is the kind of description that should be brought out in the interviews. It is not enough to know that one type of diarrhoea is called 'teething diarrhoea' and that it is caused by teething. The context around each finding must be determined.

Beliefs about what are thought to be the best or most appropriate treatments should be described for each type of diarrhoea. Often what people think are the best things to do, are not what they actually do. One way of finding out what people do is to ask about the last diarrhoea episode. Find out about actions that were taken then. Treatments should include both home treatments (e.g. herbal) or treatments outside of the home (e.g. medical doctor, village health guide, chemist, exorcist, etc.). It is expected that for different 'types' of diarrhoea, there will be different treatments.

The information about feeding during diarrhoea is key to the project. A significant portion of the interview should address the feeding issue. In order to contrast differences in feeding patterns during normal or healthy times compared to when the child is having diarrhoea, normal infant and child feeding patterns must be understood: When should a child be weaned? What kinds of solid foods should be given first? etc. In reference to feeding during diarrhoea, questions should be asked about amounts and kinds of foods given. Foods that are considered

useful and harmful during diarrhoea should be listed, as well as the reasons for these beliefs. It may be that the different types of diarrhoea have different lists of foods, or that the amount of food that should be given will vary by type. Determining this will require extensive questioning. For those foods that are considered 'useful' or that are often given during diarrhoea, obtain a detailed recipe for its preparation.

Feeding after diarrhoea, during what is called the convalescent stage, is important. Find out if mothers feed differently during this time, compared to during the episode or when the child is healthy. Amounts and kinds of foods should be listed, along with reasons for these beliefs and practices.

## **LOGISTICAL ISSUES**

It is assumed that the selection of sites for the preliminary ethnography will be made in the field by the project team. The sites will be chosen based upon ecological, agricultural, cultural/linguistic, population demography, etc. criteria. Given time and logistical constraints, a small number of sites will be chosen for the preliminary ethnography. Fieldwork should be carried out for about two weeks in each site.

The entry process for each site must be done carefully and sensitively. The first people to approach are the village leaders. A letter of authorization from the Ministry of Health should be shown, and the project explained. It is essential to gain the goodwill of the important influencers. Without it, there is little chance of conducting free-flowing interviews over an extended period.

If it is possible to live directly in the village or where the preliminary ethnography is to be done, this is optimal. However, this may not be practical or acceptable to the villagers, and discretion is required in making a decision about where to base the ethnography.

Within each site, some fairly systematic criteria for choosing respondents should be established. Decisions about who to interview should be based upon one important principle: *capture the variation*. For example, suppose the ethnography will take place in a village of one thousand population, with approximately 200 households. On the first day of ethnography in this village, some quick demographic surveillance should be done to 'map' or stratify the village into important divisions. For example, is there a clear socio-economic stratification? One way of measuring this is to map the physical 'types' of which are made with more expensive materials? Which have tile floors as opposed to mud floors? Are the different types clustered in one area of the village? Rapid surveillance and quick sketches will provide a structure for selection of respondents. For the example provided above, it is important to choose respondents from all the levels of strata.

Within each strata (and socio-economic status is often the most important as it covers with a number of important variables) identify key informants. Key informants are respondents who may be particularly knowledgeable about the issues. Lengthy, repeated interviews should be done with key informant, such as midwives, village health guides or mothers who have several young children. Again, choose enough key informants to capture the variation. Although knowledgeable, a village health guide may know too much about the 'scientific' way to manage diarrhoea, and may be out of touch or judgmental about what other people do.

The only way to find key informants is to talk to many different kinds of people, and return for second interviews with key informant candidates. For each of the two sites, there should be about five key informants.

Along with key informant interviews, which are characterized by their more intensive, longitudinal nature, one time only interviews should be done with a wide variety of people. Don't limit the choice to mothers of young children only, although this is certainly the target group (the focus should be on mothers with children three years and under). Don't forget grandmothers and mothers-in-law, who are important influencers, especially if they live in an extended family where young children are being raised. If it is possible to talk to fathers, carry out some interviews with them. It is not unlikely that they are important decision-makers in the household, and it is important to know what they believe. In many settings, fathers are the household members most likely to make a decision to take a child to the doctor, and often they, not the mother, take the child to the practitioner, clinic, or hospital.

In many cultural settings, group discussions (focus group interviews) provide valuable information. Often, focus group interviews may allow a more free-flowing and open discussion, and information may come out which would not in a person-to-person depth interview. However, it is possible that the composition of the group will actually inhibit spontaneity. An example of this could be when a mother-in-law and daughter-in-law are both in the same focus group, and the daughter-in-law is overshadowed or inhibited by her mother-in-law. Make your own evaluations on whether group interviews are useful. In many settings, it may be impossible to conduct interviews that are not in some sense focus group, as people will wander in and sit down to talk. When this happens, find out who is there: Mothers of young children? Do they work outside the home? Write this information in your notes.

When conducting interviews, it is important to cover the same topics for each interview. Notes should be taken during each interview. In the late afternoon and evening, read through the notes and add details. Remember, this is the only data and it must be result in usable and reliable information. It is very likely that project investigators will want copies of the notes. They should be legible and understandable. Make sure to allot enough time to transform field notes for this purpose.

#### **ANALYSIS OF DATA AND REPORT WRITING**

Use the format of the guide as an outline for your data analysis and write-up. Given time constraints, don't worry about elegant style, but focus on pulling out the key pieces of information.

Where there are differences of opinion between respondents, point these out, and list all of the different responses, giving weight to those that are more commonly mentioned. Beware of giving 'normative' descriptions and don't make statements like, 'mothers believe this or that..'. There are many different kinds of mothers.

One of the most important tasks is to look for the variation. Be careful not to overemphasize interesting or 'exotic' results at the expense of less interesting but more relevant data. For example, do not give undue attention to mothers who take their children to exorcists. In fact, the percent of mothers who do this may be very low, but because it makes for interesting discussion and reading, there may be a temptation to dwell upon such a finding in the report.

Summarize the data in tables, and provide frequency distributions of pertinent information. Desegregate the tables by site or urban/rural categories. Tables help in the organization of notes and are useful to the interdisciplinary team members.

## Appendix 6: Example of a 'script' of a mealtime observation (part only)

On July 8, 1987 an evening meal (*ratiko kharcha*) was observed in the household of Nokhi Ram Kaami. The household consists of nine individuals: Nokhi Ram, 43, the male head of household; Dhama, 41, his wife; Chandra Ram, 23, his elder son; Kul Bahadur, 22, his second son; Bodhi Kumari, 13, his elder daughter; Indra Kumari, 8, another daughter; Rurn Kali, 22, his daughter-in-law (Chandra Ram's wife); Khuma Kumari, 4, his granddaughter (Chandra Ram's daughter); and Suk Lal, 2, his grandson (Chandra Ram's son). All household members, except Chandra Ram, were present for the observed meal. The meal was observed by Joel Gittelsohn.

I arrive at 6.35 p.m. Nokhi Ram is out at a construction project, doing wage labour to build a new primary school. His wife, Dhama, is away herding cows. Chandra Ram is almost a day's walk away in Tharmare, doing some plastering for wages. Kul Bahadur is resting inside, having recently returned from his studies in Khalanga. Bodhi K. is chopping wood for cooking the evening meal. Indra K. is outside playing. Rurn Kali, the daughter-in-law is winnowing rice, while Suk Lal lies on some old clothes sleeping next to her. Rurn Kali's daughter, Khuma K., is sitting next to her mother. It is raining lightly outside.

The house is relatively poor, with only one storey, a few small windows, and a thatched roof. It is located in Gairagaun, near the commercial centre of the panchayat. There is only one cooking area, with a slightly raised platform off to the side. All household members eat on this platform, except Rurn Kali, her son Suk Lal, and Bodhi Kumari, who eats on the floor near the *chulo* (a low stove made of mud and stones).

At 6:41, Bodhi K. returns with kindling and began preparing potato *taarkhari* (a vegetable stew). Dhama returns at 6:48 with some greens and some bananas she had purchased from a nearby house. Bodhi K. says, 'give the greens to me Mom, I will cook them'.

At 6:52, Dhama serves herself a wheat *roti* (a kind on unleavened flat bread) (medium-sized) and a half-teaspoon of salt-chili mixture (a common kind of *achar* (sauce condiment) used by poor households for seasoning). Bodhi K. serves herself a banana. Dhama gives one sixth of her *roti* to her granddaughter Khuma K.. She then serves Suk Lal a small *roti*. Bodhi K. begins chopping the spinach greens (7:00). At 7:09, Dhama serves Khuma K. a banana. Kul B. serves himself a banana, as does Bodhi K.. Dhama then begins preparing the rice. Her daughter-in-law brings in some firewood. Bodhi K. goes out to herd the goats (7:16). Dhama serves Indra K. a banana, then splits a second banana between herself and Rurn Kali.

At 7:22 Rurn Kali begins washing dishes. Khuma K. still hungry for bananas, begins hunting for more around the kitchen. Dhama tells her, 'there's none left' and she begins to cry. Dhama speaks with me about some of the difficulties of living in Nepal, and asks if I would give her grandson an injection. Very upset, Khuma K. hits her grandmother for not giving her a banana. She begs for a banana. Dhama hits Khuma on the head, causing her to cry loudly.

At 7:35 Rurn Kali returns and begins to stir the rice. Indra K. asks for, and is given water. Rurn K. begins breastfeeding Suk Lal. Rurn Kali serves 1/6th cup of rice water (*maardh*) to Khuma, and the same amount to Indra. Khuma refuses to eat for a bit; she is still holding out for a banana, but finally drinks the rice water. Dhama cuddles her granddaughter. Dhama hits Khuma lightly on the head as punishment for playing with the dishes with her feet (7:47). Kul pours himself some water and goes outside to bath his hands and feet before the evening meal.

*Appendix 7: Flow Chart to assist in selecting type of structured observation*

Do the key behaviour(s) account for more than one hour of each actor's time per day (based on initial ethnographic assessment)? -----No----- Add 2 points to Continuous Monitoring

Yes

Add 2 points to Spot Check

Is relative amount of time spent on an activity required (versus actual amount of time)? -----No----- Add 1 point to Continuous Monitoring

Yes

Add 1 point to Spot Check

Is determining behaviours associated with key behaviours unimportant? -----No----- Add 1 point to Continuous Monitoring

Yes

Add 1 point to Spot Check

Is the study sample greater than 200-400 households -----No----- Add 1 point to Continuous Monitoring

Yes

Add 1 point to Spot Check

Is the study population very heterogenous (ethnic, economic, religious)? -----No----- Add 1 point to Continuous Monitoring

Yes

Add 1 point to Spot Check

Are the number of key behaviours to observe less than 15? -----No----- Add 1 point to Continuous Monitoring

Yes

Add 1 point for Spot

-----No----- Add 1 point to Continuous Monitoring

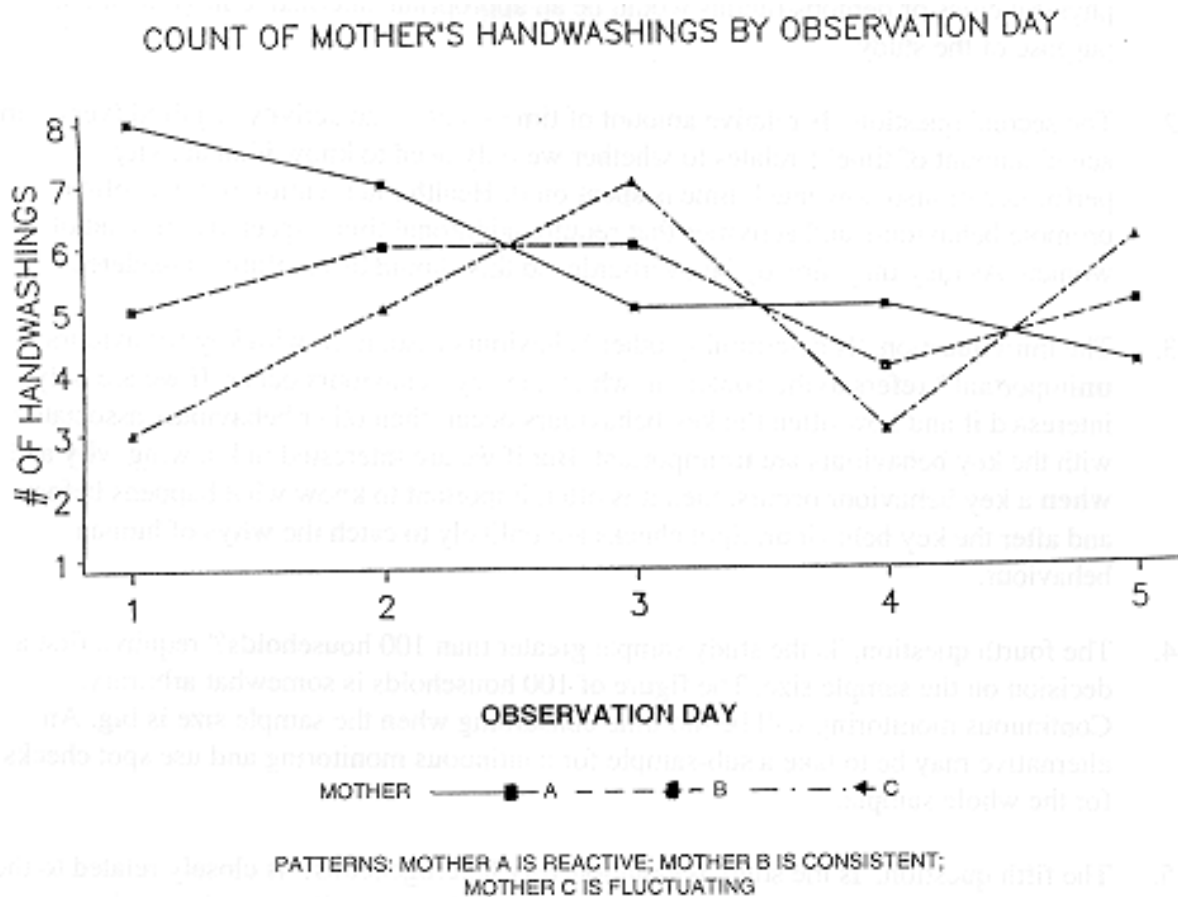
Total Points for Spot Check & Select Structured Observation Method:	0	1	2	3	4	5	6	7
	↓	↓	↓	↓	↓	↓	↓	↓
Cm-continuous monitoring								
Sc-spot check								
CM/SC-either or both	CM	CM	CM	CM/SC	CM/SC	SC	SC	SC



### Explanation:

1. The first question, 'Do the key behaviours account for more than one hour of the person's time per day?' is weighted more heavily than the other five. In many cases, this will be the decisive variable, as behaviours that occur infrequently are unlikely to be picked up via spot checks of behaviour. Of course it could be considered whether spot checks of physical clues or demonstrations would be an appropriate alternative in view of the purpose of the study.
2. The second question, 'Is relative amount of time spent on an activity required (versus the actual amount of time)?' relates to whether we only need to know if an activity is performed or also how much time is spent on it. Health intervention projects often promote behaviours and activities that require additional time especially from adult women. As they may already be overburdened this should be carefully considered.
3. The third question, 'Is determining other behaviours associated with key behaviours **un**important?' refers to the context in which the key behaviours occur. If we are only interested in if and how often the key behaviours occur, then other behaviours associated with the key behaviours are **un**important. But if we are interested in knowing **why** and **when** a key behaviour occurs, then it is often important to know what happens before and after the key behaviour. Spot checks are unlikely to catch the **whys** of human behaviour.
4. The fourth question, 'Is the study sample greater than 100 households?' requires first a decision on the sample size. The figure of 100 households is somewhat arbitrary. Continuous monitoring will be too time consuming when the sample size is big. An alternative may be to take a sub-sample for continuous monitoring and use spot checks for the whole sample.
5. The fifth question, 'Is the study population very heterogeneous?' is closely related to the fourth question, as a homogeneous population requires a smaller sample to achieve representativeness than one that is heterogeneous. Spot checks permit coverage of a wider range of populations.
6. The sixth question, 'Is the number of key behaviours to be observed less than 15?' is concerned with the degree of detail required for the structured observations. The cut-off point of 15 key behaviours is also arbitrary. Structured observations that require observers to identify large numbers of distinct behaviours cannot be done with spot checks.

Appendix 8: Sample of a figure of estimating reactivity



Explanation:

Use the vertical axis for the number of times (or the number of minutes) a behaviour was observed during one observation period, and the horizontal axis for the number of observation periods. If the responses change with time in a relatively uniform manner it may be a problem with reactivity to the observer. Then, suitable solutions or a 'threshold' point at which reactivity becomes negligible should be found. If responses appear to be relatively consistent over time, there may not be a problem with reactivity, thus enabling to limit the observation periods to only one or two. If the responses fluctuate significantly over time, it indicates that there is a lot of variability of the behaviour, thus requiring more repeated observations periods.

## *Appendix 9: General suggestions regarding the appropriate construction of data collection forms*

Data collection forms should be designed to minimize the decision making of the field worker and to ease the task of data entry.

- 1) Allowances should be made for additional codes to be added as data collection proceeds. The best way to do this is to include room next to each item for the field worker to record information which he cannot comfortably classify into any of the codes provided. The supervisor can keep tract of these 'exceptions' over time and decide if they appear with a frequency worthy of creating a new code, or if they can be combined with other codes, etc.
- 2) Whenever possible, allow for the recording of simultaneous codes. For example, in spot checks of mother's activity, it is best to design your form such that every activity in which the mother is engaged at the moment of the spot check can be checked off. Otherwise, you force the field worker to make a subjective decision about the relative importance or intensity of an activity. This could result in biased data and will result in a loss of information on activities.
- 3) Whenever possible, be consistent in designating codes for items. For example, if many items are 'yes/no', make all such items codable as '0=no' 1=yes'. If there are situations in which a response can be 'not applicable' or 'refused' or 'unknown', establish a code for each of these which will work with most items. By being consistent, you will help field workers make fewer recording errors and also make data cleaning go more smoothly. It is especially important not to leave blanks for items where the answer is 'unknown'. Data entry and data analysis software vary in how they handle blank fields, and you may end up with a situation in which your blanks have been redefined and possibly combined with another legitimate code.
- 4) If your data collection form is precoded (as is advisable whenever possible to reduce transcription errors), lay out each page such that the flow of item responses is simple to follow for data entry purposes, e.g. all keystrokes can be made by following the boxes down the left hand margin, or by reading each row of underscores across the page.
- 5) If you are recording the same information repeatedly on the same unit, as with repeated spot checks, each 'check' should be entered as a separate record in the data entry process. Each record would thus need to repeat identifying information and to contain other variables such as data and time. Note that if the data recorded at each 'check' is not substantial, you may be able to collect the information for many 'checks' on the same form, but the data entry should still be done treating each 'check' as a separate record.

Appendix 10: Example of a precoded data sheet used for spot check observations

FORM 13: TIME ALLOCATION SPOT CHECKS PAGE: \_\_\_\_\_

1. Village /Ward: \_\_\_\_\_ DATE A: \_\_\_\_\_ TIME A: \_\_\_\_\_  
 2. Neighbourhood: \_\_\_\_\_ DATE B: \_\_\_\_\_ TIME B: \_\_\_\_\_  
 3. Household ID No.: \_\_\_\_\_ DATE C: \_\_\_\_\_ TIME C: \_\_\_\_\_  
 4. Household Name: \_\_\_\_\_ DATE D: \_\_\_\_\_ TIME D: \_\_\_\_\_  
 5. Observer: \_\_\_\_\_ Observation No.: \_\_\_\_\_

ACTIVITY	HOUSEHOLD MEMBER ID: ID No., Name, Rel to MHH											
	_____				_____				_____			
	_____				_____				_____			
	A	B	C	D	A	B	C	D	A	B	C	D
Observer/Informant												
Cooking Food												
Serving Food												
Eating Food												
Breastfeeding												
Collecting Fodder												
Herding Animals												
Ploughing												
Harvesting												
Construction Work												
In School												
Washing Dishes												
Washing Clothes												
Getting Water												
Watching Children												

Please Turn Over ----->

ACTIVITY	HOUSEHOLD MEMBER ID: ID No., Name, Rel to MHH											
	_____				_____				_____			
	_____				_____				_____			
	A	B	C	D	A	B	C	D	A	B	C	D
Collecting Firewood												
Bathing												
Sleeping												
Conversing												
Not Known												
Gone to:												
Gone To:												

Instructions:

Date and time of observation are selected randomly. This form permits the collection of four separate observations on three members of a single household. Households larger than three members will require additional forms. Household composition data (including ID number, name, and relationship to male head of household (MHH) are derived from an earlier household survey.

Upon arrival at the household for the first observation on a form, record the date and time in the lines corresponding to DATE A and TIME A. Determine the activity of each household member. If you are able to determine the activity of the household member through direct observation, write your initials in the first row of boxes (Observer/Informant) under the appropriate column (A, B, C or D depending on observation number). If you are unable to directly observe the activity of the household member, ask another present adult household member where the individual is and what s/he is doing. Record the ID number of the individual who gave you the information in the appropriate Observer/Informant row-column. Now mark the box of the observed or reported activity in the appropriate row-column for the individual. If the individual is performing an activity which cannot be categorized under one of the headings given, write the name of the activity in one of the blank boxes provided.



### **Instructions for Form 15:**

1. Arrive at sample household.
2. Ascertain if majority of household members are present and the meal uneaten. If either of these conditions are not met, move on to another sample household.
3. Record the initial activity of each household member.
4. Record the type and quantity of already cooked foods.
5. If the morning meal is being observed, or the evening meal without an associated 24-hour recall, perform a short-term recall on each household member (i.e foods consumed in the past three hours).
6. Record all activities of interest, especially food-related.

As each KEY BEHAVIOUR occurs, record the TIME it occurs, the identity of the individual performing the behaviour (ACTOR ID), and the person who is the subject of the activity (RECIP ID). The key behaviour itself should be recorded under the ACTIVITY CODE column with codes drawn from the codebook. If foods are involved, the type of FOOD is recorded as well as its CONDITION (burnt, fresh, raw, etc.) and the quantity served.

7. Record conversations of interest, especially if food-related.
8. Leave only after meal is finished and clean-up begun.

*Appendix 12: Example of a ratings checklist for household sanitation*

Format: The observer approaches the household and immediately records ratings on household sanitation.

**GENERAL CLEANLINESS RATINGS:**

Definitions:

- 1 = Clean, no visible stains or dirt on object/area observed, no dried food or other organic material.
- 2 = Moderate, visible stains or dirt on object/area observed, possibly some dried food or other organic material.
- 3 = Dirty, a lot of stains or dirt on object/area observed, presence of dried food or other organic material.

Instructions: Observer circles appropriate observation code.

**CLEANLINESS RATING:**

**OBJECT/AREA OBSERVED**

**Food Preparer/Child Caretaker:**

*Clean    Moderate    Dirty*

1            2            3

Hands

1            2            3

Clothing

**Target Child:**

*Clean    Moderate    Dirty*

1            2            3

Hands

1            2            3

Clothing

1            2            3

Rest of body (incl. face)



**Inside House:**

<i>Clean</i>	<i>Moderate</i>	<i>Dirty</i>	
1	2	3	Cooking Area Floor
1	2	3	Cooking Area Countertops/Tabletops
1	2	3	Eating Area Floor
1	2	3	Food Storage Containers - outside
1	2	3	Food Storage Containers - inside
1	2	3	Water Containers - outside
1	2	3	Water Containers - inside
1	2	3	Cooking Pots and Utensils
1	2	3	Serving Dishes and Eating Utensils

**Outside House:**

<i>Clean</i>	<i>Moderate</i>	<i>Dirty</i>	
1	2	3	Adult Defecation Area
1	2	3	Courtyard
1	2	3	Perimeter of House Excluding Courtyard
1	2	3	Animal Shelter/Pens
1	2	3	Perimeter of Animal Shelters/Pens

**Communal Areas** (may be observed separately from households observations):

<i>Clean</i>	<i>Moderate</i>	<i>Dirty</i>	
1	2	3	Adult Defecation Area
1	2	3	Place where Water is Collected
1	2	3	Place where Laundry is Done
1	2	3	School Play Areas

*Appendix 13: Formula for calculating data collection parameters*

$$\text{A. Number of Observers Required} = \frac{(\text{B. No. households}^1 \text{ in sample}) \times (\text{C. No. observational episodes required per household})}{(\text{D. No. days of data collection available}) \times (\text{E. Number of observational episodes per day by one observer})}$$

$$\text{D. Number of days of data collection required} = \frac{\text{B} \times \text{C}}{\text{E} \times \text{A}}$$

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<sup>1</sup> The location of the observational episode is described here as the household. Clearly, many other places would be appropriate locales for conducting structured observations (e.g. hospitals, schools, etc.)